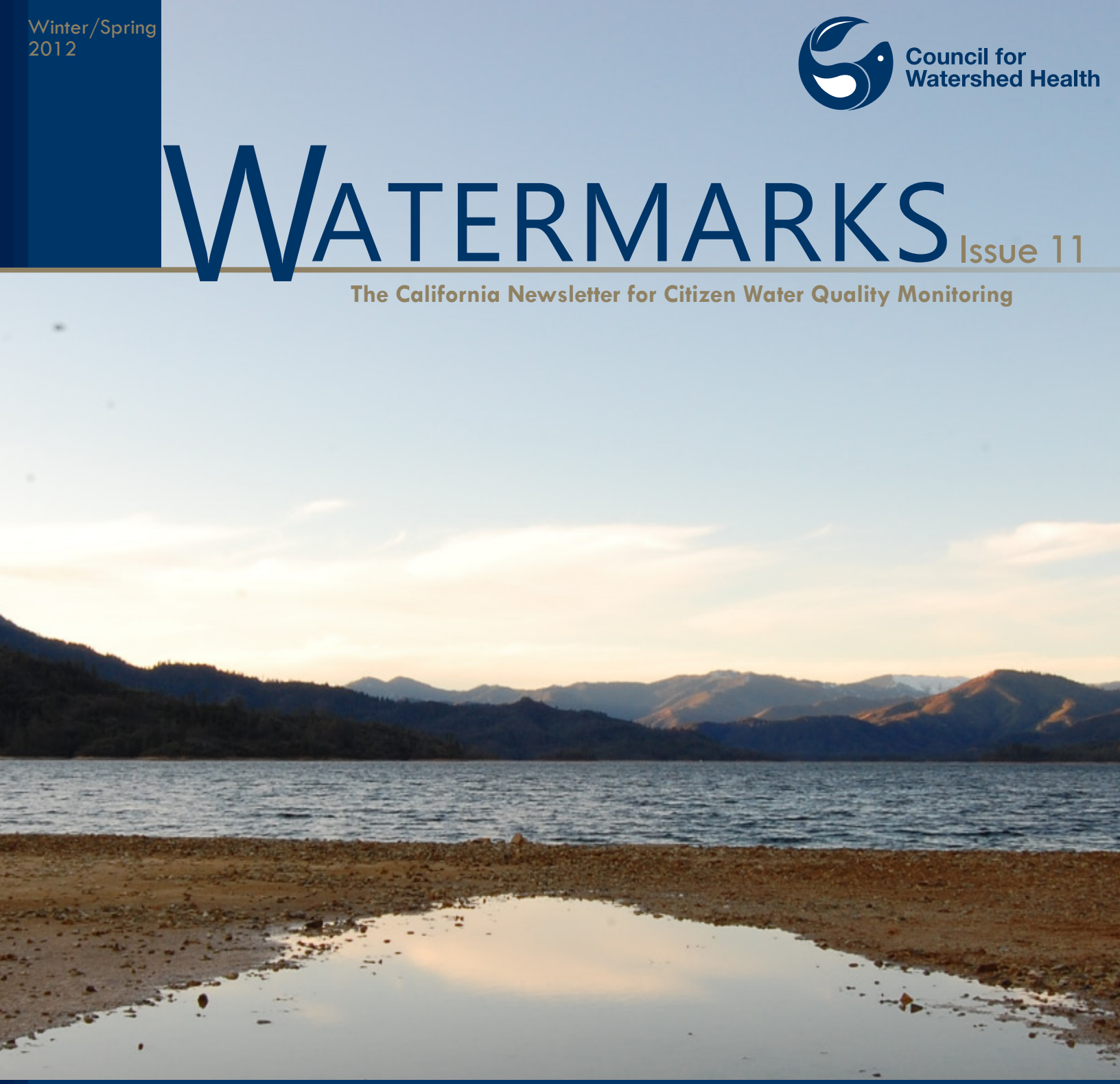
Winter/Spring
2012

Council for Watershed Health

WATERMARKS Issue 11

The California Newsletter for Citizen Water Quality Monitoring



SAVE THE DATE!

Working Together For Clean Water

CALIFORNIA'S FIRST CITIZEN MONITORING CONFERENCE

August 22 – 23, 2012
Kellogg Conference Center
Cal Poly Pomona





JOIN US TO CELEBRATE!!!

CELEBRATE CITIZEN MONITORING SUCCESS

For over a decade California's Citizen Monitors have been collecting water quality data. This data is being used to guide local watershed management and are a critical element of regional and statewide assessments of surface water quality for drinking, fishing, swimming, ecosystem health and other beneficial uses.

40th ANNIVERSARY OF THE CLEAN WATER ACT

The Clean Water Act is the cornerstone of surface water quality protection in the United States.

JOIN US TO SHARE!!!

BUILD REGIONAL COOPERATIVES

The conference will provide a forum for monitoring groups (Grassroots, NGO's, RCD's Tribes…) to communicate their current and future monitoring activities and develop collaborative relationships.

PROGRAM HIGHLIGHTS

Sessions, Workshops:

- Citizen Monitoring
- Poster Session
- Mini Workshops
- Storm Water Monitoring
- Source Identification
- BMP/Restoration Assessment
- Statistical Analysis Made Easy
- Organizational Development and Growth

Director's Desk

The Council for Watershed Health is proud to announce our partnership with the State Water Board's Clean Water Team to produce Watermarks. This newsletter will highlight the work of citizen monitoring programs throughout California and the people who volunteer their time to track the health of our waters. Citizen monitors provide valuable, useful information for watershed managers. A great example is highlighted in the article "Much To Do About Data".

Citizen monitoring programs support the Council's vision of healthy, sustainable watersheds through allowing us to assess current baseline conditions, determine if conditions are improving or declining, and identify areas to focus more resources.

Thank you to the many volunteers around California who are committed to watershed health! I would also like to thank our interns, Pomona College students Allison Sherris and Jessie Welcomer, for their capable contributions to the newsletter. Lastly, thank you to the Erick Burres and the State Water Board who inspire citizen monitoring groups to keep up the good work!

- **Nancy L.C. Steele** *(Executive Director, Council for Watershed Health)*

Citizen monitoring is a valuable resource that produces monitoring information needed to protect water resources, encourage stewardship of watersheds, and inform concerned citizens about potential water quality issues. The California Volunteer Monitoring Programs support the State's Watersheds Stewardship through involvement in citizen monitoring in order to reduce and prevent water pollution. The State Water Board Surface Water Ambient Monitoring Program (SWAMP)'s Clean Water Team provides technical assistance, training, data management consultation, outreach and education to citizen monitoring organizations.

The SWAMP Comprehensive Strategy supports the building of stronger partnerships with agencies, watershed groups, citizen monitors, and others to facilitate the sharing of information and the use of monitoring tools to help in collection of comparable data. This Newsletter highlights some of these volunteer-based monitoring and restoration projects, and informs citizen groups about the available tools for their monitoring projects.

- **Shakoora Azimi-Gaylon** *(Assistant Deputy Director, Office of Information Management and Analysis, State Water Board)*

We Are Back...

"The Environmental Protection Agency recognizes the many benefits of volunteer monitoring. In addition to providing needed water quality data, volunteer monitors build community awareness, help identify problems, become advocates for their watersheds, and ultimately contribute to the restoration and protection of the nation's water quality. This newsletter will help inform and motivate volunteers to care for their watersheds."

- **John Kemmerer** *(Associate Director, Water Division, U.S. EPA Region 9)*

"I am so excited about this newsletter. It shows that there are hundreds of groups with thousands of volunteers ready, willing and able to get their shoes wet and protect our waters. To be effective we need not only to be motivated but we also need training, the right equipment, the right techniques and the knowledge to put our information to the most use. This newsletter will help bring that about by showing the scope of citizen monitoring in our State, highlighting leading-edge techniques and describing innovative projects. This is our newsletter, we should use it to bring us closer together and get better at our job."

- **John Norton** *(Citizen Monitoring Rep., Water Quality Monitoring Council)*

"California is fortunate to have an extensive network of people concerned about their watersheds and waterways. Volunteer monitors are increasingly recognized as a well-instrumented, well-informed population caring for and watching out for our environment. Volunteer-scientists are also a major and growing source of data for many ecosystem indicators around the state. Investing in their involvement and burgeoning database is a critical state function. This newsletter is a critical tool for sharing approaches, telling stories, and creating social ties. The Council and the Board deserve kudos for helping keep the spirit of science-volunteerism alive along our waterways and throughout our watersheds. From benthic bugs and algae, to phosphate and pesticides, and even wildlife, volunteer scientists are measuring ecosystem health and keeping watch. Read on and learn about their efforts and findings."

- **Fraser Shilling, Ph.D.** *(UC Davis ecologist and proud trainer of volunteer water quality and wildlife observers)*

"There is no better way to ensure the long-term protection of our natural environment than to enlist the service of citizen volunteers. Scientists and we in government can't do it all. Volunteers perform an invaluable service by monitoring what's actually happening in the environment and getting things done in the field. Every time they step into their waders or measure the pH of a water sample, they demonstrate how much they care about the health of the world in which we live.

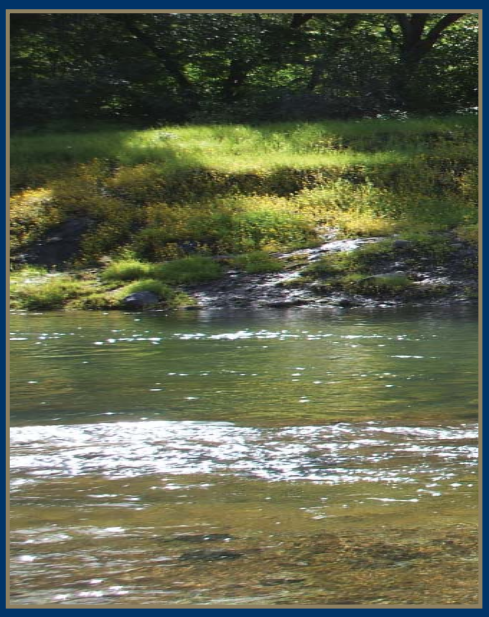
But volunteers can't work effectively in a vacuum, and Watermarks is a great way to keep them connected to other volunteer efforts and informed of the science behind their work. The Coastal Conservancy has long supported the work of California's citizens who volunteer for the environment, and applauds the re-publication of Watermarks (formerly known as Currents) —a newsletter for and about them."

- **Sam Schuchat** *(Executive Officer, California Coastal Conservancy)*

Student Editors

Allison Sherris studies Geochemistry at Pomona College in Claremont, California. She's currently working on a project investigating the effects of acid mine drainage from an abandoned metal mine. In her free time you'll probably find her enjoying the outdoors, playing the cello, or daydreaming about traveling.

Jessie Welcomer is a sophomore at Pomona College in Claremont, California originally from the San Francisco Bay Area. She is majoring in Public Policy Analysis with a concentration in Environmental Analysis and a minor in Spanish. She loves spending time outside and discovering good books.



Watermarks: The California Newsletter for Citizen Water Quality Monitoring

A collaboration between the Council for Watershed Health and State Water Resources Control Board Stream Team

Issue No. 11 | Winter 2012

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The California Urban Streams Alliance

Contents

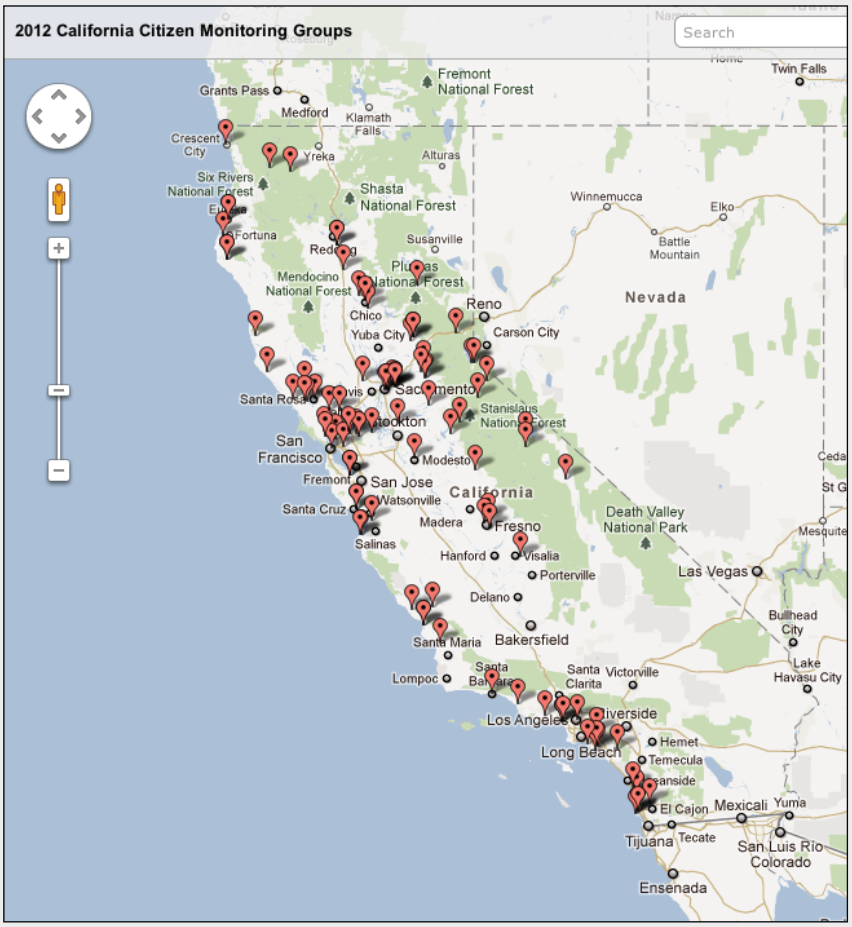
In California and abroad, watershed protection relies on citizens. Volunteers are the watchdogs of our streams and rivers, ensuring that watersheds are safe for families and ecosystems.

The citizens of California have embraced this principle, together forming one of the largest volunteer monitoring efforts in the country. The "Watermark" newsletter celebrates the achievements of these monitoring groups and helps to publicize important news and events in watershed protection.

This issue, the first since 2006, is about progress. We define the scope of volunteer monitoring in California today and highlight leading-edge techniques and innovative projects. We hope that this newsletter will be a resource for our watershed monitors and anyone wanting to get involved. Thank you for helping to protect our watersheds!

The San Francisco Baykeeper

2012 Citizen Monitoring Groups



There are over 400 watershed stewardship organizations throughout California. This map highlights those with active Citizen Monitoring Programs.

Visit the SWAMP Clean Water Team website to access the interactive map that can help you locate and contact a group near you.

Much to do about Data

Two citizen monitoring programs that are making data count

By Allison Sherris and Jessie Welcomer

The Ventura Stream Team at work on the Ventura River

The Ventura Stream Team:

Helping establish a TMDL to effectively control nutrient load

Many volunteer-based monitoring groups find it difficult to make an impact on watershed management. The Ventura Stream Team, however, is using its findings to help establish new policies for nutrient management on the Ventura River.

Like many other water bodies in California, the river contains elevated levels of nutrients—and the blooming algae population to prove it. The Ventura Stream Team has been monitoring water quality in the river for over ten years, generating extensive records on nutrient levels and algae populations. They have now partnered with the Los Angeles Regional Water Quality Control Board to utilize that data towards establishing a Total Maximum Daily Load (TMDL) for algae.

The Stream Team represents a collaboration of the Santa Barbara Channelkeeper, the Ventura Surfrider Foundation, and over 500 volunteers. Ben Pitterle, Director of Watershed Programs at the Channelkeeper, estimates that these volunteers have logged over 5,900 hours in the field, and many have been with the group since its inception in 2001. Each month, the volunteers and Channelkeeper staff measure temperature, dissolved oxygen, pH, turbidity, and conductivity at fifteen different sites on the river. In addition, samples are collected for the laboratory analysis of bacteria and nutrients.

Between 2001 and 2005, the Stream Team found that nutrient levels in the river exceeded EPA recommended maximums at most sampling sites. High nitrate levels were likely the result of treated sewage effluent, animal waste from horse and cattle facilities, faulty septic systems, and fertilizer use. Phosphate in the basin originates from both natural and anthropogenic sources, with sewage and animal waste contributing to anthropogenic influx.

At that point, the Stream Team leaders recognized the need to take a closer look at algae populations in the river, one of the closest proxies for nutrient levels. In 2008, the Stream Team initiated a pre-dawn algae monitoring project, which continues to this day. Volunteers meet at 4:30am to measure pH and dissolved oxygen levels at their lowest, and again at mid-afternoon, when photosynthesis is up and dissolved oxygen levels are high. These data reveal diel

> "We've contributed heavily to the development of the Ventura River Algae TMDL through submittal of the most long-term, watershed-wide nutrient dataset that exists as well as our years of diel dissolved oxygen data."

variations (changes observed over a 24 hour period usually including a day and the adjoining night) in water chemistry and give the Stream Team a comprehensive understanding of algae activity.

This wealth of data is now being put to use. "We've contributed heavily to the development of the Ventura River Algae TMDL through the submission of the most long-term, watershed-wide nutrient dataset that exists as well as our years of diel dissolved oxygen data," says Pitterle.

The TMDL will likely be adopted by 2013. The ideal "target" for the TMDL (be it algae percent cover, clorophyll, dissolved oxygen, etc.) and the compliance monitoring requirements are still in discussion. The Ventura Stream Team's contributions to the policy change represent a major achievement for citizen monitoring groups in California and highlight the importance of volunteer-based data in watershed protection.

Filamentous algae. Photo courtesy of SCCWRP

Click to visit the Ventura Stream Team

The San Diego Coastkeeper:

Using baseline data to recognize and quantify the effects of a sewage spill

On Saturday, September 10, 2011, volunteers from San Diego Coastkeeper headed out for their monthly routine water quality sampling. At one of the sites, however, it was instantly apparent that something was wrong. The water was colored gray, and dead fish floated in the stream. A strong smell of sewage gave away the culprit of the deteriorated stream conditions.

Two days beforehand, a power outage at the Roselle Street pumping station caused a 1.9-million gallon sewage spill into San Diego's Los Penasquitos Lagoon. Following the spill, the San Diego Coastkeeper water monitoring team measured levels of fecal indicator bacteria, ammonia and phosphorus in water samples, confirming what the visual clues suggested – the sewage spill had a severe negative impact on the water quality of the recieving waters.

Escherichia coli levels in the September 10 tests exceeded 241,920 cells/100 mL, the maximum level the test kit could detect. The safe level for human contact for these fecal indicator bacteria is merely 406 E. coli cells/100 mL. Ammonia and phosphorus levels also exceeded the maximum of the test kits, far above safe levels. Dissolved oxygen, which typically needs to be at least 5.0 mg/L to support most aquatic life, was found to be 0.08 mg/L, explaining the dead fish found on the surface and on river banks.

The San Diego RWQCB (SDRWQCB) used monitoring data gathered by the San Diego Coastkeeper over the past three years to identify baseline stream conditions. According to Travis Pritchard, Water Quality Lab Coordinator at the Coastkeeper, "Neither the City of San Diego nor the SDRWQCB had water quality data for this specific location, so Coastkeeper's three years of monthly data was used to establish background water quality conditions that were used as a target for their pumping." Over the subsequent weeks, the city pumped about 14 million gallons of water out of the creek and back into the sewage treatment system until water quality tests matched the baseline levels as determined by Coastkeeper's data.

Cont. on Page8. >

Scenes from the September Los Penasquitos Spill. Photos courtesy of the San Diego Coastkeeper.

Cont. from Page 7.

Throughout the cleanup process, Coastkeeper workers continued to monitor the stream and lagoon to assess the pace of recovery. Twelve days after the spill, they found that levels of bacteria and nutrients at the site steadily decreased and began to approach or meet safe levels. Volunteers expanded their monitoring to include both tidal areas and upstream regions of the lagoon. These tests revealed higher concentrations of bacteria and ammonia, as the sewage continued to travel downstream.

The scope and thoroughness of the Coastkeeper data enabled the SDRWQCB to identify and effectively treat the sewage spill. Coastkeeper volunteers were the first to discover the detrimental effects of the spill, and they reported their evidence to the Regional Board and to the Department of Fish and Game to ensure a speedy cleanup.

Thanks to the efforts of this watchdog organization and the commitment and hard work of its volunteers, this San Diego sewage spill was quickly identified and cleanup efforts began almost immediately. The Coastkeeper team's contributions to the cleanup highlight the importance of monitoring water quality and show how volunteer efforts can help to ensure the continued protection of watersheds.

Los Pensaquitos Lagoon after the spill

Click to visit the **San Diego Coastkeeper**

Ask the Experts:

How can other monitoring groups make in impact on watershed management?

The Ventura Strem Team keeps track of algae percent cover on the Ventura River.

"Try not to get so caught up in the routine and logistics of an ongoing monitoring program that you are unable to adapt and modify your program to address pertinent issues or lessons that you learn. No one wants to collect data just for the sake of collecting data, so keep the real goal in mind, which is probably to identify and address pollution problems, and adapt your program over time to be effective.

Also, be flexible, and don't be afraid to try something different. Just because it isn't in a State approved manual doesn't mean that it's not something you can use to effectively raise awareness about a problem." -Ben Pitterle, Director of Watershed Programs, Santa Barbara Channelkeeper

"Establish a working relationship with other entities doing monitoring and decision makers. By working with other monitoring groups, you can somewhat coordinate your efforts so redundancies are reduced and the amount of usable data is increased. By sharing data, your monitoring data has the ability to tell a more complex story." - Travis Pritchard, Water Quality Lab Coordinator, San Diego Coastkeeper

Building Credibility

By Jessie Welcomer

While many citizen monitoring organizations rely on volunteers to perform water quality monitoring tasks, some agencies and data users remain skeptical of results from these so-called "amateurs." Though volunteer labor saves resources and involves the greater community, accusations of unreliable procedures and a lack of scientific knowledge often surround volunteer-based groups. Some of these volunteers, however, have had years of experience working with water quality monitoring (see page 22 for one such "Water Warrior" profile). Even with a brand new workforce, however, organizations can still develop a strict data collection program designed to ensure high quality results. Leaders also train volunteers so that citizens, though not technically scientific "experts" in the field, can successfully gather and analyze data, enabling the organization to reach its goals.

Because volunteers do face a fair amount of skepticism from the general public, leaders must be sure to develop a Quality Assurance Project Plan (QAPP) capable of standing up to inquiries and tests administered by skeptics. This includes a written plan detailing the organization's goals, methods of data collection, and how the results will be analyzed and interpreted. Outlining the project's specific priorities helps pinpoint what data collection is necessary and minimizes unhelpful and unnecessary monitoring. The data to collect should be chosen in order to best answer and achieve the established goals, and the collected measurements, from water temperature to dissolved oxygen levels, must be representative of the area of interest. Documentation of employed methods is necessary to help guarantee the data will be useful to future researchers.

Training with the Storm Drain Detectives

Volunteers with the Upper Merced Water Council measure dissolved oxygen levels

Every effort should be made to keep results accurate and precise. Volunteers should be equipped with calibrated instruments and high performance field kits (see page 19 for comparisons of various phosphate test kits). Multiple analyses or parallel tests conducted by staff members also increase the reliability of results and give volunteers' efforts more credibility. Using quality control samples for comparison and reference also increases the dependability of the data.

The people involved with the organization must be dependable as well. A comprehensive training program helps minimize mistakes and increases confidence in the volunteer staff. The legitimacy of volunteer-run programs significantly increases when volunteers understand program objectives and procedures to reach them, through hands-on, on-site training. An effective education program to prepare volunteers for their monitoring tasks helps ensure credibility both in a technical sense and a more holistic manner.

Because citizen monitoring groups are often met with distrust and suspicion, volunteers must work to prove their data's reliability. Organization leaders need to make sure that volunteers are adequately trained to understand and carry out necessary procedures. Developed and administered properly, volunteer monitoring groups can help answer questions about regional water issues in a reliable, technical, and scientific way.

On the Rocks

Profiles of California aquatic flora and fauna

By Jessie Welcomer

Anyone who has ever been fishing knows that streams and rivers typically contain an abundance of life. But it is often the smallest forms of life, buried at the bottom of streams, which help scientists determine the health of the aquatic ecosystem. These organisms are referred to as benthic macroinvertebrates: bottom-dwelling animals visible to the naked eye that lack a backbone. These species serve as indicators of the overall health of the watershed.

Insects are the main types of invertebrates present in streams, and their abundance or scarcity provides valuable information regarding the well-being of the ecosystem. Species are classified into "**sensitive**," "**intermediate**" and "**tolerant**" categories based on their ability to survive under different conditions. "Sensitive" species will hardly be found in polluted waters, while "tolerant" species are, for the most part, still found in larger numbers.

In a streamside biosurvey, different macroinvertebrate species are tallied and classified into the three aforementioned categories. Each category is then scored based on the number of organisms found in each grouping. Because more points are given in the case of "sensitive" species abundance, an overall higher biological index score (calculated from the sum of the categories' scores) indicates a healthier aquatic ecosystem. A lower biological index score means that only "tolerant" species are widespread, indicating a degraded watershed.

For more infomation on CA streamside surveys visit : SWAMP-Clean Water Team Citizen Monitoring Program Guidance compendium for watershed monitoring and assessment (section 3.5) (http://www.waterboards.ca.gov/water_issues/programs/swamp/cwt_guidance.shtml)

Mayfly Nymph

Mayfly Adult

A "sensitive" species: The Mayfly

Mayflies abound in cleaner water, making them a "sensitive" species to pollution. Mayflies are insects belonging to the order Ephemeroptera whose color, though typically black, can sometimes be shades of green, brown or gray. They usually grow up to one inch in length, with most organisms in the five to 10 millimeter range. Mayfly nymphs are easily identified by their three tails and gills on their abdomens. They typically feed on algae or non-living organic particles, also known as detritus. They in turn are consumed by larger fish.

Mayflies are typically found in three life cycle stages – nymphs, dunns and adult mayflies. For the purpose of steamside surveys, nymphs are collected. Nymphs go through a series of molts and two winged growing stages before becoming adult mayflies. Adults have two pairs of upright folded wings and two cerci but apart from these differences a nymph looks relatively similar to its adult counterpart. This type of transformation is known as incomplete metamorphosis.

An "intermediate" species: The Riffle Beetle

Riffle beetles are another common insect species used in stream monitoring. Riffle beetles fall under the order Coleoptera and family Elmidae. Unlike mayflies, which go through incomplete metamorphosis, riffle beetles undergo complete metamorphosis. Immature riffle beetles are referred to as larvae and look very different from adults. The transformation from larvae to adult occurs in a distinct pupae stage, where the riffle beetle is in a cocoon-like structure until its emergence as an adult.

Adult riffle beetles are also aquatic, and can be collected along with larvae during stream sampling. Both adults and larvae are a dark brown color and usually range from about three to five millimeters. Both forms also feed on detritus and algae. The similarities between this species' two primary forms, however, end here. The larvae are torpedo shaped with pointed ends and rings around the body. The stout adult riffle beetles, on the other hand, resemble true beetles.

Riffle Beetle Adult

Riffle Beetle Nymph

A "tolerant" species: The Leech

Collecting benthic macroinvertebrates on the LA River with the Council for Watershed Health

An abundance of leeches, a "tolerant" species, can indicate poor water quality and a struggling aquatic ecosystem. Leeches are classified in phylum Annelida and class Hirudinea. While leeches are well known in popular culture as blood-sucking predators, only some species actually rely on blood as a primary food source. Other leech species feed on decaying plant and animal matter. Phenotypically, leeches resemble aquatic worms, with a flattened, segmented, body and a sucker at each end. Most leeches are between 10 and 20 millimeters in length, although some can grow as big as 40 millimeters long. Leeches' colors also vary – these organisms can be green, black, brown or gray and can even have bright patterns in yellow or red.

The Leech

Leeches are hermaphroditic, meaning each organism has both male and female reproductive organs. Leeches do not, however, have more than one distinct physical form like insects do. Leeches therefore do not undergo metamorphosis or a significant bodily transformation during its life cycle.

Project Profile:

Napa volunteers and RCD staff keep tabs on salmonid populations

Interview by Jessie Welcomer

Jonathan Koehler, Senior Biologist with the Napa County Resource Conservation District (NRCD), runs the organization's salmonid outmigrant population monitoring programs in the Napa River. The NRCD works with volunteers coordinated by the nonprofit group Napa River Steelhead. From April to June, 2011, staff and volunteers checked a rotary screw trap daily to remove, identify and count fish. Over 9,000 fish from 24 different species were caught. Koehler spoke with The Council for Watershed Health regarding the monitoring program, Chinook salmon and steelhead populations in the Napa River, and the importance of volunteer efforts.

What is the history of the Napa County Resource Conservation District's monitoring program?

We've done water quality and rainfall monitoring for maybe 15 years or so, off and on with a group of volunteers, and that's provided baseline data. In the last three or four years what we've done is augment that with this salmon/steelhead monitoring program, and the idea is to basically get volunteers and local folks involved with collecting good, useful data on fish.

What is the purpose of the monitoring program?

The purpose of the salmon and steelhead monitoring program is to answer very fundamental fisheries questions in Napa. I've been here about ten years now, and when I first started, I was amazed at how little information there was on really basic stuff: When do fish come into the system? How many steelhead juveniles is the Napa River producing? Do we have a population estimate? Is the population going up or down or is it stable? None of that really existed, and so the purpose of our monitoring program is to try to answer those very basic questions. And then of course also to just get people involved and inform the public.

How does the monitoring actually work? During what time of the year does it take place?

We have a couple of sampling periods. One is for adult fish, so we go out after salmon in the fall, usually right around Thanksgiving through New Year's. We do a standard Fish and Game protocol where we go out and find salmon carcasses, and we look for spawning nests and take GPS points of where those are. Any time we come across a salmon carcass, we'll take genetic samples from them, we'll measure them for length, and we'll extract their otolith, which is

a little structure in the ear bone. It's kind of like a black box of that fish's life – it records the water chemistry- so you can learn a lot about where it came from, how old it is, and other details about its life. We do that usually on a weekly basis, and we'll do that until we no longer find salmon. Once the river gets up to a certain level, it'll be impossible to wade, and then we stop for the year.

In the spring for the last three years we have this rotary screw trap which is a big, floating sampling device that catches young steelhead and salmon on their way out to the ocean. Those are fish that have basically completed the freshwater part of their life cycle, and now they're going out to the ocean to try their luck. A trap is put in place during February and March, depending on flow; we're kind of at the mercy of the river. We put this thing in the Napa River in the spring, and we fish it more or less continuously for about two months or two and a half months. We check the trap daily with the volunteers, and that's been the real benefit, because it gets really expensive to go out every single day, and that's where the volunteers come in.

What were the general conclusions discussed in the 2011 Monitoring Report, and what did the results tell you about the fish populations?

It's always important in a study like this to just step back and see where we are. Three years of data is definitely better than none, but it's still kind of early to make any long-term conclusions. The major conclusions for 2011 were that we had a pretty consistent catch of steelhead in all three years, so we've seen this fairly stable population of fish that are going out year after year. Like I said, three years is a fairly limited data set, but it's pretty impressive that in those three years we've had a good production. The other thing we've found is that they're generally big, and so we think that they have a pretty high ocean survival rate, because the bigger they are the more likely they are to survive in the ocean. In 2011, we had a big Chinook year, but our conclusions were that Chinook salmon in the Napa River seem to be very hit-or-miss. It's highly variable from year to year: in 2009 we caught very few, last year we caught more, and then this year we caught a lot. It seems to be much more of a fledging population that is still getting established, whereas the steelhead seem to be at least stable enough to produce good-size fish year after year.

What are the goals for the 2012 monitoring program? What are the organization's longer-term goals?

In 2012 we really would like to get the trap in as early as possible. Last year we missed a pretty good chunk of the sampling field because of strong flow in the spring. We're trying to get the trap in in February and collect as many genetic samples and otolith samples as possible. Ideally we'd like to fish the trap for a minimum of about ten years. If you look at a ten year data set, then you can start making population estimates and have confidence in trends, but that's down the road a bit.

What role do the volunteers play, and why do you think volunteer monitoring is important?

Because we're dealing with a threatened species, the steelhead is a threatened species in Napa, we have to have a permitted biologist any time one of those is handled. Obviously that gets expensive because that's staff time every single day. We have to have a crew of two on the trap at all times just for safety and because it's impractical to have one person; there's a lot of work to do. The volunteer can assist and do that for free, so that basically cuts our staffing costs for that aspect of the project in half. And they love to do it. It has a public education component to it: they learn a lot, then they talk to their friends, they talk to their colleagues, and it kind of spreads the word about the health of the watershed and what's going on.

Click to view the **2011 Monitoring Report**
Photos courtesy of the Napa River RCD.

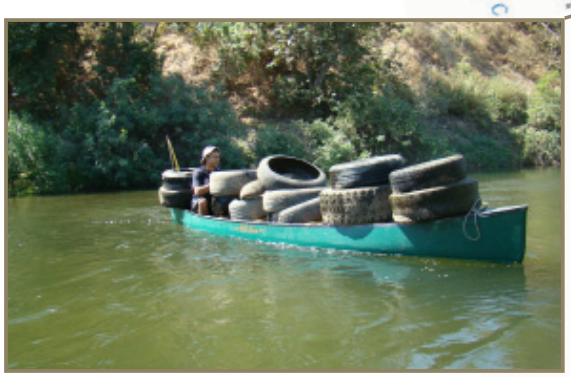
What's Happening in Your Watershed?

(Click the photos to visit our featured groups!)

South Yuba River Citizens League are the leading regional advocates for creating resilient human and natural communities throughout the Yuba River Watershed by restoring creeks & rivers, regenerating wild salmon populations, and inspiring & organizing people. Founded in 1983 through a rural, grassroots campaign to defend the South Yuba River from proposed hydropower dams, SYRCL has developed into a vibrant community organization with over 3,500 members and volunteers based in Nevada City, CA.

Truckee River Watershed Council has experienced significant growth since it began in 1999. A dedicated group of bioassessment volunteers monitor area streams for benthic macroinvertebrates, 14 "stream teams" conduct regular chemical and physical monitoring of their "Adopted" streams, and the Council participates in the annual watershed wide Snapshot Day event.

RiverTree Volunteers are a nonprofit group dedicated to the maintenance of the San Joaquin River Watershed. They have removed 970 tires so far from the Fresno area of the San Joaquin River in 2011, and 6,694 since the organization was founded in 2003. On average they remove 32 tons of trash and debris from the San Joaquin River each year.



Batiquitos Lagoon Foundation is dedicated to the preservation, enhancement, and protection of Batiquitos Lagoon, one of the few remaining tidal wetlands on the southern California coast. The BLF is also involved in programs to educate the public in the values of this natural environment (coastal salt marsh with tidal mudflats) and the habitats it provides for birds, insects, plants, fish, mammals, and benthic animals.

California Urban Streams Alliance - The Stream Team administrates the Big Chico Creek Watershed Citizen Monitoring Program, which is now entering its 9th year. Citizen volunteers monitor water chemistry, bacteria, and flows monthly (including during storm events) and conduct bioassessment surveys each year during the fall. Recently, a Regional Water Quality Control Board's Safe-to-Swim program provided supplies and guidance for bacterial monitoring and has agreed to upload the 8 years of baseline to their website.

Upper American River Foundation was founded to conserve and protect the Upper American River watersheds in Placer and El Dorado Counties. Illegal dumping of trash is a major problem in the watersheds, and the UARF holds cleanups as part of the Great Sierra River Clean and continues working with the local newspapers to help educate residents about the issue. In 2011, the UARF initiated a survey of anglers to determine their knowledge of health hazards from remnant mercury used in the California Gold Rush of the 1840's.

Friends of the South Fork Kings River hosts volunteer monitoring and clean-up events to address water quality problems in their watershed. Thundershowers during 2011 resulted in huge sediment discharges following both prescribed and wild fires. The organization is currently investigating the effects of increased erosion and sediment load on wild trout and benthic invertebrate habitats.

San Diego River Park Foundation- Riverwatch Team is in its 8th year of monitoring, with two teams that sample monthly at 15 locations. The Riverwatch Team recently published 6- and 7-year reports, in which they discuss the development of a water quality index for public education. The Foundation also publishes a State of the River report that uses monitoring results to grade the River on trash, invasive non-native plants as well as water quality.

Map: California Department of Parks and Recreation

The Cutting Edge

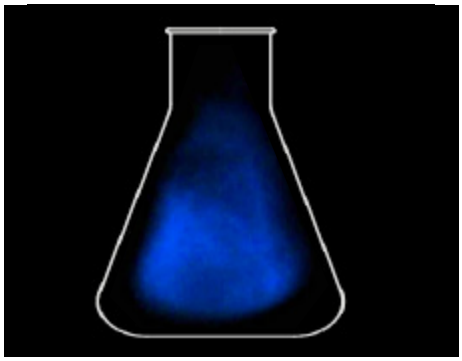
Emerging Technologies and Techniques

By Allison Sherris

Bioluminescent Bugs: A Quick Screen for Water Toxicity

One of the most exciting new technologies in water monitoring gives users quick information on water toxicity. "Rapid toxicity tests" utilize bioluminescent microorganisms to measure the toxic effect of water conditions. These organisms (dinoflagellates) are incubated in the sample water and their light production is measured with a photometer. If the water has toxic properties, luminesce is inhibited due to stress or fatality. Thus, the test can easily quantify the biological effect of the water sample.

Rapid toxicity tests are not designed to evaluate concentrations of specific contaminants, but rather to determine whether the particular chemistry of the water is harmful to life. They are intended as a screen—a quick test to see if something is wrong and further analysis is necessary. The system has the advantage of speed, generating results within 24 hours. Standard toxicity bioassays, such as observing the stress levels of crustaceans in water samples, can take several days.



Right: Growing bioluminescent dinoflagellates (with flask added for perspective) Banner picture: Cathryn tests water samples using QwikLite Photos courtesy of Assure Controls, Inc.

There are several commercially available technology systems, both laboratory- and field-based, that have been verified under the EPA's Environmental Technology Verification Program. These systems are already part of standard monitoring protocol for many industrial and federal programs. However, their use by volunteer-based monitoring groups has been limited by financial and laboratory constraints. But a few California watershed groups have been able to adopt rapid toxicity testing, generally with very positive results. The San Diego Coastkeeper has incorporated rapid toxicity testing using Assure Control's Qwiklite™ system into its monthly water quality monitoring activities. For over a year, the Coastkeeper has been using Qwiklite to test samples at 43 sites in San Diego County with the help of over 250 volunteers.

Travis Pritchard, Water Quality Lab Coordinator at the San Diego Coastkeeper, explains the laboratory protocol for the organization's rapid toxicity testing program. "The procedures for the Qwiklite are very simple. Water samples brought back to the lab are salinity adjusted to 30-33 ppt and then dosed with the dinoflagellate culture. The sample is divided into a 6 chambered cartridge and left to incubate on a 12 hour light/dark cycle. After 24 hours, the samples are removed from the light box and read through Assure's photometer. The reading machine pumps air into each chamber to excite the dinoflagellates and measures the intensity of light output, as compared to a control sample. The process is very easy for vol-

unteer lab techs to accomplish," says Pritchard.

Pritchard believes that Qwiklite is "an excellent tool" for other volunteer monitoring groups. He wrote, "The process is not technically challenging, but requires volunteers to be precise in their measuring of sample quantity and salinity adjustment. Traditional three-species toxicity tests are too expensive, too space intensive, and requires too much sample water to fit in nicely with volunteer programs that are often limited by funding and laboratory space."

Rapid toxicity tests have been a great success for the San Diego Coastkeeper, but the technology is still scarce among citizen water monitoring programs in California. If other monitoring groups are able to adopt systems like Qwiklite with as much success as the Coastkeeper, rapid toxicity tests have the potential to become important tools for volunteer watershed protection in California.

Samples ready in the light box. Photo courtesy of Assure Controls, Inc.

Algae: A Second Bioindicator

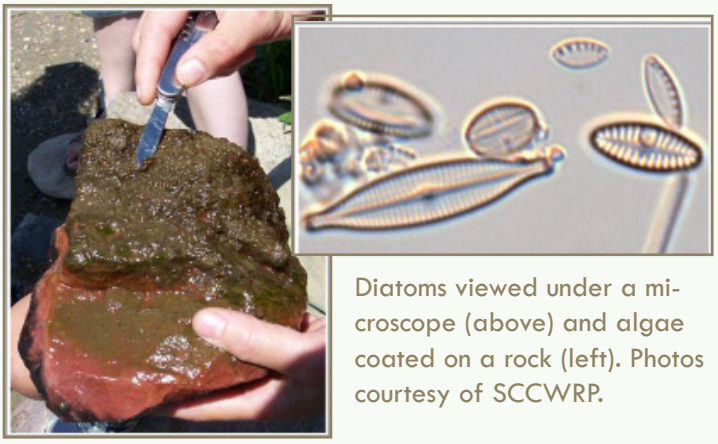
Bioassessment is one of the most important tools available to water monitors. The biological communities of streams and rivers can give us a much broader understanding of overall ecological integrity than the separate analysis of each physical or chemical property of the water.

In California, most bioassessment programs utilize benthic macroinvertebrates (see page 8). However, there is growing interest among watershed groups in incorporating more than one indicator into stream sampling protocols. Each aquatic community may respond to a different set of physiochemical stressors, so the study of more than one aquatic community can provide a more complete and reliable picture of stream health. For this reason, algae-based bioassessment has emerged as an important new tool for freshwater monitoring in California.

In many ways, algae are the ideal complement to benthic macroinvertebrates. Diatoms and soft-bodied algae are present in nearly every stream in California. In general, they have shorter generation times than their "bug" counterparts and can respond more quickly to changes in stream conditions. And as primary producers, algae are among the best bioindicators of nutrient levels. Nutrient enrichment—one of the most common water quality problems in California—can lead to algal blooms and eutrophication. Algae communities can also reveal clues into the pH and dissolved oxygen concentration of streams, the presence of heavy metals, or the amount of siltation.

Betty Fetscher, a biologist at the Southern California Coastal Water Research Project (SCCWRP), is one of the leading experts on algae bioassessment in California. Fetscher led a multi-institutional project team in the development of a preliminary algal Index of Biotic Integrity (IBI) to help southern California monitors utilize these attributes. The Index lets monitors evaluate essential aspects of stream health, including nutrient impacts, based on the taxonomic composition and biomass of algae communities.

Fetscher also lead-authored the Standard Operation Procedures document used by the California Surface Water Ambient Monitoring Program (SWAMP), which recently incorporated an algal component into their statewide sampling procedure. According to Fetscher, "algae are fairly straightforward to sample, and the SWAMP protocol allows them to be sampled in tandem with benthic macroinvertebrates, thus >



Diatoms viewed under a microscope (above) and algae coated on a rock (left). Photos courtesy of SCCWRP.

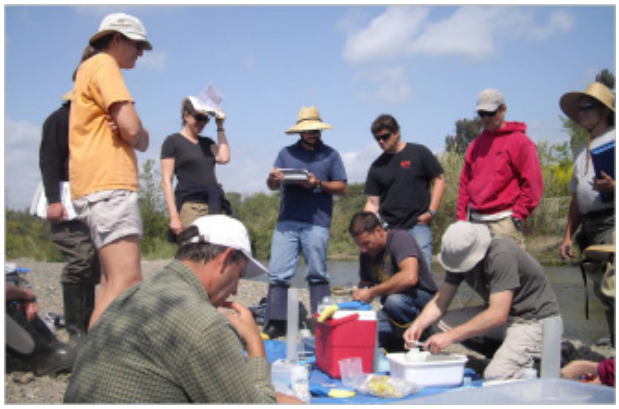
making the field portion of the combined bioassessment effort quite streamlined." The EPA and the USGS National Water Quality Assessment Program have also been utilizing algae sampling for over ten years, and algae bioassessment programs are routine in many other states and in the European Union.

Despite these resources, algae-based bioassessment is not common among volunteer-based monitoring groups. But Fetscher believes that algal IBIs (indexes of biological integrity) can become useful tools for citizen monitors as well. Most of the equipment needed to collect algae is inexpensive and easily assembled at home, and sample protocols are relatively simple. However, lab analysis of samples, which is necessary to identify diatoms and soft-bodied algae to species level, can be more expensive. Still, algae biomass and percent cover are important indicators of nutrient levels and can be easily measured.

"For really tight budgets, quantitative information about levels of stream algal biomass can be gathered by making point-intercept observations of macroalgae presence/absence across transects. This method is straightforward, inexpensive, and yields high-quality data that help managers determine whether there is an algal nuisance problem in the stream," says Fetscher. Clearly, algae bioassessment is a valuable tool for watershed groups hoping to supplement and improve their understanding of watershed health.

To learn more about sampling algae, take a look at the **official SWAMP field protocol**

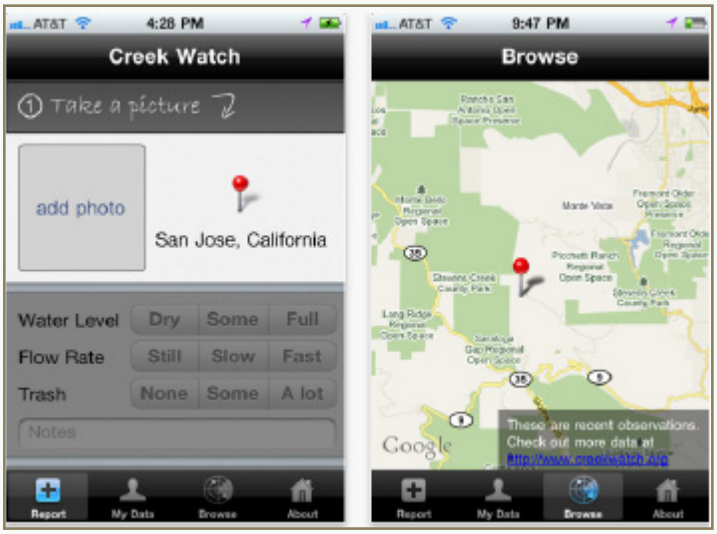
For basic information about algae for use in bioassessment, see **California's "Algae Plan"**



Fetscher leads a training session for SWAMP algae sampling protocol. Photo by Kangshi (Kenny) Wang.

Creek Watch: An "App" for Clean Water

Today, anybody with a "Smart Phone" can be part of a monitoring network. The Creek Watch Application was designed to make water monitoring easy and accessible to the concerned citizen, no experience required.



iTunes preview: IBM Creek Watch App

Users simply open the App, snap a picture of a water body, and answer questions about the amount of water in the creek, the rate of flow, and the amount of trash visible. The App can be used however frequently the user chooses and at whatever stream or river they happen to visit.

The data is compiled on the Creek Watch website and shared with watershed groups and agencies. The App was designed by researchers at the IBM Almaden Lab in collaboration with the Clean Water Team, who hope that it will help groups track essential aspects of stream conditions.

Watershed protection requires the time and collaboration of hundreds of individuals. Hopefully, the Creek Watch App will make it easier for hundreds more to become involved.

Learn more at **www.creekwatch.org**

Product Review:

Phosphate Test Kits

Reviewed by Jessie Welcomer
and Allison Sherris

Phosphate test kits are a quick way to measure phosphate levels in water samples. The kits generally employ one of two testing methods: the stannous chloride method or the ascorbic acid method. In the stannous chloride method, orthophosphate reacts with ammonium molybdate to form molybdophosphoric acid. Stannous chloride then reduces this to molybdenum blue. The intensity of the blue color is directly proportional to the phosphate concentration. In the ascorbic acid method, ascorbic acid reduces the phosphomolybdate complex to produce the blue color that is observed. The Council for Watershed Health tested two kits of each method and compared ease of use, accuracy, and general features of the kits.

Jessie determines phosphate concentration using the Orbeco-Hellige color disc. Photos by Allison Sherris.

Product 1:

CHEMetrics, Inc.

Phosphate (reactive ortho) CHEMets Kit; K-8510

This CHEMetrics kit requires 25 mL of water sample, the most of all four tested kits. The activator solution is administered in two liquid drops, and next a glass ampoule adds the reagent necessary for colorimetric analysis. The instructions provide clear drawings as to how to break the ampoule tip to add the reagent to the solution, and it is not difficult to do so—although this does create additional waste. After inverting the tube and waiting two minutes, the results are ready. For a low-range comparison (0-1 mg/L), the sample is compared with eight color shades in a kaleidoscope-like tube. For high-range phosphate (1-10 mg/L), there are ten color standards for comparison. While the tests were quick and straight-forward to perform, the kit only contains 30 ampoules, limiting the number of tests to 30, as opposed to the other kits' 100 tests. In addition, the kit does not use a blank, untreated water sample, making it harder to match the sample with known standards if test water is turbid. The discrete color standards for the low-range test are in increments of 0.1 or 0.2 mg/L, making accurate reading easier than in the high-range test (increments of 1 mg/L). However, any discrete color standard create the possibility that a sample's color may fall between standards, forcing the tester to estimate the accurate concentration.

Product 2:

Hach Company

The CHEMetrics kit high-range phosphate standards.

Phosphorus, Orthophosphate (Reactive) Test Kit, Model PO-14; #147500

The Hach Company's PO-14 test kit requires only 5 mL of the water sample. While this is the lowest amount required of the test kits, it is not clear on the test tubes which etched line marks the 5 mL level. Two tubes are filled – one is left as is and serves as the "blank" sample, and the other sample is mixed with two different reagents. For low range detection (0-5 mg/L), the first reagent is administered in four liquid drops, and the second, a powder, is mixed in. The powder is pre-packaged into individual packets, one of which is required per test. Waiting for the power to dissolve takes some time, but the results become clear within a few minutes. The treated sample is compared with the color wheel and blank. For high range detection (5-45 mg/L), the dropper is used to add 0.5 mL of sample water, which is then diluted to 5 mL. The test is repeated and the reading multiplied by ten.

Company Name	Product Name and Number
CHEMetrics, Inc.	Phosphate (reactive ortho) CHEMets Kit; K-8510
Hach Company	Phosphorus, Orthophosphate (Reactive) Test Kit, Model PO-14; #147500
Hach Company	Phosphorus, Orthophosphate (Reactive) Color Cube Test Kit; #1252200
Orbeco-Hellige, Inc.	Aqua Comparator: Phosphate LR (ortho-Phosphate); L147240

Product 3:

Hach Company

Phosphorus, Ortho-phosphate (Reactive) Color Cube Test Kit; #1252200

Hach's other phosphate test kit also only requires 5 mL of water, and this kit does make it clear what level the tube should be filled to. This kit only uses one reagent; one packet of the powdered reagent is required per test. After only one to two minutes, the results are ready to be compared with a color block with five color standards. This kit was the easiest and fastest to use and with only one reagent and required the least amount of steps. Furthermore, the test kit comes in a small, light-weight bag, making it easier to carry around than the other tests that came in larger and heavier boxes. However, the color block provides only five standards in increments of one mg/L, making low-range phosphate detection difficult and forcing users to estimate accurate concentrations. This, coupled with the lack of a blank, may make the results less accurate.

Product 4:

Orbeco-Hellige, Inc.

Aqua Comparator: Phosphate LR (ortho-Phosphate); L147240

This test kit has the tester prepare two test tubes – the blank water sample left untreated and the sample to add the reagents to. Each tube requires 10 mL of the water sample. Instead of powder or liquid drops, this test is unique in that the reagents are added as tablets. The two reagents are added one at a time, and the kit provides a tool to crush each tablet in the water after it is added. The use of the tablet ensures that the exact same amount of reagent enters the sample during each individual test, but the tablets proved somewhat hard to crush and dissolve. After the tablets have fully dissolved in the water, the sample is then compared to the blank and a color wheel (in much the same way as in the Hach Model PO-14 test). The continuous color wheel provides a more precise measurement of the water's phosphate concentration.

Market Price	Range of Measurement	Testing Method	Comparison Method	Number of Tests per Kit	EPA Approval
$57.10	1-10 mg/L	Stannous Chloride Method	Color standards	30	N
$56.69	0-45 mg/L PO4	Stannous Chloride Method	Color disc	100	N
$23.29	1-5 mg/L PO4	Ascorbic Acid Method	Color standards	100	N
$74.70	0-4 mg/L	Ascorbic Acid Method	Color disc	100	N

Q&A

Professionals in watershed management and protection take your questions on Quality Assurance, toxic phytoplankton, and Total Maximum Daily Load

Q: What is the significance of the new "Minimum Quality Assurance (QA) and Reporting Requirement System put out by the State Water Resources Control Board and the California Environmental Data Exchange Network (CEDEN)? Why should citizen monitors care?

A: This communication allows people to understand what the minimum QA components are for submission of their data. When any organization that's doing water quality monitoring wants to put their data into CEDEN, they must meet these minimum data requirements. If they have all those boxes checked, it's going to allow them to put their data into CEDEN. Once it's in CEDEN, everybody will have access to that information and can utilize it – your partners, other watershed folks, etc. If we have any type of issue down the line that can utilize that information, because we can't always predict the future, then that data will be in there for others to use.

If you don't meet those needs, you can use your data, but nobody else can, and it's a severe limitation. We want to make the best use of our time, our volunteers' time, and the resources from those that are kind enough to fund our programs. We want to reward everybody by making that data useable and more valuable.

Volunteers with the Council for Watershed Health take samples in the San Gabriel River Watershed

We've gone through a process of taking huge, long lists of what some people record in QA and distilling it down to a minimum set of standards that programs can use to understand the data and make use of it for their needs. This is the smallest set of QA requirements that you could utilize to come up with a usability factor. This guidance document will be coming out sometime in early 2012.

-Erick Burres, Citizen Monitoring Coordinator for the State Water Resources Control Board's Clean Water Team

Q: What harmful effects do toxic phytoplankton have on aquatic ecosystems and humans? How do monitoring groups keep tabs on phytoplankton?

A: A small number of the hundreds of phytoplankton species present in our coastal waters produce toxins that can be fatal to humans and other mammals. The two most common toxin-producers are *Alexandrium*, a dinoflagellate responsible for the paralytic shellfish poisoning (PSP) toxins, and *Pseudo-nitzschia*, a diatom responsible for domoic acid, which can cause amnesic shellfish poisoning (ASP). When these toxins are concentrated by bivalve shellfish such as mussels, oysters, clams, and scallops, they can be passed on through marine food webs to affect fish and marine mammals.

Phytoplankton toxins are a problem for human health in view of the poisonings of consumers of shellfish exposed to the toxins. Although human fatalities are rare from Alexandrium toxins, cases of eye irritations and headaches or other illnesses can be observed. In mammals, including humans, domoic acid from Pseudo-nitzschiaacts as a neurotoxin, causing short-term memory loss, brain damage and, in severe cases, death. In marine mammals, domoic acid typically causes seizures and tremors.

Additional human consequences of toxic phytoplankton blooms include high costs incurred by the fisher-

Non-toxic brown algae

ies and touristic industries. Fish and marine mammals with high mortality during blooms sometimes result in bans on the consumption and trade of fish and shellfish for quite some time afterwards.

The California Department of Public Health (CDPH) developed a volunteer-based phytoplankton monitoring program in 1993. This volunteer-based effort, the first statewide effort in the U.S., is one of several elements of CDPH's effort to protect the public from these potentially deadly neurotoxins.

Find out more at the **DCDPH Phytoplankton Monitoring Program website**

-Kristy Morris, Senior Scientist/Water Quality with the Council for Watershed Health

Q: What is a TMDL? How is it used?

A: TMDL stands for Total Maximum Daily Load. It is the maximum amount of a pollutant that can be discharged to a waterbody without causing an exceedance of the water quality objectives for that pollutant. The federal Clean Water Act requires TMDLs to be established for waterbodies where pollutants exceed the applicable water quality standards or objectives. Such waterbodies are considered to be "impaired" because the water quality is not adequate to fully support their designated beneficial uses (e.g. fishing, water contact recreation).

The goal of a TMDL is to restore water quality of an impaired water body to the level that will enable it to support its designated beneficial uses. TMDLs lay the framework for implementation actions geared towards eventual attainment of water quality objectives. A TMDL determines the loading capacity of an impaired waterbody, identifies all sources of the impairing pollutant (point and non-point), and allocates the load among the identified sources. These allocations to the identified sources generally require a reduction in their pollution discharge in order to address the impairment. Natural background sources, seasonal variations and a margin of safety are all taken into account in the allocations. Implementation strategies are developed to achieve compliance with these allocated loads and monitoring requirements are included to track progress towards achieving the water quality standard.

Upon adoption and approval, TMDLs are incorporated into the Water Quality Control Plan and the allocations (for point and nonpoint sources) are implemented through permits and/or nonpoint source management programs. More information on TMDLs can be found at **waterboards.ca.gov.**

-Ginachi Amah, Water Resources Control Engineer, Los Angeles Regional Water Quality Control Board

This map shows all impaired water bodies in California. Search by location or pollutant, or download data **here.**

Interview with a Water Warrior

By Jessie Welcomer

Joanne Hild

Joanne Hild has been passionate about conservation issues since her childhood.

"I always thought I wanted to study biology. Ever since I was a little girl, I was always one of those people who loved the outdoors and playing in the creeks," Hild said. "I don't think I really thought about doing anything else."

Hild, Executive Director and Biologist at Sierra Streams Institute (Streams), has been able to fulfill her childhood dreams. Hild earned her MS in Zoology from the University of Massachusetts in Amherst after graduating from Tufts with a BS in biology. She also conducted research with the Wildlife Conservancy in Sacramento, with the Bermuda Biological Station and with Cornell University.

Hild's work with Sierra Streams began in 2000, when she became the organization's first staff member. Over the past 11 years Hild has worked to transform the organization into one of the leaders in watershed health in California.

Sierra Streams Institute began in 1995 as Friends of Deer Creek when a group of citizens became concerned about the impact on the creek of a bridge construction project. With money from their first grant, Friends of Deer Creek hired Hild in 2000, and the organization has been growing in influence ever since. In 2012, Streams is planning to start training other watershed groups and agencies in the state.

Joanne and other volunteers with the Sierra Streams Institute

"Gradually, using science as our base, we have grown and become a leader for other watershed groups that are using science as a way to make changes in the health of the environment," Hild said.

> "We are a scientific organization. We base everything that we do on taking scientific data... You can look at numbers, you can look at data, and you can come to a conclusion in a collaborative way."

Hild emphasizes the role that quantitative scientific data has played in her organization's success. "We are a scientific organization. We base everything that we do on taking scientific data," Hild said. "I think science is set up to be as non-biased as possible. You can look at numbers, you can look at data, and you can come to a conclusion in a collaborative way. It's always worked very well for us."

Friends of Deer Creek became Sierra Streams Institute in 2010 to reflect the organization's growth. "[The new name] better reflected our scientific base and our broader base regionally," Hild said. "We are looking at watersheds in all of Northern California now and doing work in the whole region with Deer Creek as our model."

The initial work focusing on Deer Creek, however, still proves valuable to the organization today. Streams has 11 years worth of data regarding the health of Deer Creek, and Hild said the solutions developed for Deer Creek have allowed her organization to work more successfully with other nearby streams.

One of the ongoing regional projects of Streams is working to analyze the impacts of historical mining waste resulting from more than a century of gold

mining that began with the California Gold Rush. "We're in an area where there was extensive gold mining, and so a lot of contaminants still remain. We did an assessment of the whole region for mining contaminants and their impacts, and we also got funding to do some cleanup," Hild said.

To assist with cleanup in a sustainable way, Streams has been looking at phytoremediation, which uses plants to absorb the heavy metal contaminants. Hild has helped her organization look into finding native plant species that naturally absorb the mining contaminants.

Streams is also examining the human health implications of living with mining waste. The organization is partnering with scientists at the Cancer Prevention Institute of California to look into the health effects mining contaminants have on local communities.

Another current effort is to determine the impact of a local Deer Creek dam on watershed health, and to carry out subsequent restoration projects including gravel augmentation – replacing gravel into the creek that are blocked by the dam and which provide essential habitat for spawning salmon. "We are putting gravel back into the creek and then doing research as to how healthy it becomes, using benthic macroinvertebrates as health indicators as well as tracking how many salmon come back and use that gravel for spawning," Hild said.

Hild also emphasizes the importance of the organization's outreach and education programs. Before coming to work at Streams, Hild was a Biology Professor at Sierra College near Sacramento, California for fifteen years. Hild said that her past work in education gave her the leadership experience necessary to serve as Executive Director and helped her realize the importance of hands-on projects for students. At Sierra College, Hild truly found her passion when she began engaging her students in hands-on fieldwork.

"We started working on real-life projects, going into the community and finding out who was doing some restoration work," Hild said. Sierra Streams has an education program that allows charter school students and homeschooled students to accompany scientists into the field to work on restoration projects and understand the science behind monitoring watershed health. The program is currently for middle school and high school students, but Hild said a program for younger students is in the works.

Hild added that Streams aims to connect not only local students to the watershed, but all members of the community as well. "We do quite a lot of outreach to the communities in which we serve. Our goal is to have the stakeholders of the community become knowledgeable and involved with the health of the watershed," Hild said. "We not only want to understand what is going on, but we also want to share the responsibility for the future of its health."

A large part of this community involvement is citizen monitoring. Streams has about 35 volunteer citizen monitors that gather monthly water quality data at about 16 different sites in the region. Volunteers conduct macroinvertebrate sampling, algae sampling, and storm sampling. Hild stresses that this helps the local community stay involved with the whole process of preserving stream ecosystems.

> "[Citizen monitors] help us come up with some of our scientific questions, they help us go out and gather data and do this monthly monitoring, and then they help us come up with the solutions. I can't imagine doing it any other way."

"Having the citizen monitors there involves them in every step of the way: they help us come up with some of our scientific questions, they help us go out and gather data and do this monthly monitoring, and then they help us come up with the solutions," Hild said. "I can't imagine doing it any other way."

Hild herself is able to accompany the monitors about six times a year, which she says is a great opportu-

>

nity. “I certainly don’t want to be stuck in my office. I’m a biologist, I want to be out there with the monitors,” Hild said. “It’s important to have everybody on the creek doing the work that’s the basis for all of our data collection. It just keeps you tied to the work, tied to the data, and tied to what can be improved.”

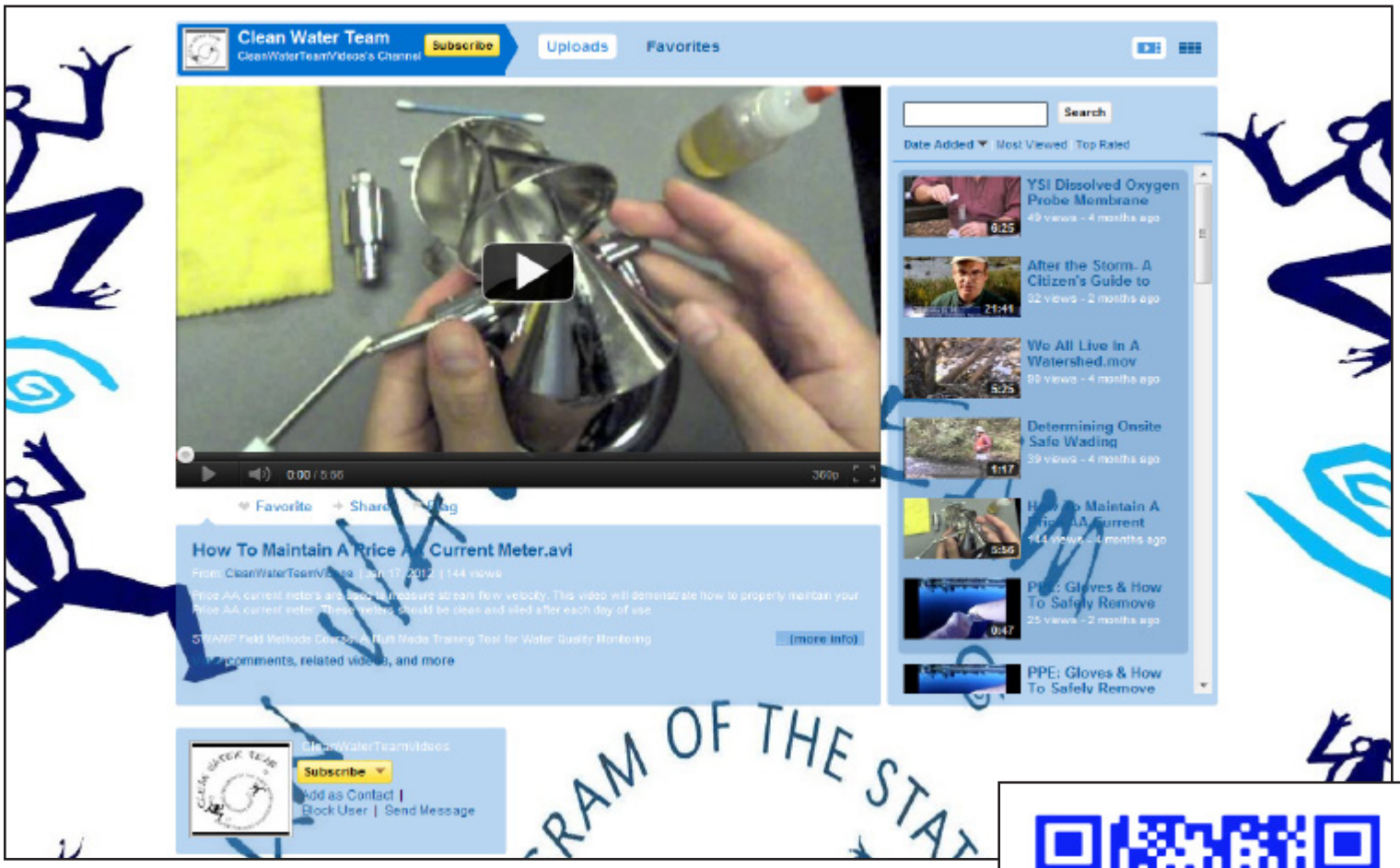
Hild encourages interested parties to get involved with local watershed monitoring and focus on the helpful effects small-scale solutions can have on large-scale problems. Hild’s own work, apart from fulfilling her childhood dreams, also keeps her positive about the future.

“Sometimes when I think about global warming and large global problems I get very overwhelmed and discouraged,” Hild said. “But if I stay focused on going from community to community and helping to solve local problems, it really keeps me feeling like things are getting done and improving, and that they all will add up to a bigger picture of health.”

Hild’s final piece of advice to future monitors and scientists is a simple one: “Get out there and enjoy the environment that you’re helping to save.”

Photos courtesy of the Sierra Streams Institue
Click to visit the **Sierra Streams Institute website**

Clean Water Team VIDEOS



http://www.youtube.com/cleanwaterteamvideos

YouTube

Upcoming Events

The 2012 California Citizen Monitoring Calendar was created to assist and highlight Citizen Monitoring within the state and to serve as a marketing resource. This calendar is a collection of all the important water related days, weeks, months, year long celebrations and outreach events for California. Having access to this knowledge allows citizen monitoring programs and watershed stewardship groups to better promote their organizations, educate the public, celebrate their activities, fund raise and recruit volunteers.
-The Clean Water Team

Upcoming Webinars

2012 Webinars:

January

1/19 An Introduction to the Concept of Reporting Limits
Presented by the SWAMP QA Team

February

2/16 8-Year PSA Report: Ecological Condition Assessments of California's Perennial Wadeable Streams (2000 through 2007): Novel use of probability surveys to assess the condi tion of streams draining agricultural, urban, and forested landscapes
Presented by Pete Ode, DFG-SWAMP Bioassessment Coordinator

March

3/15 Finding the Right Funders
Presented by Barbara Floersch, Grantsmanship Center

April

4/12 StreamStats: A streamflow web application

Upcoming and archived webinars can be found at the **WQMCN website**

The Water Quality Monitoring Collaboration Network (WQMCN) is a voluntary monthly Webinar that allows members of the monitoring community to network and exchange information and ideas on topic of interest. The Webinar format, content, and topics of interest vary in response to input from participants. Sessions are planned to share technical and support tools for monitoring, assessment and reporting; to encourage discussion on common concerns like information management and program development; and to provide a forum for networking and collaboration.
-WQMCN

Council for
Watershed Health

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