

SCCWRP Director's Report



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FALL 2015 ISSUE

Panel proposes reforms to ELAP following review

A five-member advisory panel convened by SCCWRP to evaluate the state's Environmental Laboratory Accreditation Program (ELAP) has published [a report outlining its Year 1 findings and recommendations](#), the culmination of a months-long review of the agency.

The ELAP Expert Review Panel described the program in its report as ineffective, financially challenged, and lacking credibility. But the panel also noted that ELAP's newly installed management team has already made progress turning around the program.

Panel Chair Lara Phelps and SCCWRP Executive Director Steve Weisberg presented the report's findings November 4 at a State Water Board meeting.

ELAP, established in 1998, is responsible for inspecting nearly 700 public-health and environmental testing laboratories across California, both public and private. The accrediting body plays a key role in protecting the integrity of environmental

data on which the state bases its management decisions.

The panel issued five main recommendations for reforming the 25-person program:

- 1) Install a comprehensive management system that holds employees accountable to clear performance criteria and standards
- 2) Adopt a new set of prewritten accreditation standards by which labs are inspected
- 3) Update the list of methodologies used by the program to conduct accreditation
- 4) Invest in staff development opportunities and make use of third-party accreditors to resolve programmatic backlogs
- 5) Build a rigorous communications plan with the program's clients and reinvigorate the program's technical advisory committee

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Calendar

Thursday, November 12
CTAG quarterly meeting

Friday, November 13
Seminar: "The ecology of natural stormwater treatment systems"

Friday, December 4
Commission meeting

Friday, December 11
Seminar: "High-content screening of chemical toxicity in zebrafish embryos"

Winter 2015-16 (Date TBD)
CTAG research planning workshop on ecohydrology

Despite the challenges, the panel said it has high hopes for the program's future.

"If ELAP is successful in implementing the recommended reforms, the Panel believes ELAP can regain credibility, achieve financial sustainability, operate an accreditation process that the State and stakeholders can support, and reliably ensure that environmental and public health data being used in State decision-making are of known and documented quality," the report concluded.

Over the past eight months, the panel hosted three public meetings, plus a webinar meeting, to gather information, input and perspectives from stakeholders.

The panel members intend to revisit the program in about a year to conduct a follow-up assessment.

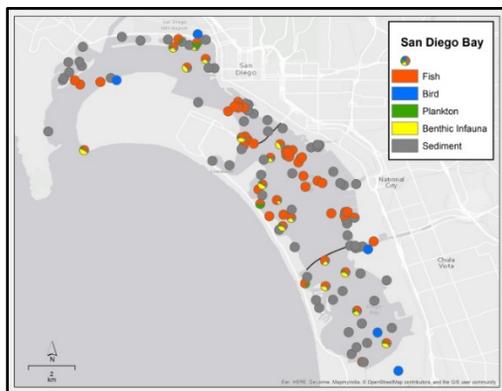
For more information, contact Dr. [Steve Weisberg](#).



ELAP Expert Review Panel members, from left, Mitzi Miller, Jordan Adelson, David Speis, Stephen Arms and Lara Phelps discuss the status of California's accreditation program for environmental laboratories during a meeting hosted by SCCWRP. The panel has recommended a series of reforms intended to improve the program.

Massive 3-year sampling effort for San Diego Bay bioaccumulation study wraps up

Scientists have finished collecting and analyzing more than 260 animal samples from San Diego Bay in one of the most comprehensive Southern California investigations ever conducted into how



San Diego Bay was blanketed with collection sites from which samples of fish, bird eggs, plankton, benthic infauna and sediment have been gathered over the past few years. SCCWRP and its study partners are analyzing the data as they seek to evaluate health risks to wildlife and humans who consume seafood.

contamination is transferred through various levels of the food web.

The sampling – completed over the past three years – encompasses sediment-dwelling mollusks, worms, and shrimp near the bottom of the food web; multiple species of sport fish and prey fish in the middle of the food web; and the eggs of the California least tern and other birds at the top of the food web.

The goal is to understand how contaminants from sediment and other sources build up – or bioaccumulate – in each successive predator. SCCWRP and its numerous study partners are seeking to evaluate health risks to wildlife and humans who consume seafood from San Diego Bay.

Study findings, scheduled to be published in summer 2016, are intended to provide environmental managers and regulators with a strong scientific foundation with



Eggs from the California least tern have been collected in San Diego Bay as part of a bioaccumulation study that seeks to understand how contaminants are transferred through the food web. Scientists plan to publish the study in summer 2016.

which to plan and take action to improve the bay's water quality.

The expansive data set being used for the study is unique among bioaccumulation

studies because multiple key steps of the food web are being studied at once, and because a comprehensive list of analytes is being targeted, including mercury, selenium, PCBs, DDTs, PAHs, and contaminants of emerging concern (PBDEs).

This study is highly leveraged, with the Southern California Bight Regional Monitoring Program and several San Diego public agencies contributing to the sampling and chemical analysis efforts.

Study data will be used to produce an updated evaluation of the risk to San

Diego Bay wildlife from contamination, and to refine an assessment framework under development that will explain how to interpret California's sediment quality objective to protect human health.

For more information, contact [Steve Bay](#).

Scientists to track El Niño's physical impacts to coastal lagoons this winter

To better understand how sea level rise may impact Southern California's vulnerable coastal lagoons, SCCWRP is launching a study this month to observe how predicted El Niño-fueled storm surges this winter affect coastal geomorphology and hydrology.

The study, which will focus on up to 12 major estuary sites along the Southern California coastline, will methodically document changes to water levels, how the shape of each lagoon's mouth is altered by storm surges, and whether natural and manmade protective barriers are breached during storm events.

The field work will be done with in-kind help from numerous study partners, including a citizen science program led by the Scripps Institution of Oceanography that will train volunteers to photograph coastal lagoons before and after storm events.

The goal is to better understand what happens to these coastal areas during storm surges, so that scientists and coastal managers can work toward better long-term protection and restoration strategies.

Climate scientists say the frequency and strength of storm surges are expected to intensify in the coming decades in response to climate change and rising sea levels. Thus, this winter's predicted El Niño storm season marks a prime opportunity to track topographical and hydrodynamic changes triggered by storm surges.

The monitoring protocols call for setting up one or more fixed camera stations aimed toward the mouth of each lagoon to capture visible changes.



Photo courtesy of Sean Baumgarten, San Francisco Estuary Institute

Los Peñasquitos Lagoon in San Diego is separated from the ocean by a reinforced berm along which Highway 101 runs. SCCWRP will track changes to the shape of the mouth of this lagoon and several others this winter as predicted storm surges fueled by El Niño batter the coastline.

Additionally, trained scientists and technicians working in the field will use geospatial tools to measure the height, size and position of protective berms and other barriers both before and after storm events; they also will set up water gages inside the lagoons to measure pressure, temperature, salinity, and water height.

The priority sites in the study stretch from Mugu Lagoon in Ventura County to the Tijuana River estuary near the U.S.-Mexico border, and represent both lagoons that flood during high tide and those that typically remain closed to sea water.

Among the study's predictions is that lagoons with naturally formed mouth barriers will be less impacted by storm

surge than those with jettied and armored mouths.

The project will be co-led by Dr. Eric Stein, head of SCCWRP's Biology Department, and Dr. Sarah Giddings of the Scripps Institution of Oceanography. The study's findings will be disseminated widely to coastal and wetland managers, and are expected to be helpful in calibrating sea-level rise response models being developed by the U.S. Geological Survey and others.

For more information about the El Niño lagoon study, contact Dr. [Eric Stein](#).

SCCWRP models flow patterns at 850 stream sites for ELOHA study

SCCWRP in October finished modeling hydrological flow patterns for about 850 un-gaged bioassessment stream sites across Southern California, a milestone in a three-year project that aims to use a scientific framework known as the Ecological Limits of Hydrologic Alteration (ELOHA) to evaluate environmental flow requirements.

The project, which kicked off in 2013, seeks to link changes in hydrology to changes in biological condition, allowing scientists to estimate the hydrological conditions necessary to support in-stream biological communities.

Because most of the 850 stream sites being used for the study are un-gaged, the first step was to model flow patterns at each site. Modeling is the only cost-effective way to generate time-series flow data for all 850 sites in the study.

SCCWRP developed 45 hydrologic models, based on locations of existing long-term stream gages, to represent hydrological conditions at the 850 stream sites.

Then, SCCWRP developed a model-assignment algorithm to appropriately match each bioassessment stream location to one of the 45 models.

Once assigned, flow was modeled at all 850 sites for both current and natural conditions to produce estimated hydrologic change. These hydrologic changes will be used with the existing bioassessment data to produce flow-ecology relationships.

Later this month, SCCWRP and its partners will begin testing the new tools to



Streams that experience dramatic shifts in their hydrologic flow patterns are prone to severe erosion, such as this creek in southern Orange County where the water table has dropped by several meters. Erosion exposes roots that become vulnerable to perishing, and also is associated with changing water chemistry that further impacts stream health. SCCWRP is working to understand how to better manage flow patterns to protect in-stream biological communities.

conduct an ELOHA analysis of the San Diego River Watershed. This case study will allow study participants to gain an understanding of how the flow-ecology analysis can be used to inform management decisions and to troubleshoot challenges and obstacles associated with running an ELOHA analysis.

By early 2016, SCCWRP expects to release preliminary estimates for the in-stream flow requirements within the San Diego River Watershed.

For more information, contact Dr. [Eric Stein](#).

BIOASSESSMENT

SCCWRP transitioning new stream condition scoring tool to managers

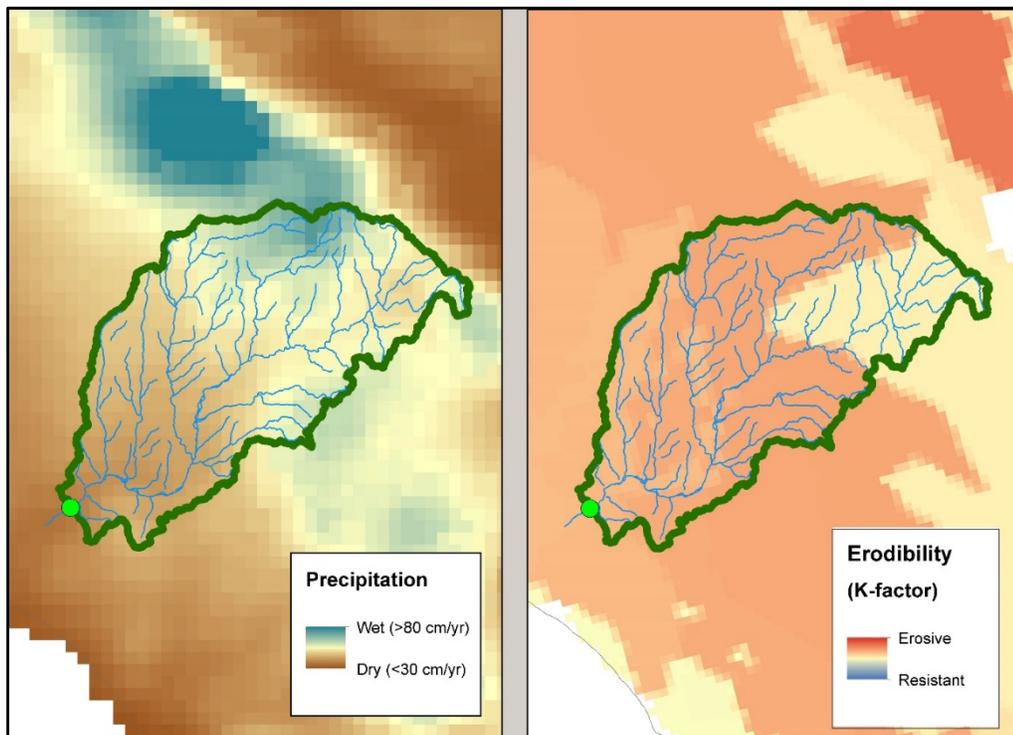
SCCWRP and its partners have launched a series of outreach and training exercises to teach watershed managers how to use a new scoring tool for evaluating the biological health of streams across California.

The California Stream Condition Index, co-developed by SCCWRP, represents an important advancement in stream monitoring, allowing managers to generate condition scores using site-specific biological expectations that account for the stream's unique environmental characteristics.

In October, the state's Surface Water Ambient Monitoring Program (SWAMP) published a [CSCI technical memo](#) and accompanying [instruction manual](#) co-authored by SCCWRP that explains how to calculate index scores. Two peer-reviewed articles about the development of the CSCI, meanwhile, have been published as open-source journal articles in *Freshwater Science*, accessible [here](#) and [here](#).

SCCWRP also has helped SWAMP build an interactive map to make CSCI scores for nearly 2,000 streams publicly accessible, prepared a two-page fact sheet for non-technical audiences, and co-hosted a workshop in September in Sacramento to train staff at regional boards, who, in turn, will train end users within their regions.

While SCCWRP's short-term goal is to help the bioassessment community calculate CSCI scores with currently available tools (specifically, ArcGIS and the R statistical



Calculating the health of a stream using the California Stream Condition Index requires use of a geospatial mapping tool that overlays the watershed with site-specific data on average annual precipitation, left, and geomorphic erodibility, right. Above, this tributary of the San Juan Creek watershed in Orange County encompasses a range of precipitation and erodibility patterns that help inform expectations about the biological condition of each of its stream segments.

programming language), the ultimate goal is to make the process automated and thus accessible to a larger audience.

To that end, SCCWRP has been working with the State Water Board to build an automated, web-accessible CSCI calculator that can be used with minimal

training and no software licensing requirements.

SCCWRP and SWAMP expect to release the CSCI calculator in late 2016.

For more information, contact Dr. [Raphael Mazor](#).

In brief ...

Ichthyoplankton barcoding project kicks off: SCCWRP hosted a kickoff meeting in October to begin developing ichthyoplankton as a biological indicator of waterbody condition. Ichthyoplankton, which are the eggs and larvae of fish, could

offer key insights into the condition of the marine pelagic zone, an offshore area heavily impacted by land-based discharges. SCCWRP and its project partners at NOAA's Southwest Fisheries Science Center and the University of

California, Santa Barbara, will be working to incorporate molecular taxonomic tools and next-generation DNA sequencing technology into development of ichthyoplankton as a bioindicator.

SEDIMENT QUALITY

Gene expression patterns of fish change in response to pollutant exposure, study shows

SCCWRP has found that the gene expression patterns of the hornyhead turbot change as they are exposed to different chemical pollutants at different concentrations, a proof-of-concept finding that reveals how gene expression analyses might one day be used as an environmental monitoring tool.

The study, completed this summer, involved exposing the hornyhead turbot in a lab to mixtures of one of two chemicals at two different concentrations – either the industrial chemical class known as PCBs or the flame retardant chemical class known as PBDEs. The two types of chemicals are common contaminants in sediment and fish.

SCCWRP created a new gene microarray containing probes for more than 14,000 genes to measure the fish's corresponding gene expression changes.

Scientists detected about 420 gene changes in the fish that had been exposed to the two pollutant types.

Furthermore, the gene expression changes correlated strongly with the type of



A hornyhead turbot is dissected to remove the liver for analysis. SCCWRP has found in a proof-of-concept study that the gene expression patterns of this fish change as they are exposed to different pollutants.

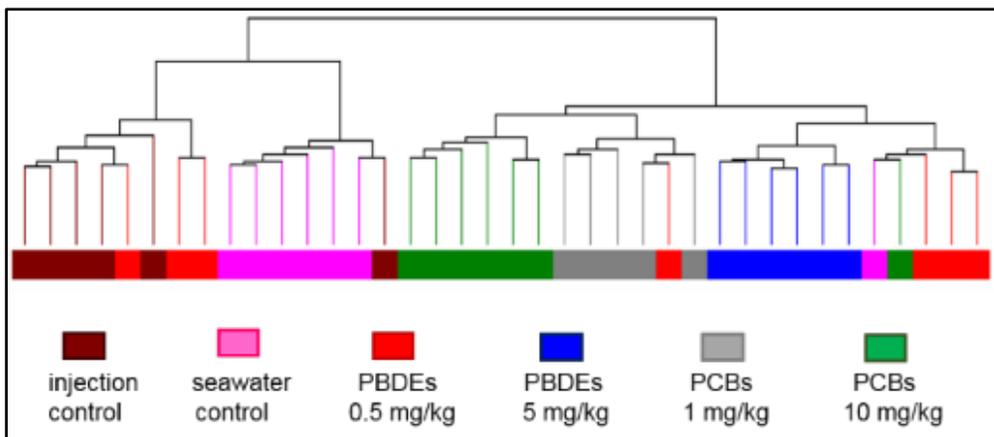
contaminant the fish had been exposed to. In other words, a fish exposed to one

chemical type tended to exhibit gene expression patterns that were statistically different than a fish exposed to the other chemical type.

Wild fish caught from a site known to have high levels of PCBs and PBDEs also were analyzed during the study; as predicted, they exhibited a wider variety of gene expression changes than the laboratory fish did.

In follow-up studies, SCCWRP intends to explore the impact that other factors may have on gene expression changes, including fish size, life stage and movement patterns.

For more information, contact Dr. [Alvina Mehinto](#).



Hornyhead turbot exposed to PBDEs and PCBs in a lab tended to exhibit different gene expression patterns depending on which chemical type they were exposed to. This cluster analysis shows how the gene expression patterns were different enough that the fish samples tended to cluster together by contaminant type and, to a lesser degree, by concentration.

In brief ...

Marina del Rey studies to kick off next year: SCCWRP anticipates launching two studies in early 2016 to investigate the effects of contamination on sediment and water quality in Marina del Rey Harbor. The sediment contamination study will use toxicity tests and benthic community analyses to identify the contaminants responsible for impaired sediment quality; the water quality study will seek to develop a site-specific water quality objective for dissolved copper. Both studies are intended to help harbor

managers achieve compliance with Marina del Rey Harbor's Toxic Pollutants TMDL (total maximum daily load). The work plans for both studies are undergoing final reviews.

Sediment toxicity database debuts: SCCWRP and members of the Sediment Advisory Group (SEDAG) of the Society of Environmental Toxicology and Chemistry have created a new web database to serve as a clearinghouse for hundreds of toxicity test results covering a wide range of

chemical contaminant types and benthic species. The spiked sediment database, accessible at <http://data.sccwrp.org/sedag>, marks the first time that so much data have been compiled into one user-friendly, publicly accessible database. Users are able to extract subsets of data using custom searches, among other features. The database is intended to facilitate the use of sediment toxicity data in the development of sediment quality management targets.

CONTAMINANTS OF EMERGING CONCERN

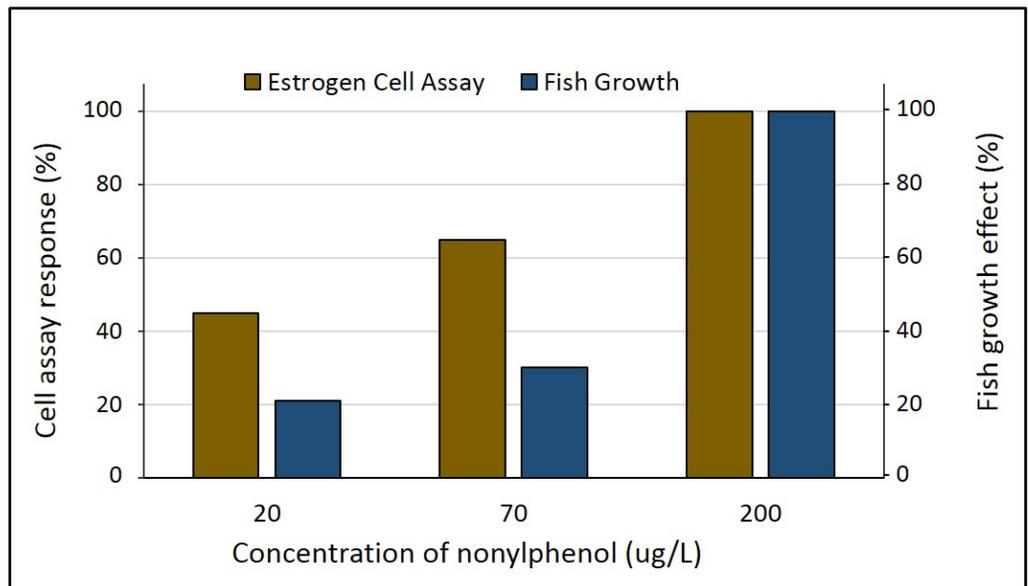
Cell assay shows promise for detecting effects of estrogenic chemicals on fish

In an effort to understand whether cell-based biological assays could be used to screen for compounds not presently being monitored in receiving waters, SCCWRP is participating in a study to explore the efficacy of using bioassays to screen for exposure to estrogen-mimicking chemicals.

Early results obtained in October indicate a correlative response between the cell-based bioassay and reduced growth in fish in a laboratory setting. This preliminary finding adds to emerging evidence that bioassays can be linked to meaningful biological impacts on whole organisms that have been exposed to a constituent of emerging concern.

The toxicity testing was performed using a mild estrogenic chemical called nonylphenol on the inland silverside (*Menidia spp.*), a stalwart species used for environmental monitoring.

SCCWRP and the University of Florida found that the cell assay was able to track a clear pattern of inhibited growth in *Menidia* exposed to nonylphenol; the fish's normal growth became increasingly stunted with higher concentrations of nonylphenol exposure.



Scientists have found that as the inland silverside (*Menidia spp.*) fish is exposed to increasing concentrations of an estrogenic chemical called nonylphenol in seawater, the cell bioassay is able to detect a progressively greater response, and the fish growth effect becomes more severe. These preliminary findings are important in SCCWRP's ongoing work to assess whether bioassays could be used to screen for CECs in aquatic environments.

Nonylphenol, an industrial chemical, is ubiquitous in water and sediment near wastewater outfalls and stormwater discharge zones following decades of production and use.

The next step in this ongoing study is to expose the fish to wastewater effluent

containing a mixture of natural and synthetic estrogens. Using actual wastewater effluent samples instead of a pure dose of nonylphenol will more closely approximate reality in open waters.

For more information, contact Dr. [Keith Maruya](#) or Dr. [Alvina Mehinto](#).

In brief ...

SCCWRP hosts recycled water CEC workshop: SCCWRP hosted a two-day State Water Board workshop in October that brought together leading scientists and engineers to identify research priorities for improving monitoring and treatment for CECs in recycled water. The workshop, co-hosted by the National Water Research Institute and Water Reuse Research Foundation, included discussions about potential use of targeted chemical analysis, non-targeted chemical analysis, and bioanalytical screening tools to both

improve CEC monitoring and assess efficacy of treatment systems. The State Water Board will release a report summarizing outcomes from the workshop in early 2016.

Bioassay screening for SoCal waterways continues: SCCWRP is continuing to screen water samples collected from across Southern California this summer for the presence of CECs and other contaminants using cell-based bioassays. The Year 1 pilot screening project,

expected to be completed in December, represents the first tier of a multi-tiered screening framework that SCCWRP has created to identify and monitor the most relevant environmental contaminants in stormwater-impacted waterways statewide. Depending on the findings, some samples may advance to the next monitoring tier: diagnostic non-targeted chemical analysis using two-dimensional gas chromatography.

EUTROPHICATION

SCCWRP works toward predicting causes, impacts of West Coast acidification

SCCWRP and its partners have begun work on a predictive model that will offer managers key insights about the extent to which anthropogenic nutrients introduced to coastal waters affect ocean acidification and hypoxia.

Scientists know numerous factors impact acidification of coastal waters, including carbon dioxide emissions, natural upwelling processes, and nutrients introduced via local discharges. Although global-scale CO₂ is the largest contributor, scientists have limited information about the importance of local biogeochemical processes.

The model's goal is to disentangle these stressors, so that marine resource managers and water-quality managers can understand whether actions they take at the local level can have a meaningful effect on the acidifying ocean.

The project will involve development of a [coupled physical-biogeochemical model](#) for the entire West Coast, stretching from British Columbia to Baja California, and will take into consideration the impacts

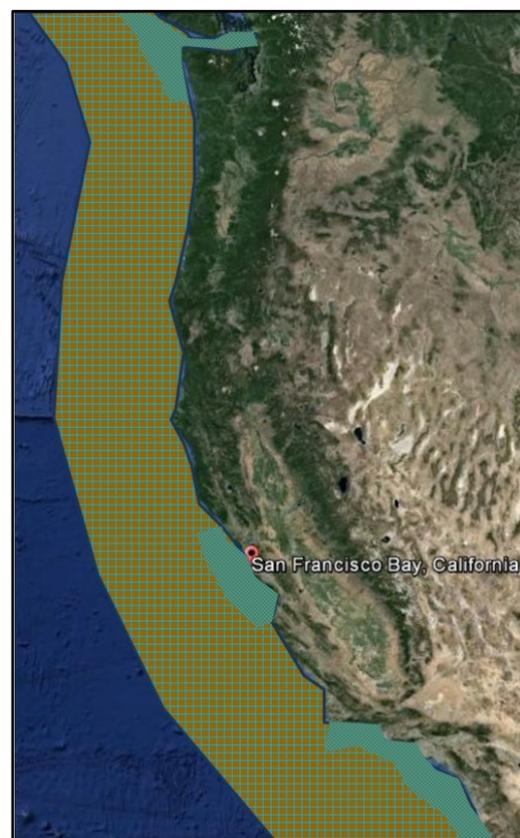
that the region's dominant California Current System has on circulation, biogeochemical cycling, and the health of the lower-trophic ecosystem.

Downscaled versions of the model will be built for the Southern California Bight, as well as coastal areas near San Francisco Bay and the Columbia River outfall in the Pacific Northwest.

When the model is finished in 2018, scientists expect to be able to share with West Coast managers which marine habitats are most vulnerable to acidification and hypoxia.

The modelers also expect to be able to describe to what extent local, land-based sources of pollutants are exacerbating ocean acidification and hypoxia.

For more information, contact Dr. [Martha Sutula](#).



SCCWRP is working to help build a coupled physical-biogeochemical model for the U.S. West Coast, above, that can predict the impacts of local pollution on ocean acidification. The model will be downscaled to focus on the coastal areas near the Columbia River outfall, San Francisco Bay, and the Southern California Bight, shown in turquoise shading.

In brief ...

Draft of CyanoHABs strategy report released: A report that outlines a proposed statewide monitoring strategy for cyanobacterial toxins and blooms was submitted to state officials in August for internal review. The cyanoHABs strategy, which SCCWRP has taken the lead on developing, is intended to unify monitoring and research efforts that are taking place in the coastal zone and various freshwater habitats in California. The report is expected to be released for public review in early 2016.

New project to improve HABs monitoring in estuaries: SCCWRP and its

partners initiated a project in September to improve the tools and strategies used to monitor harmful algal blooms (HABs) in coastal estuaries in California. The four-year project will examine the ecosystem impacts of both marine and freshwater cyanotoxins; recent research has shown that freshwater toxins are present in marine waters and can be fatal to shellfish and other animals that live at the land-sea interface.

Testing of XPRIZE pH sensors expands: SCCWRP is overseeing testing of two additional ocean pH monitoring instrument prototypes developed through

an international XPRIZE competition, bringing to a total of four the number of instruments being tested by SCCWRP's four POTW member agencies. The prototype instruments are being deployed while conducting ocean acidification-related field monitoring through the Southern California Bight Regional Monitoring Program. The two newer prototypes – the ANB and Sunburst sensors – show greater promise than the first two sensors for fulfilling the routine monitoring needs of SCCWRP's member agencies.

MICROBIAL WATER QUALITY

In brief ...

SCCWRP looks for pathogenic *Vibrio* bacteria in lagoons: SCCWRP and the Scripps Institution of Oceanography have launched an exploratory study to search for the presence of *Vibrio* bacteria in Southern California coastal lagoons, after two surfers in San Diego became infected with a pathogenic strain of the bacteria last winter via open wounds. During an initial round of field sampling in October in Newport Beach's Back Bay and San Diego's Los Peñasquitos Lagoon, SCCWRP and its partners found *Vibrio parahaemolyticus* and *Vibrio vulnificus* – two potentially pathogenic strains of the bacteria. Researchers plan to sample at about 10 coastal lagoons across Los Angeles, Orange, and San Diego Counties over the next several months.



SCCWRP's Jacqueline Jansz collects water samples in Newport Back Bay as part of a study investigating whether potentially pathogenic *Vibrio* bacteria are present in coastal lagoons. Elevated levels of *Vibrio* in coastal areas are a concern because human health could be at risk.

WETLANDS

Workshop kicks off design process for sea level rise vulnerability tool for wetlands

SCCWRP scientists attended a two-day brainstorming workshop at the geospatial technology company Esri in Redlands this summer to jump-start development of a scientific tool that will aid coastal managers in assessing coastal wetlands' vulnerability to sea level rise.

Participants at the "design sprint" workshop identified project goals, priorities and challenges associated with building the proposed Sea Level Rise Decision Support System (SLR DSS), and mocked up storyboards to begin conceptualizing how the various portions of how the tool might function and how the end-user management community might interact with it.

The SLR DSS is designed to serve as a tool – possibly web-based – that wetland managers would use to evaluate proposed wetland conservation and restoration projects against relevant data and objective scientific information. The tool would incorporate regional objectives, local criteria, mitigation scenarios, and pre-screened alternatives, and also could assist in compiling documentation and visual aids to communicate the implications of rising sea levels on the scope and design of projects.

Rising sea levels in response to global climate change are expected to trigger a host of coastal challenges in the coming decades, notably to vulnerable, low-lying wetland areas.



Wetland scientists and managers take part in a storyboarding exercise with colored sticky notes at Esri headquarters in Redlands to help them design a management tool capable of assessing coastal wetlands' vulnerability to sea level rise. Project participants, including SCCWRP, plan to flesh out the design of the Sea Level Rise Decision Support System over the next year.

The workshop brought together representatives from the State Coastal Conservancy, Nature Conservancy, San Francisco Estuary Institute, Audubon Society, University of California, Los Angeles, Tijuana River National Estuarine Research Reserve, and SCCWRP. Project

participants plan to spend the next year developing the tool.

For more information, contact Dr. [Eric Stein](#).

REGIONAL MONITORING

Year 1 sampling for stream survey's second cycle wraps up

The Southern California Stormwater Monitoring Coalition has completed Year 1 field sampling for the second cycle of the Regional Watershed Monitoring Program, which builds off the successes of the program's first cycle that wrapped up in 2013.

About one-third of the 70 sites being sampled annually in the program's second cycle are the same as in the first cycle, ensuring results will be comparable. The inaugural monitoring cycle found that 75% of Southern California's 4,300 miles of perennial wadeable streams are degraded.

Perhaps the biggest change has been extending the survey's reach to first-order tributaries and nonperennial streams. Nonperennial streams encompass more than half of all stream miles in Southern California, and SCCWRP research over the past five years has demonstrated that the CSCI scoring tool developed to evaluate the health of perennial streams can be applied to nonperennial streams as well.

Other key changes include:

- The number of condition indicators used in the survey has been expanded to include a number of "observational" indicators that document engineered channels, the presence of invasive vertebrate species, and the hydrologic state relative to permanence and persistence of flow.
- Sediment toxicity will also be monitored for the first time during Year 2 sampling. During Year 1 sampling, locations of sediment accumulation were documented in preparation for this effort.



The Southern California Stormwater Monitoring Coalition has introduced new condition indicators and additional stream types to the second cycle of its Regional Watershed Monitoring Program. Above, field staff practices stream protocols at Madea Creek in the Santa Monica Mountains during a training exercise kicking off the program's second cycle.

- Water samples are being tested for the presence of CECs using a monitoring framework developed by SCCWRP this year that uses bioanalytical screening tools to screen for relevant environmental contaminants. The pilot testing is an opportunity to evaluate the framework's effectiveness when used for a regional monitoring program.

To offset expansion of some program elements, other elements were scaled

back. The total number of sites surveyed was reduced by about one-third for the program's second cycle. Also, the survey is no longer monitoring for metals and toxicity in the water column, as these stressors were seldom observed at elevated levels during the first cycle.

For more information about the SMC Regional Watershed Monitoring Program, contact Dr. [Raphael Mazor](#).

INFORMATION TECHNOLOGY & VISUALIZATION

SCCWRP kicks off effort to automate image processing for CellScope

SCCWRP has launched an effort to automate analysis and processing of environmental images obtained with the CellScope field-portable cell phone microscope.

SCCWRP is focusing its initial work on automatically counting the number of discrete organisms contained within a given CellScope image.

The CellScope, which is a mostly plastic device that uses a cell phone as the viewfinder, is a prototype instrument being adapted by SCCWRP and its partners for environmental field

monitoring. It was originally developed for medical applications.

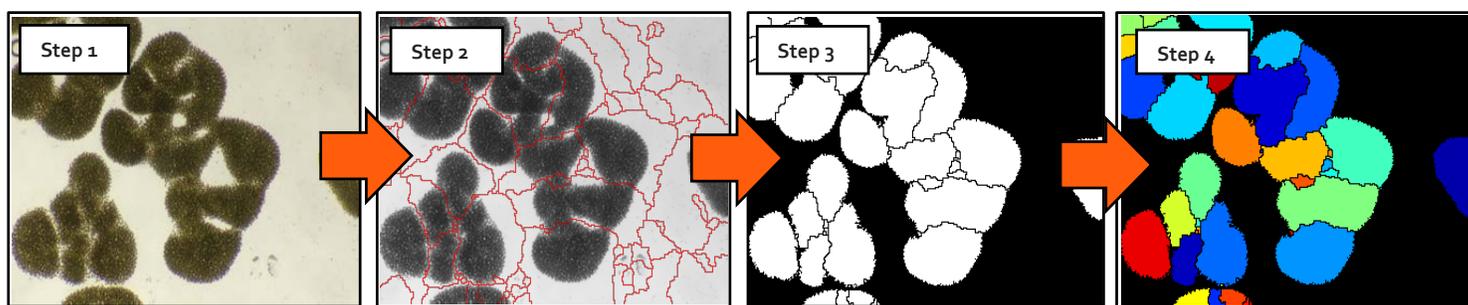
SCCWRP is using MatLab with the Image Processing Toolbox to write computer algorithms that can identify and segment individual objects, then autonomously count them.

SCCWRP's long-term goal is to be able to write software programs that recognize a number of distinct features in images, including shapes, movements and recognition patterns. Being able to extract this data automatically will dramatically speed up image processing, especially for high volumes of images.

Even as SCCWRP develops its automated image analysis capabilities for the CellScope, the prototype instrument itself is continuing to undergo field testing and validation by partners. The original six-month testing phase, in which five of the instruments were deployed to the field, has been extended for an additional six months.

Feedback from users about the CellScope's effectiveness as a field-deployable microscope continues to be uniformly positive.

For more information, contact Dr. [Steve Steinberg](#).



The computer program that SCCWRP is building to autonomously count object images is designed to recognize, isolate and classify individual objects of interest. Above, a raw CellScope image of algae (Step 1) is separated into discrete candidate objects using an approach known as water-shedding (Step 2). Next, thresholds are set for object size, shape, color intensity and other factors to eliminate the background, an approach known as binary image masking (Step 3). Finally, the resulting objects in the image are separated for counting and classification (Step 4).

In brief ...

SCCWRP assumes management of ocean data portal: SCCWRP in September took over hosting and management of the West Coast Governors Alliance Ocean Data Portal from the Supercomputer Center at the University of California, San Diego. The portal, which SCCWRP played a key role in developing, offers a centralized access point for West Coast ocean data.

San Diego committee reviews data management recommendations: The San Diego Integrated Regional Management Program's Regional Advisory Committee on October 7 reviewed a SCCWRP-authored report that makes

recommendations regarding the development of an environmental data management system for the region. The committee's members from the NGO and business communities, in particular, expressed support for implementing the recommendations outlined in the report. The report, titled "[San Diego Integrated Regional Water Management Data Management System Basic Design Recommendations](#)," will next be considered by the Regional Water Management Group.

CTAG Analysis and Visualization Users Group developing first tools: CTAG's

Analysis and Visualization Users Group, which is working to develop tools to compute indices and generate data outputs, has begun conceptualizing and developing a core tool set to support its tool development efforts. The group's initial tool will incorporate open-source tools, such as R and Shiny, and take advantage of the fact that several member agencies already have experience working with such tools in other contexts. The Analysis and Visualization Users Group, formed by CTAG in spring 2015, continues to experience strong participation and involvement.

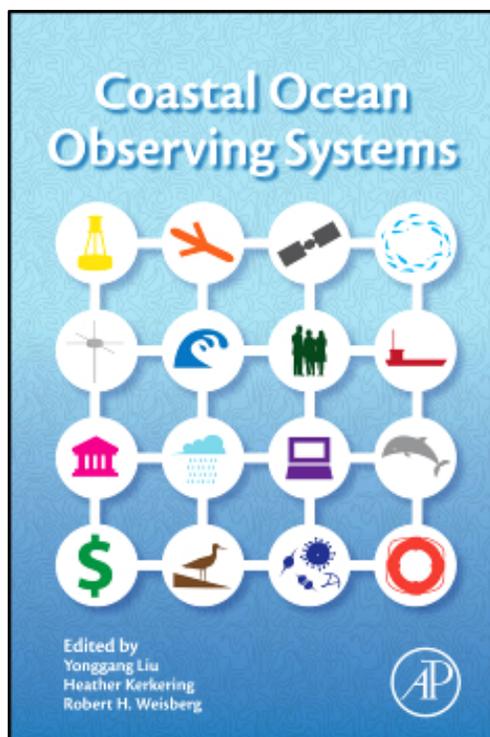
New SCCWRP Publications

Journal Articles (Published)

Fetscher, A.E., M.D.A. [Howard](#), R. Stancheva, R.M. Kudela, E.D. [Stein](#), M.A. [Sutula](#), L.B. Busse, and R.G. Sheath. 2015. [Wadeable streams as widespread sources of benthic cyanotoxin production in California, USA](#). *Harmful Algae* 49:105-116.

Magrann, T., M.D.A. [Howard](#), M. [Sutula](#), D.S. Boskovic, W.K. Hayes, S.G. Dunbar. 2015. [Screening assessment of cyanobacteria and cyanotoxins in Southern California lentic habitats](#). *Environmental Management and Sustainable Development* 4(2), ISSN 2164-7682.

[Maruya](#), K.A., W. [Lao](#), D. Tsukada, D. [Diehl](#). 2015. [A passive sampler based on solid phase microextraction \(SPME\) for sediment-associated organic pollutants: comparing freely-dissolved concentration with bioaccumulation](#). *Chemosphere* 137:192-197.



SCCWRP is a coauthor of a book chapter in the recently published *Coastal Ocean Observing Systems*. The chapter is about the development of California's monitoring and alert program for harmful algal blooms.

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Kudela, R.M., A. Bickel, M. Carter, M.D.A. [Howard](#), L. Rosenfeld. 2015. [The monitoring of harmful algal blooms through ocean observing: the development of the California Harmful Algal Bloom Monitoring and Alert Program](#). pp. 58-75 in: Y. Liu, H. Kerkering, R.H. Weisbert (eds.), *Coastal Ocean Observing Systems*. Academic Press. Boston, MA.

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Azimi-Gaylon, S., S. Fong, P. Goodwin, T. Hale, G. Isaac, A. Osti, F. Shilling, T. Slaweki, S. [Steinberg](#), M. Tompkins, L. Videmsky. 2015. [Enhancing the Vision for Managing California's Environmental Information](#). Technical Report 884. Southern California Coastal Water Research Project. Costa Mesa, CA.

Berg, M., M. [Sutula](#). 2015. [Factors Affecting Growth of Cyanobacteria with Special Emphasis on the Sacramento-San Joaquin Delta](#). Technical Report 869. Southern California Coastal Water Research Project Authority. Costa Mesa, CA.

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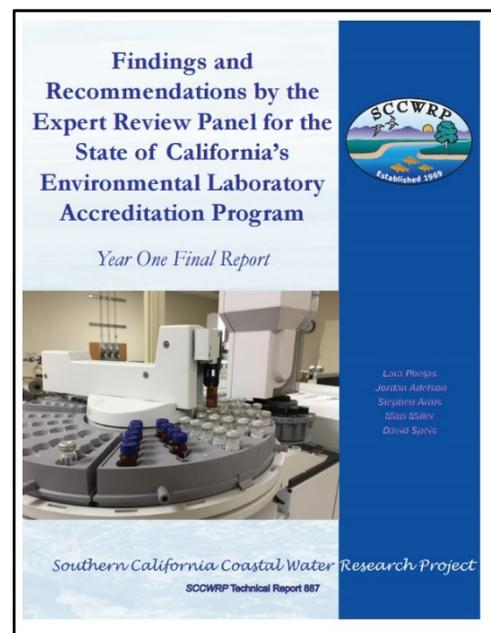
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The advisory panel tasked with reviewing the state's Environmental Laboratory Accreditation Program has released a report outlining its Year 1 findings and recommendations. SCCWRP facilitated the review process and the report's preparation.

[Steinberg](#), S.J. 2015. [San Diego Integrated Regional Water Management Data Management System Basic Design Recommendations](#). Technical Report 878. Southern California Coastal Water Research Project. Costa Mesa, CA.

[Tiefenthaler](#), L., M. [Sutula](#), Y. [Cao](#), J. [Griffith](#), M. [Raith](#), C. Beck, R. Christoph, J. Shrake. 2015. [Wet and Dry Weather Natural Background Concentrations of Fecal Indicator Bacteria in San Diego, Orange, and Ventura County, California Streams](#). Technical Report 862. Southern California Coastal Water Research Project. Costa Mesa, CA.

Quarter in Review

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[Bay, S.](#) [Challenges in Addressing Impacts from Emerging Contaminants](#). Santa Monica Bay National Estuary Program State of the Bay Conference. September 9, 2015. Los Angeles, CA.

[Brown, J.](#) (moderator). [Meeting Meeting ASBS Requirements](#). California Association of Stormwater Quality Agencies Annual Conference. October 19-20, 2015. Monterey, CA.

[Brown, J.](#) [ASBS natural water quality: translating narrative objectives into numerical guidelines](#). California Association of Stormwater Quality

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[Crompton, C.](#), [M. Pestrella](#), [R. Purdy](#), [E.D. Stein](#), [E. Zaldivar](#). [Watershed Management Plans: New Opportunities and Challenges](#). Santa Monica Bay National Estuary Program State of the Bay Conference. September 9, 2015. Los Angeles, CA.

[Dodder, N.G.](#), [K.A. Maruya](#), [A.C. Mehinto](#). [An integrated biological and chemical monitoring framework for contaminants of emerging concern in aquatic ecosystems](#). Industrial Environmental Association 31st Environmental Training Symposium and Conference. October 29-30, 2015. San Diego, CA.

[Gillett, D.](#), [R. Mazor](#), [E.D. Stein](#). [Improving Causal Assessment in California Step 1: Selecting Comparators for Your Site](#). California Association of Stormwater Quality Agencies Annual Conference. October 19-20, 2015. Monterey, CA.

[Lao, W.](#), [Y. Hong](#), [D. Tsukada](#), [K.A. Maruya](#), [J. Gan](#). [Evaluation of various polymers for equilibrium passive sampling](#)

[of moderately hydrophobic emerging pollutants in water](#). SETAC North America 36th Annual Meeting. November 1-5, 2015. Salt Lake City, UT.

[Mazor, R.](#) [How Healthy Are the Streams of the Santa Monica Bay Watershed? Answers from the Stormwater Monitoring Coalition's Regional Stream Survey](#). Santa Monica Bay National Estuary Program State of the Bay Conference. September 9, 2015. Los Angeles, CA.

[Mazor, R.](#), [D. Gillett](#), and [E.D. Stein](#). [Improving causal assessment through data-driven comparator site selection](#). California Aquatic Bioassessment

SCCWRP scientist delivers keynote address in China on DNA-based bioassessment

Dr. Eric Stein, head of the Biology Department, traveled to Nanjing, China, in October to serve as one of the invited keynote speakers at an international conference on environmental health.

Stein's talk, titled "Improving diagnostic capability of bioassessment: New tools and the role of molecular methods," chronicled advances in DNA barcoding and metabarcoding technology that have provided an unprecedented ability to measure and assess various functional aspects of aquatic ecosystems.

The four-day Symposium on Chemical Pollution and Environmental Health brought together experts on ecotoxicology, ecogenomics, and bioassessment from across the globe, including from the University of New Brunswick, University of Michigan, Hong Kong University, and U.S. Environmental Protection Agency.

While in China, Stein also delivered an invited seminar on ecogenomics and bioassessment at East China Normal University in Shanghai, and met with researchers to discuss opportunities for international collaboration on the development of molecular methods for environmental monitoring and assessment.



Dr. Eric Stein, bottom row center, eats dinner at Nanjing University's conference center with the other invited keynote speakers of China's four-day Symposium on Chemical Pollution and Environmental Health. Stein, head of SCCWRP's Biology Department, discussed how molecular technologies are changing how various functional aspects of aquatic ecosystems are measured.

Workgroup Annual Meeting. October 20-21, 2015. Sacramento, CA.

[Schiff, K. Climate change management in marine ecosystems: hypoxia and ocean acidification](#). American Water Resources Specialty Conference on Climate Change. June 15-18, 2015. New Orleans, LA.

Scott, G.I., S. Norman, D.E. Porter, T. Chandler, J. Moore, P.L. Pennington, M.H. Fulton, E. Wirth, M.I. Uyaguari Diaz, K.A. [Maruya, S. Weisberg. Hazards posed by antibiotics and antibiotic resistance in coastal ecosystems](#). SETAC North America 36th Annual Meeting. November 1-5, 2015. Salt Lake City, UT.

[Stein, E.D., R. Ambrose. State of the Bay 2015 Plenary](#). Santa Monica Bay National Estuary Program State of the Bay Conference. September 9, 2015. Los Angeles, CA.

[Stein, E.D. Ecogenomics and Biodiversity: Improving our Diagnostic Capacity](#). International Symposium on Chemical Pollution and Environmental Health. October 20, 2015. Jiangu, China.

[Steinberg, S.J. Turning Data into Information for Stormwater Decision Makers: A Web-Based Program Management Dashboard](#). CASQA 11th Annual Conference. October 19-21, 2015. Monterey, CA.

Conference Posters

[Dodder, N.G., S.A. Mackintosh, J.M. Cossaboon, N.J. Shaul, K.A. Maruya, L.I. Aluwihare, S.J. Chivers, K. Danil, D.W. Weller, E. Hoh. Biomonitoring of organic contaminants in marine mammals by GCxGC/TOF-MS](#). SETAC North America 36th Annual Meeting. November 1-5, 2015. Salt Lake City, UT.

Hoh E., J.S. Park, N.G. [Dodder, A. Holden, K. Hooper. Halogenated organic compounds identified in California peregrine falcons \(*Falco peregrinus*\) by nontargeted analysis](#). SETAC North America 36th Annual Meeting. November 1-5, 2015. Salt Lake City, UT.

[Steinberg, S.J. Turning Data into Information for Stormwater Decision Makers: A Web-Based Program Management Dashboard](#). CASQA 11th Annual Conference. October 19-21, 2015. Monterey, CA.

Other Presentations

[Bay, S.M. Site Specific Objectives for Copper in Marina del Rey: Study Update](#). International Paint and Printing Ink Council Antifouling Coatings Committee. October 21, 2015. Long Beach, CA.

[Griffith, J. Rapid testing for bacterial indicators in coastal waters](#). Orange County Coastal Coalition. October 22, 2015. Newport Beach, CA.

[Mazor, R. Background and benefits of the SMC regional monitoring program for agricultural discharges in the San Diego region](#). San Diego Regional Water Quality Control Board. August 3, 2015. San Diego, CA.

[Mazor, R. Calculation and use of the California Stream Condition Index. Surface Water Ambient Monitoring Program](#). September 10, 2015. Sacramento, CA.

[Mazor, R., and E.D. Stein. Bioassessment, flow ecology and hydrological modeling of intermittent streams. SWAMP Roundtable annual strategic planning meeting](#). November 4-5, 2015. Riverside, CA.

[Schiff, K. Climate change and impacts to water quality](#). San Diego Regional Water Quality Control Board. August 12, 2015. San Diego, CA.

[Sengupta, A. Modeling to support flow ecology analysis](#). Commonwealth Scientific and Industrial Research Organization, Canberra. October 30, 2015. Sydney, Australia.

[Sengupta, A. From Gaged to Ungaged: Predicting Long-term Environmental Flows, and Ecosystems Responses](#). University of Melbourne. October 28, 2015. Melbourne, Australia.

[Sengupta, A. From Gaged to Ungaged: Predicting Long-term Environmental Flows, and Ecosystems Responses](#). University of Canberra. October 29, 2015. Canberra, Australia.

[Stein, E.D. Climate-Smart adaptive strategies into wetlands recovery in coastal Southern California](#). San Diego Management & Monitoring Program. September 23, 2015. San Diego, CA.

[Stein, E.D. Ecogenomics and Bioassessment](#). East China Normal

University. October 23, 2015. Shanghai, China.

[Stein, E.D. Overview of the Southern California Flow Ecology Analysis](#). San Diego County Integrated Regional Water Management (IRWM) Regional Advisory Committee. August 5, 2015. San Diego, CA.

[Steinberg, S.J. Cellscope Aquatic: A high quality cellphone-microscope for field data collection](#). Monterey Bay Aquarium Research Institute. October 28, 2015. Moss Landing, CA.

[Steinberg, S.J. Geographic Information Systems at SCCWRP](#). Inaugural meeting of the SoCal Marine GIS User Group. August 27, 2015. Long Beach, CA.

[Steinberg, S.J. Standardized reporting: Stormwater dashboard project](#). Stormwater Monitoring Coalition quarterly meeting. September 15, 2015. Costa Mesa, CA.

[Steinberg, S.J. and A. Rogers. Regional Water Management Data Management Project, Final Report](#). San Diego Integrated Regional Water Management Regional Advisory Committee. October 7, 2015. San Diego, CA.

External Articles Featuring SCCWRP

[Citizen science will help assess effects of El Nino](#). Scripps Institution of Oceanography. November 3, 2015.

[NOAA hopes to predict coastal acidification impacts](#). The Philadelphia Patriot-News. October 12, 2015.

[Embracing the weirdness of waterless waterways](#). Hakai Magazine. September 9, 2015.

SCCWRP Personnel Notes

Commission and CTAG



Jennifer Phillips, program manager for the California Ocean Protection Council, was appointed an Alternate Commissioner in September, filling a vacant seat.

Departures



Larry Cooper, information technology supervisor in the Information Management & Analysis Department, is retiring in December after a 26-year career at SCCWRP. He was hired in 1989 as a part-time laboratory assistant and took a full-time job with SCCWRP upon graduating in 1992.

Professional Appointments

Dr. **John Griffith** has been appointed to the Master's Thesis Committee of Brianna Young at the University of North Carolina, Chapel Hill.

Dr. **Meredith Howard** was appointed co-chair of the Eighth Symposium on Harmful Algae in the U.S., to be held November 15-19 in Long Beach, Calif.

Dr. **Keith Maruya** has been appointed as an ad hoc member of the USEPA Federal Insecticide, Fungicide, and Rodenticide Act Scientific Advisory Panel (FIFRA SAP).

Dr. **Eric Stein** was appointed to an expert panel for the WERF Stream Restoration and Crediting Projects Expert Panel Meeting in August in Denver, Colo.

Dr. **Martha Sutula** was elected secretary of the Coastal and Estuarine Research Federation in November.

Dr. **Martha Sutula** assumed the position of past-president of the California Estuarine Research Federation in November.

Dr. **Doris Vidal-Dorsch** has been appointed co-chair of the SETAC Omics Global Advisory Group.

Dr. **Doris Vidal-Dorsch** has been appointed a member of the Latin America SETAC 2017 Scientific Steering Committee.

Dr. **Doris Vidal-Dorsch** has been appointed a member of the SETAC North America Horizon Scanning Workshop.

SCCWRP COMMISSIONER SPOTLIGHT

Manager left NOAA for more ground-level work

As a Knauss Marine Policy Fellow at the National Oceanic and Atmospheric Administration, Jennifer Phillips worked on big-picture climate change issues at the federal level. Her responsibilities included strategic planning, external affairs, communications and speechwriting – and she did all of this work at the very top of the NOAA administrative pyramid, in the office of NOAA Administrator Dr. Kathryn D. Sullivan, the Under Secretary of Commerce for Oceans and Atmosphere.



Jennifer Phillips

Phillips, who had just finished graduate school, thrived in this environment, and after her one-year fellowship ended, she was invited to continue working for the head of NOAA.

But Phillips was restless. She enjoyed the challenge of working for the NOAA administrator, but longed for an opportunity to return to the ground-level work of understanding how climate change plays out in ocean systems. Phillips' master's thesis is on the ecological impacts of anthropogenic acidification of the Great Lakes.

So when she learned of an opportunity to join the California Ocean Protection Council as a program manager, she left NOAA in April 2015 and moved to Sacramento.

"At NOAA, I was at the top of the food chain, but now my work is really focused and I can take ownership of it," Phillips said. "It's not as high profile, but I feel state government is the level where things get done. California is a really powerful, unique place to work."

At the Ocean Protection Council, Phillips serves as the scientific and policy lead on ocean acidification and hypoxia. She works closely



Jennifer Phillips hikes through pristine Lake Tahoe wilderness, one of her favorite spots in California to be immersed in nature.

Jennifer Phillips

Job: Program manager, State of California Ocean Protection Council

SCCWRP role: Alternate Commissioner (2015-present)

Prior jobs: Special assistant to the administrator, National Oceanic and Atmospheric Administration (2014-15); Knauss Marine Policy Fellow, NOAA Administrator's Office (2013-14); science writer, Night Kitchen Interactive design company (2010); volunteer home builder in the Peruvian town of Pisco (2007)

Education: M.S. environment and resources, University of Wisconsin, Madison (2012); B.S. biology and society, Cornell University (2009)

Residence: Sacramento

Family: Mother Patti, dean of graduate studies for the Rhode Island School of Design; sister Sam, director of emergency management for the City of Philadelphia; brother Luke, a renewable and sustainable building contractor; cat Olive

Hometown: New Paltz, Upstate New York

Hobbies: Biking; backpacking; triathlons and marathons; visiting farmers' markets

with the West Coast Ocean Acidification and Hypoxia Science Panel and other experts to transfer climate-change science into management action and policy.

"I'm a good scientist, but my skill is really in making the connections, organizing, translating science to policy," she said.

Phillips' time at NOAA was her second stint in Washington, D.C. She enrolled at George Washington University as a college freshman, but soon realized that the politics-focused D.C. campus wasn't a good fit for her interest in environmental science. She transferred after two years to Cornell, where she earned her bachelor's.

After college, she took a year off, spending a few months in Buenos Aires, Argentina, and six weeks rebuilding homes in the Peruvian town of Pisco, which was devastated by a massive earthquake.

"I loved getting my hands dirty," Phillips said. "When you're laying a new floor, the people are incredibly grateful and want to hang out with you and talk to you."

Now, she lives within walking distance of her work in downtown Sacramento. She spends her free time browsing farmers' markets, going backpacking, and training for marathons and triathlons.

CTAG SPOTLIGHT

L.A. County rep comes full circle in water arena

Paul Alva was first introduced to the world of public-sector water management as a sophomore in college. He was hired as a part-time student engineer for the City of Los Angeles Department of Water and Power, where he spent more than four years learning about the city's drinking water infrastructure. He created technical drawings for water lines, dabbled in hydraulic modeling and assisted with field repairs.



After graduating college, however, Alva left the world of water management to take a job with the Los Angeles County Department of Public Works. He worked for a year on underground tanks, then in solid waste management for 17 years. It was not until he was transferred to the watershed management unit last year as a principal engineer that he had an opportunity rekindle his passion for environmental science.

Paul Alva

"It took me 20 years to get back to what I really liked about public service and environmental science within this civil engineering profession," Alva said. "Being a student engineer at Water and Power really was the start of my exposure to the entire water infrastructure and how it impacts people."

Within L.A. County's watershed management division, Alva's main responsibility is stormwater MS4 permit compliance. He oversees more than 50 civil engineers, scientists, technicians and other staff.

Alva's most ambitious undertaking to date has been leading a county team that, in partnership with more than 80 cities, has developed 19 water-quality improvement planning documents



Paul Alva hikes through Devils Postpile National Monument with wife Dene and daughters Sierra, center, and Sage during a weeklong camping trip.

Paul Alva

Job: Principal engineer, Watershed Management Division, Los Angeles County Department of Public Works

SCCWRP role: CTAG representative (2014-present); vice chair (2015-16)

Prior jobs: Civil engineering assistant, associate civil engineer, civil engineer, and senior civil engineer, Solid Waste, L.A. County DPW (1995-2013); civil engineering assistant, Underground Tanks, L.A. County DPW (1994-95); student engineer, City of Los Angeles Department of Water and Power (1990-94)

Education: B.S. civil engineering, California Polytechnic State University, Pomona (1994); Graduate Certificate in Public Sector Employee-Employer Relations and Personnel Management, California State University, Long Beach (2003)

Residence: Sierra Madre

Family: Wife Dene, a chiropractor and former civil engineer; daughters Sage, 3; Sierra, 7; and Savannah, 21; dogs Bear (German shepherd), Pippin (Pomeranian), and Sparkle (wired terrier)

Hometown: El Centro, Calif.

Hobbies: Hiking in the Angeles National Forest; spotting wildlife near his home; spending time with his young daughters

representing the most comprehensive, far-reaching proposal ever developed for achieving water-quality compliance standards in the region. The Los Angeles Regional Water Quality Control Board is expected to vote on the plans in early 2016.

Alva never thought he'd end up in a career in watershed management. He started out as an aerospace engineering major at Cal Poly Pomona, and only switched his major to civil engineering after hearing about mass layoffs in the region's aerospace industry.

"I happily stumbled into this field," he said.

Alva says he's appreciative of SCCWRP for its role in lending credibility to stormwater research, as well as keeping his agency at the cutting edge of technology. Alva and his staff routinely pass along what they learn at SCCWRP to municipal partners, he said.

In his spare time, Alva enjoys going on nature hikes around his home in the canyons of Sierra Madre. He lives within walking distance of the Mt. Wilson trailhead.

"I hope as my kids get older, it will help them to appreciate these experiences with wildlife more," Alva said. "We're able to be so close to everything."

SCCWRP PARTNER SPOTLIGHT

Fellow views research through management lens

As a master's student at Pennsylvania's Villanova University, Cheryl Doughty studied climate change through the lens of how warmer temperatures have induced rapid expansion of mangrove forests along the Atlantic Coast.



Cheryl Doughty

As a Ph.D. student at UCLA and a research fellow at SCCWRP, she's also been studying climate change, but through a different lens – she's looking at how sea level rise will impact coastal ecosystems.

Her SCCWRP work, she says, has broadened her understanding of the management decisions that will need to be made to prepare for sea level rise, particularly in vulnerable wetland areas.

"I was strictly on the ecology side of things on the Atlantic Coast," Doughty said. "Now I'm seeing how things get done on the decision side. Coming from a research perspective, this is definitely more challenging for me, but it's so useful. It's how you actually effect change."

Via a research grant from USC Sea Grant, Doughty has been studying how sea level rise models and tools could be adapted to inform wetland adaptation and restoration decisions in Southern California. Dr. Eric Stein, head of SCCWRP's Biology Department, is her SCCWRP mentor.

In particular, Doughty says her SCCWRP experiences have helped shape her research focus at UCLA, where she's in the first year of her Ph.D. program and still working to flesh out her doctoral



Cheryl Doughty, right, hikes through the Santa Monica Mountains with her parents, Mary and David, in October. Doughty's parents came to visit her from their home in Pennsylvania.

Cheryl Doughty

Job: Ph.D. student in geography, University of California, Los Angeles

SCCWRP role: Sea level rise research fellow

Prior jobs: Link Fellow studying mangrove historical distribution at the Smithsonian Marine Station, Ft. Pierce, Fla. (2014); volunteer touch tank interpreter at the St. Lucie County Aquarium, Ft. Pierce, Fla. (2014)

Education: M.S. biology, Villanova University in Pennsylvania (2015); B.S. biology, Temple University in Pennsylvania (2012)

Residence: Culver City

Family: Parents David and Mary, co-owners of a landscaping business; sisters Diane, a pharmaceutical drug delivery researcher, and Christine, a video production assistant; boyfriend Mike, a computer programming student; cat Birdie

Hometown: Perkasio, Penn.

Hobbies: Hiking, playing the ukulele, baking, scuba diving

dissertation. Her UCLA adviser is Dr. Kyle Cavanaugh, a climate change researcher and SCCWRP partner.

"We've laid a foundation for at least part of my dissertation," Doughty said. "My work will be at the intersection of ecology and geospatial techniques that will allow us to investigate climate change impacts to coastal wetlands. For Southern California wetlands, we hope to better understand sea level rise in particular."

Doughty grew up in the rural town of Perkasio, Penn., about an hour outside Philadelphia. Her parents still own a five-acre farm there, where they operate a family landscaping business.

Doughty became interested in a career in environmental research while working on an undergraduate project chronicling the impacts of the Deepwater Horizon oil spill on deep-sea fauna.

As a master's student at Villanova University in Pennsylvania, she began working on climate change-induced expansion of mangrove forests, which led her to connect with other climate-change researchers, including at SCCWRP. SCCWRP has helped her rethink how she will go about framing her doctoral work, she said.

"For ecologists in general, at the end of our papers, we insert a note that says, 'Managers should do this,'" Doughty said. "It's more of a postscript than a point of emphasis. My time at SCCWRP has convinced me that all of my work needs to be more applicable. You can do great science, but if no one uses it, it's pointless."

SCCWRP STAFF SPOTLIGHT

IT supervisor reflects on move into computers

When Larry Cooper was hired at SCCWRP in 1989 as a part-timer, he officially worked in a laboratory. But he also saw his colleagues struggling to build computer databases to manage their environmental data sets – so he offered to help.



Larry Cooper

Cooper had done some computer programming work on the side, but for the most part, he learned as he went. It was the dawn of the personal computing age, and there were no instruction manuals for designing the type of databases that his colleagues needed.

"The whole basis of science is creating and analyzing data to draw conclusions," he said. "You want the cleanest data set you can get."

Soon, Cooper began receiving outside requests for database help. By 1990, he was administering the U.S. EPA's West Coast Environmental Monitoring and Assessment Program (EMAP) database, a job he held until 1995.

In 1994, just two years after completing his undergraduate degree in marine biology from Cal State Long Beach, he was asked to almost singlehandedly build the data management infrastructure for the pilot run of the Southern California Bight Regional Monitoring Program.

Then, in 1997, Dr. Steve Weisberg presented Cooper with a career-defining choice: He could remain a fish biologist, Weisberg said, or he could build an IT department for SCCWRP. In 1998, Cooper accepted the challenge to create SCCWRP's Information Management & Analysis Department.



Larry Cooper rides his motorcycle through Sherman Pass in the Sequoia National Forest during a joyride in summer 2013.

Larry Cooper

Job: Information technology supervisor, SCCWRP Information Management & Analysis Department

Retiring: December 31, 2015

Prior jobs: SCCWRP histologist (1992-98); SCCWRP laboratory assistant (1989-92); owner of a Yamaha motorcycle shop in Buena Park (1985-88); Yamaha corporate warranty technician in Cypress (1980-85); motorcycle repair technician (1975-80); weather observer for the U.S. Air Force in Albuquerque, N.M. (1972-75)

Education: M.S. marine biology, California State University, Long Beach (1997); B.S. marine biology, CSULB (1992)

Residence: Apple Valley, Calif.

Family: Wife Doris, a homemaker; dog Kendra, a German shepherd; bird Rosie, an African gray parrot

Hometown: Hawthorne, Calif.

Hobbies: Carving figurines in a home woodworking studio; flying radio-controlled airplanes; writing freelance articles for model airplane hobbyist magazines; playing rhythm guitar for the two-person band Creedence Clearwater Cremated; practicing yoga

"I have no regrets at all," Cooper said. "I'm a scientist, but what my choice did was to expose me to so many other branches of science, instead of just getting pigeonholed into fish biology. I've gotten to learn things about bacteria, invertebrates, ecosystems. And I've made a lot of friends outside SCCWRP through my database work."

Over the past two decades, Cooper has built large-scale databases for numerous agencies across Southern California and beyond, including public health departments, regional boards and other member agencies. He's trained countless colleagues how to use and maintain these databases, and he's forged strategic, enduring relationships with SCCWRP partners.

Among his many accomplishments was building the West Coast Field Computer system in 1998, a version of which is still widely used today. He also developed automated data checking systems for Bight '03 that quickly became the gold standard for submitting error-free electronic data.

Now, after a 26-year career at SCCWRP, Cooper is preparing to retire at the end of December.

"I've had offers to do consulting work," Cooper said. "We'll see how it all shakes out."

Delivering life-saving medical aid

SCCWRP staff learned how to perform chest compressions, breathing exercises, abdominal thrusts and other life-saving emergency medical aid during a four-hour American Red Cross certification course offered in September. In all, 32 staff members earned certificates of completion during five hands-on courses spread across two days. Participants had the opportunity to become certified or recertified in adult and pediatric first aid, CPR, and use of an automated external defibrillator (AED).



Photos courtesy of Martina Zolner



Above, Nathan Dodder, left, Edween Hernandez, and Nasser Hasan, behind them, practice delivering chest compressions to mannequins during a first-aid course offered at SCCWRP by the American Red Cross.

Left, SCCWRP staff receive hands-on instruction in small groups on how to properly administer first aid to someone who is not breathing and/or has no pulse. The four-hour certification course was open to all SCCWRP staff.