

## Monitoring the Waters

Have you ever stood on the banks of Santa Rosa or San Simeon Creeks and watched the light play on A hundred riffles? Or waded out into the cool flow, looking for water skeets and tiny fry? Do you ever wonder what might be in the water?

Last weekend, several Greenspace Board Directors and members, along with an enthusiastic group of high school students, participated in the annual Coastal Clean-Up Day, sponsored by EcoSLO. We picked up a hundred pounds of trash from one beach and the mouth of Santa Rosa Creek, including plastic toys, fireworks containers from the community 4th of July celebration, 465 cigarette butts and several pieces of duct tape.

Many of these items are small, but it's the little things, isn't it? Plastic bottle caps, bits of shiny mylar and cigarette butts can kill sea birds. By cleaning our beaches, we are good neighbors to the creatures that inhabit our nearshore waters, from plankton to humpback whales.

How do we also ensure that the creeks flowing into our coastal ocean waters are clean and healthy habitats as well? How can we find out if they are carrying pollutants that endanger the plants, animals and people who depend on them? Are they healthy enough to sustain populations of native creatures, such as steelhead and western pond turtles?



Ellen Leigh checks water quality

Photo: Connie Gannon

For two years, a team of Greenspace volunteers has been conducting water monitoring forays into local creeks, to check the content and temperature of surface water. Funded by the Morrissey Family Foundation, the project employs a battery-powered YSI Professional water monitoring instrument to test local streams for temperature, salinity, conductivity, oxidation reduction potential (ORP), pH, total dissolved solids (TDS), specific conductance and resistivity. (Remember your high school chemistry?)

Currently, the team is testing at three sites on Santa Rosa Creek--the Main Street Bridge, Creekside Reserve and the lagoon--and two sites on San Simeon Creek--Jon Pedotti's ranch and the Hearst/San Simeon State Park. In years past, we also have monitored Pico Creek, Arroyo de la Cruz and Carpoforo Creek, and would like to do so again if we can get adequate volunteer numbers.

What does the data that the team records tell us about the state of our creeks? First, our collection is limited by stream flow. As we know, the local creeks have been struggling for the past four years as surface flow drops below year-round levels during our lengthening dry season. Last year, the stream dried up in early July and we suspended testing until November. This year, however, we were able to test in Santa Rosa Creek through the entire summer.

The components we test for provide information about the viability of local creek habitat for goby, steelhead, western pond turtles, and red-legged frogs, all threatened and endangered species.

The salinity of a water sample tells us the level of sodium chloride and other salts in a water sample. In fresh water, the concentration should be close to zero. Ocean water averages 35 parts per thousand. Estuarine or brackish water can range from 0.5 to 35 ppt. High salinity upstream can indicate runoff of certain chemical fertilizers into creeks. High salinity reduces available oxygen in water, which can affect some aquatic species.

Conductivity and total dissolved solids indicate the degree of mineralization in a water source. High conductivity indicates that the water sample contains a large volume of TDS, which can impact the health of riparian vegetation and physiological processes of creatures dependent on the stream. Conductivity testing month over month can reveal sudden changes in water quality, possibly due to upstream storm runoff or illegal dumping in a creek. Warming water temperatures and saltwater intrusion also affect conductivity.

Oxidation reduction potential (ORP) measures the capacity of a water sample to either release or accept electrons from chemical reactions. A high ORP can indicate the presence of excess chlorine in water. A low ORP can indicate a high pH value and possibly excess mineralization.

The acidity or alkalinity (pH) of a water sample can indicate creek habitat conditions. Like other salmon, steelhead prefer a slightly alkaline (pH 7-8) freshwater environment. They can become seriously ill in more acidic waters. As we know, acidification of the oceans is impacting many marine species. Acidified waters also can mobilize heavy metals that cause physiological damage when taken up by creek organisms.

Finally, temperature is a significant factor in creek habitat health. Most aquatic organisms are adapted to a very narrow temperature range. Excessive warmth can cause the overbloating of certain bacteria which are toxic to amphibians, fish and birds. Overly cold waters can cause the death of small organisms that form the basis of the local food pyramid. Tracking the temperature of creeks over a longer time horizon can give us a picture of the impact of global warming trends.

In the future, our water monitors hope to add other specific water quality measurements to this set, to determine chlorine, nitrogen and heavy metal levels in particular. We will need to send water samples out for such testing and will probably only conduct it once or twice a year.

For more information on water quality indicators, check out the "Fundamentals of Environmental Measurements" website, (<http://www.fondriest.com/environmental-measurements/parameters/>).

If you want to explore our local creeks and help us determine the health of these waters, please call Connie at 805.927-2866 to learn more about volunteering as a water monitor. – CG

## COMING UP

Sunday, October 9, as part of Cambria's Heritage Days, we will offer guided tours of the Chinese Temple at the Creekside Reserve, 2264 Center Street, from 1-4 p.m. Come and learn about the Chinese who helped build our town's economic base by mining and abalone and kelp processing.

Then, save the date for a fascinating presentation by David Helvarg, author of *The Golden Shore: California's Love Affair with the Sea*, on Sunday Nov.13, from 2-4 p.m. at the Vets Hall in Cambria.



Photo: David Helvarg

Winner of the 2007 Herman Melville Literary Prize, explorer and marine activist David Helvarg serves as executive director of Blue Frontier, promoting protection of the world's oceans through events and publications. He is editor of the *Ocean and Coastal Conservation Guide*, author of seven books and organizer of Blue Vision Summits for ocean activists.

A history, a travelogue and a love letter, *The Golden Shore* explores the sweep of California's coast and people's simultaneous love and exploitation of the Pacific Ocean's eastern rim. Learn what shocked David as he researched this book and be surprised by insights into our extraordinary coastal world.

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The North Coast area of San Luis Obispo County is a national treasure. Greenspace will protect and enhance its ecological systems, cultural resources and marine habitats through land acquisition, education and advocacy.