

Originally published in the April, 2009, issue of the **Active Page**:

## Exploring Our Little Corner of the World with the Galiano Naturalists

by Reiner Krueger

### The Vernal Wetland: Prophecy in a Pool

As I was wandering around The Bluffs and Matthews Point many months ago, with an ecologist, looking for a very small and entirely inconspicuous plant, I spotted two round pools in the rock. The setting is what made it odd: the holes were small, and seemed to have been carved into the bedrock of the area, with grass coming right up to the edge of the pools. They were about 10 feet apart, and for the life of me, I couldn't figure out what they could possibly be.

I knew there was a reason we had an ecologist with us.

He told me they were vernal pools. He had written a report about the recovery of certain species found within vernal pools in the Pacific Northwest, and so knew everything that he could possibly know about this type of wetland.

The thing about wetlands is that they come in all shapes and sizes, at all times of year and in a variety of biomes. Vernal pools can vary widely, depending on where they are found, the underlying geological structure, and the type of water regime present. Some vernal pools are no bigger than a puddle; others can be whole lakes.

A loose definition of a vernal pool is a seasonal depression wetland. In other words, a small or large depression in the land, that fills up with water seasonally. Commonly, these wetlands could be inundated during the winter and spring months but completely dry during the rest of the year. Below them

you will find an impermeable layer of substrate, whether that be a hard clay or silt, or in the case of those pools on The Bluffs, bedrock.

The terms "vernal pool" and "ephemeral pool" are sometime used interchangeably, though their definitions differ slightly. *Vernal* means having to do with spring. This makes sense, given that these wetlands tend to only occur in the spring time to early summer here on the West Coast and are typically dry throughout the summer. *Ephemeral* recognizes the transitory or temporary nature of the pool but doesn't refer to a specific time of year. One could suppose that a wetland might be ephemeral but not always vernal.

Given the unique nature of this type of ecosystem, we would expect to find unique and interesting species that can take opportunistic advantage of the transient water of these ecosystems.

Some of the main organisms found throughout most ephemeral systems are: ostracods (seed shrimp), cladocera (water fleas), and minute zooplankton, including crustacean-like copepods. The pool will host at least one species of branchiopod crustacean, if not several. The Fairy Shrimp (*Branchinecta spp.*) is a very common branchiopod in these vernal pools. These crustaceans are clever survivors adapted to this harsh ecosystem. They have evolved to produce eggs that hatch over a different range of conditions. Some of the batches hatch very rapidly, allowing the Fairy Shrimp to mature, mate, and produce another batch of eggs in a very short time. Others might not hatch over the period of two or more wet/dry cycles, incubating in the detritus-rich soils in these pools. No one knows what triggers the eggs to hatch, but the strategy works for them.

All sorts of other organisms make their home in the pools. Some amphibians, frogs and salamanders spend at least part of their life cycle in these temporary waters. Given the typical size of these wetlands, and their unstable moisture regime, the pools tend to lack larger predators. So, amphibious young are free to develop into a mature stage before making their way to a more permanent body of water. Insects too might decide to use these systems to carry out one form of their life cycle or another. The deciding factors being: proximity to other water bodies, numbers of prey species, and the duration of the ecosystem's aquatic stage. The insects have to mature from one "tolerant" stage to another before the pool dries up. Many of the species found in these pools have evolved to develop much faster than other closely related species that exist in more permanent settings. If at some stage in your life cycle you can fly, crawl, or resist desiccation, then a vernal pool is prime real estate for you.

The energy cycle in these systems deserves comment. Many of these vernal wetlands rely almost entirely on the decomposing detritus, caught up in the bottom of the pools, instead of relying on photosynthesis for energy. The organisms are then considered "heterotrophic" (*hetero*-other; *trophic*-nutrients) and derive all their energy from sources other than the sun. Although some of these wetlands support vascular plant systems, others rely on material blown in from the surrounding watershed, with algae being the primary producers of the pool.

These pools are facing threats, daily, from development and destruction of local habitat, putting the species themselves at risk or endangerment. Various organizations are out there working for the protection of these fragile ecosystems. People, governments and non-profit organizations are doing all they can to identify threatened

species within these pools, so that they can be registered and protected.

Because the organisms, whether plant or animal, are so specialized to live in these environments, they are sensitive to climatic changes. The stability of these pools relies greatly upon temperature and precipitation patterns. If these patterns shift, could we start to lose all of the countless species that have adapted so well, possibly to their own destruction, to life in these temporary ecosystems? The specter of global warming may well be reflected in the calm surface of those prophetic pools up on The Bluffs.

For more information on vernal pools:

Climate change and ephemeral pool ecosystems: Potholes and vernal pools as potential indicator systems. :  
<http://geochange.er.usgs.gov/sw/impacts/biology/vernal/>

Vernal pools. A U.S. EPA report on Wetlands and Wetland types:  
<http://www.epa.gov/owow/wetlands/types/vernal.html>

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### **Natural Mysteries**

Last month's mystery was: *Why, back in January, as I walked along the shell beach at Montague Park, did I come across numerous kelp hold-fasts (root-like anchoring structures) washed up on the shore? What has caused all these hold-fasts to be found alone, with no other parts of the kelp to be seen, littered across the beach?* You were likely seeing the hold-fasts of bull kelp (*Nereocystis luetkeana*), and let's note that this plant is deciduous. In the winter, the kelp has shed its stipe (stalk), float, and leaves, and all that remains is the hold-fast, waiting patiently for spring, when it will send up new stipes. Come the storms and

extreme low tides of winter, the churning of the waves can batter the hold-fasts, and a bad storm can break them away, the same way the stormwinds will sometimes uproot trees on land. These dislodged hold-fasts then end up on some windward shore, in this case the shell beach at Montague, to be discovered by some curious Naturalist.

This month's Natural Mystery: I have often heard a loud screech following the familiar call of the Barred Owl. Do they shriek when they attack their prey?

Have an answer? Send your thoughts to [galianonaturalists@gulfislands.com](mailto:galianonaturalists@gulfislands.com). Have a Natural Mystery of your own? Let us know, and we'll try to answer it.

THE GALIANO NATURALISTS are a group of curious explorers who enjoy observing, marveling, and sharing information about the natural world around us. Come join us. How? Just send us an email at [galianonaturalists@gulfislands.com](mailto:galianonaturalists@gulfislands.com). Visit our website at <http://gulfnet.sd64.bc.ca/GalianoNaturalists.html>.