

Summer/Fall
2014



WATERMARKS

Issue 15

The California Newsletter for Citizen Water Quality Monitoring

- **On The Rocks: Sea Stars**
- **Snapshot Day: Lake Tahoe & The Truckee River Watershed—14th Anniversary of this Bi-State Monitoring Event**
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Salmon River

Watermarks: The California Newsletter for Citizen Water Quality Monitoring

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A product of the State Water Resources Control Board's Clean Water Team

Editor:
Erick Burres
eburres@waterboards.ca.gov

Guest Writers:
On the Rocks
&
Interview with a Water Warrior
by
Heather Smith
hesmith@uwalumni.com

Snapshot Day: Lake Tahoe & the Truckee River Watershed
By
Richard Booth
rbooth@waterboards.ca.gov

Cover photo:
Sea Stars and Sea Urchins
By E. Burres



Los Angeles Waterkeeper



Sierra Streams Institute

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Snapshot Day: Lake Tahoe - Truckee River Watershed

14th Anniversary of this Bi-State Monitoring Event

Richard Booth - Lahontan RWQCB
rbooth@waterboards.ca.gov

On the morning of May 17th 2014, almost 400 *volunteers* gathered around Lake Tahoe and the Truckee River to monitor the water quality of their watershed at *over 70 sites*. Volunteers have been sampling sites around Lake Tahoe and the Truckee River for 14 consecutive years. It's one of the largest water quality monitoring events in California history and all of us participants feel like members of the California Water Board's Clean Water Team.

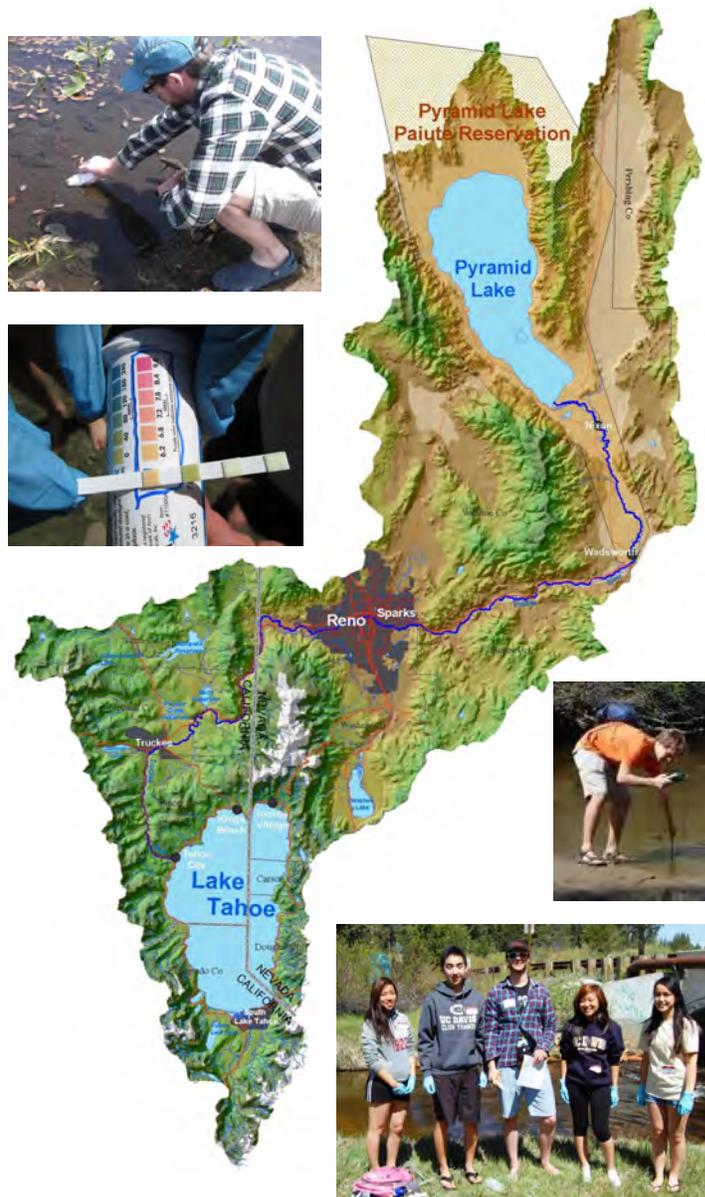
There are a lot of reasons folks spend a Saturday morning collecting water samples and making visual observations about the lake or the river environment. Some do it because they are curious; they've seen the posters around town inviting their participation. Maybe some accompany friends who are veteran Clean Water Team members. Perhaps others are part of a class or an organization. Then there are the environmental professionals who relish the chance to get away from their computer screens and into the field.

But the two most important reasons they all do this are:

- To collect valuable water quality information, and
- To promote environmental education and stewardship

It's a Big Event for a Big Watershed

The Lake Tahoe/Truckee River watershed encompasses a large area. Lake Tahoe is the largest alpine lake in North America (191 square miles), and is the sixth largest lake by volume in the United States (122,160,280 acre-ft), placing it just behind the five Great Lakes. Lake Tahoe is also recognized as an "Outstanding National Resource Water". The



snapshotday.org

Truckee River is the sole outlet of Lake Tahoe and flows for 121 miles draining parts of the high Sierra Nevada before emptying into Pyramid Lake (Nevada) in the Great Basin.

To accommodate the travel time to the sample sites, the watershed is divided into four areas and

volunteers pick the area they are interested in sampling that morning. They can choose the South Shore of Lake Tahoe where they will go to specific, pre-determined sampling locations at one or two of the streams that flow into the Lake; or they can go to the North Shore of the Lake and sample tributaries in that area. The Truckee River Watershed Council hosts the sampling on the Middle Truckee River, from the Lake to approximately the California border. Our colleagues in Reno, Nevada sample the Lower Truckee River and Pyramid Lake. In Nevada they actually sampled one day before Snapshot Day to engage school kids as part of their school day.

On the day of the event, the volunteers meet at one of the four gathering places to receive some basic instruction and to hear why their help is important. They are taught the “big picture” of watersheds and water quality. They are then broken up into small teams with a Team Leader who takes their Team out to their designated stream sampling site.

Sampling sites are pre-selected to best represent the water quality for that portion of the watershed. Other factors in picking a site include how accessible it is and how safe it is for collecting water samples (nobody wants volunteers accidentally floating down the stream in fast flowing water!). At the sampling location the volunteers describe pertinent features of the stream and the surrounding terrain on a checklist provided in their monitoring packet. They take a series of pictures of the sampling site and measure certain water quality parameters such as temperature, pH, electrical conductivity, TDS, and dissolved oxygen. Finally, they collect water samples for analysis in local laboratories that are tested for fecal coliform bacteria, nitrogen, phosphorus, and turbidity.

Preparation

Weeks before the three-hour Snapshot Day event, the organizers perform all of the tremendous logistics necessary to support 400 volunteers in one morning’s event, including obtaining supplies and equipment, advertising, calibrating equipment, and training Team Leaders. The Team Leaders are volunteers but are not necessarily environmental pros. Typically, they were a volunteer at a previous Snapshot Day and receive a few hours of training by Snapshot Day organizers a week or two before the main event.

Water Quality Information

Fourteen measurements collected during the same season each year at over 70 sampling sites is a remarkable achievement and a valuable source of data. The data tell us if the trends of the water quality parameters measured change or stay constant. It is also possible to detect areas that may have water quality problems, or confirm whether a problem area detected still has that problem.

Education and Stewardship

Common sense and research tells us that hands-on participation is the best way we learn and engage. Volunteers learn about water quality and its many aspects while they are in the field. These volunteers are more likely to become informed active stewards of our watersheds because they will have been introduced to the big picture. Lastly, the act of observing and sampling a specific site creates a personal experience with the water body.

For the volunteer, this happens all during one morning. It’s a large effort for the organizers, but not a huge endeavor for the volunteers. Nonetheless, for almost all of the volunteers, the three hours are fun, instructive, satisfying, and memorable. That is why organizers do it and why volunteers participate. You should consider it too.



com · pen · di · um

/kəm 'pendēəm/



Noun a collection of concise but detailed information about a particular subject, especially in book or other publication.

The Clean Water Team’s [**GUIDANCE COMPENDIUM FOR WATERSHED MONITORING AND ASSESSMENT**](#) is a collection of **How to Manuals** (starting and running a monitoring program), **Fact Sheets** (presenting ecological significance and regulatory benchmarks), **Information Papers** (method “menus” and principles), **Standard Operating Procedures** (step by step instructions) and more. This Compendium was created to help citizen monitoring programs organize and produce actionable data for watershed stewardship.

Evaluating Your Volunteer Water Quality Monitoring Program



There are three primary purposes for evaluations:

1. To inform you about the state and effectiveness of your program or initiative
2. To provide information that can be used to evolve, refine or improve your efforts, and
3. To collect evidence of progress toward, or achievement of, intended outcomes in order to communicate the impact of your project.

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hen you evaluate, you show what you have accomplished, which is important both in terms of accountability and making the case for future funding.

Evaluation helps ensure that programs are meeting their goals, the needs of their stakeholders, and creating the benefits for which they were created. Evaluation should occur on an on-going basis, and be an integral part of overall program activities. Timelines for collecting evaluation data should align with the schedule of program activities. Many programs engage in evaluation over the course of a one-year cycle; collecting data throughout the year, then analyzing and making use of the data annually.

One of the most important and overlooked steps in evaluation is to collect some baseline data. It is difficult to know what you've accomplished if you don't know what you are starting with. By incorporating evaluation into your program development, you provide the opportunity to gather baseline data, as well as allowing the program to better adapt to social and environmental changes, supporting long-term success.

To help Citizen Monitoring programs conduct these types of evaluations, the USDA National Facilitation of NIFA Volunteer Monitoring produced [Factsheet XVI: Evaluating Your Volunteer Water Quality Monitoring Program](#). This factsheet briefly explains why you should evaluate your volunteer monitoring program. It provides examples of what to evaluate, and discusses five essential steps for doing evaluation by means of a case study. Additionally, resources noted throughout the document and at the end provide considerably more information about conducting a program evaluation.



ON THE ROCKS

Sea Stars

Heather Smith
hesmith@uwalumni.com

The sea star is one of the many sea creatures that inhabit California waters. Formally known as the star fish (scientist like to preserve the term fish for creatures with fins), sea stars are one group of water-dwelling animals that have scientists concerned. Sea stars along North America's Pacific coast have been disappearing at an alarming rate – read on to learn more about these unique creatures and ways in which you can help track California sea star populations!

California coastal waters are home to a number of species of sea star, all of which belong to the phylum Echinodermata. Echinoderms, which include other creatures such as sea urchins and sand dollars, are marine invertebrates with a rough, protective, calcified skin. A common feature to all Echinoderms is their radially symmetric body construction; all appendages radiate from a central axis.

Sea stars can be found hanging out in ocean waters around the globe, from tropical waters to arctic habitats. They are found the entire span of California coastal waters. Some sea stars prefer the rocks and sea grass beds of intertidal zones (areas submerged with sea water twice a day with each tide), while other prefer the sand and mud of subtidal regions (areas submerged with sea water most of the time). Other

sea stars live on the muddy, deep sea floor.

Sea stars have an incredible water vascular system that enables them to slowly walk along the sea floor. This hydraulic system involves special chambers and muscles that allow sea stars to force water through their tube feet, called podia. Sea stars have a collection of podia on each appendage; each sea star has thousands of these so-called feet. Forcing water into the podia extends them outward; contracting special muscles results in the retraction of podia. Tiny suction cups on the end of sea star podia aid in walking and allow them to grasp prey or secure themselves to surfaces. (Learn more by watching [ScienceMan Digital Lesson - Animals - Sea Star Tube Feet.](#))

Sea stars are a keystone species in coastal waters. An ecosystem may experience a dramatic shift if a keystone species is removed, even though that species was a small part of the ecosystem by measures of biomass or productivity. The ochre sea star, *Pisaster ochraceus*, lives in intertidal areas and preys on mussels. If the sea stars were to be removed from the ecosystem, mussel populations could expand rapidly and cover the rocky intertidal shores so exclusively that other species could not establish themselves. Consequently, the interaction between the ochre sea star and mussels supports the structure and species diversity of these communities.

The majority of sea stars are carnivores, a few are omnivores, and some even display cannibalism in the right situation. Most eat clams, mussel, oysters, and detritus (organic matter from decomposing plants and animals). Sea stars are quite unique in the way that they consume their meals. They grasp their prey's shell and using the suction cups on their podia and pry the valves (shells) apart and then extend their stomach outside of their body cavity. The stomach sac exudes out of the sea star's mouth and seeps into the shell opening. The stomach then digests the prey's tissue and retracts back into the sea star's body once the meal is complete.

Sea stars make a tasty meal for a number of animals including crabs, sea otters, and sea gulls. Some predators eat sea stars whole, while others prefer the tender underside. Sea otters often eat only parts of the sea star before moving on to their next meal. As a result, areas where sea otters have been feasting are often littered with sea star amputees. But amputees don't remain so for long. Sea stars have an amazing ability to regenerate appendages and sometimes, entire bodies. Most of the sea star's vital organs are located inside their appendages; some species can regenerate an entire new body from just an appendage.

Humans are also a sea star threat. Tourists, divers, and researchers collect sea stars; this has resulted in population declines in some areas. Sea star collection has been outlawed in many places. According to California Code of Regulations Title 14, Section 29.05(d), sea stars may not be taken off the nearshore rocks if they are between the mean high tide line and 1,000 feet seaward of the mean low tide line. With a valid fishing license, anglers may take 35 sea stars outside of this zone.

California sea stars are facing a new and very real threat - sea star wasting syndrome. This disease has been plaguing sea stars intermittently for the last 40 years and has rapidly devastated populations in North America's Pacific coast. The disease arrived on the west coast in 2013 and spread from Alaska to Baja California by spring 2014. Although this disease is not new, the current magnitude of its devastation and geographic extent is unprecedented.

Over 20 species of west coast sea stars are affected by sea star wasting syndrome. Symptoms include sores and corresponding tissue decay. Eventually, the decaying tissue causes total body disintegration and

death – usually within a week. Researchers estimate a 95 percent mortality rate for sea star wasting syndrome.

The cause of sea star wasting syndrome is still a mystery. The scientific community believes that bacteria, viruses, or pollutants - or a combination of these elements - may be responsible for the syndrome. Some scientists believe warmer temperatures may intensify the disease. Cornell University is currently using molecular diagnostic methods to determine if there is a viral or bacterial culprit. (Learn more by watching [Sea Star Wasting Syndrome Causing Mass Die-Off on the West Coast](#))

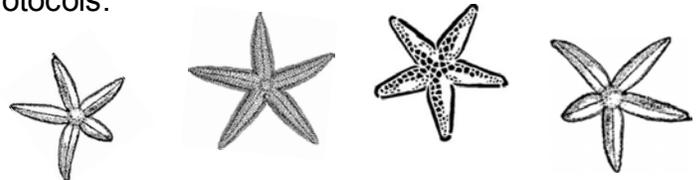


Bat star with sea star wasting syndrome

Researchers from the [Multi-Agency Rocky Intertidal Network \(MARINE\)](#) first discovered this go-around of sea star wasting syndrome in the state of Washington in June 2013. Since then, MARINE monitoring groups and various other university and governmental agencies have been documenting wasting episodes along the west coast.

Citizen science groups are getting involved in efforts to track the spread and intensity of sea star wasting syndrome. Researchers from UC Santa Cruz began training citizens in Oregon this spring to cover the large volume of unsampled coastline; other citizen monitoring groups are following suit. Citizen scientists have been using MARINE sampling methods and working with coastal resource managers to collect valuable data used in the MARINE database as well as other west-coast databases.

Interested in helping? Visit seastarwasting.org to find out more and how you can help. Contact UC Santa Cruz's [Melissa Miner](#) or [Rani Gaddam](#) for details on how to collect additional sea star data using MARINE protocols.





2013 Year in Review

United States Leaders 2013

U.S. Leaders in Sites Monitored	
Florida	10,143
Colorado	418
California	242
Puerto Rico	193
Texas	155
All Others	1,371
TOTAL	12,522

U.S. Leaders in Participant Visits	
Florida	19,830
California	1,799
Puerto Rico	1,699
Colorado	1,520
Texas	470
All Others	14,443
TOTAL	39,761

Participation and Averages by U.S. State or Territory

State	Sites	Participant Visits	Disolved Oxygen (DO)	pH	Tempera- ture (°C)	Turbidity (JTU)
California	242	1,799	5.21	6.98	15.59	18.09

World Water Monitoring Challenge™ is an international education and outreach program that builds public awareness and involvement in protecting water resources around the world by engaging citizens to conduct basic monitoring of their local water bodies.

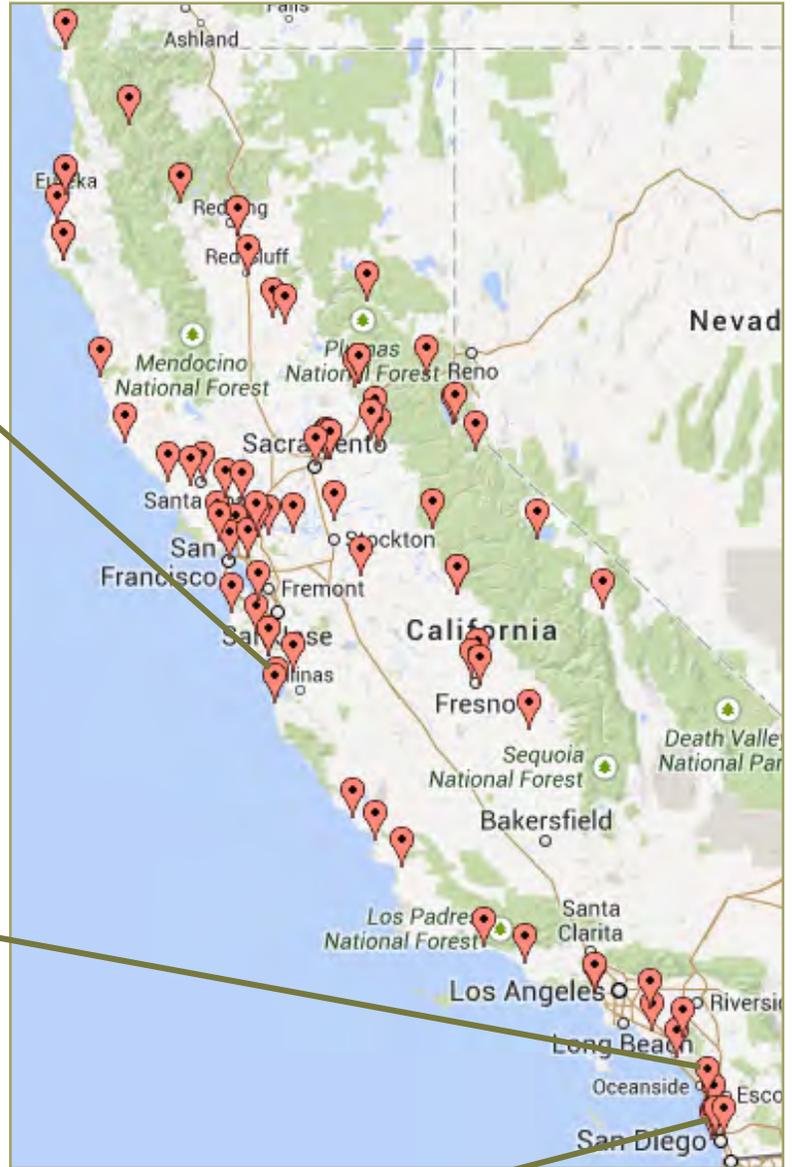
CA events are typically held around October 18 which is the Clean Water Act's anniversary date. But anyone can participate and hold a WWMC event anytime from March 22 through December 31 to test the water. (You can also observe the official World Water Monitoring Day on September 18.) www.worldwatermonitoringday.org/GetInvolved.aspx

WWMC is a great way to... highlight your ongoing water quality monitoring program, involve the public through public participation, acknowledge and recruit volunteers, share through the media your watershed concerns, involve STEM with environmental monitoring and/or to support your fund raising efforts.

Learn About Your Watershed!



Monterey Bay National Marine Sanctuary provides many volunteer opportunities that provide valuable research data through their Water Quality and Beach Monitoring Programs. First Flush monitoring is held during the first major storm of the year, volunteers analyze water quality to characterize "first flush" storm water runoff. As part of Urban Watch volunteers collect urban runoff water samples from storm drains during the dry weather months that are analyzed for contaminants. MBNMS also conducts Beach-COMBERS, a beach monitoring study, utilizing volunteers to sample selected sections of beach for stranded marine birds and mammals.



STARR RANCH SANCTUARY

Audubon CALIFORNIA

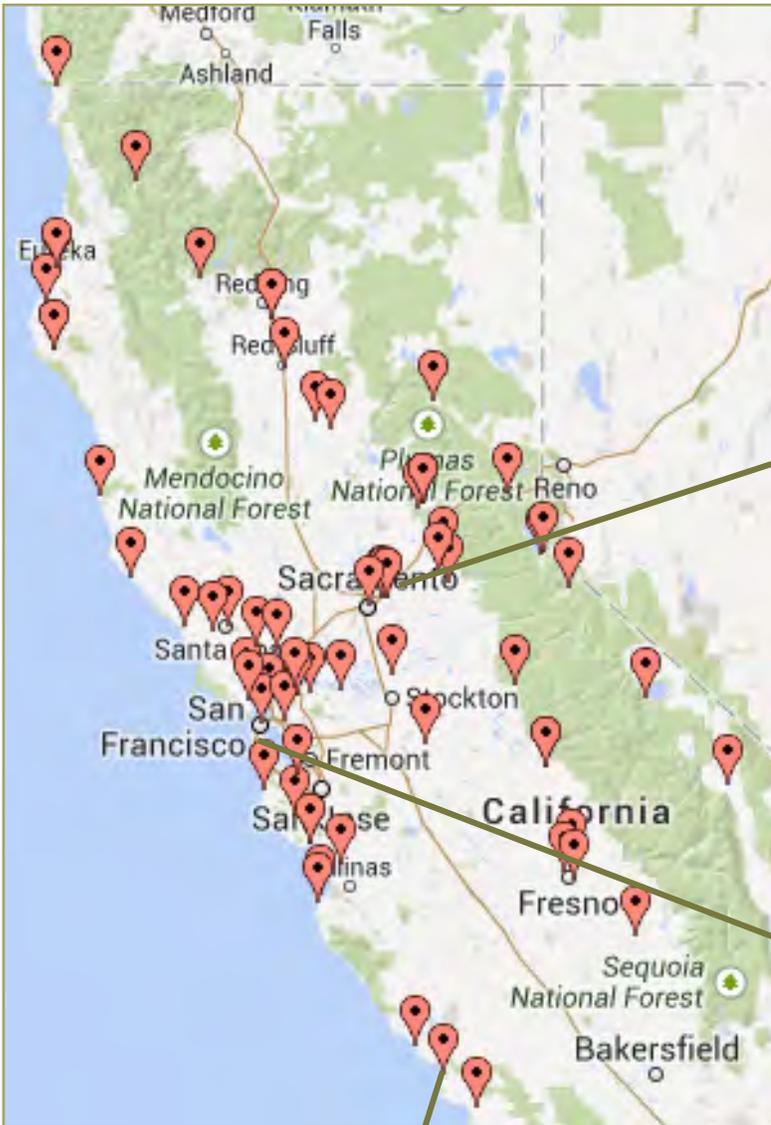
The primary mission of Starr Ranch Sanctuary is to offer innovative approaches to land management and environmental education that will influence the way Southern California citizens appreciate, conserve, and manage wildlands. Starr Ranch Sanctuary also serves as a focal point for environmental activism and networking as well as a meeting place for planning efforts that involve both developers and environmentalists.

Volunteers at Starr Ranch Sanctuary have been monitoring water quality, habitat and conducting bioassessments



Famosa Slough is a wetland preserve managed by the San Diego Park and Recreation Department with the help of the Friends of Famosa Slough. FFS and its volunteers have implemented and monitored water quality improvement and habitat restoration projects.

Learn About Your Watershed!



For more than 25 years, the American River Conservancy (ARC) has been preserving rivers and land for life. They work to preserve natural areas and cultural resources and build an enduring ethic of care, building a sustainable future for humans in harmony with nature. Safeguarding the region's water supply and protecting riparian corridors is a main focus for the Conservancy. The various tributaries that make up the American River and Cosumnes River systems feed into the Sacramento – San Joaquin Delta to provide water to more than 20 million Californians.



San Francisco Baykeeper works to reverse the environmental degradation of the past and promote new strategies and policies to protect the water quality of the San Francisco Bay. Baykeeper was founded in 1989 as the fourth "waterkeeper" organization in the nation and the first on the west coast – on the principle that our waterways are common property, owned by all who use and enjoy them. Using advocacy, water quality monitoring and science, on-the-water patrols, public education and legal action they work to reduce pollution and advance restoration.



Central Coast Salmon Enhancement (CCSE) is committed in helping their community to strengthen, protect and understand their watersheds and fisheries. CCS has worked to improve and enhance habitat and flows for threatened Steelhead trout in Arroyo Grande Creek and in the Pismo Creek Watershed.

Share information about your program!

Take this simple [survey](#) for the next *Citizen Monitoring Directory*

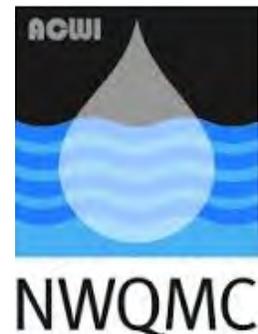
NWQMC's Volunteer Monitoring Webpage & National Monitoring Conference

The National Water Quality Monitoring Council (Council) has recognized the Volunteer Monitoring (VM) community as a viable and valuable member of the monitoring community, essential to its purpose and mission. One of the 25 Council seats is for a Volunteer Monitoring Representative.

This VM website is designed to leverage, not duplicate, existing VM resources, tools and networking opportunities. A wealth of knowledge, experience, wisdom and resources exists within the VM community that can be shared among the entire community.

Keep in touch with citizen science water quality monitoring programs nationwide.

- ◇ [Volunteer Monitoring News](#)
- ◇ [Resources for Volunteer Water Quality Monitoring](#)
- ◇ [Volunteer Monitoring Representatives to the NWQMC](#)
- ◇ [USEPA Volunteer Monitoring LISTSERVE](#)
- ◇ [Volunteer Water-Quality Monitoring Program Directory](#)



The National Monitoring Conference is a leading forum for communication and collaboration among the monitoring community. The conference explores many water monitoring issues.

Attendees represent governmental organizations, tribes, volunteers, academia, watershed and environmental groups, and the private sector. The conference is a showcase for new findings on the quality of the Nation's waters and for highlighting new innovations and cutting-edge tools in water-quality monitoring, assessment, and reporting.

9th National Monitoring Conference, Cincinnati, OH, April 28-May 2, 2014 Conference Results

Abstracts: http://acwi.gov/monitoring/conference/2014/2014_NMC_Abstracts_2014-04-15.pdf

Presentation Material: <http://acwi.gov/monitoring/conference/2014/#>

Posters: http://acwi.gov/monitoring/conference/2014/3Posters/posters_2014_conference.pdf

Interview with a WATER WARRIOR

Barbara Horn

Heather Smith
hesmith@uwalumni.com

Venturing up into the multi-state shared Colorado River Watershed we bring you Water Warrior Barb Horn. Horn is a water quality specialist at [Colorado's Department of Parks and Wildlife](#) (CPW), the agency responsible for managing the parks and wildlife of the Centennial State. She joined the CPW in the late 80's with the belief that real people could produce real science. As a founder of [Colorado River Watch](#), the state's citizen water quality monitoring program backed by CPW, Horn plays a vital role in educating Coloradoans about water quality and enabling them to monitor Colorado streams and rivers.

Horn began exploring her love for water quality and aquatic ecosystems while attending the University of Colorado, Boulder (CU-Boulder). "When I learned you could make a profession learning about rivers - I was sold," said Horn about a stream ecology course at CU-Boulder. She earned two undergraduate degrees— one in Environmental Conservation and the other in Environmental Economics— and later a master's in Aquatic Ecology from CU-Boulder. An internship with Colorado Division of Wildlife exposed Horn to the regulatory arena of water quality management. The internship provided her with her first exposure to data gaps – and how they affected management decisions. Horn wrote a water quality monitoring plan, gave it to the agency responsible for implementing the Clean Water Act in the state, and asked "if data was collected in this way, would you use it?" They said yes; however she never specified who would be collecting this much-needed data. Right then, she knew her passion for working with students and citizens, quest for high quality data and desire for proving the worth of citizen science would steer her career.

Colorado, one of the only true "headwater" states (meaning that all the water in its streams and rivers



Photo: Candice Hopkins, National Water Quality Monitoring Council

originate from snowmelt and precipitation), provides water for eighteen states, including California, and parts of Mexico. The primary goals of River Watch are to provide students, teachers and citizens with hands-on experience in order to better understand river ecology while collecting high quality data for serious decisions on Colorado's 770,000+ miles of stream and river. The program started as a school-based volunteer water quality monitoring program. In 1989, River Watch training sessions were held at six schools in northern Colorado. Over 600 volunteer groups and 65,000 Coloradans have been directly involved in River Watch since its 1989 launch.

The majority of volunteers Horn works with are educators and students - though individuals, watershed groups and municipalities also monitor using River Watch protocols. The River Watch program serves 140 watershed groups that sample over 300 rivers annually. These groups monitor Colorado's streams and rivers for pH, temperature, dissolved oxygen, alkalinity, hardness, metals, nutrients, physical habitat and macroinvertebrates.

River Watch has more volunteer –generated data stored in the Environmental Protection Agency’s water quality database, STORET, than any other citizen monitoring program in terms of scope and longevity. The program collects more riverine water quality data than any other water quality agency in the state. River Watch volunteers provide about eight full time persons worth of work annually and their mileage equates to driving from Denver to New York City three times each year!

Horn spends her days training volunteers, writing grants, conducting research and collecting, analyzing and validating volunteer-generated water quality data. River Watch’s thorough training and strong Quality Assurance/Quality Control Program ensures robust data. The program has been extremely effective at filling in the state’s data gaps. Data generated by River Watch volunteers is used to develop stream chemical and biological standards, determine impaired stream listings/ de-listings and stream restoration project effectiveness and are used in many other state water quality management decisions. Of her work, Horn reports that “It has been a reward to see agency staff use volunteer data in the highest level of decision making when the data quality is there. We continue to have naysayers who do not believe anyone outside of themselves could possibly provide any valuable data. Thus, educating, informing and outright defending is still required but has been less and less necessary as time passes. The amount of data collection possible as the result of

engaging citizens is just now being realized in a way that can be quantified – and it is astounding.”

When Horn began coordinating and managing Colorado River Watch, she fully immersed herself into the national water quality monitoring scene. Horn serves as a chair of the Rocky Mountain Watershed Network and the [River Networks Board](#) and is outreach coordinator of the [Colorado Water Quality Monitoring Council](#). After serving a six year term, she recently stepped down from the role of Volunteer Monitoring Representative on the [National Water Quality Monitoring Council](#). She received the [River Hero’s award](#) in 2002 and was the first female to receive the award. But don’t expect to hear this from Horn herself; she is quite humble about her titles and accolades. “I am not one for titles and awards – I just love people and rivers so [my career] is a good mix for me” says Horn.

Horn’s words of wisdom for citizen water quality monitors and Water Warriors across the globe: “We are connected, your air makes it to my skies and what is in the skies above me ends up in the water. So thanks. And when you think you don’t matter, never forget you do. We need all of us, all the time”. Exactly the attitude, energy, and gusto you need from someone coordinating one of the nation’s largest- and most successful- state sponsored citizen water quality monitoring programs. So thank you, Horn, for serving as an inspirational leader within the watershed stewardship and citizen science communities.



Citizen Monitors at the 9th National Monitoring Conference
Cincinnati, OH, April 28-May 2, 2014

Photo: Kristine Stepenuck, Ph.D. - Water Action Volunteers Stream Monitoring Program Director

THE CUTTING EDGE

“California Digital Reference Collection to Go” & Online Algae, Diatom and Plankton Taxonomic Resources

The [California Digital Reference Collection to Go](#) is a new digital resource tool to assist citizen scientists identify and learn about California’s stream dwelling benthic macroinvertebrates and water quality. When using other field guides or taxonomy books, you can refer to this collection of images. The tool provides family level information such as key characteristics, geographic distribution, tolerance values and the images can be expanded to show anatomic details. It was made for portable devices (tablets, smartphones) for easy streamside access to this information. To use this, you must have Adobe Reader installed on your device.

Use this along with your smartphone microscope as covered in our [last Watermarks issue](#). We also provided useful weblinks for water monitors and educators.

The screenshot shows a digital interface for identifying insects. On the left is a table of insect orders. The main area shows a navigation screen for Plecoptera with a grid of images and a 'back'/'forward' navigation system. A hand icon indicates touch screen navigation. To the right, a detailed view of the Perlidae family is shown, including an 'Anatomic Detail' of gills. A large blue arrow at the bottom points from the navigation screen to the anatomical detail.

 ORDER	HABITUS PHOTO	DISTINGUISHING CHARACTERISTICS
Ephemeroptera (mayflies)		Three "tails" or cerci, with gills on abdomen (either dorsal or lateral, usually plate-like) and one tarsal claw.
Odonata (dragonflies, damselflies)		Mask-like labium; gills are internalized within the abdomen (Dragonflies) or external on the end of the abdomen (Damselflies).
Plecoptera (stoneflies)		Two "tails" or cerci; gills (either plumose or finger-like) present on thorax, or on thorax and first few abdominal segments, two tarsal claws.
		
Diptera (true flies)		Head may be sclerotized (and visible) or reduced. Legs are not sclerotized. Body fleshy (possibly with clawed prolegs) with various types of breathing structures on the tail end.
Non-Insects		Various characteristics, please see non-insects page.

Algae can be monitored as Indicators for Ecosystem Health. To incorporate algae into the bioassessment toolbox, SWAMP funded the development of a guidance document (the "[Algae Plan](#)") that established a detailed road map for achieving robust and consistent algae bioassessment in California. The Algae Plan recommends a structured and standardized approach to algal bioassessment. Standardized infrastructure and tools will ensure consistency among users.

Since [algae bioassessment tools](#) are not well-described in California, the state must take an active role in maintaining a coherent and consistently used standardized taxonomic database when moving forward. Also, the literature on taxonomy for soft-bodied algae and diatoms is rapidly changing and fully established. The online tools presented here will include a photolibrary of taxa with taxonomic description to the lowest taxonomic level possible and available references. Online tools for taxonomic identification for soft-bodied algae and diatoms were developed for southern California through a Proposition 50 funded project ("Development of Multimetric Tools for Setting Numeric Nutrient Targets Including an Algal Index of Biotic Integrity"). Online tools for soft algae are now developed to cover the entire state of California, and were funded through SWAMP. Future funding will support the development of online tools for diatoms for California.



Soft-Bodied Stream Algae of California

This site includes 701 soft-bodied algal taxa recorded in the benthos of Californian streams. Taxa belong to blue-green algae (Cyanobacteria), chlorophytes and charophytes (Chlorophyta sensu lato), rhodophytes (Rhodophyta), euglenophytes (Euglenophyta), cryptophytes (Cryptophyta), dinoflagellates (Dinophyta), xanthophytes (Xanthophyceae), chrysophytes (Chrysophyceae), synurids (Synurophyceae), phaeothamniophytes (Pheothamniophyceae), and brown algae (Phaeophyceae). Data on this site are based on sampling of over 1,500 streams throughout California (SWAMP, 2008-2013) and 105 streams draining coastal watersheds along southern California, from Point Conception in Santa Barbara County to the Mexican border (Proposition 50 funded project, 2007-2008).



Diatoms of the Southern California Bight (Freshwaters from Santa Barbara to San Diego)

This identification and resource tool has three major elements to it. First, images and descriptions of taxa found in the region investigated are included. The names of the taxa have been updated to align with names in the Master List of Names for California Freshwater Diatoms. Second, there is a key to major groups and genera and a list of taxa within each genus found in the resource. One can also go directly to a taxon page by choosing a genus and species from pull down menus or lists located on the home page. Finally, distributional data for each taxon is represented by a dynamic map indicating sites where each taxon was found. Each point of the map has information about the name of the site and its location. Each site reference also has data on taxa found at that site and may additionally have environmental data and/or pictures of the site.

Glossary of Terms Relating to Diatom Valve Morphology with an Illustrated Glossary

The glossary is presented as a guide to terminology present in the keys and descriptions of genera.

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OAA's Phytoplankton Monitoring Network: Phyto Smartphone App Helps Volunteers Identify Marine Phytoplankton

Phyto is a free smartphone application that helps volunteers identify *marine phytoplankton* by providing images of salt water species taken with a light microscope.

Phyto helps you learn to identify phytoplankton and their proper pronunciation. It includes the most common salt water phytoplankton. The program consists of two main modes. The first is a listing of the different species and includes different images taken with a light microscope and the ability to hear the correct pronunciation. The app also includes a flash card game to help volunteers improve their ID skills.

Phyto was developed by *volunteer* Shawn Gano with the Phytoplankton Monitoring Network (PMN), a national network of volunteers monitoring for coastal algal blooms. The goals of the PMN are to increase public awareness about harmful algal blooms (HABs) and maintain an extended monitoring area along U.S. coasts throughout the year. The PMN is managed by the National Oceanic and Atmospheric Administration.

For more information about the PMN, visit <http://www.chbr.noaa.gov/pmn/>.

<https://itunes.apple.com/app/phyto/id333237649?mt=8>
(for iPhone and iPad)

<https://play.google.com/store/apps/details?id=name.gano.phyto&hl=en>
(for Android)



Images from www.gano.name/shawn/phyto/

Q&A

Professionals in watershed management and protection take your questions on Quality Assurance and Quality Control.

What are “blanks”?

Q: What are quality control blanks and why do I need so many of them? What resources does the SWRCB have for me regarding Quality Assurance and Quality Control and blanks?

A1: The primary purpose of blanks is to trace sources of artificially introduced contamination. A comparison of different blank sample results can be used to identify and isolate the source of contamination introduced in the field or the laboratory.

Quality Control Tool	Frequency of Analysis	Measurement Quality Objective
Field Blank, Travel Blank, Equipment Blank	Per method	< RL (less than the reporting limit) for the target analyte
Laboratory Blank	Per 20 samples or per analytical batch, whichever is more frequent	< RL (less than the reporting limit) for the target analyte

FIELD BLANKS

Rinsate/Equipment Blank: A sample of analyte free water poured over or through decontaminated field sampling equipment prior to the collection of environmental samples. Purpose: Assess the adequacy of the decontamination process. Assess contamination from the total sampling, sample preparation and measurement process, when decontaminated sampling equipment is used to collect samples. Frequency: 1 blank/day/matrix or 1 blank/20 samples/matrix, whichever is more frequent.

Field Blank: A sample of analyte free water poured into the container in the field, preserved and shipped to the laboratory with field samples. Purpose: Assess contamination from field conditions during sampling. Frequency: 1 blank/day/matrix or 1 blank/20 samples/matrix, whichever is more frequent.

Trip Blank: A clean sample of a matrix that is taken from the laboratory to the sampling site and transported back to the laboratory without having been exposed to sampling procedures. Typically, analyzed only for volatile compounds. Purpose: Assess contamination introduced during shipping and field handling procedures. Frequency: 1 blank/cooler containing volatiles.

LABORATORY BLANKS

Method Blank: A blank prepared to represent the matrix as closely as possible. The method blank is prepared/extracted/digested and analyzed exactly like the field samples. Purpose: Assess contamination introduced during sample preparation activities. Frequency: 1 blank/batch (samples prepared at one time.)

Instrument Blank: A blank analyzed with field samples. Purpose: Assess the presence or absence of instrument contamination. Frequency: Defined by the analytical method or at the analyst's discretion (e.g., after high concentration samples).

COMPARING BLANKS: The source of contamination introduced in the field or laboratory can be deduced by comparing blank results. An equipment blank could potentially be contaminated in the field, during transport to the lab or in the lab. The method blank, on the other hand, could only be contaminated in the lab. Using all blanks (appropriate for the project) described will facilitate the identification of contamination sources.

This diagram shows how comparison of different blank sample results can be used to identify and isolate the source of contamination introduced in the field or the laboratory.

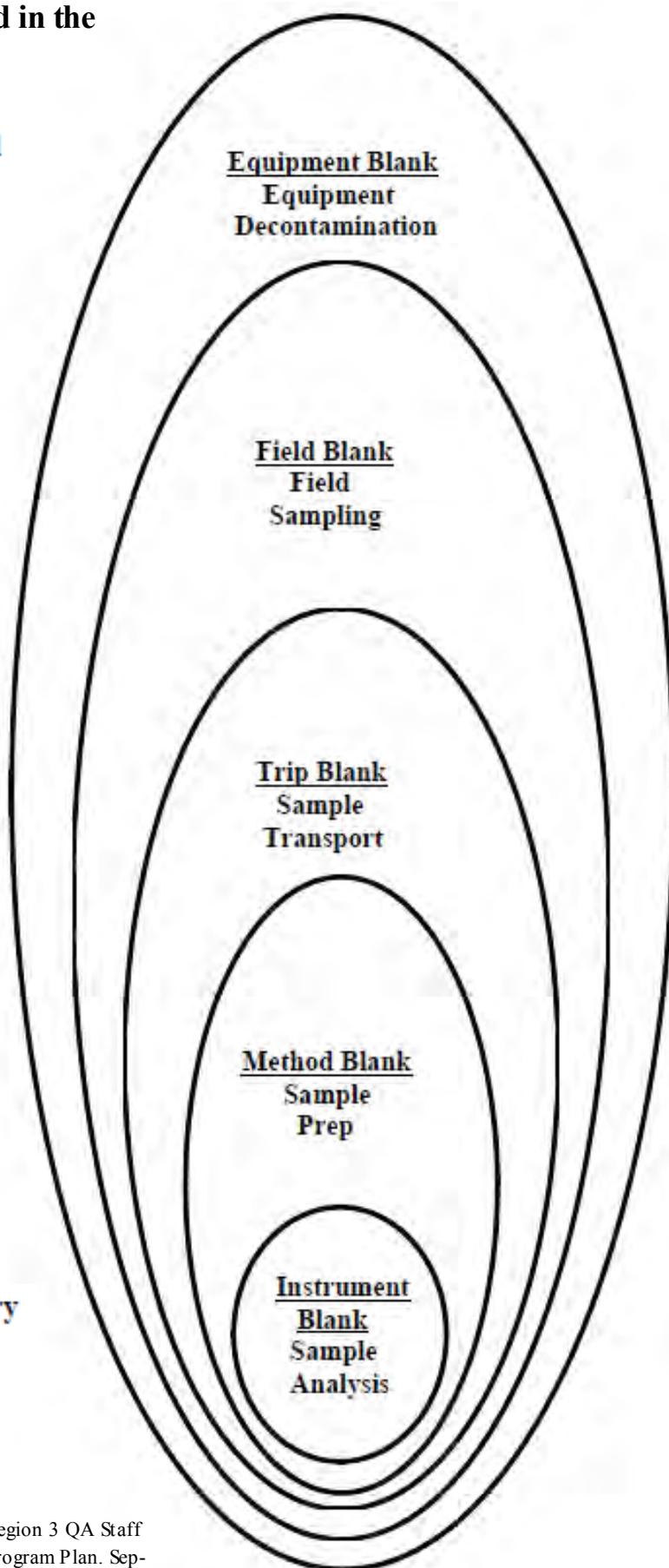
Equipment Blank results include total field and laboratory sources of contamination.

Field Blank results include total ambient conditions during sampling and laboratory sources of contamination.

Trip Blank results include shipping and laboratory sources of contamination. Volatiles only.

Method Blank results show only laboratory sources of contamination.

Instrument Blank results show only laboratory sources of contamination.



SOURCES:

- ◆ Fact Sheet: Quality Control Tools: Blanks. April 27, 2009. EPA Region 3 QA Staff
- ◆ Surface Water Ambient Monitoring Program Quality Assurance Program Plan. September 1, 2008. The Surface Water Ambient Monitoring Program Quality Assurance Team, Quality Assurance Research Group, Moss Landing Marine Laboratories, San José State University Research Foundation

Clean Water Team Videos



Fecal Indicator Bacteria Enumeration Using IDEXX's...



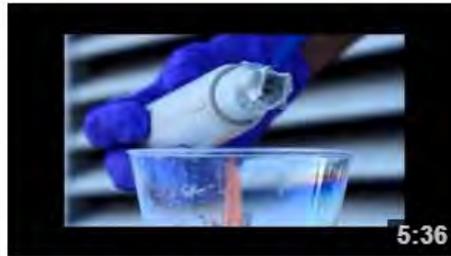
DIY: Make a Water Quality Sampling Scoop



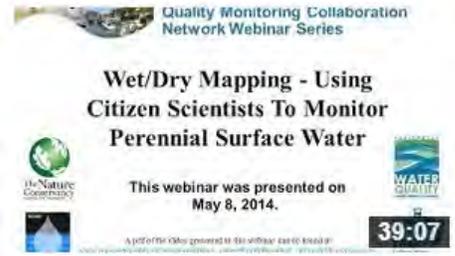
Test the Waters * Become a Citizen Scientist



Collecting Water Quality Samples Low Flowing Stream...



Calibrating Meters: Total Dissolved Solids (TDS) &...



Wet/Dry Mapping -- Using Citizen Scientists To Monitor...

New Videos on the Clean Water Team's YouTube Channel:

- ◇ New Bioassessment Tools and Videos from the SWRCB's CWT 2013
- ◇ CABW 2012: New Tools from the Clean Water Team
- ◇ DIY: Make a Water Quality Sampling Scoop
- ◇ Collecting Water Quality Samples from Low Flowing Stream or Sheet Flow
- ◇ Calibrating Meters: Total Dissolved Solids (TDS) & Electrical Conductivity
- ◇ Fecal Indicator (FIB) Enumeration Using IDEXX's Colilert, Colilert-18 Enterolert
- ◇ Wet/Dry Mapping Using Citizen Scientists to Monitor Perennial Surface Waters



2015 Citizen Monitoring Calendar



Please Send Us Your Pics.

The Clean Water Team is preparing the 2015 CA Citizen Monitoring Calendar. Consider submitting pictures of your volunteers conducting monitoring, scenes of your watershed and images of wildlife benefiting from your activities. We would like to highlight and share the work you are doing.

The CWT calendar serves two purposes: it highlights the importance of California's surface waters, and celebrates the state's citizen monitors who volunteer to improve and protect water quality by using applied science to monitor the state's waters.

Email images to Maria at mgonzalez@waterboards.ca.gov. The 2014 calendar can be [downloaded](#) for free.

CITIZEN SCIENCE

2 0 1 5

Conference and Gathering

February 11 & 12

San Jose, California, USA

#CitSci2015



- What:** Citizen Science is a partnership between everyday people and professional scientists to investigate pressing questions about the world. CitSci2015 invites anyone interested in such collaborations to participate.
- Who:** People involved in all aspects of citizen science are welcome, including researchers, project leaders, educators, evaluators, designers and makers, volunteers, and more—representing a wide variety of disciplines.
- Why:** Join people from across the field of citizen science to discuss designing, implementing, sustaining, evaluating, and participating in projects. Share your project innovations and questions.
- When:** February 11 & 12, 2015
- Where:** San Jose, California, USA

Citizen Science 2015 is a pre-conference of the...

 **AAAS | 2015**
ANNUAL MEETING
12-16 FEBRUARY • SAN JOSE, CA

Citizen Science 2015 is the inaugural conference and gathering of the newly formed Citizen Science Association (CSA). This event is a pre-conference of the 2015 American Association for the Advancement of Science (AAAS) Annual Meeting.

www.citizenscienceassociation.org

Follow conference conversations on Twitter at #CitSci2015

*Alpine Watershed Group — Clean Water Team
Spring 2014 Workshop*

