Creating Pathways

for Exploring and Monitoring Freshwater and Aquatic Environments

Water is one of California's most precious resources. Current demands for clean water, especially during today's climatic stress rely on require tough decisions and an engaged community. Citizen science has provided a way for communities to contribute useful and much needed data and increase environmental literacy.

With the rise in portable digital technology and interests in citizen science ,the Water Boards citizen science program the Clean Water Team has increasingly added new free easy to use resources that require little to no monitoring equipment, to its citizen monitoring program that support citizen science, crowdsourcing, and STEM (Science, Technology, Engineering and Mathematics). These resources help watershed coordinators, educators and scientists bring people and the environment closer together via science. By increasing environmental literacy through placed based science watershed stewardship should also increase..
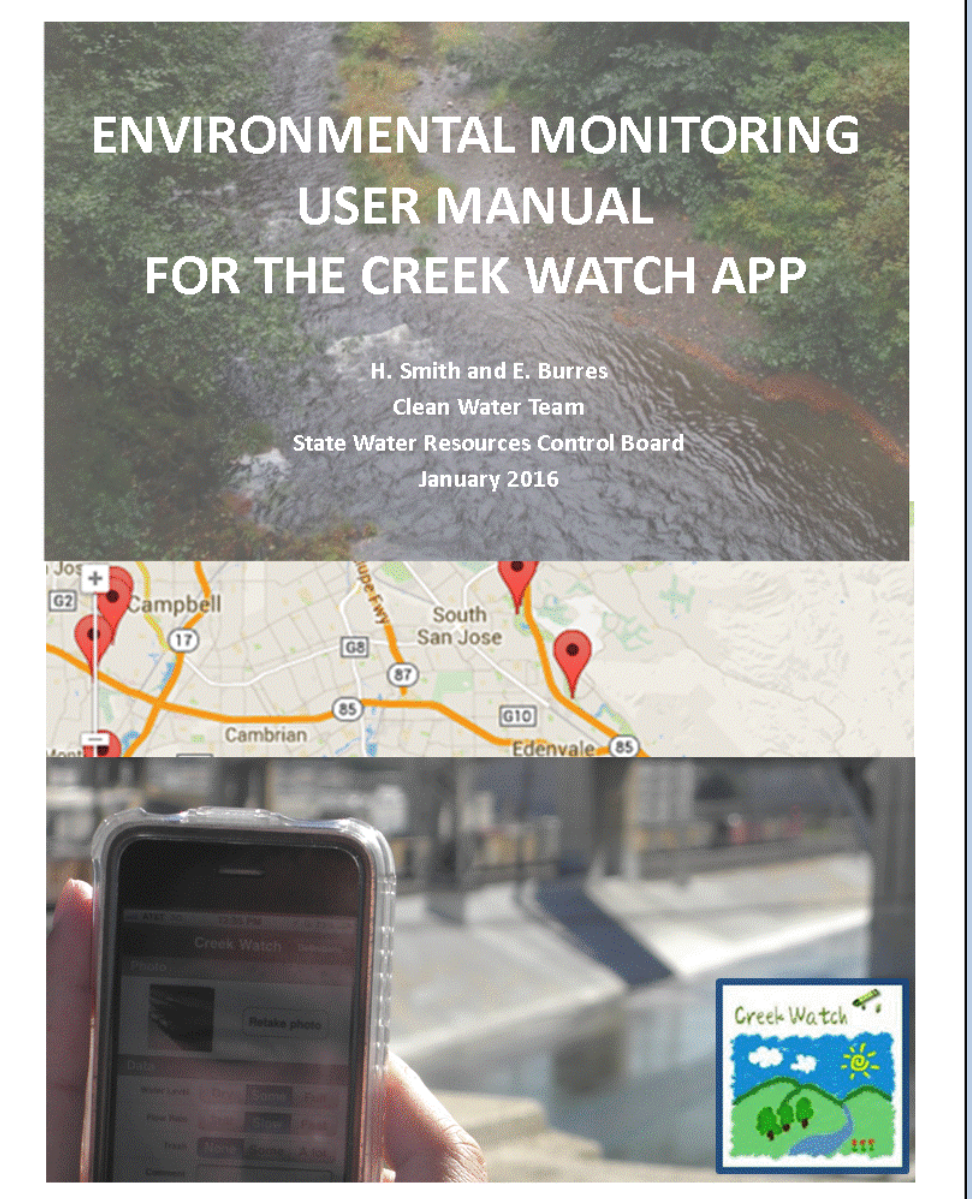
The tools the Clean Water Team created for exploring and monitoring freshwater and aquatic environments allow easy access to water science. These entry points have been based on real science to support real stewardship needs. When used as research tools they can assist programs in creating projects where valuable information can be obtained.
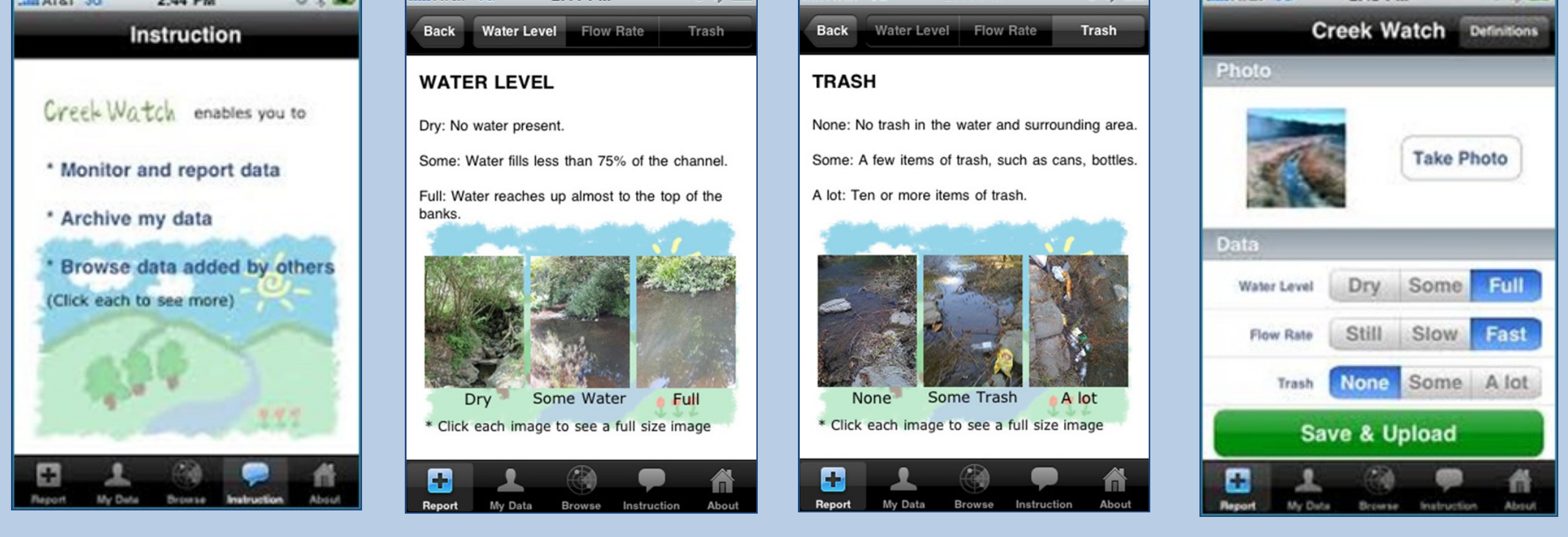
www.waterboards.ca.gov/water_issues/programs/swamp/cwt_guidance.shtml

Environmental Monitoring User Manual for The Creek Watch App (IOS).

Creek watch, an iPhone application by IBM, enables any iPhone/iPad user that spends time near rivers and streams to quickly upload water quality data. Whether you're spending the whole day at the river or are quickly passing by a stream, spend a few minutes using the Creek Watch application to snap a picture and report how much water and trash you see. The data will be aggregated and shared with watershed groups, scientists, and water control boards to help track pollution, manage water resources and plan watershed education programs. Use the app yourself to answer watershed level questions and build a baseline dataset of your stream or river. Baseline datasets, quantities of data that serve as a basis for comparison for data acquired at a later date, can allow us to document changes from normal or historic conditions. By leveraging this free simple to use app, people can collect data that helps answer larger environmental questions.
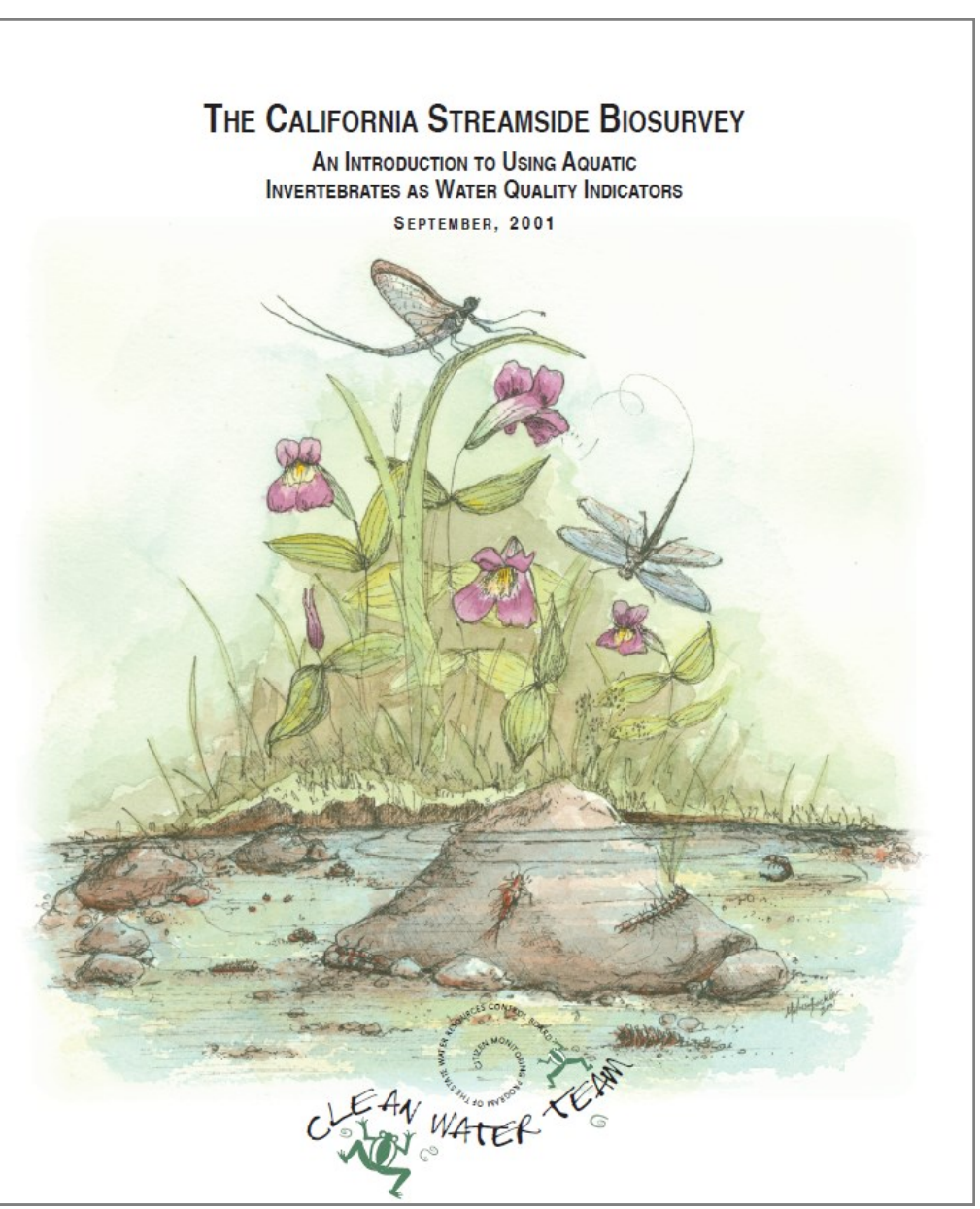
The Creek Watch App collects "6 pieces of data":
1. The amount of water: empty, some, or full.
2. The rate of flow: still, moving slowly, or moving fast.
3. The amount of trash: none, some (a few pieces), or a lot (10 or more pieces).
4. A photo of the waterway.
5. Geo-tags & timestamps data from items 1-4

The California Streamside Biosurvey

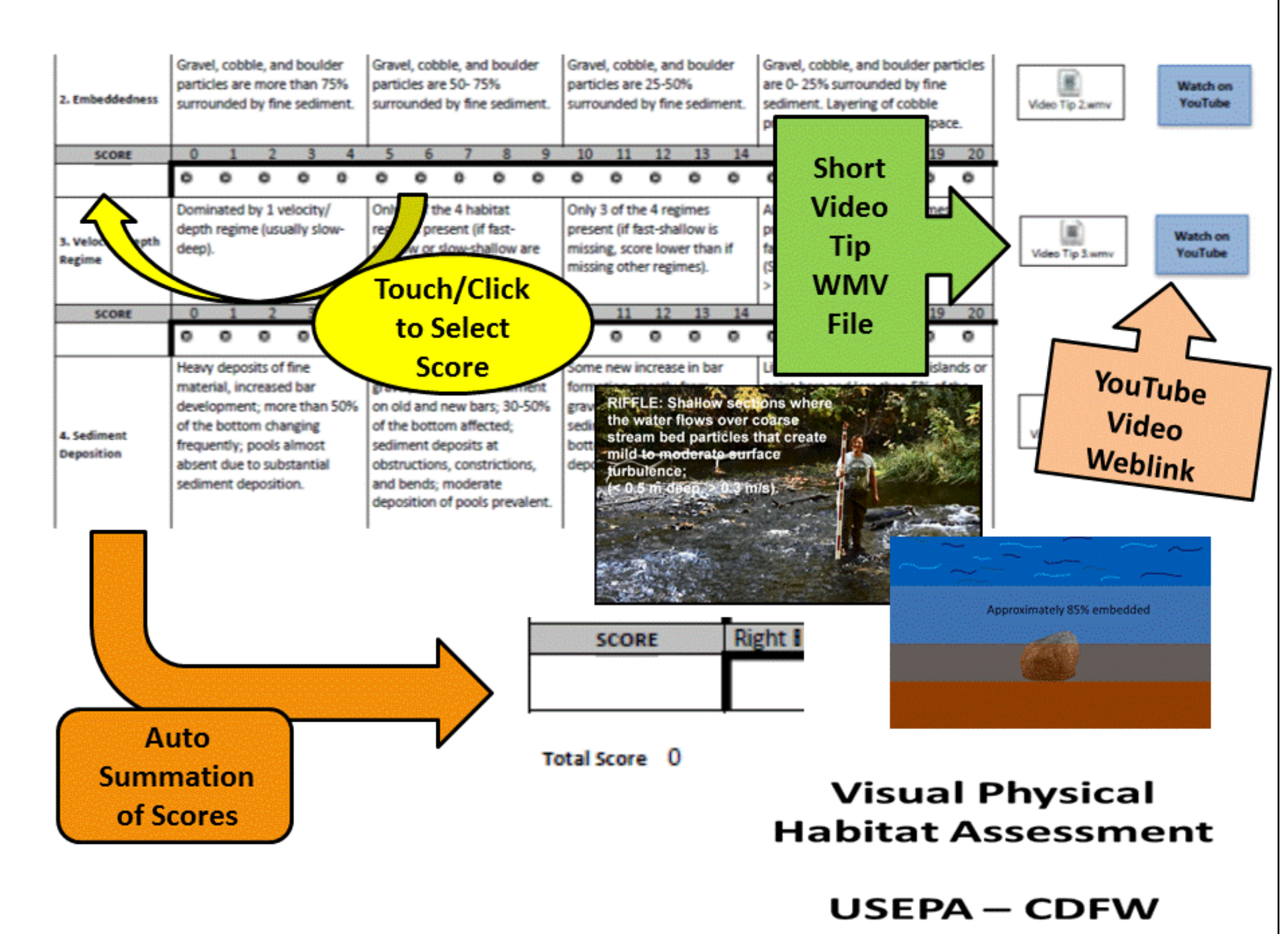## An Introduction to Using Aquatic Invertebrates as Water Quality Indicators

Aquatic insects and other invertebrates are the most common form of animal life in streams. They live among algae, aquatic plants, and many microscopic organisms (like bacteria). Macroinvertebrates (those invertebrates visible to the unaided eye) play many roles in the aquatic food web--they help break down organic debris, recycle nutrients, and provide food for fish, amphibians and riparian birds. Some of these organisms can live and even thrive under polluted conditions but many others require clean and cold water to survive. The variety and types of organisms present are indicators of the health of the stream. A biosurvey is literally a "life-survey", a simple test of stream health that involves collecting and classifying stream life. The biosurvey described here, and more extensive sampling known as bioassessment, are tools for measuring stream water quality and habitat health based on the types of invertebrate organisms that live on the stream bottom.

A Scientific Collection permit from CDFW is required to conduct a biosurvey.

Visual Habitat Assessment for Wadeable Freshwater Streams

Based on an EPA methodology. We have created an enhanced spreadsheet and videos that supplement basic instruction. A Visual Assessment is a technique to document waterway and watershed conditions and uses. It requires minimal technical equipment and training and relies primarily on the monitor's sensory abilities and common sense. Visual assessments are attempts to document conditions from the viewpoint of the individual observer, and are therefore usually qualitative or, at best, semi-quantitative. To conduct the assessment, the monitors walk a segment of shoreline or stream, recording information and/or taking photographs. This assessment can be used as a baseline for gross problem identification, or for tracking gross changes over time.

The California Digital Reference Collection of Freshwater Benthic Macroinvertebrate Families.

This interactive pdf brings aquatic invertebrate knowledge from the lab and library to the creekside. It takes advantage of touch-screen navigation and can be downloaded from the Clean Water Team for free.

Totally Trashed or Not? Conducting Rapid Trash Assessments.

Nobody likes a trash filled creek. Unfortunately clean-ups are only temporary solutions. By conducting rapid trash assessments you can learn more about trash accumulations and their harm.

Many public and community based organizations host volunteer cleanups periodically, and document the amount of trash that was removed. The purpose of volunteer clean-ups is to visibly clean the river and its banks, not to quantify debris. As a result, it is likely that some of the debris collected during those events are not recorded. In addition, volunteers traditionally focus on larger, more visible debris to the exclusion of smaller debris which are commonly encountered, such as cigarette butts. The data collected also does not indicate how long the trash had been accumulating .

The rapid trash assessment is a great addition to a clean-up event. It can be used for a number of purposes, such as ambient monitoring, evaluation of management actions, or comparing sites with and without public access. Ambient monitoring efforts should provide information at sites distributed throughout a waterbody, and several times a year to characterize spatial and temporal variability. Additionally, the ambient sampling design should document the effects of episodes that affect trash levels such as storms or community cleanup events. Pre- and post-project assessments can assist in evaluating the effectiveness of management practices ranging from public outreach to structural controls, or to document the effects of public access on trash levels in waterbodies (e.g., upstream/downstream). Such evaluations should consider trash levels over time and under different seasonal conditions. The methodology was developed for sections of wadeable streams, but can be adapted to shorelines of lakes, beaches, or estuaries.

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

World Water Monitoring Challenge — Test. Share. Protect.

You Tube — CleanWaterTeamVideos

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