A close-up photograph of a frog, likely a gray tree frog, resting on a dense mat of bright green duckweed. The frog's head is in the center-right of the frame, looking towards the left. Its skin is a mottled gray color with some lighter spots. The background is a soft, out-of-focus green, suggesting a natural, moist environment. The text is overlaid on the image in a clean, white, sans-serif font.

Frogs and Fur, the Amazing Biodiversity of Ridgefield

Understanding Vernal Pools: A Significant Wildlife Habitat

A close-up photograph of two frogs in water. The frogs are dark-colored with prominent, large eyes. The water is dark, and the background is filled with out-of-focus light spots, creating a bokeh effect. The word "Introduction" is overlaid in white, outlined text across the center of the image.

Introduction

What are Vernal Pools?



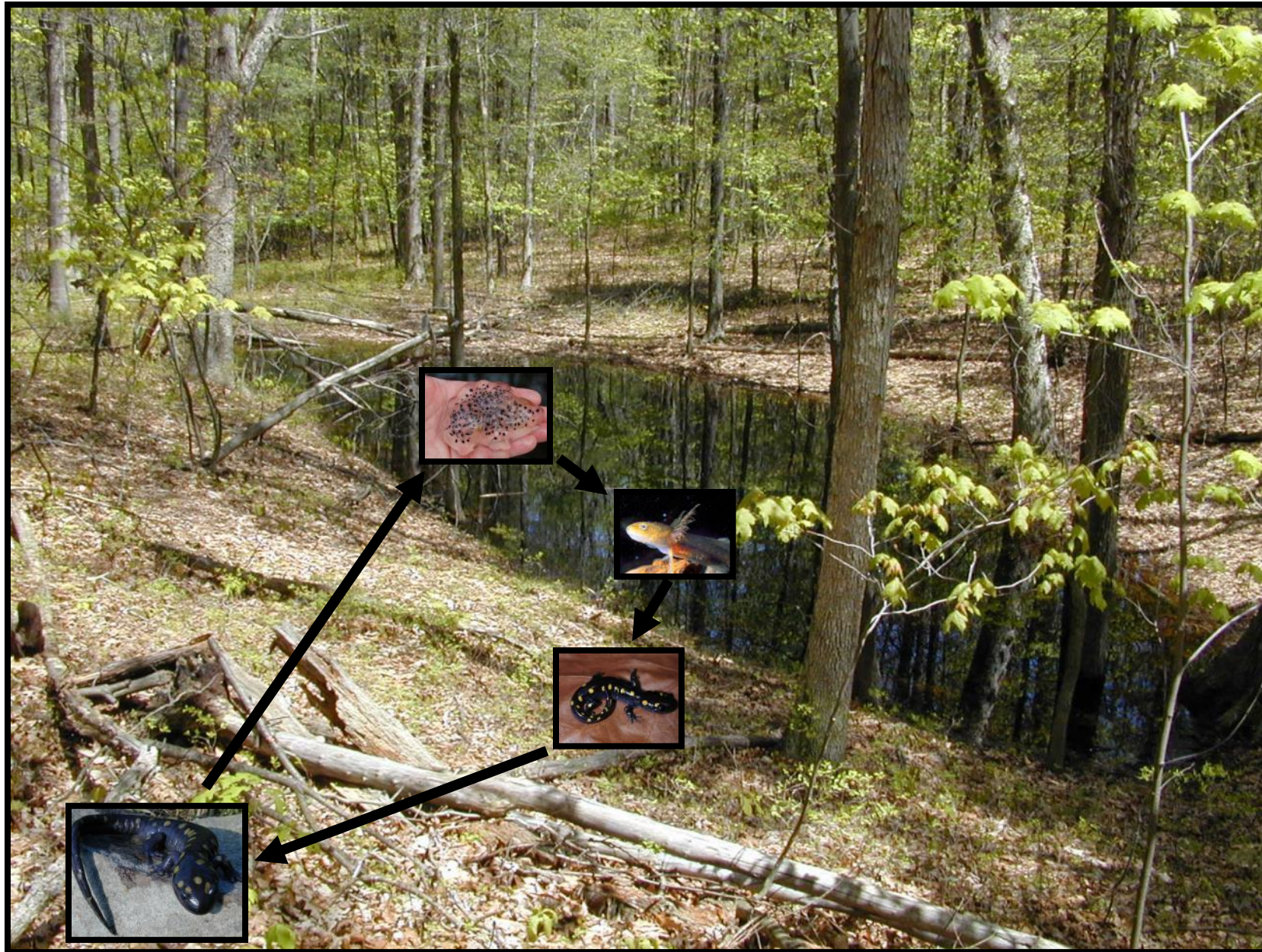
- Vernal pools or intermittent woodland pools are seasonal waterbodies that provide a safe environment for amphibians to breed and lay their eggs
- They lack permanent surface water connections with other wetlands and waterbodies
- Are filled by snowmelt, runoff, or ground water
- Dry out between 3 months to over a year at some pools
 - Keeps fish out



Habitat identification

- Vernal pools are relatively small, confined basins often around 2000ft² , and 3 feet deep.
 - Lack established fish populations
 - Often lack water inlets and rely on other sources for water.
 - Are natural depressions that hold excess water
- The easiest way to identify a pool is to find the presence of an obligate woodland pool species.

Typical Vernal Pool-Breeding Amphibian Life Cycle



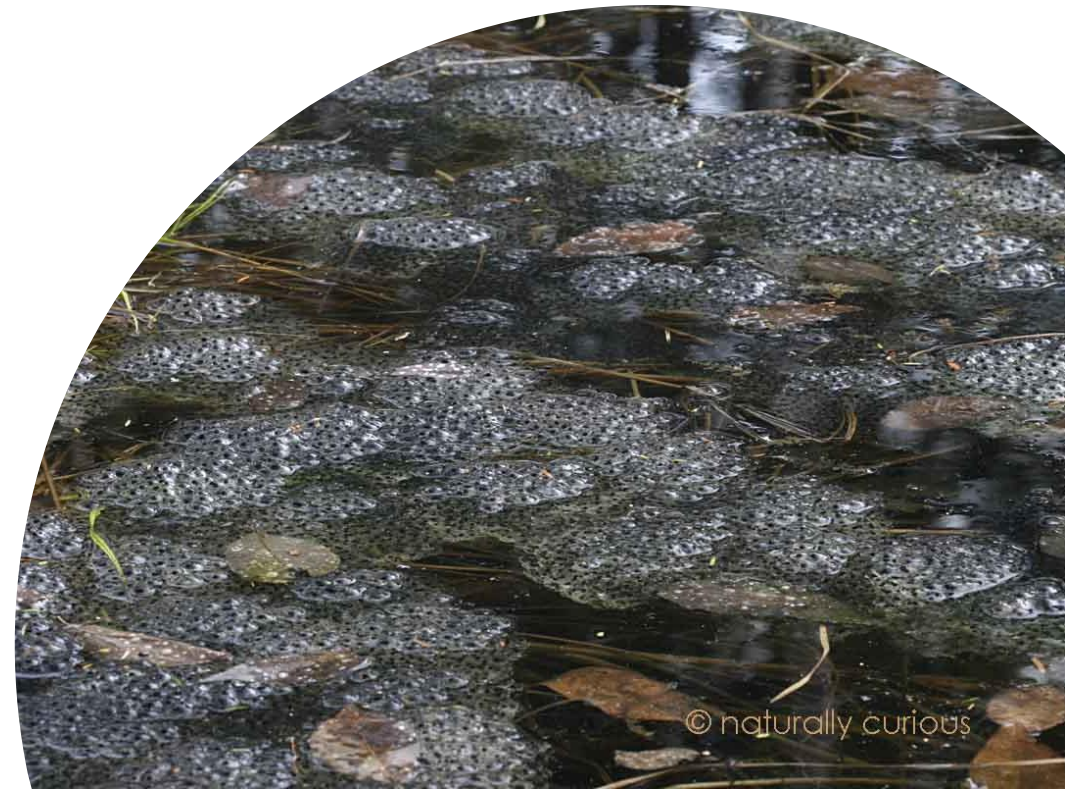


Importance of Vernal Pools

- Are important not only for amphibians but are also a great environment for shade tolerant plants.
- They are hotspots of biodiversity, with native plant and animal species.
- Vernal pools, like other depressional wetlands, can also help store and slow floodwaters.

Goals of the Study

- Compare the breeding activity of amphibians in pools to a 2010 study
- Assess the overall quality of the vernal pools
- Observe the surrounding environments
- Collect basic water quality information in pools



A photograph of a forest stream with the word "Methods" overlaid in white outline text. The stream is in the foreground, reflecting the surrounding trees and the ground covered in brown leaves. The background shows a dense forest of tall, thin trees, some with green foliage and others bare. The overall scene is dimly lit, suggesting an overcast day or a shaded forest.

Methods

The Initial Evaluation

- The protocol for surveying vernal pools was developed by Dr. Michael Klemens in the spring of 2010
- Documented species from egg masses found in the pool
 - Prior to the survey, pools were identified by surveying aerial maps and by reports received by the Conservation Commission.
 - Volunteers were recruited and trained at a session held at the Cary Institute and then again in the field by Dr. Klemens.



The Initial Evaluation (CONT)

- The protocol for the survey was to visit each pool twice.
 - On each visit the pool was examined for the presence of egg masses and tadpoles or larvae of the indicator species.
 - The findings were documented with data sheets and photographs, and reviewed by Dr. Klemens





Replication of the Prior Study

- We replicated the study methods to ensure proper identification, as well as to ensure no harm to the species of the different pools.
 - Prior pools found by GPS – 15 Total.
- Determined:
 - Physical Attributes
 - Biological Attributes
 - Chemical Attributes



Methods of data collection

- Physical
 - Visual data collection and estimation
- Chemical
 - PH, Salinity, and Conductivity meter
- Biological
 - Visual
 - Field guide of obligate species

Pro1030 pH and Conductivity Meter

- The Pro1030 is a handheld meter that measures pH, salinity, conductivity, and temperature.
- This was done to ensure proper habitat health for obligate vernal pool species





Indicator Species

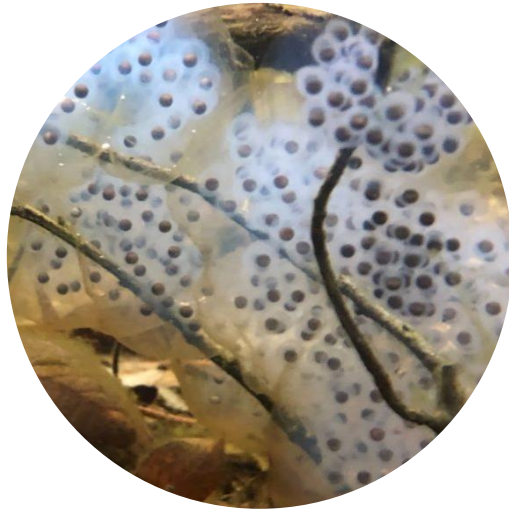
- Wood Frog
- Mole Salamanders
 - Spotted Salamander
 - Jefferson's Salamander (Hybrid)
 - Marbled Salamander
 - Only looked for larvae and adults
- Fairy Shrimp

How to differentiate

- Spotted Salamander eggs:
 - Hold shape out of water
 - Attached to twigs
 - Outer casing is clear or a milky-white color
- Wood Frog eggs:
 - Dense mass the size of a grapefruit
 - May lose shape, and look like a film on the surface of water
- Marbled Salamander eggs:
 - Breeds in the Fall
 - Eggs are laid in dried-up ponds/pools/ditches
 - Find larvae in spring
- Jefferson Salamander eggs:
 - Appear loose or "drippy" out of water
 - Deposited in cylindrical "tubes" along twigs, stems or leaf points



Spotted Salamander Eggs



Wood Frog Eggs



Marbled Salamander Larvae



Jefferson Salamander Eggs





Facultative Species

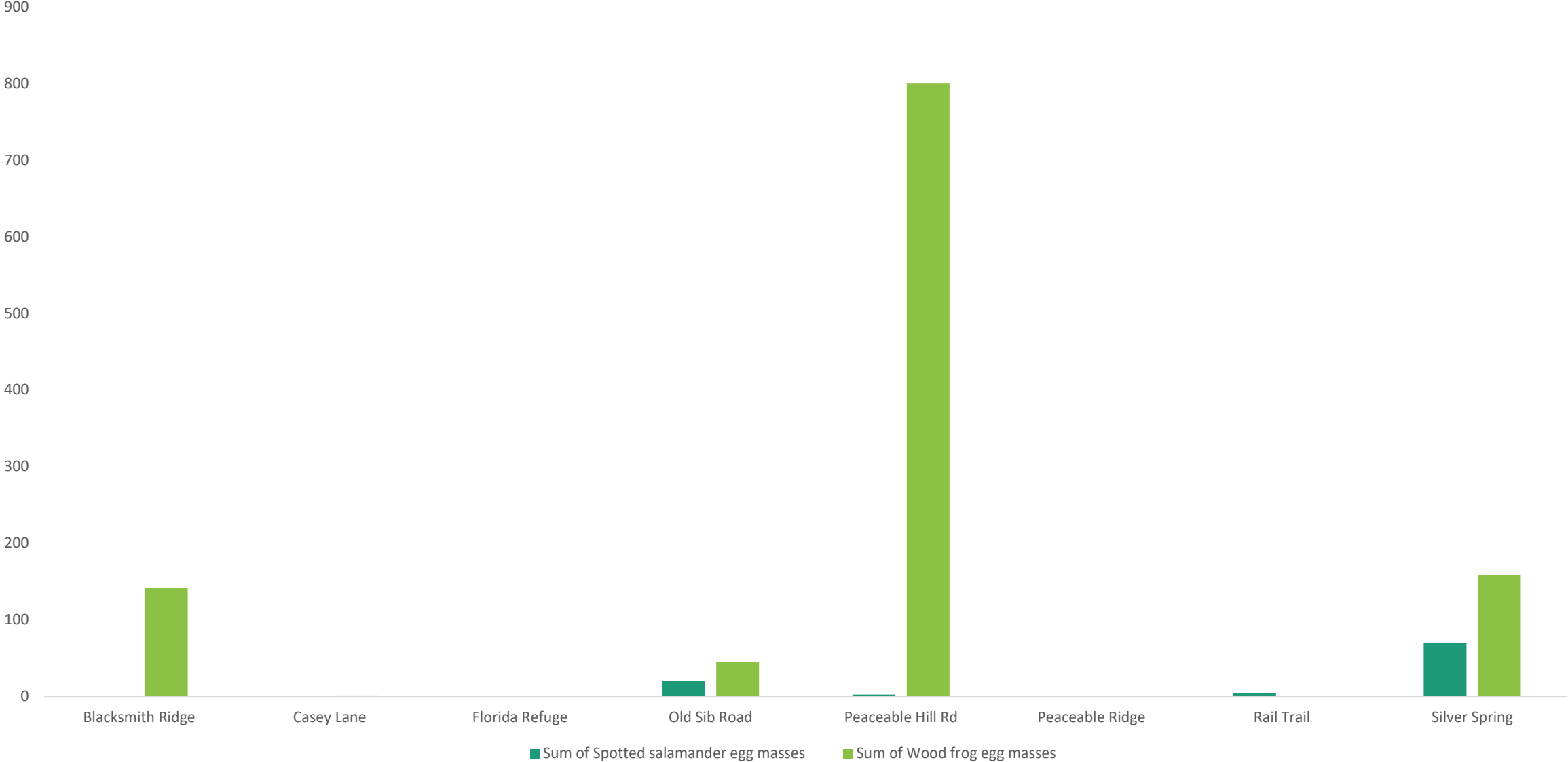
- Red-Backed Salamander
- Four-Toed Salamander
- Eastern Newt
- Green Frog
- Bullfrog
- Spring peeper
- Snapping Turtle
- Wood Turtle
- Painted Turtle
- Box Turtle
- Garter Snake
- Northern Water Snake
- American Toad



Results

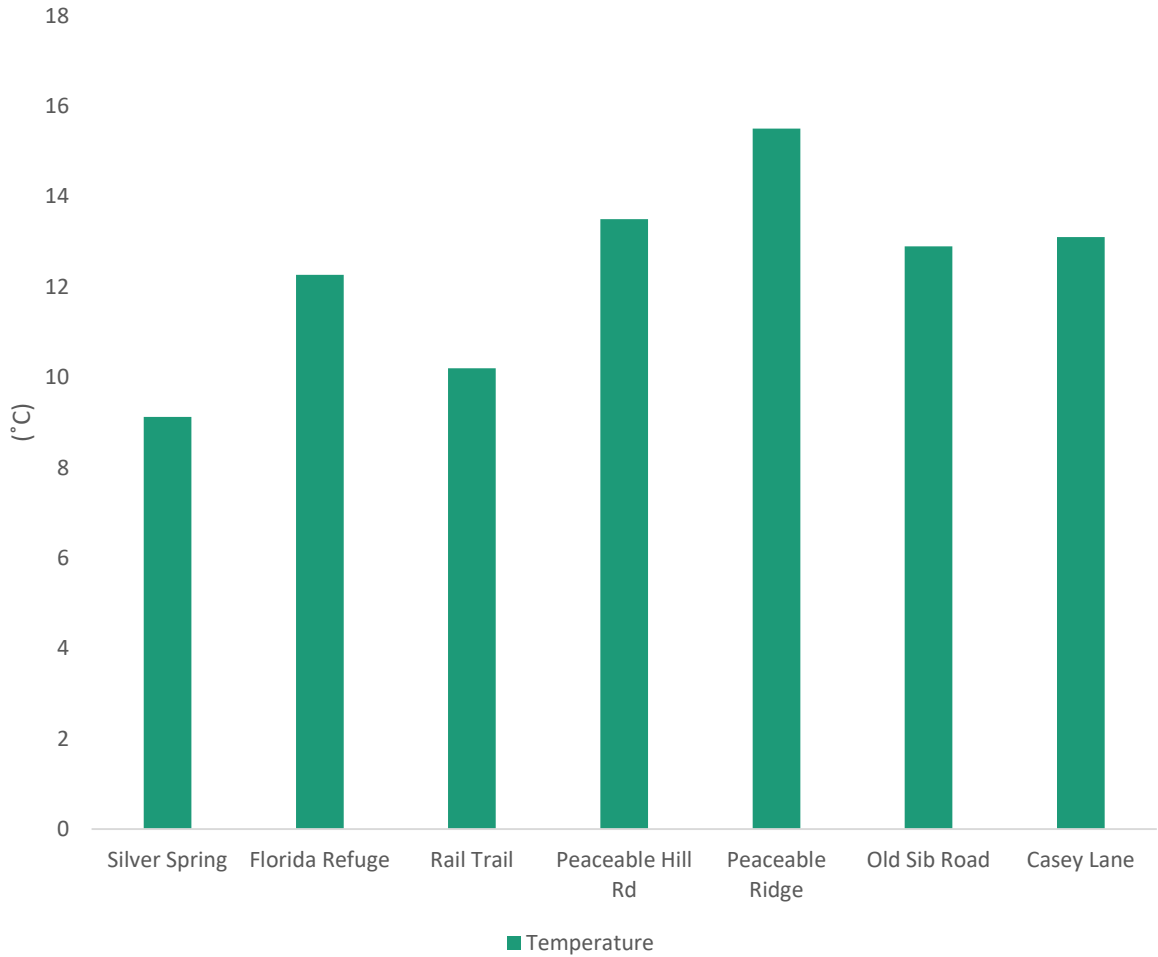
Data: Quantities of Egg Masses Identified

Sum of Egg Masses Identified

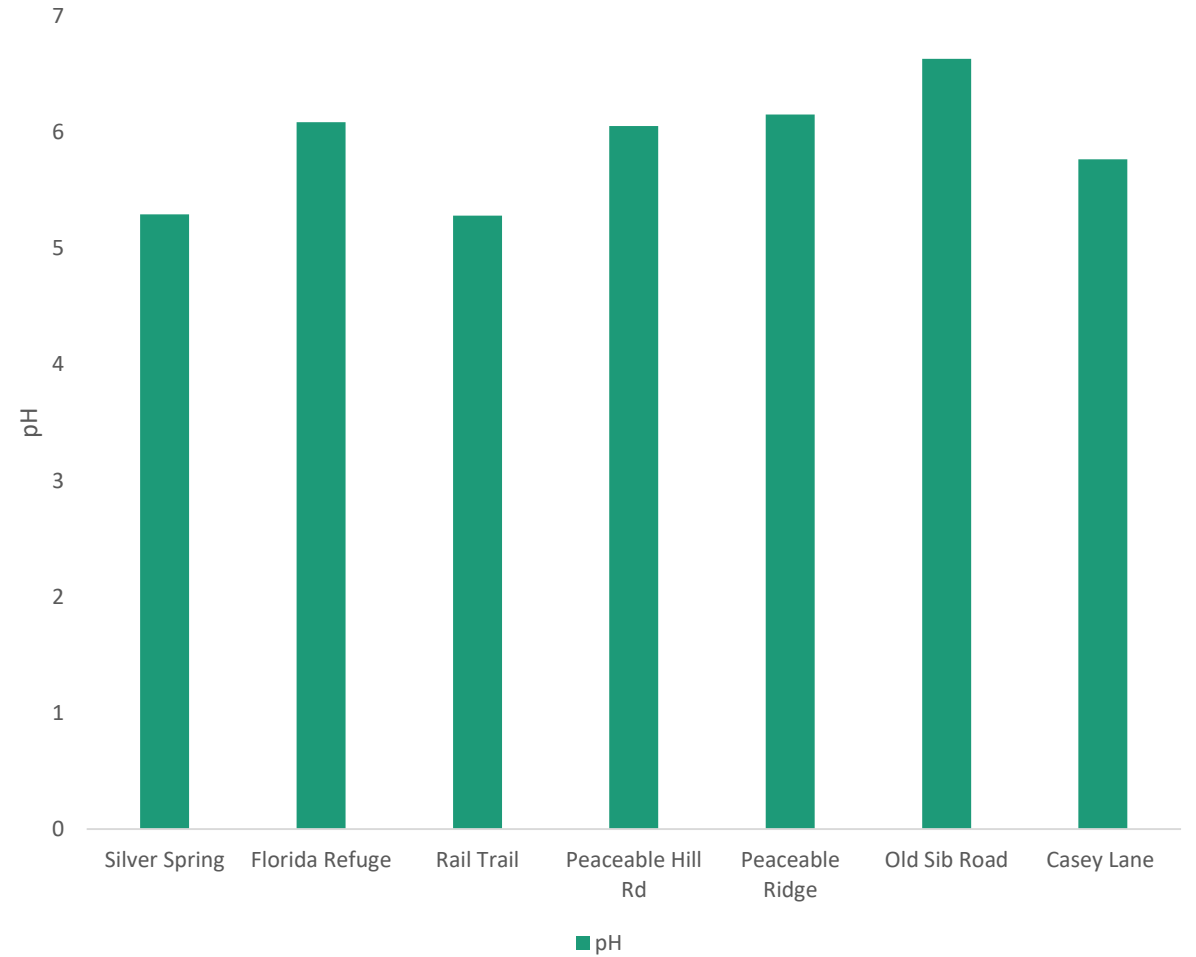


Data: Water Chemistry Comparison

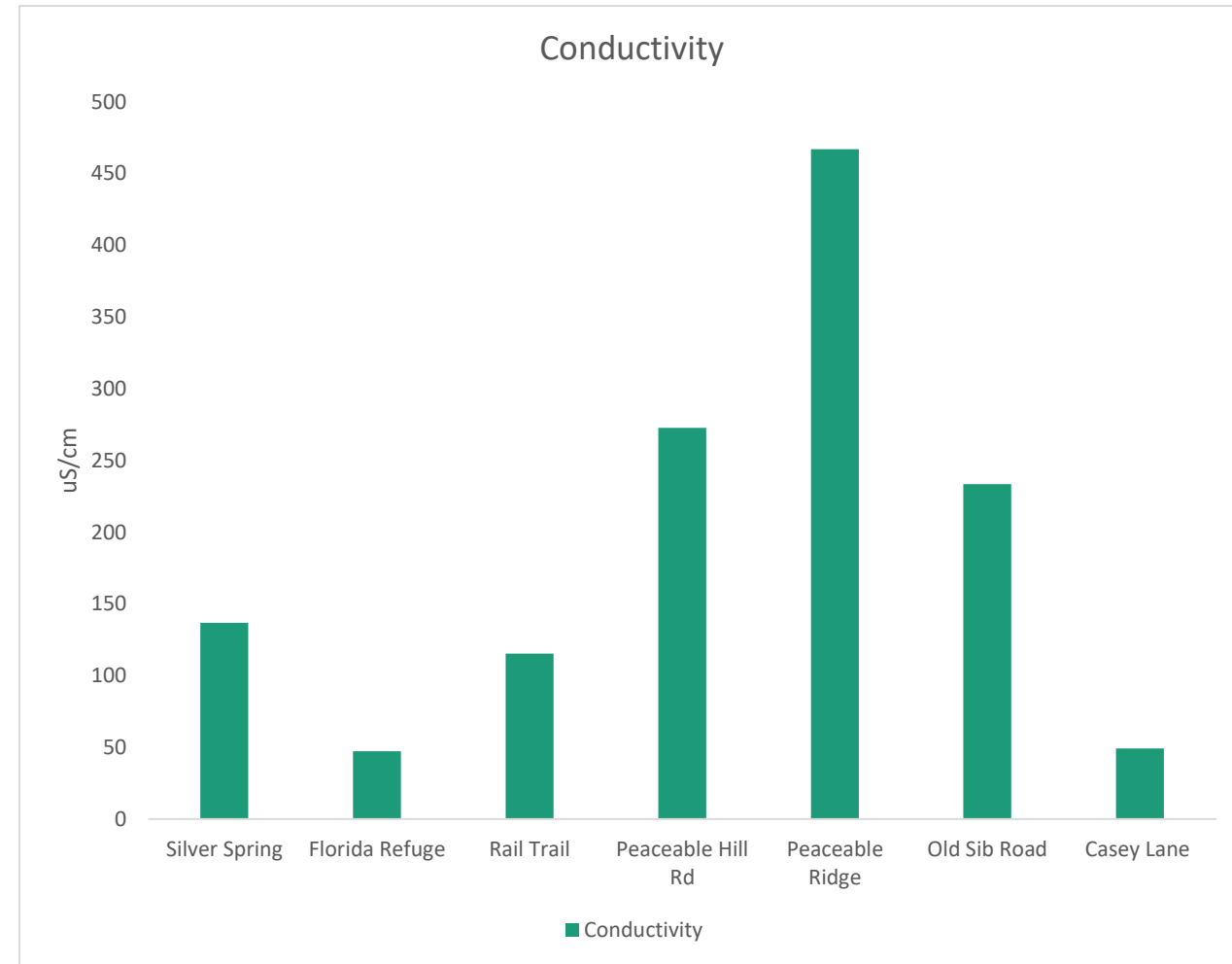
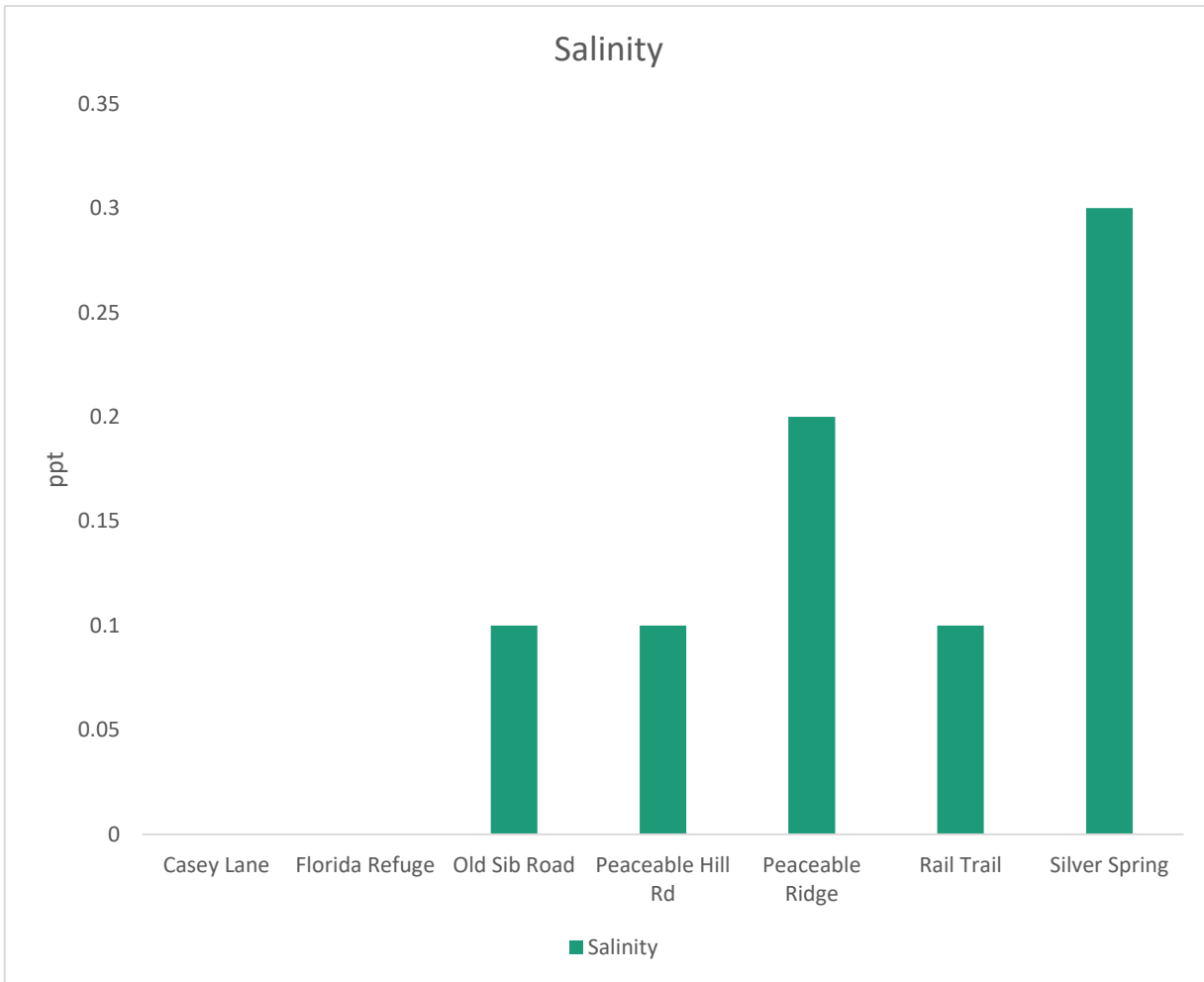
Temperature (°C)



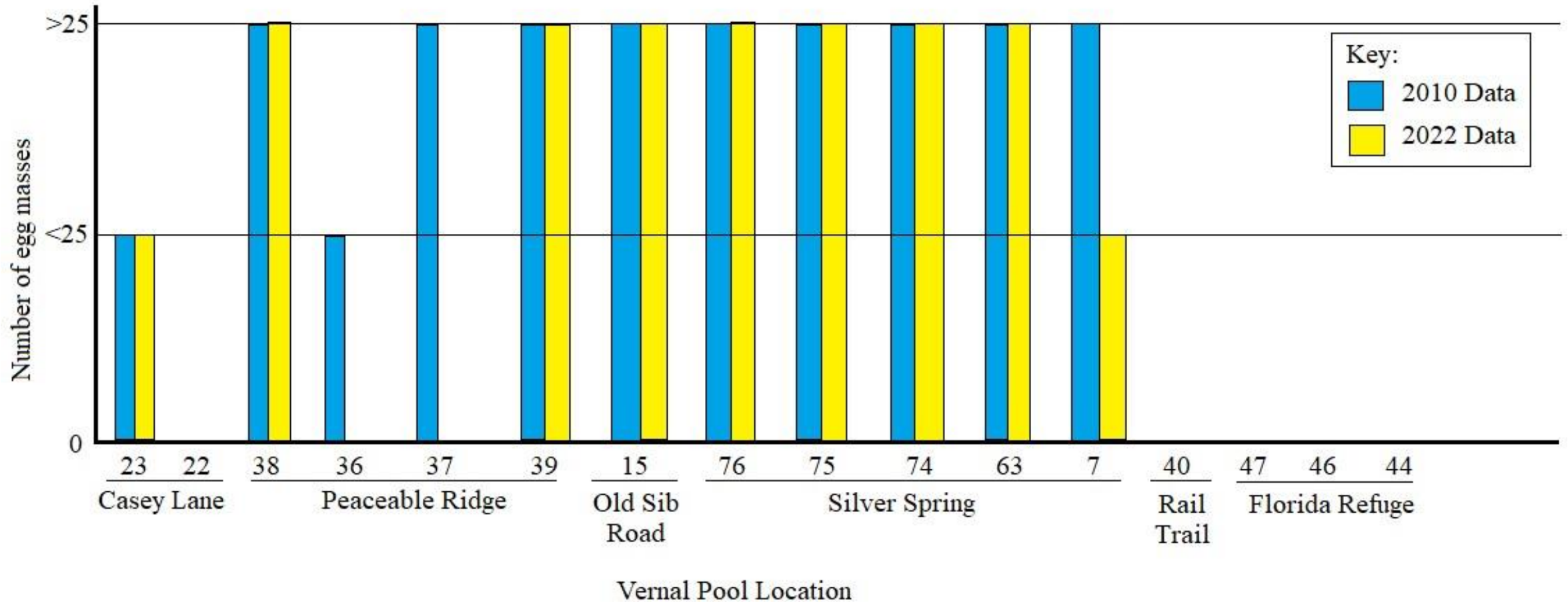
pH



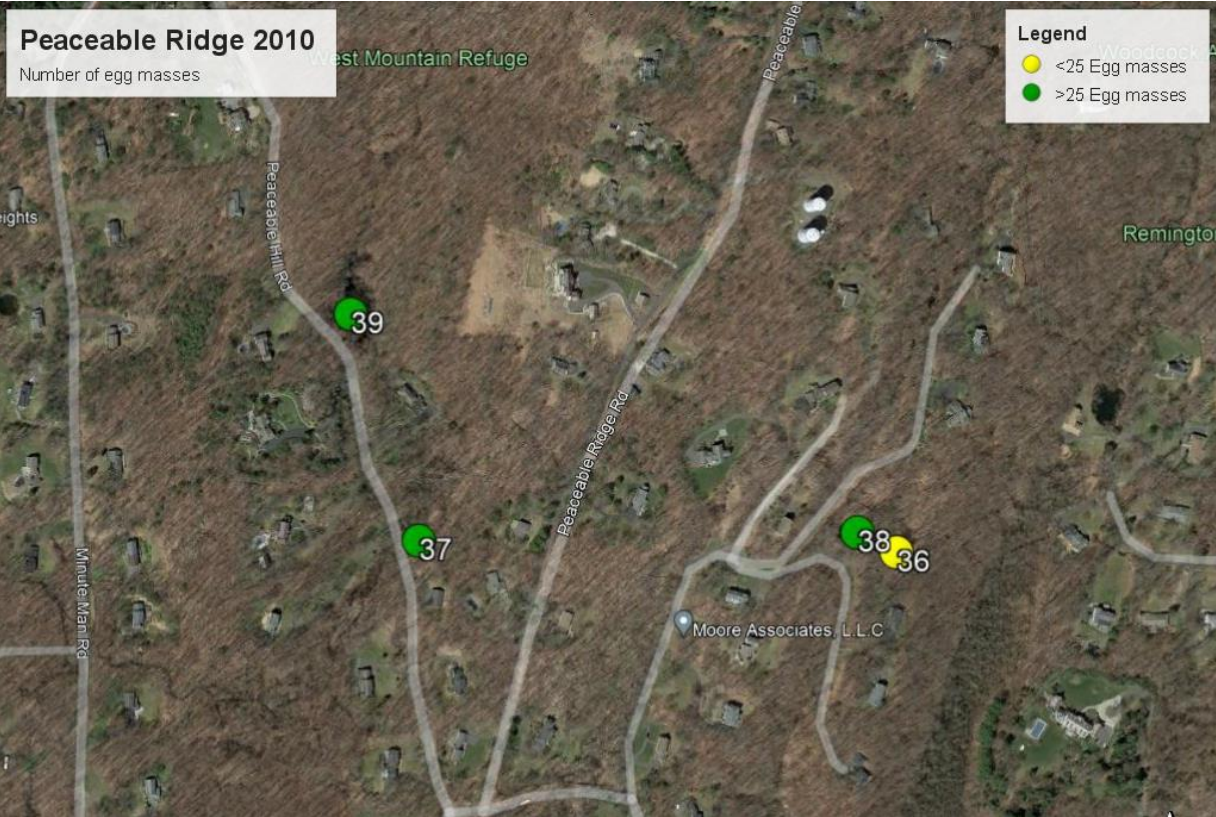
Data: Water Chemistry (continued)



2010 vs. 2022 Data

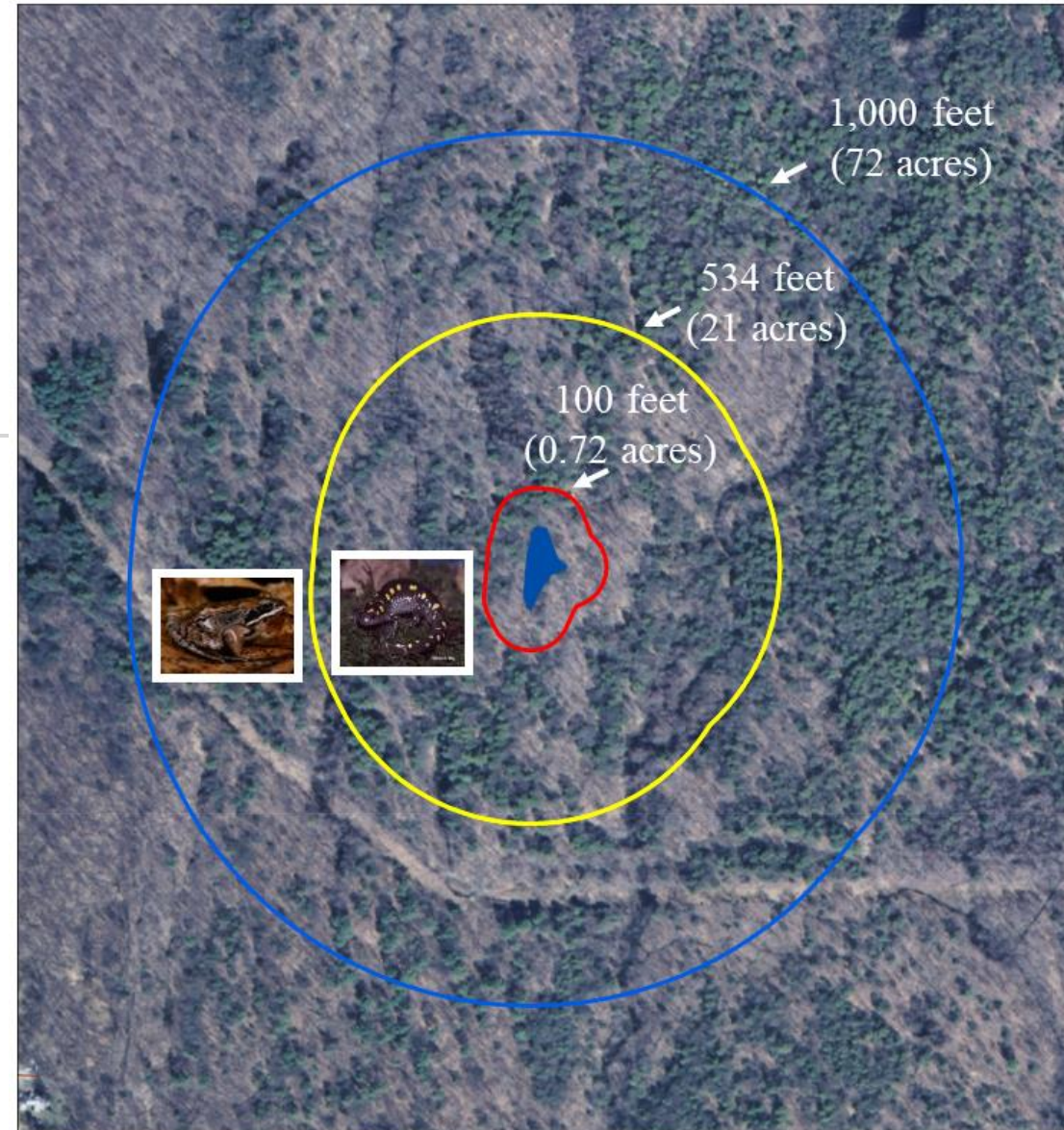


Peaceable Ridge



How to help?

- Avoid interfering with the vernal pools
 - Don't enter the vernal pool
 - Don't remove woody debris or vegetation
- Limit fertilizer use in landscaping
- Use alternatives to road salt to melt ice on roads
 - Brine solution
- Advocate to protect buffer areas around each of the vernal pools



Summary

- There are many vernal pools throughout Ridgefield
- They range in quality
 - Number of amphibian egg masses
 - Likely based on hydroperiod
- We observed only slight differences between 2010 and 2022
 - Could be attributed to study design (visual assessment from edge of pool)
 - Future studies should have participants wade through pools
- The water quality data collected did not appear to show any major impacts to pools
 - Even roadside pools such as Peaceable and Old Sib
 - More research is needed here to confirm
- Overall, the pools appear to be in good condition

