New Tools and Videos from the SWRCB's Clean Water Team

www.waterboards.ca.gov/water_issues/programs/swamp/cwt_volunteer.shtml
www.YouTube.com/CleanWaterTeamVideos
www.YouTube.com/CWQMCN
www.waterboards.ca.gov/resources/email_subscriptions

Erick Burres
Citizen Monitoring Coordinator
SWRCB's Clean Water Team
eburres@waterboards.ca.gov

www.scgcorp.com/CitizenScientists/

CWT is involved with working groups committed to two products:

1) Discussion Paper/Article

What citizen science groups need to know about government water quality monitoring programs?

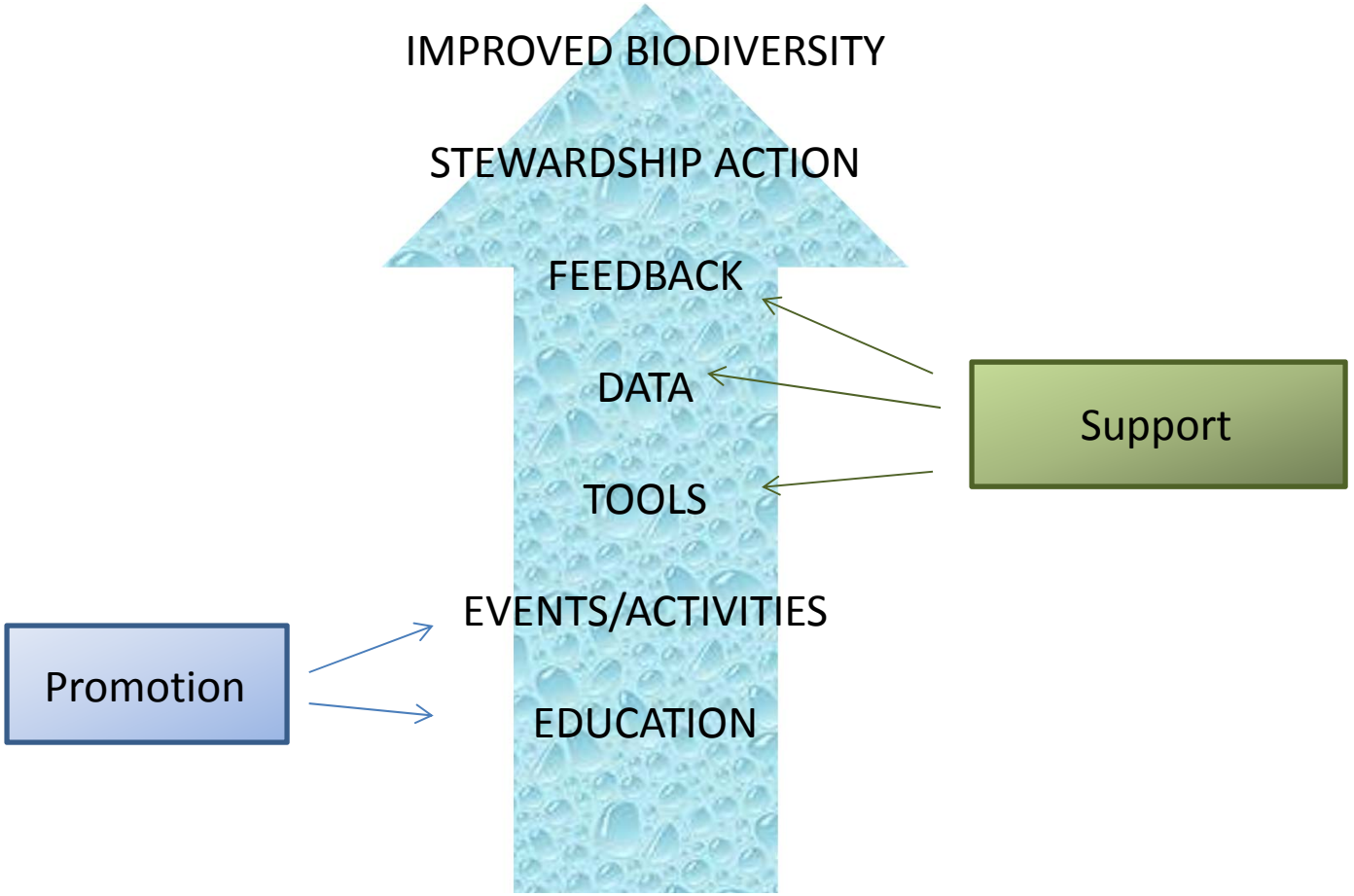
2) National Monitoring Conference 2014

Title of Panel: Better Data, Better Partnerships: How can new technologies increase the participation and use of volunteer biomonitoring data?

Theme: *Strengthening Monitoring Collaboration and Partnerships*

CLEAN WATER TEAM'S AREAS of IMPACT

Citizen Monitoring (*Citizen Science & Volunteer Monitoring*)
for the protection of Stream Biodiversity



FROG WATCH USA

MIGRATORY DRAGONFLY PARTNERSHIP

Grunion Greeters

Citizen Science on the Beach

www.waterboards.ca.gov/water_issues/programs/swamp/cwt_newsletter.shtml

BioBlitz: Fast and Furious Biomonitoring

BioBlitz is an intense period of biological surveying in an attempt to record all the living species of plants, animals, microbes, fungi, and other organisms as possible within a designated area. Groups of scientists, naturalists and volunteers conduct an intensive field study over a short, usually 24 hour, time period. Getting the public interested in biodiversity is the primary goal of a BioBlitz. It is hoped that by participating in these fun and exciting hands-on field studies, people will learn about biodiversity and better understand how to protect it.

Photo Courtesy of Sabrina Drill & FoLAR

National Geographic is helping conduct a BioBlitz in a different national park each year during the decade leading up to the U.S. National Park Service Centennial in 2016. Their 2008 BioBlitz was held in the Santa Monica Mountains National Recreation Area. During its 24-hour species inventory, teams of scientists, naturalists, and volunteers combed more than 150,000 acres (60,700 hectares), observing and recording as many species as possible.

The Santa Barbara Natural History Museum's BioBlitz sent teams to the rich riparian corridor that surrounds Mission Creek. Not only did their study help paint a picture of what lives in the native landscape, but it will served as a helpful indicator of just how healthy downstream areas -i.e., more urban-may or may not be. It is the latter that has perhaps the most significance for the community at large as it provided a helpful context for the research already being done by the likes of the city's Creek Council and nonprofits such as Santa Barbara Channelkeeper and Heal the Ocean.

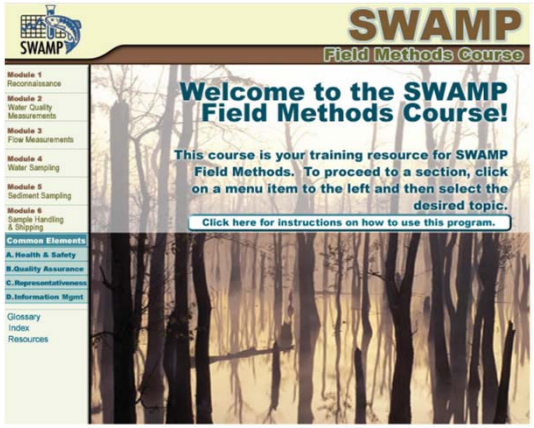
The Marin Municipal Water District in conjunction with the California Academy of Sciences has an ongoing BioBlits. With more than 18,000 acres of land and thousands of species in the Mt. Tamalpais Watershed, they cannot document everything at once, so they are taking a more targeted approach. Their BioBlitz surveys are performed over a period of months and include systematic specimen collection, including photos and GPS coordinates for each specimen. These collections and associated data will be added to the California Academy of Science's research collections and will serve as the beginnings of a new baseline of Mt. Tamalpais botanic diversity. In addition, the new findings will be compared to historic collections in order to document any shifts in ranges or distributions.
The multi-year effort has brought together botanical experts from around the Bay Area and more than 80 volunteer "citizen scientists." During the four bioblitz survey days held in 2012, participants recorded more than 700 observations comprising over 300 kinds of plants—close to 40 percent of the estimated.

Collaborative projects such as a BioBlitz are extremely advantageous. Not only is the data obtained valuable, the experiences allow groups to grow an active and engaged community for the benefit of these resources and create a pool of volunteer citizen scientists.

www.nationalgeographic.com/explorers/projects/bioblitz/
www.sdnhm.org/archive/research/readings/fn_0409.php
www.nationalgeographic.com/explorers/projects/bioblitz/bioblitz-ca-2008/
www.inaturalist.org/projects/biodiversity-survey-on-the-mt-tamalpais-watershed

www.youtube.com/watch?v=E-P6-hbqOd4

SWAMP
Surface Water Ambient Monitoring Program



Tools for Assessing the Biological Integrity of Surface Waters

Biological Integrity as used by the SWAMP program refers primarily to the assemblages of benthic macro-invertebrates "observed" at various sampling locations, as compared to the "expected" assemblages found in good quality waters from appropriate reference sites.

Wadeable Streams and Rivers

- **Tools based on benthic macroinvertebrates.**
  For bioassessment field methods, lab methods, quality assurance/quality control (QA/QC) methods, and taxonomic conventions, see Bioassessment Methods.
  - South & Central Coast Index of Biotic Integrity (IBI)
    - A Quantitative Tool for Assessing the Integrity of South & Central California Coastal Streams - Journal article Environmental Management 35(4):493-504 (2005)
    - Calculating the South & Central Coast IBI - May 2009
      - Boundary map for the South Coast IBI (kml file) (Coming Soon)
  - North Coast IBI
    - Development of a Benthic Index of Biotic Integrity (B-IBI) for Wadeable Streams in Northern Coastal California and its Application to Regional 305(b) Assessment (September 2005)
  - Eastern Sierra IBI
    - Development of a Benthic Macroinvertebrate Index of Biological Integrity (IBI) for Stream Assessments in the Eastern Sierra Nevada of California Technical report (March 2009)
    - Calculating the Eastern Sierra IBI - (MS-Excel spreadsheet calculator)
  - Central Valley IBI
    - An Index of Biotic Integrity (IBI) for Perennial Streams in California's Central Valley (December 2008)
- For other tools, see the State Water Board's webpages for biological objectives, the Perennial Streams Assessment, and "My Water Quality."

Methods and Standard Operating Procedures

In order to be SWAMP-comparable, bioassessment sampling (benthic macroinvertebrates and algae) must be conducted according to SWAMP's standard operating procedures (SOPs) (links provided below). There are no other SWAMP-mandated field methods. Additional resources regarding field methods are provided for informational purposes.

Methods for Conducting Bioassessments in Freshwater Streams and Rivers

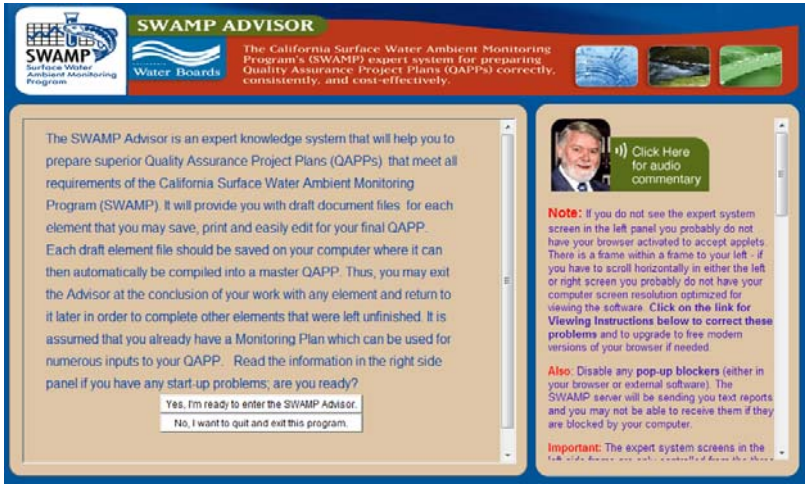
- SWAMP Bioassessment Procedures 2012 - Standard Operating Procedures for Laboratory Processing and Identification of Benthic Macroinvertebrates in California - October 2012
- Collecting Benthic Macroinvertebrate Samples & Associated Physical and Chemical Data for Ambient Bioassessments in California - Standard Operating Procedures Manual - February 2007
- Collecting Stream Algae Samples and Associated Physical Habitat and Chemical Data for Ambient Bioassessments in California - Standard Operating Procedures Manual - June 2010
- SWAMP Stream Habitat Characterization Form - June 2008
- Taxonomic conventions for identifying benthic macroinvertebrates (BMIs) - Southwest Association of Freshwater Invertebrate Taxonomists (SAFIT)

Aquatic Invasive Species (AIS)

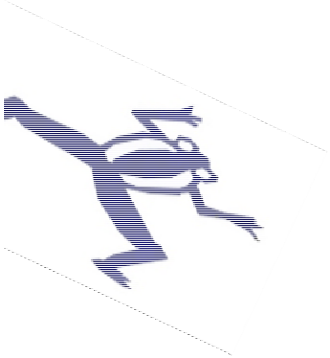
AIS THREATEN CALIFORNIA'S WATERS AND THEIR BENEFICIAL USES. AIS MAY CAUSE ECONOMIC, ENVIRONMENTAL, AND/OR HUMAN HEALTH HARM

- **AIS can have negative impacts on water supplies** (clogged pipes, increased transpiration), agriculture (reduced water flows…), fisheries (loss of species, disease…), ecological functions (altered hydrology…), waterways (choke and congested waters, undermine levees…) and more.
- **AIS are plants, animals or disease agents that are not native to an ecosystem**. (AIS are also known as, but not limited to: Exotic Species, Alien Species, Invasive Organisms, Noxious Species, Naturalized Species, and Non-indigenous Aquatic Species or Non-Native Species).
- **Proper planning and decontamination techniques** should be practiced by recreationists (boaters, sport fishers, hikers…), water professionals and aquatic scientists alike.

To protect California's waters and their beneficial uses it is important that we all act in ways, which will prevent the introduction or spread of AIS. Persons active within surface waters may act as dispersants for certain AIS. It is important to prevent the transfer of AIS from one waterbody to another and to prevent the spread of AIS within a watershed.



GUIDANCE COMPENDIUM FOR WATERSHED MONITORING AND ASSESSMENT



Section 1.0	Introduction and Overview
Section 2.0	Field Procedures (e.g., sample collection)
Section 3.0	"Grab Samples" - Measurements Taken at One Point in a Water Body or in a Container (including Water Quality Fact Sheets)
Section 4.0	Stream Measurements (e.g., flow)
Section 5.0	Measurements Taken in a Watershed (e.g., rain)
Section 6.0	Geographic Information for Watershed Use (GIS & GPS)
Section 7.0	Programmatic Quality Assurance and Quality Control (QA, QC & QAPP)
Section 8.0	Data Quality Management (DQM)
Section 9.0	Volunteer & Staff Role-Specific DQM Materials
Appendices	Glossary and Web Links (Spanish)
Notes	About the Contents

3.5	Biological Communities Indicators	4.4	Wildlife
	CA Streamside Biosurvey		
	BMI Handouts (Eng./Spanish)	4.9	Riparian Vegetation
	Bioassessments		

THE CLEAN WATER TEAM'S TOOL BOX

In addition to the Clean Water Team Compendium for Watershed Monitoring and Assessment, this **Toolbox** has template files and documents that will help you manage and organize your water quality monitoring data. Most of the items are part of the Data Quality Management (**DQM**) system that the Clean Water Team has developed for the collection management and sharing of reliable data of known quality. The utility of the tools contained within this virtual toolbox will be especially useful as you begin to analyze your project's data.

- Part 1: The Basics
- Part 2: Data Validation Kit
- Part 3: Advanced Tools
- Part 4: Monitoring Project Planning Kit

BioAssessment
Videos & Webinar Recordings

www.youtube.com/cleanwaterteamvideos

www.youtube.com/cwqmcn

The SWRCB's SWAMP also has recorded webinars
http://www.waterboards.ca.gov/water_issues/programs/swamp/presentation.shtml

Shipping Benthic Macro Invertebrate Biological Samples Under Special Provision A180

www.youtube.com/watch?v=AfAdxXZgKr8

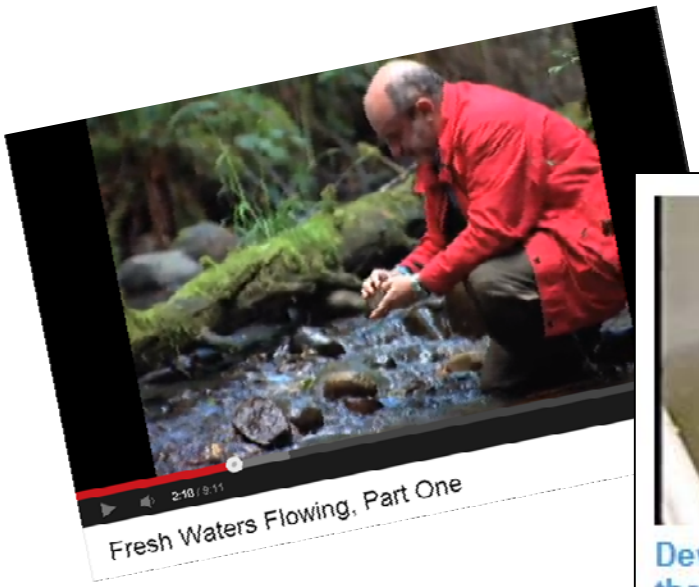
17-Point Spherical Convex Densiometer Modification

Measuring Slope with a Leveling Rod and an Inclinometer

Recognizing Basic Flow Habitat Types

100 %

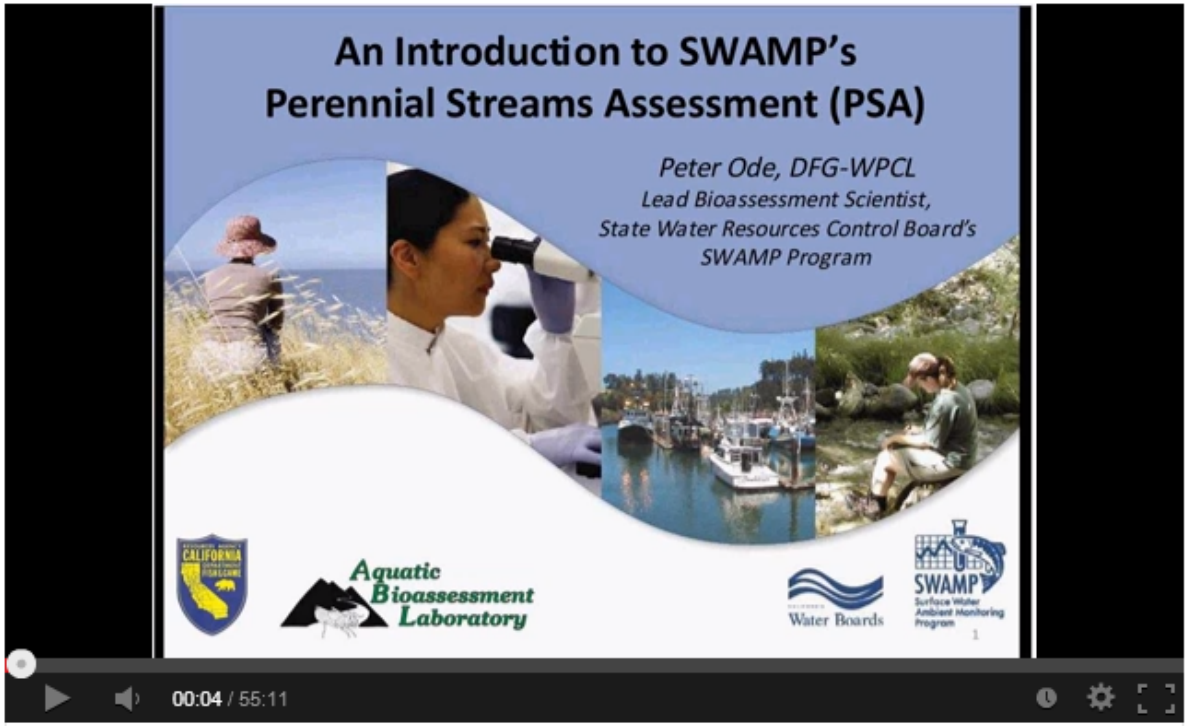
A Guide for Field Identification of Bankfull Stage in the Western United States



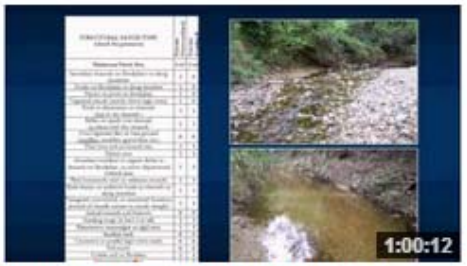
Fresh Waters Flowing, Part One

Development of Biological Criteria for the Protection of Aquatic Life

Antidegredation Policy: A means to maintain and protect existing uses ...



Ecological Condition Assessments of California's Perennial Wadeable Streams



An Introduction to the California Rapid Assessment Method (CRAM) ...

Monitoring for Chemicals of Emerging Concern (CECs) in California's Aquatic

Introducing the New Water Quality Portal "Are Our Stream and River ...

Causal Assessments in Streams and the CADDIS Approach

Guidelines for taxonomic determination of Baetis adonis and...

Hazard Analysis and Critical Control Point Planning (HACCP) for Water

Winter/Spring 2013

Issue 13

WATERMARKS

The California Newsletter for Citizen Water Quality Monitoring

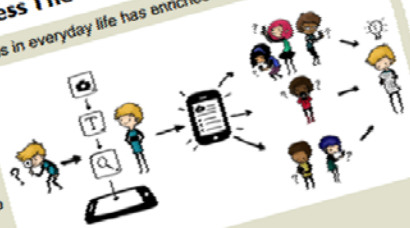
CWT Volunteers

- Learn About Your Watershed
- The Value of an Hour
- Interview with a Water Warrior
- BioBlitz: Fast and Furious Biomoni
- Clean Water Team Tools: Videos
  2013 CA Citizen Monitoring Cale

A Swarm of Apps

SENSR: An Easy Way To Harness The Power Of Citizen Science

The proliferation of mobile and computing devices in everyday life has enriched our surroundings in terms of sensing and sharing, providing diverse channels to scientists for data collection, and creating tremendous opportunities for everyday people to engage in scientific projects. However, the difficulty of creating an appropriate application for mobile devices often hinders grassroots efforts. **SENSR** allows people without programming skills to easily build a mobile data collection tool and manage data among users. The process is as follow:



1. On this website, you can create and maintain a project which will run on a mobile phone!
2. Create a project that requires contributions from citizen scientists
3. The project you created is deployed in the mobile SENSR application as well as in this website
4. Citizen scientists can now subscribe and contribute data to your project remotely though the SENSR mobile application.

The Shark Observation Network provides a means for divers, marine biologists and naturalists around the world to enter data about shark sightings, including date, time, location, water temperature and other environmental variables. Membership is free and all of the data is permanently accessible to all users. The app, called **Shark Spotter**, is free of charge and will soon be available on Google Play. (It is available now from App Geyser here). www.geerg.ca/sharksonline/autres/index.php

Shark Observation Network

Using Technology to Connect Students & the Environment

The National Environmental Education Foundation, with generous support from Toshiba America Information Systems, Inc., and in partnership with Project Noah, presents *Using Technology to Connect Students & the Environment*, a video on how technology can further STEM learning through the environment, both in nature and in the classroom. Video www.youtube.com/watch?v=p-QjqMhm9rY

The Educator Toolkit for *Using Technology to Connect Students & the Environment* is a companion to the video, and includes activities and resources at all grade levels for implementing a project similar to the one featured in the video. Toolkit www.eeweek.org/pdf/Video_Toolkit.pdf

SWIM Guide

The Swim Guide is an app for iPhone®, iPad®, iPod touch® and Androi that makes it easy to explore and enjoy the best beaches in many areas – including California Find your closest beach using list, map, or search tools

- Discover a wide variety of beaches, ranging from city parks to remote lakes ideal for camping
- Identify at a glance which beaches are clean for swimming (Green) and which have water quality problems (Red) in real-time
- Get walking, driving, or transit directions to the beach of your choice
- Bookmark beaches for easy access
- Invite your friends to join you at the beach using Facebook, Twitter, email and SMS text messaging
- Report pollution or environmental concerns

The Swim Guide gives you original descriptions with photographs of over 1,500 different beaches so you can learn a bit of history and geography as you explore! www.theswimguide.org/

GET WATER QUALITY GRADES ON THE GO

Beachgoers can now check the latest water quality grades at 650+ West Coast beaches via Heal the Bay's Beach Report Card mobile app for the iPhone or Android, at www.beachreportcard.org.

Two Universities in the Great Lakes Region Are Using Creekwatch in a Challenge Called Waterpressures.

Northwestern and the University of Wisconsin – Milwaukee are asking science professors to pair their students with municipal officials to work on a water issue. Creekwatch is one tool students will use to monitor the waterway they work on.

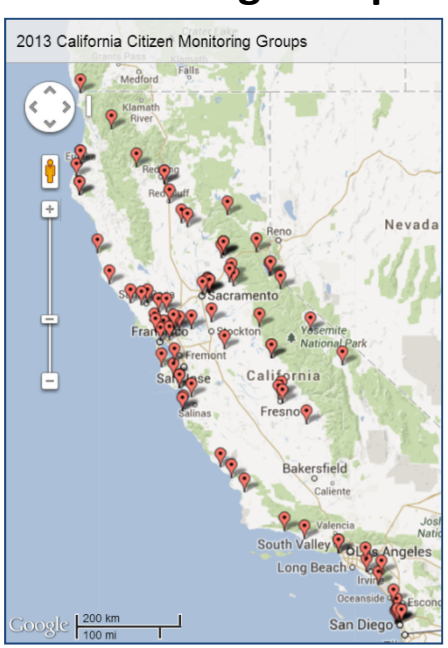
www.waterpressures.org/

water pressures

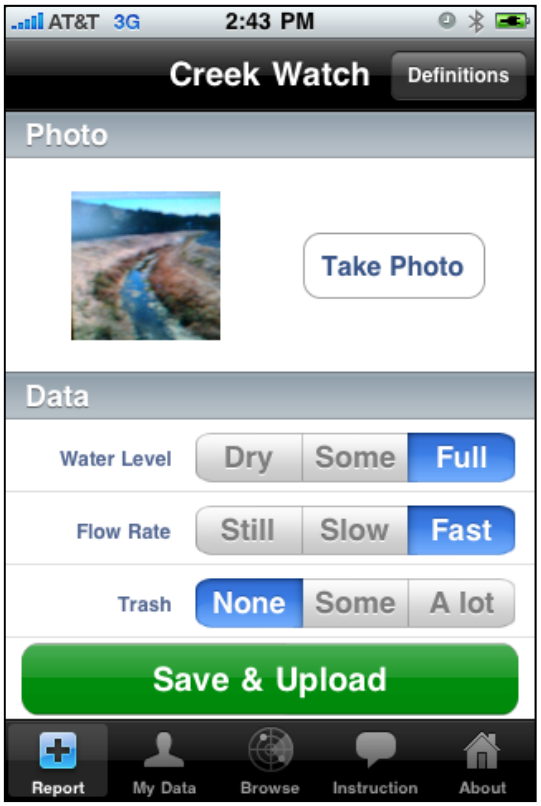
Secchi App is the mobile interface to Plymouth University's Secchi Disk project enabling any seafarer to take part in a global study of the phytoplankton in our oceans. The phytoplankton in the sea, although they are invisible to the naked eye, are the ocean's most important inhabitants since they begin the plankton food web that underpins the marine food chain.We need to know much more about these changes and you can help by using a simple piece of scientific equipment called a Secchi Disk, measuring tape and using the Secchi App.

https://play.google.com/store/apps/details?id=uk.ac.plymouth.marlmutt.secchi&hl=en

Find a Citizen Monitoring Group

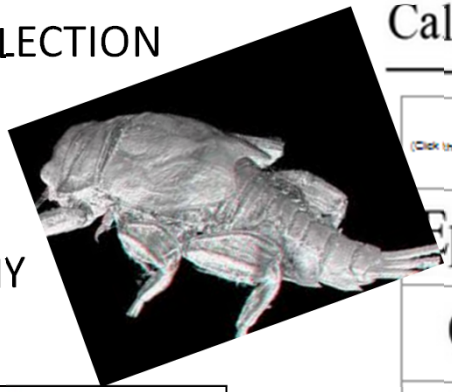


http://batchgeo.com/map/74e2dcf703ccc0bf1b3cc8da1e2942cb



FUTURE APPS:

- CA DIGITAL REFERENCE COLLECTION
- VISUAL PHYSICAL HABITAT ASSESSMENT
- 3D IMAGES SUPPORTING BMI ANATOMY AND TAXONOMY



Watershed/ Stream: _____ Date/ Time: _____

Company/ Agency: _____ Sample ID Number: _____

Site Description: _____

Circle the appropriate score for all 20 habitat parameters. Record the total score on the front page of the CBW.

Parameters to be evaluated within the sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% (50% for low gradient streams) of substrate favorable for epifaunal colonization and fish cover; most favorable is a mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% (30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% (10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% (10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/ Depth Regimes *(deep<0.5 m, slow<0.3 m/s)*	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow).	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

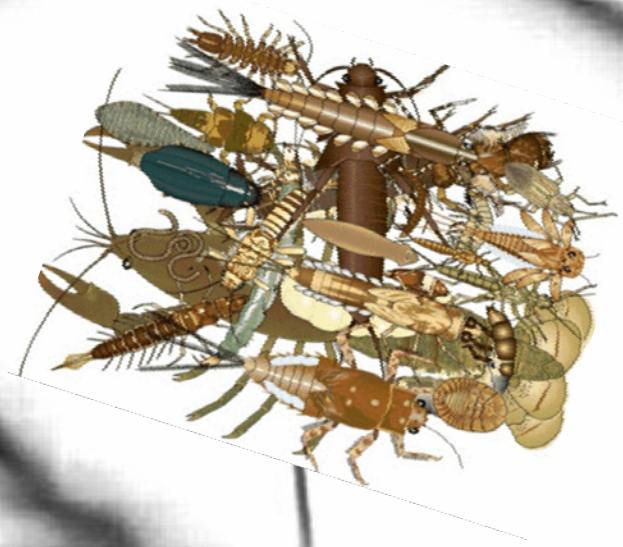
California Digital Reference Collection

Orders (Click the banner to jump to a specific order within the family-level page)	Habitus photo (Click thumbnail for larger image)	Distinguishing characteristics
Ephemeroptera		Three "tails" or cerci, with gills on abdomen (either dorsal or lateral, usually plate-like) and one tarsal claw.
Odonata		Mask-like labium; gills are internalized within the abdomen (Dragonflies) or external on the end of the abdomen (Damselflies).
Plecoptera		Two "tails" or cerci; gills (either plumose or finger-like) present on thorax, or on thorax and first few abdominal segments; two tarsal claws.
Hemiptera		"Half wings" – first set of wings half membranous and half sclerotized (looks like an "X"); piercing-sucking mouthparts
Megaloptera		Well-developed mandibles, four-segmented antennae. Head and abdomen are patterned; the head is also quadrate. Two claws on thoracic legs. Segmented lateral gills on abdomen.
Neuroptera		Long antennae, slender legs with single claws. Transparent gills on ventral side of abdominal segments. Mouthparts elongate and unsegmented.
Trichoptera		No "tails," just anal prolegs with claws; thorax partially or fully sclerotized, membranous abdomen. May have a "case" built of various materials
Lepidoptera		Head is distinct with a ring of simple eyes. Thorax and legs are segmented. Prolegs and anal prolegs present on abdominal segments.
Coleoptera		No anal prolegs but possibly claws.Bodies of larvae may be completely sclerotized; adults have a hardened first pair of wings ("elytra").
Diptera		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.

www.dfg.ca.gov/abl/Lab/california_referencecollection.asp

Mobile Device
Macro Lens Converters

Please consider presenting a webinar on your favorite BMI.



For collaborations and webinar presentations please contact Erick at

eburres@waterboards.ca.gov

213-712-6862