

SOUTHERN CALIFORNIA COASTAL WATER RESEARCH PROJECT
A Public Agency for Environmental Research



**Quarterly Director's Report
to the SCCWRP Commission**

November 2014

Detailing activities August 8 – November 7, 2014

Stephen B. Weisberg, Ph.D.
Executive Director

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HIGHLIGHTS

News

Changes to Southern California's coastal wetlands quantified in new historical analysis

SCCWRP and its collaborators have completed a multi-year effort to comprehensively document the scope of Southern California's coastal wetland areas prior to urbanization in the mid-1800s and compare it to present-day conditions.

The initiative, known as the Southern California T-sheets project, required overlaying 40 high-resolution historical maps of Southern California's shoreline with present-day maps to show how wetland areas have changed over time. The project was completed in August.

The 40 topographical sheets, or T-sheets, span the 400-mile-long coastline of the Southern California Bight and were produced between 1851 and 1889 by the U.S. Coast and Geodetic Survey. Researchers digitized and georectified the T-sheets, then uploaded them to the project's publicly accessible website, www.caltsheets.org.

The [study](#) found that Southern California once had more than 330 individual coastal systems that provided over 25,000 hectares of estuarine habitat. Since the mid-19th century, 48% of Southern California's coastal estuarine habitats have been lost, according to the study. Hardest hit was Santa Barbara County, where 62% of total estuarine habitats have disappeared. The study also found that vegetated marsh and salt and mud flats were disproportionately affected, experiencing higher losses of 75% to 78%.

The study's authors noted that the estimates were lower than previous estimates that indicated more than 90% of California's wetlands have been lost. Researchers say this difference could be explained by the precision of the latest analysis, differences in the types and locations of wetlands included in the study area, and disproportionate impacts to certain types of wetland areas.



A total of 40 overlapping historical maps known as topographical sheets, or T-sheets, that span the 400-mile-long coastline of the Southern California Bight were digitized and georectified for the Southern California T-sheet project. The study provided a comprehensive snapshot of the extent of Southern California's coastal wetland areas prior to urbanization in the mid-1800s.

SCCWRP completed this project in collaboration with the San Francisco Estuary Institute and the Center for Geographical Studies at California State University, Northridge.

For more information about the Southern California T-sheets project, contact Dr. Eric [Stein](#).

SCCWRP scientist receives grant to host a bilateral U.S.-India stormwater workshop



Dr. Ashmita Sengupta

SCCWRP hydrogeologist Dr. Ashmita Sengupta has won a competitive grant from the nonprofit Indo-US Science and Technology Forum to host a two-day workshop in India in January 2015 focusing on stormwater research.

Titled “Transforming Stormwater into a Resource: Design, Risks and Benefits,” the workshop is one of seven proposals selected by IUSSTF to be funded for 2014-15. The grant winners were announced July 31.

The annual IUSSTF workshops take place in either India or the United States, and span a wide variety of science and technology disciplines. IUSSTF’s goal is to promote interaction and collaboration between U.S. and Indian researchers in academia, R&D laboratories, industry and government.

The workshop will explore large-scale best management practices for stormwater management, with a focus on new assessment tools, an integrated assessment framework and direct partnerships with implementing agencies.

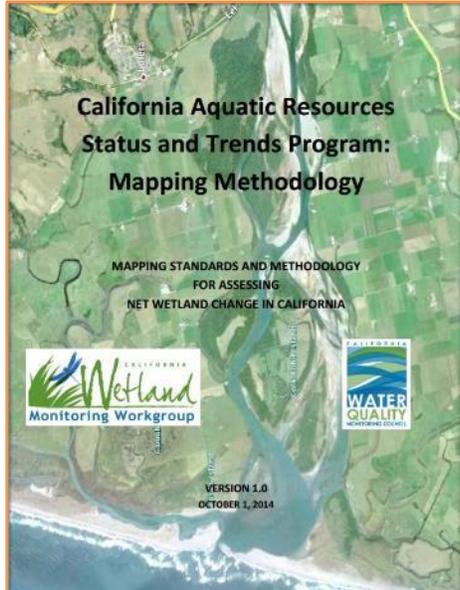
Collaborators from major U.S. and Indian universities, including the University of California, Irvine, and the Indian Institute of Technology, will be part of the workshop.

IUSSTF was established in 2000 via an agreement between the governments of India and the United States. The nonprofit society’s mission is to provide opportunities for exchanging ideas, information, skills and technologies and to facilitate collaborations on scientific and technological endeavors of mutual interest.



Dr. Sengupta’s research at SCCWRP focuses on applying modeling techniques to evaluate and improve the efficacy and impact of Integrated Water Resource Management (IWRM) strategies, and to evaluate tradeoffs. She also models stress responses in receiving waterbodies due to watershed activities. For more information, contact Dr. [Sengupta](#).

Standards, methods for probability mapping of California’s aquatic resources released



A new [report](#) has been released that outlines how to use standardized probability-mapping protocols to track wetlands and other aquatic resources in California, paving the way for scientists to build a cost-effective, California-specific monitoring program to assess changes in condition over time.

Co-authored by SCCWRP on behalf of the California Wetland Monitoring Workgroup, the “California Aquatic Resources Status and Trends Program: Mapping Methodology” report establishes mapping standards and methods that are to be used when monitoring wetlands and other aquatic resources using California’s existing framework. This framework, known as the California Status and Trends program, is adapted from a federal probability-mapping program developed by the U.S. Fish and Wildlife Service.

The California Status and Trends program includes about 2,000 randomly selected plots across the state that allow scientists to generate comprehensive, probability-based maps of all aquatic resources, from lakes to streams to wetlands. The methodology report ensures that the standards and methods used to generate the maps will be consistent and yield comparable results across the state.

The report was produced by scientists at SCCWRP, the San Francisco Estuary Institute, California State University, Northridge and Moss Landing Marine Laboratories. For more information, contact Dr. [Eric Stein](#).

U.S. EPA watersheds site features Calif. healthy streams program co-developed by SCCWRP

A statewide healthy streams initiative that SCCWRP helped shape has been selected as one of three U.S. watershed protection programs to be showcased on a newly revamped federal watersheds website.

The [California Healthy Streams Partnership](#), part of the state-run Water Quality Monitoring Council, is featured on the [U.S. Environmental Protection Agency’s watersheds website](#) alongside healthy-watershed counterpart programs in Maryland and Tennessee.

The California Healthy Streams Partnership is a work group formed by state water officials to improve monitoring of the state’s stream and river ecosystems and to foster better-informed resource management decisions and actions, especially for threatened and impaired areas. SCCWRP is represented



on the work group, along with other state and federal agencies, research universities and nonprofit groups.

The two other featured programs on the EPA watersheds site are the Tennessee Health Watershed Initiative and the Annapolis, Md.-based Chesapeake Bay Program, which is working to restore the expansive Chesapeake estuary.

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

Fulbright visiting scientist to study climate change at SCCWRP



Dr. Neil Saintilan

Australian environmental scientist Dr. Neil Saintilan, who heads the water and wetlands team for the New South Wales government’s environmental agency, will join SCCWRP in mid-November as a [Fulbright Scholar in Climate Change and Clean Energy](#).

During his three-month tenure as a visiting professional scholar at SCCWRP, Saintilan will study the capacity of tidal wetlands to capture atmospheric carbon and store it for long periods in wetland soils.

Saintilan’s project is part of the [International Blue Carbon Initiative](#), which focuses on mitigating climate change by conserving and restoring coastal and marine ecosystems that have the ability to store “blue” carbon. Quantifying the benefit of “blue” carbon storage could pave the way for market-based incentives for wetland restoration and conservation, via carbon pollution offsets.

Saintilan said he was interested in working in Southern California because of the similarities between the coastlines of his native southeastern Australia and of Southern California, including climate, geography and population dynamics.

“Management responses have evolved separately on the two sides of the Pacific, and the Fulbright fellowship provides an opportunity for a sharing of perspectives and approaches to these common challenges,” Saintilan said.

Saintilan’s Fulbright Scholarship is sponsored by the Australian and U.S. governments and co-hosted by the Imperial Beach, Calif.-based [Tijuana River National Estuarine Research Reserve](#). Saintilan will work under SCCWRP’s Dr. [Eric Stein](#), head of the Biology Department.

Based in Sydney, Saintilan is a senior principal research scientist in the [Office of Environment and Heritage](#), which is the environmental agency for the Australian state of New South Wales. He leads a group of about 20 scientists who conduct research in support of improved management of aquatic ecosystems.

Saintilan holds a bachelor’s in biology and geography and a Ph.D. in biogeography, both from the University of Sydney.

SCCWRP's beach microbial water-quality research profiled in new Bio-Rad web feature

SCCWRP's pioneering work to develop faster, more effective microbial monitoring methods for beach ocean water is featured in an [extensive new magazine article and accompanying short documentary](#) from the life sciences company Bio-Rad.

Bio-Rad's online magazine [BioRadiations](#) chronicled the challenges of designing a monitoring method capable of delivering reliable water-quality results within hours, then explained how SCCWRP's use of Bio-Rad Droplet Digital PCR technology could revolutionize how beach managers decide when coastal waters become unsafe to enter. The most common reason beaches are closed is when high levels of pathogens from urban areas run down to the coast via rain and other runoff.

"We're interested in making sure we're using the most advanced methods to protect public health from pathogens, primarily from human waste," Dr. John Griffith, head of the SCCWRP's Microbiology Department, said in the October 15 article.

Preliminary SCCWRP data reveal that the bacteria types commonly indicating the presence of fecal matter in ocean water can be more accurately and efficiently quantified using BioRad's ddPCR assay technology.

The BioRadiations article and accompanying five-minute documentary film include extensive interviews and footage featuring Griffith, SCCWRP microbiologist Dr. Yiping Cao and SCCWRP senior research technician Meredith Raith. The article, titled "[Protecting Coastal Ecosystems with Droplet Digital PCR](#)," is highlighted on the BioRadiations site. Based in Hercules, Calif., Bio-Rad is a global corporation serving more than 100,000 research and industry customers.

For more information, contact Dr. [John Griffith](#).



Broadcast journalists from China interview SCCWRP's director

A visiting delegation of journalists from the Jiangsu Broadcasting Corporation in China conducted an extensive on-camera interview with SCCWRP Executive Director Dr. Steve Weisberg on October 2 for a Chinese TV series on how U.S. officials are working to solve environmental problems.

Weisberg discussed how SCCWRP scientists work closely with the SCCWRP Commission to improve the scientific foundation for how to manage aquatic ecosystems and human health.

The Chinese report will be called "International Tour on Environmental Protection." Jiangsu is China's third-largest TV station and is based in the city of Nanjing, near Shanghai.

SCCWRP Scenes



High school students from the Upward Bound college preparation program at California State University, Fullerton get up close and personal with a white sea urchin, top, and listen to SCCWRP's Steve Bay, head of the Toxicology Department, discuss environmental science research opportunities, left, during a special tour of SCCWRP's facilities. The high school students will all be first-generation college students; they're enrolled in a special, university-sponsored program to expose them to science and other career paths.

PEOPLE

Honors and Awards

- SCCWRP Deputy Director **Ken Schiff** was honored with a Distinguished Marine Biology Alumnus award from California State University, Long Beach during the university's annual marine biology alumni gathering on October 4. Schiff, who was the guest of honor at the gathering at San Pedro's Cabrillo Marine Aquarium, earned his master's in biology from Cal State Long Beach in 1988.



Ken Schiff, left, pictured with SCCWRP Executive Director Steve Weisberg, displays the Distinguished Marine Biology Alumnus award he received from Cal State Long Beach.

Personnel

- Dr. **Mariana Alonso**, a visiting scientist from Brazil who spent seven months at SCCWRP, left in September to continue her post-doctoral research for five months at San Diego State University's Graduate School of Public Health, under Dr. Eunha Hoh. Alonso's year-long post-doctoral project is titled "Organohalogen contaminants and non-target compounds in dolphins from South and North Atlantic (Brazil and U.S. coastlines)."

Commission

- **Todd Snyder**, watershed protection program manager for the County of San Diego Department of Public Works, was appointed to the Commission in October, replacing **Cid Tesoro**, who left the county for a job with the Port of San Diego.



Todd Snyder

Commission's Technical Advisory Group

- Nothing to report.

Staff Spotlight

Dr. Youwei Hong – Visiting Scientist



Dr. Youwei Hong

Dr. Youwei Hong is a visiting scientist from China's Institute of Urban Environment who specializes in studying the fate and effects of organic pollutants. He is working in SCCWRP's Chemistry Department under Dr. Keith Maruya on using aquatic passive sampling technology to measure the bioavailable portion of the common household insecticide fipronil. His one-year tenure at SCCWRP began in mid-April.

Hong's research in China focuses on the organic pollutant cycle and how pollutant particles interface with water and the atmosphere. He works as an assistant professor at the Institute of Urban Environment, an academic research institution in the southeastern coastal city of Xiamen. The institute, established in 2006 by the national Chinese Academy of Sciences in Beijing, focuses primarily on improving water, soil and air conditions and sustainable management in the three most polluted regions of China: the Circum-Bohai Sea surrounding Beijing, the Yangtze River Delta surrounding Shanghai, and the Pearl River Delta surrounding Hong Kong. The institute also is increasingly turning its attention to the economically booming area where he lives, known as the Western Taiwan Straits Economic Zone. "We're trying to improve environmental quality – not just water, but air, too," he said. "Haze pollution is a serious problem in China."

At SCCWRP, Hong said he's impressed by the level of camaraderie and communication among scientists and with the water-management community. The workplace culture in China is much more formal and stratified, and he and his Chinese colleagues often struggle to communicate their environmental message to government officials who seem more focused on economic expansion, Hong said. "It's very good to connect with different kinds of people," he said. "I hope for future collaboration with SCCWRP."

A native of Xiamen, Hong earned a bachelor's and master's in resources and environmental sciences from Fujian Agricultural and Forestry University, and a Ph.D. in environmental chemistry from Xiamen University in 2009. Hong lives in Costa Mesa just a few miles from SCCWRP, in a rented house he shares with two college students. His wife, Dan Liao, is an instructor of environmental management and engineering at Xiamen's Huaxia Vocational College. Hong stays in touch with his wife and 2-year-old daughter, Yu-jia, using China's popular WeChat video-messaging service. They also visited him for two months last summer and plan to come again, likely in January. For fun, Hong enjoys biking, nature walks, and watching American comedies and sci-fi films.



Dr. Youwei Hong, wife Dan Liao and 2-year-old daughter Yu-jia enjoy a day at the beach in La Jolla last summer.

Partner Spotlight

Mary Erickson – Director, National Centers for Coastal Ocean Science

Mary Erickson is director of the National Centers for Coastal Ocean Science in Silver Spring, Md., a division of the National Oceanic and Atmospheric Administration’s National Ocean Service. She heads a 170-member office that works to advance ecosystem science and apply science solutions and initiatives to coastal management decisions. The National Ocean Service’s interest in applied research areas like chemical and nutrient coastal monitoring dovetails with SCCWRP’s regionally focused work in those areas.



Mary Erickson

A research meteorologist by training, Erickson spent the first two decades of her career at the National Weather Service, developing statistical models and software for weather forecasting. She transitioned in her final two years to a leadership role that brought her into contact with NOAA ocean scientists; in 2005, she moved to NOAA’s National Ocean Service. “There were some opportunities to really make a difference in the coastal ocean perspective,” Erickson said. “As much as I like management and leadership, I’m passionate about the environmental component.”

One of her biggest accomplishments since moving to the National Ocean Service was co-leading a multi-year initiative to unify disparate approaches to storm-surge predictions being released by various federal agencies. Her challenge was convincing each organization to adapt its unique format for issuing predictions into a single, user-friendly interface. “When resources are strained, it’s difficult to get people to change approaches, but providing improved services to the customer won out,” she said.

Erickson was named acting director of the National Centers for Coastal Ocean Science in spring 2013 and assumed the permanent post a year later. In her work with water-quality groups across the nation,



Mary Erickson enjoys a tender moment with her Saint Bernards, Ellie and Eva.

Erickson said SCCWRP stands out as one of the few regional agencies that seamlessly integrates science into management and decision-making. “We learn a lot from how these local partnerships are working,” she said.

Erickson grew up in upstate New York, a place where unrelenting blizzards and other dramatic weather phenomena shaped her lifelong respect for the power of weather. She earned a bachelor’s in meteorology from Pennsylvania State University and a master’s in operations research from George Mason University. Today she lives in Brandywine, Md. with husband Brett, an electrician; a 10-year-old son and two 9-month-old Saint Bernards. She also has two older children in college. Erickson is an avid reader of nonfiction and science-fiction books, and enjoys cooking, canoeing, hiking and spending time at the beach, especially North Carolina’s Outer Banks.

Commissioner Spotlight

Sam Unger – Los Angeles Regional Water Quality Control Board

Sam Unger is executive officer of the Los Angeles Regional Water Quality Control Board, which oversees water quality in Los Angeles and Ventura counties. He joined the SCCWRP Commission in 2010.

A native of West L.A., Unger was drawn to environmental work by his father, a meteorologist who worked for the State Air Board. He earned his bachelor's in biochemistry and his master's in chemical engineering, both from the University of California, Berkeley, in the mid-1970s. He then spent 22 years as a private environmental consultant. Early on, he worked on criteria for designing hazardous-waste landfills as part of the U.S. Resource Conservation and Recovery Act of 1978. Although his work resulted in several patents for hazardous waste encapsulation technology, Unger's ideas were never used – a consequence of resistance from hazardous-waste disposal facilities, he said.



Sam Unger

In the late 1990s, Unger became a lead engineer for the high-profile Avila Beach oil-spill cleanup project, a \$200 million Central California effort to remove 400,000 tons of oil that had leaked into the ground. Avila Beach exposed Unger to the complex challenges of managing a project under intense public scrutiny. "Once the public is involved, you really have to be more expansive in your viewpoint and consider many nontechnical concerns," Unger said.

Unger thrived on the challenge and decided to transition permanently to the public sector. He joined the L.A. regional board in 1999 as an associate engineer and moved quickly through the ranks, becoming



Sam Unger goes backpacking along a snow-covered pass on Mount Whitney in 2010.

head of the downtown L.A.-based agency in 2010. As executive officer, Unger is focused on evolving the L.A. board's core regulatory work to include emphasis on habitat restoration, increasing recreational opportunities, preserving of drinking-water supplies and regulating stormwater as a resource.

Unger sees SCCWRP as a critical intermediary in the friction-filled world of water regulation. SCCWRP is able to find common ground and propose solutions that increase proactive interactions, he said. "In places where we can't build a bridge, SCCWRP has been very effective," Unger said.

Unger lives in Agoura Hills with wife Janet, a diagnostic sonographer for a breast cancer clinic, and adult son Jake, a clean-diesel mechanic. He enjoys backpacking, bike-riding through the Conejo Valley and reading classic literature. He also likes tasting craft beers and tequila.

CTAG Spotlight

Dr. Jeff Armstrong – Orange County Sanitation District



Dr. Jeff Armstrong

Dr. Jeff Armstrong is the Orange County Sanitation District’s environmental supervisor for the ocean monitoring program. He oversees a staff of 12 scientists who monitor treated wastewater discharged off the coast of Orange County, ensuring ocean ecosystems and human health remain protected. Armstrong joined CTAG in spring 2014, replacing Ron Coss.

A native of Tustin in Orange County, Armstrong has had just two employers his entire life – the sanitation district and the Santa Ana Police Department. His two jobs couldn’t have been more different. In 1975, at age 16, he took part in a Santa Ana police explorers program that transitioned seamlessly into an 18-year law-enforcement career in one of Orange County’s poorest, highest-crime cities. He worked as a patrolman, on the abuse and molest detail, and as a school resource officer, among other duties, eventually rising to corporal.

In the mid-1980s, while still working full time, he began pursuing a business degree at nearby Santa Ana College. To fulfill the community college’s general-education requirements, he enrolled in an introductory marine biology class and instantly found his second calling. “It was just something that hit home,” Armstrong said. “I was fascinated by the critters, by the science, by the possibilities for learning and discovery.”

Meanwhile, the adrenaline rush that propelled him into police work began to dissipate. He had been shot at twice, nearly stabbed once and sustained a serious knee injury while chasing a suspect across the rooftop of a building. Armstrong earned a bachelor’s in marine biology in 1993 and a master’s in biology in 1997, both from California State University, Long Beach. While working on his master’s, he was invited to intern at the O.C. Sanitation District in Fountain Valley; he was hired afterward as a principal environmental specialist and finally quit police work. He went on to earn his Ph.D. in biological oceanography from a predominantly online program at City University Los Angeles.

Armstrong has been interacting with SCCWRP since 1994, when he began working for the sanitation district as an intern. He continues to rely on SCCWRP for frequent technical expertise and guidance, he said. “The quality of work and scientists are just amazing,” Armstrong said. “They’re a great resource for me.”

Armstrong is married to wife Dawn, a human development community-college instructor he met as a Santa Ana police explorer; they have two adult daughters, Shannon and Cassandra (who once worked as a part-time SCCWRP lab assistant), and three grandsons. Armstrong, a resident of Orange, is a self-described “die-hard” Angels baseball fan and an avid sailboater. He takes out his all-wooden, 44-foot-long sailboat – *Anam Chara*, docked in Long Beach – nearly every weekend.



Jeff Armstrong’s wife
Dawn on a sailboating trip.

COMMUNICATIONS

Journal Articles — Published

- [Gene networks and toxicity pathways induced by acute cadmium exposure in adult largemouth bass \(*Micropterus salmoides*\)](#). 2014. AC Mehinto, MS Prucha, RC Colli-Dula, KJ Kroll, CM Lavelle, DS Barber, CD Vulpe, ND Denslow. *Aquatic Toxicology*. DOI 10.1016/j.aquatox.2014.04.004.

Journal Articles — Published Online

- [Evaluating alternative temporal survey designs for monitoring wetland area and detecting changes over time in California](#). 2014. LG Lackey, ED [Stein](#). *Journal of the American Water Resources Association*. DOI: 10.1111/jawr.12254.

Journal Articles — Accepted

- Small drains, big problems: the impact of dry weather runoff on shoreline water quality at enclosed beaches. M Rippy, R Stein, B Sanders, K Davis, K McLaughlin, J Skinner, J Kappeler, S Grant. *Environmental Science & Technology*.
- Estuaries: Life on the Edge. JE Cloern, PL Barnard, E Beller, JC Callaway, JL Grenier, ED Grosholz, R Grossinger, K Hieb, JT Hollibaugh, N Knowles, M [Sutula](#), S Veloz, K Wasson and A Whipple. H.A. Mooney and E. S. Zavaleta (eds.). *Ecosystems of California*. University of California Press, Oakland, CA.
- An Assessment of the Transport of Southern California Stormwater Ocean Discharges. P Rogowski, E Terrill, K [Schiff](#). *Marine Pollution Bulletin*
- Effect of ecological group classification schemes on performance of the AMBI benthic index in US coastal waters. DJ [Gillett](#), SB [Weisberg](#), T Grayson, A Hamilton, V Hansen, EW Leppo, MC Pelletier, A Borja, D Cadien, D Dauer, R Diaz, M Dutch, JL Hyland, M Kellogg, PF Larsen, JS Levinton, R Llansó, LL Lovell, PA Montagna, D Pasko, CA Phillips, C Rakocinski, JA Ranasinghe, DM Sanger, H Teixeira, RF Van Dolah, RG Velarde, and KI Welch. *Ecological Indicators*.

Technical Reports

- [Wetlands of the Southern California Coast: Historical Extent and Change Over Time](#). 2014. ED [Stein](#), K Cayce, M Salomon, DL Bram, D De Mello, R Grossinger, and S Dark. Technical Report 826.

- [Northern San Diego Lagoons Historical Ecology Investigation: Regional patterns, local diversity, and landscape trajectories](#). 2014. E Beller, S Baumgarten, R Grossinger, T Longcore, ED [Stein](#), S Dark, and S Dusterhoff. Technical Report 831.
- [California Aquatic Resources Status and Trends Program: Mapping Methodology](#). 2014. California Water Quality Monitoring Council. Technical Report 833.
- [Estimating Wet and Dry Deposition of Nitrogen to Southern California Streams: Final Report of IA DW-12-92326401-0](#). 2014. K McLaughlin, M Sutula. Technical Report 837.

Conference Presentations

[California Stormwater Quality Association 2014 Annual Conference – September 15-17, 2014 – Garden Grove, CA](#)

- The Southern California Stormwater Monitoring Coalition Five-Year Research Agenda – K [Schiff](#)
- (Poster) The Onset of a Novel Pollutant Offset: An Australian Case Study – A [Sengupta](#)

[61st Eastern Pacific Ocean Conference – September 17-20, 2014 – Mt. Hood, OR](#)

- (Poster) Assessment of the impact of wastewater discharge on dissolved oxygen over the southern California shelf – N [Nezlin](#), J Ashley T Booth, C Beegan, C Cash, J Gully, M Mengel, G Robertson, A Steele, and S [Weisberg](#)

[California Estuarine Research Society 2014 Fall Conference – September 26-27, 2014 – Bodega Bay, CA](#)

- Untangling the Impacts of Wastewater Effluent on Coastal Nitrogen Cycling: Lessons from the Southern California Bight – K [McLaughlin](#), M [Howard](#), NP [Nezlin](#), CDA [Beck](#), G Robertson
- Assessing Habitat Quality in the Diverse Estuarine Habitats of California: What we do & what we need to do – D [Gillett](#)
- Cyanobacteria prevalence in Southern California Coastal aquatic habitats: The potential for land-sea transfer. – M [Sutula](#), M [Howard](#), B [Fetscher](#), ED [Stein](#), L Busse
- Effect of wastewater effluent on fate of nitrogen in the southern California Bight – K [McLaughlin](#)

[Canadian Ecotoxicity 41st Aquatic Toxicology Workshop – September 29-October 1, 2014 – Ottawa, ON](#)

- Interlaboratory Comparability of Gene Expression Data for Toxicity Identification Evaluation – SM [Bay](#)

[Eighth Biennial Bay-Delta Science Conference – October 28-30, 2014 – Sacramento, CA](#)

- Spatial and temporal patterns in Bay-Delta sediment quality: Relationship to California sediment quality objectives – SM [Bay](#)

[Esri Ocean GIS Forum – November 5-7, 2014 – Redlands, CA](#)

- (Poster) A Water Quality Index for the Southern California Bight: Spatial integration of multiple pollutants and sources – S [Steinberg](#), R Schaffner and K [Schiff](#)
- Mapping impacts of marine debris using the West Coast Ocean Data Portal – T Hallenbeck, A Lanier and S [Steinberg](#)

Other Presentations

- Ashmita [Sengupta](#) gave an invited lecture titled “California’s water” at Western Waters (Western Region Water Cooperation) on July 9 in Melbourne, Australia.
- Karen [McLaughlin](#) gave an invited lecture titled “Ocean Acidification: Causes and Implications of Changing Ocean Chemistry” as part of the Orange County Natural History Lecture Series at the Back Bay Science Center on August 6, 2014 in Newport Beach, CA.
- Meredith [Howard](#) gave an invited talk titled “Cyanobacteria blooms and toxins: At a waterbody near you!” at the Santa Ana Regional Water Quality Control Board meeting on August 11 in Riverside, CA.
- Keith [Maruya](#) gave a presentation titled “Adapting in vitro bioassays for screening of water quality” for the EPA Federal-State Toxicology Risk Analysis Committee webinar series on August 13.
- Steve [Weisberg](#) gave a presentation titled “Ocean Acidification: Causes and Implications of Changing Ocean Chemistry” at the San Diego Regional Water Quality Control Board meeting on August 13 in San Diego, CA.
- Steve [Bay](#) gave a presentation titled “Bioaccumulation Pathways and Sources in San Diego Bay” at the San Diego Regional Water Quality Control Board meeting on August 13 in San Diego, CA.
- Eric [Stein](#) gave a presentation titled “State of Wetlands in the San Diego Region: Wetland Types, Historical Loss, and Tracking Future Trends” at the San Diego Regional Water Quality Control Board meeting on September 10 in San Diego, CA.
- Raphael [Mazor](#) gave a presentation titled “State of Wetlands in the San Diego Region: Tools and Approach for Examining a Regionally Under-Represented Water Body Types: Non-Perennial Streams” at the San Diego Regional Water Quality Control Board meeting on September 10 in San Diego, CA.
- Ken [Schiff](#) gave a presentation titled “Upcoming SCCWRP research priorities” to the San Diego Regional Water Quality Control Board on September 10 in San Diego, CA.
- Ken [Schiff](#) gave a presentation titled “Biological Objectives and its relationship to the State’s Wetland Policy” to the San Diego Regional Water Quality Control Board on September 10 in San Diego, CA.

- Chris [Solek](#) helped organize and lead a training for the U.S. Army Corps of Engineers regulatory staff in the California Rapid Assessment for Wetlands September 15-19 at SCCWRP.
- Steve [Steinberg](#) presented a guest lecture at Chapman University about SCCWRP’s activities and the Clean Water Act on September 18 in Orange, CA.
- Keith [Maruya](#) gave a presentation titled “Bioanalytical tools for monitoring constituents of emerging concern in recycled water” at the State Water Resources Control Board meeting on September 23 in Sacramento, CA.
- Keith [Maruya](#) gave a series of lectures titled “New tools for monitoring emerging contaminants in aquatic systems” at the National Kaohsiung University, National Kaohsiung Marine University, Sun-yat Sen University and National Cheng Kung University from September 30 to October 2 in Taiwan and China.
- Nathan [Dodder](#) gave a presentation titled “Monitoring of Constituents of Emerging Concern (CECs) in Aquatic Ecosystems – Pilot Study Requirements” at the SWAMP Roundtable meeting on November 6 in Riverside, CA.

Professional Appointments

- Shelly [Moore](#) was appointed to the local organizing committee for the 13th International Conference on Copepoda to be held at the Cabrillo Marine Aquarium in San Pedro in July 2017.
- Ken [Schiff](#) was appointed to the Ocean Science Trust Expert Panel on Sandy Beach Ecosystem Health.
- Steve [Bay](#) was appointed to the Steering Committee of the Sediment Advisory Group of the Society of Environmental Toxicology and Chemistry.

Meetings & Workshops Held at SCCWRP

Date	Meeting	SCCWRP Contact/ Sponsoring Agency
Aug. 11	Wetlands Treatment	Maruya
Aug. 14	SCCWRP Commission’s Technical Advisory Group	Weisberg
Aug. 14	Bight ’13 Trawl Committee	Schiff
Aug. 18	Bight ’13 Nutrients Process Study Training	Howard

Date	Meeting	SCCWRP Contact/ Sponsoring Agency
Aug. 18	Surfer Health Study	Schiff
Aug. 20	California Beach Water Quality Workgroup	Griffith
Aug. 21	Bight '13 Areas of Special Biological Significance	Weisberg
Aug. 21	Australia Centre for Aquatic Pollution Identification and Management	Sengupta
Aug. 22	Seminar: Dr. Meenakshi Arora – “Water Resource Management in Australia: Quantity and quality perspectives”	Sengupta
Aug. 27	Bight '13 Trawl Committee	Schiff
Sept. 3	Southern California Stormwater Monitoring Coalition Training	Stein
Sept. 5	SCCWRP Commission	Weisberg
Sept. 8-9	San Diego Bay Bioaccumulation	Vidal-Dorsch
Sept. 9	Southern California Stormwater Monitoring Coalition Executive Committee	Stein
Sept. 9	Seminar: Dr. Susan Kidwell – “Using Benthic Grunge to Evaluate Biotic Change in Marine Systems: Dead Shells Do Tell Tales”	Gillett
Sept. 12	Seminar: Dr. Bradley Moore: “Marine Bacterial Synthesis of Polybrominated Organic Compounds Relevant to Environmental Toxicology”	Weisberg
Sept. 15-19	U.S. Army Corps of Engineers California Rapid Assessment Method Training	Stein
Sept. 22	San Diego Creek Causal Assessment	Gillett
Sept. 23	Canadian Council of Ministers of the Environment Index	Brock Bernstein
Sept. 23	Bight '13 Benthic Committee	Gillett
Sept. 24	Los Cerritos Channel Restoration Project Kickoff	Stein

Date	Meeting	SCCWRP Contact/ Sponsoring Agency
Oct. 3	Seminar: Dr. Toby Garfield – “Integrated Ecosystem Assessment”	Weisberg
Oct. 9	Southern California Wetlands Recovery Project Science Panel	Stein
Oct. 14	CTAG Intersessional: Contaminants of Emerging Concern Planning	Maruya
Oct. 15	Environmental Systems Research Institute Partnership Development Meeting	Weisberg
Oct. 20	Harbor Technical Workgroup Compliance Committee	Bay
Oct. 21	Southern California Wetlands Recovery Project Wetland Managers Group	Solek
Oct. 22	San Diego Creek Causal Assessment	Gillett
Oct. 24	Bight '13 Toxicology Committee	Bay
Oct. 29	Recycled Water Research Needs	Weisberg
Oct. 30	Bight '13 Microbiology Committee	Cao
Oct. 30	Publicly Owned Treatment Works CTAG Members	Weisberg
Oct. 31	Southern California Society of Environmental Toxicology and Chemistry Technical Assessment Group	Greenstein
Nov. 3-4	West Coast Governors Alliance on Ocean Health Ocean Data Portal	Steinberg

Upcoming Commission/CTAG Meetings and Seminars

- SCCWRP will host the next [CTAG](#) meeting on Thursday, November 13 from 9 a.m. to 4 p.m.
- SCCWRP will host the next [Commission](#) meeting on Friday, December 5 from 9:30 a.m. to noon.
- Dr. Ellen Hanak of the Public Policy Institute of California will give a talk titled “Paying for Water in California” on Friday, November 21 at 11 a.m. as part of SCCWRP’s [Fall 2014 Seminar Series](#). (Note that this seminar will be presented on a different day than originally announced.)

- Dr. Robert Miller of the University of California, Santa Barbara, will close out SCCWRP's Fall 2014 Seminar Series on Friday, December 12 at 11 a.m. with a talk titled "Demonstrating an Effective Marine Biodiversity Observation Network in the Santa Barbara Channel."

PROJECTS

Note: The following progress updates describe accomplishments for each of SCCWRP's projects in the last quarter. Find more details about each project in SCCWRP's [2014-15 Research Plan](#).

Projects with significant activity this quarter

[Nonperennial Streams](#)

[Atmospheric Deposition of Nutrients to Coastal Watersheds](#)

[Wetlands Status and Trends](#)

[Microbial Source Tracking and Identification](#)

New project

[QMRA Efficacy in Assessing Water Quality](#)

A. ENVIRONMENTAL ASSESSMENT METHOD/TOOL DEVELOPMENT

1. Chemistry Assessment

a. [Emerging Contaminant Prioritization](#)

Purpose: Enhance availability of emerging contaminant occurrence data to enable continued prioritization within the state

Update: Staff began analysis of preliminary results for selected pharmaceuticals and personal care products (PPCPs) in fish tissue samples from regional watersheds. Also, staff completed and circulated the draft quality assurance project plan (QAPP) for the statewide pilot CEC monitoring study. A CTAG research planning inter-sessional workshop on CECs was held on October 14. Next, staff will assess perfluorinated chemical data for river and bay sediments and will finalize requirements for the statewide pilot CEC monitoring study.

Lead Investigator: [Maruya](#)

b. Bioanalytical Screening Tools

Purpose: Evaluate and optimize bioanalytical methods for monitoring CECs in recycled water and ambient waters that receive treated wastewater effluent and/or stormwater discharge

Update: Staff analyzed chemical analysis data from a round-robin exercise assessing *in vitro* screening bioassays for recycled water applications. Staff presented a summary of this research to the State Water Resources Control Board on September 23. Next, researchers will draft a manuscript on the results of the round-robin, and will continue to analyze extracts from sediment and tissue from selected coastal habitats.

Lead Investigator: [Maruya](#)

c. Non-Targeted Analysis

Purpose: Develop analytical methods for identifying unknown contaminants of emerging concern (CECs) in tissue, sediment, and water samples

Update: Staff and collaborators submitted two manuscripts on the analysis of cetacean blubber and bird (black skimmer) eggs. Staff also initiated a project to investigate additional marine mammals as potential sentinel species with collaborators from NOAA and San Diego State. Next, staff will analyze preliminary results for tissues of bottlenose dolphins frequenting the Bight.

Lead Investigator: [Dodder](#)

d. Analytical Methods for Emerging Contaminants

Purpose: Develop analytical methods for priority contaminant of emerging concern (CEC) analytes

Update: Staff successfully developed protocols for high-priority CECs and began analysis of water samples from a linkage study with the freshwater fish *Menidia*. Next, staff will complete analysis of lab exposure samples and begin applying these new methods to water, sediment and tissue samples collected for CEC prioritization (see [A.1.a. Emerging Contaminant Prioritization](#)).

Lead Investigator: [Maruya](#)

e. Passive Samplers

Purpose: Evaluate whether passive samplers can be used in coastal sediments to monitor water quality and predict bioaccumulation and sediment toxicity

Update: Instrumental analysis and data processing for more than 100 passive samplers deployed in 2013 on the Palos Verdes Shelf (PVS), as well as for passive samplers exposed to sediments prepared for an international laboratory intercomparison exercise, were completed. Next, staff will generate a database for the PVS passive sampler dataset and submit the results of the sediment intercomparison exercise. In addition, staff will continue investigation into a passive sampling technique for current-use pesticides.

Lead Investigator: [Maruya](#)

2. Toxicity Assessment

a. [Molecular Tools for Toxicity Identification Evaluation](#)

Purpose: Develop new methods for evaluating sediment toxicity via gene microarrays that reveal molecular-level responses in sentinel organisms (e.g., marine fish and invertebrates)

Update: Review and revision of a manuscript describing the results of the amphipod microarray interlaboratory comparison study is in progress. A summary of the findings of the study was given at the 14th Aquatic Toxicity Workshop in Ottawa, ON. Reanalysis of RNA samples for the hornyhead turbot PCB/PBDE exposure study is in progress; the QA issues with the previous analysis have been successfully resolved. Laboratory exposures of amphipods (*Eohaustorius estuarius*) to contaminant-spiked sediments are in progress, with the exposures expected to be completed next quarter. The differential gene expression of the surviving amphipods will be measured using a microarray developed by SCCWRP; the results will be used to develop a toxicant characterization model for use as a toxicity identification evaluation tool.

Lead Investigator: [Bay](#)

3. Biological Assessment

a. [Rocky Reefs](#)

Purpose: Develop an assessment index to interpret the ecological integrity of rocky reefs

Update: Staff completed calibration and validation of an ecosystem response model in rocky reef habitats, one of the first such models to predict biological richness in these incredibly productive ecosystems. Based on a variety of physical variables including water temperature, reef substrate, and depth, the model successfully predicted the probability of finding individual species at an unimpacted site. Missing species can be correlated to impacts from human-induced pressures such as fishing or water quality. Researchers at SCCWRP, Occidental College and the Ocean Science Trust are finishing a peer-reviewed publication on this project.

Lead Investigator: [Schiff](#)

b. [DNA Barcoding](#)

Purpose: Assess the efficacy of DNA barcoding for rapidly identifying marine and freshwater benthic invertebrate and algal species

Update: The U.S. Environmental Protection Agency lab in Cincinnati completed processing of the sequence data for the approximately 100 environmental DNA (eDNA) samples collected in the fall. Staff are analyzing the data to compare community composition based on eDNA to the community quantified through typical morphological analysis.

Lead Investigator: [Stein](#)

c. [Cyanobacteria](#)

Purpose: Increase understanding of environmental drivers for cyanobacterial bloom occurrence and toxin production in streams and wetlands

Update: Sample analysis was completed for the depressional wetlands assessment. In addition, work has begun on correlative analysis of potential drivers of cyanotoxin production in streams and effects on benthic macroinvertebrate communities. A large number of blooms was reported in 2014, resulting in a decision to conduct an *ad hoc* field survey in San Diego. The survey was conducted in conjunction with the San Diego Regional Water Quality Control Board and the University of Southern California. A report is in preparation that will synthesize all of the cyanotoxin studies conducted in the past three years and will include a wide variety of waterbodies. Planning for the 2015 field season is underway with the San Diego and Santa Ana Regional Water Quality Control Boards. Work has also begun to establish a statewide strategy on cyanotoxins that will specifically address monitoring, assessment and reporting needs.

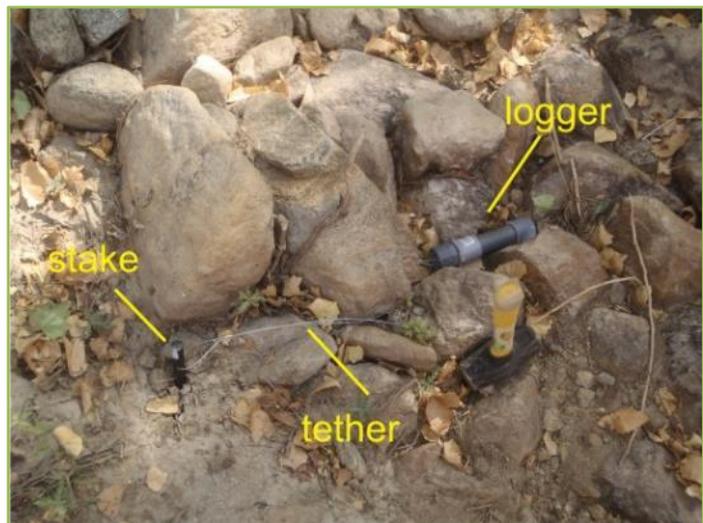
Lead Investigators: [Fetscher](#), [Howard](#)

d. [Nonperennial Streams](#)

Purpose: Develop and test bioassessment tools for use in two types of nonperennial water bodies: arid/episodic and intermittent streams

Update: For the arid/episodic stream project, field work and data analysis were completed for study sites located throughout Southern California. A draft of the updated field book for the California Rapid Assessment Method modified for arid, episodic streams was completed and is being field-tested at selected sites throughout the region. For the non-perennial stream project, two technical memos were completed this quarter: one characterizing hydrologic conditions in the San Diego Region (including the model-based map of predicted stream flows), and the other testing the performance of biological scoring tools at non-perennial sites. The hydrology memo characterized flow conditions at nonperennial reference sites with a range of flow frequency and duration in the San Diego region. The

Highlight



Stream flows are assessed with water level loggers like this one, which measures the pressure of the water column above using a pressure transducer. This nonperennial stream was dry when the water level logger was deployed, but the logger is tethered to the ground and can remain in place for months.

analysis resulted in three hydrologic categories for reference sites: short-duration flow (following rain events), extended flow (months of flow), and discontinuous flow (alternating dry and flowing reaches). Reference conditions in each of these categories inform decisions regarding bioassessment sampling.

The biology scoring memo characterized biological conditions at nonperennial reference sites with a range of flow frequency and duration in the San Diego region. Results showed that the mean CSCI score at nonperennial reference sites was not significantly different from the mean CSCI score at perennial reference sites in the San Diego region. The conclusion based on these two memos is that the CSCI seems appropriate for use in nonperennial streams towards the “wetter” (extended flow) end of the nonperennial spectrum.

Lead Investigator: [Stein](#)

e. [Soft-bottom Benthos](#)

Purpose: Develop and calibrate benthic indices for the mesohaline environment of San Francisco Bay

Update: The San Francisco Regional Monitoring Program decided not to fund the second phase of this project: the calibration and validation of the assessment index. Therefore, work on this project has been suspended.

Lead Investigators: [Stein](#)

4. Microbiological Assessment

a. [Rapid Water Quality Indicators](#)

Purpose: Develop and test application of rapid methods for enumerating indicator bacteria at high-risk beaches

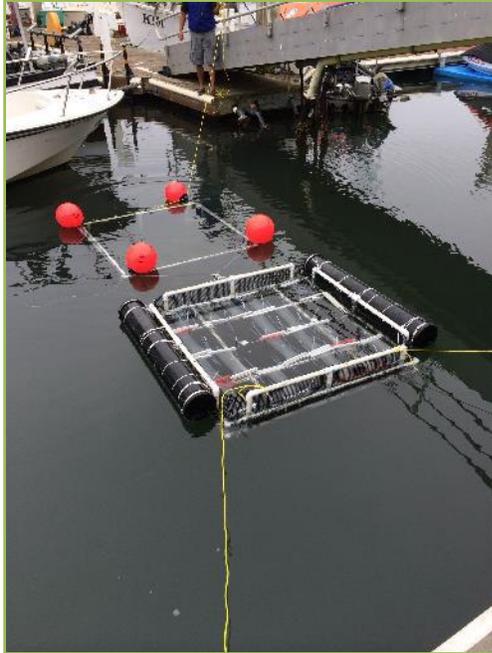
Update: SCCWRP and other researchers involved in developing technology to automate rapid measurement of water quality indicators held a meeting at the Monterey Bay Aquarium Research Institute on September 17 to initiate this project. This quarter, SCCWRP and MBARI researchers will conduct experiments to refine sample collection and pre-processing steps.

Lead Investigator: [Griffith](#)

b. [Microbial Source Tracking and Identification](#)

Purpose: Develop and implement protocols for identifying microbial contamination sources to beaches throughout the state

Highlight



Update: The research team completed dry-weather field work for the degradation study, which will track the relative degradation of DNA-based fecal markers, fecal indicator bacteria (FIB) and pathogens in the environment. Laboratory analysis of samples collected during the summer has commenced, and planning for wet season deployment is underway.

Lead Investigator: [Griffith](#)

Dialysis bags filled with diluted sewage float in the Pillar Point Harbor in Half Moon Bay, above, and in Arroyo Burro Lagoon in Santa Barbara County, right, during a 10-day microbiology study in September to determine how DNA-based bacterial fecal markers degrade in various California water body types. Pillar Point is a brackish water site, and Arroyo Burro is a marine site. The dialysis bags allow for nutrient exchange only; the contents of the bag cannot escape.



SCCWRP led the portion of the project that took place in the San Joaquin Marsh in Irvine, left. Dialysis bags were filled with diluted sewage and animal feces and attached to floating frames that provided either shaded or unshaded treatment. Sunlight/UV plays a key role in degradation of fecal organisms.

c. [Wet Weather Epidemiology](#)

Purpose: Quantify the risk of illness in surfers from water contact recreation following storm events

Update: Based on the success of the Pilot Study last winter, SCCWRP researchers and collaborators at UC Berkeley and the Surfrider Foundation have been mobilizing for the full study this upcoming winter. Utilizing cell phone apps and customized software, the study team will recruit 3,200 person-weeks of exposure from surfers who enter the ocean following rain storms, and compare their health to when they enter the ocean during non-storm periods. Study participation will occur from early December to the end of March. Complementing the human health information will be hundreds of beach water quality samples and pathogen measurements, so that researchers can assess if current water quality standards protect public health. In addition, the study team will use the human health information and pathogen measurements in a quantitative microbial risk assessment (QMRA), the first such application at a marine beach following wet weather.

Lead Investigator: [Schiff](#)

d. [Quantitative Microbial Risk Assessment \(QMRA\)](#)

Purpose: Apply QMRA to characterize the risk of illness to swimmers at a southern California marine beach impacted by nonhuman sources of fecal indicator bacteria

Update: Study commencement, including site selection, awaits a final grant agreement with the State Water Resources Control Board.

Lead Investigator: [Schiff](#)

e. **QMRA Efficacy in Assessing Water Quality**

Purpose: Develop a guidance document to aid water-quality regulators and stakeholders in demonstrating that sources of FIB to a beach are predominantly non-human

Update: This project uses a combined modeling and field-demonstration approach for building an assessment framework to quantify the confidence in the presence/absence of human fecal sources of fecal indicator bacteria (FIB). The goal is to help determine scientifically defensible triggers for Quantitative Microbial Risk Assessment (QMRA) or natural source exclusion (NSE) to establish site-specific FIB criteria. A field site has been selected, and a study design is being formulated.

Lead Investigator: [Cao](#)

**New
Project**

5. Biogeochemical Cycling Assessment

a. [Harmful Algal Blooms](#)

Purpose: Improve understanding of conditions leading to *Pseudo-nitzschia* blooms and toxin production in Monterey Bay and San Pedro, California

Update: The principal investigators met and reviewed findings from previous field efforts and began to plan for the 2015 field season. Field sampling events are planned for spring 2015 in Orange County and Monterey Bay.

Lead Investigator: [Howard](#)

b. [Ocean Acidification](#)

Purpose: Improve ocean acidification monitoring capacity for the U.S. West Coast

Update: Staff is working through the California Current Acidification Network (C-CAN) to develop how-to manuals that will help standardize acidification monitoring practices. As part of that effort, staff is analyzing data from a Durafet™ pH sensor intercalibration study to help develop a best practices manual. Staff also is working with the [Bight '13](#) offshore water quality team to pilot improved acidification monitoring practices among the SCCWRP member agencies. Sampling for this pilot program began in May and will continue through next year.

Lead Investigator: [McLaughlin](#)

c. [Coastal Ocean Nutrient Modeling](#)

Purpose: Evaluate the relative roles of anthropogenic and natural oceanographic nutrient input sources on hypoxia and acidification in Southern California

Update: Scoping began this quarter, in collaboration with UCLA, for initiating this linked causal modeling in the Southern California Bight. A proposal was submitted to a competitive NOAA grant program to enhance the modeling effort for assessing effects local nutrient inputs on hypoxia and acidification in southern California.

Lead Investigator: [Sutula](#)

B. TECHNICAL SUPPORT FOR MANAGEMENT/REGULATORY PROGRAMS

1. Nutrient Objectives

a. [Nutrient Objectives in Streams and Lakes](#)

Purpose: Provide technical support for state nutrient objectives program by developing: (1) condition assessment tools (eutrophication indicators and range at which adverse effects occur), and; (2) models to link eutrophication indicators to nutrients and other environmental co-factors

Update: A [final report](#) summarizing analyses to identify thresholds in the relationship between nutrients, algal abundance and indicators of aquatic life (benthic invertebrate and algal community composition) has been released by EPA headquarters. Staff has been working with CTAG to develop a five-year research program to support wadeable streams nutrient objectives. Stakeholder input on the wadeable streams science plan will be solicited next quarter. In a TMDL case study in the Santa Margarita River watershed, a watershed loading and estuarine water quality model is under development to establish allowable nutrient loads. Sampling to develop nutrient linkage models is beginning this month.

Lead Investigator: [Sutula](#)

b. [Nutrient Objectives in Estuaries](#)

Purpose: Technical support for state nutrient objectives program by developing estuarine eutrophication indicators related to algae, nutrients, and dissolved oxygen

Update: Staff continue to prepare a manuscript based on the results of field experiments quantifying the effect of macroalgae on seagrass. In addition, they held the second expert workgroup meeting to support development of a Nutrient Numeric Endpoints assessment framework for San Francisco Bay. Fieldwork continues to document the natural background levels of dissolved oxygen, macroalgae, and phytoplankton in bar-built estuaries, which are closed to the ocean by sandbars during portions of the year.

Lead Investigator: [Sutula](#)

2. [Sediment Quality Objectives \(SQOs\)](#)

Purpose: Provide technical support for implementing an assessment framework evaluating the indirect effects of bay and estuarine sediment contamination on human health

Update: Staff continued work focused on a case study applying SQOs in a TMDL for sediment and tissue contamination in Los Angeles/Long Beach Harbor. The compliance committee of the Harbor Technical Workgroup (HTWG) met October 20; strategies for assessing the spatial extent of impacts were discussed. The next HTWG meeting, scheduled for Nov. 14, will focus on the development of bioaccumulation models for the harbor environment. Preparations for a Nov. 20 SQO advisory committee meeting are in progress; this meeting will focus on application of the Tier I screening method and the process for determining when to employ Tier III assessment methods. A briefing on the SQO program for NGOs will be held prior to the advisory committee meeting in order to encourage their involvement. Two projects are underway in San Diego Bay: a study of food web transfer of contaminants and a survey of seafood consumption. Collection of sport fish for the food web study is in progress; samples of spotted bay bass, barred sand bass and halibut have been collected from three regions of the Bay. Previously collected samples of forage fish have been distributed to analytical labs for chemical analysis, and a database structure to house the data is in development. Development of a work plan to investigate seafood consumption rates in San Diego Bay is in progress. A Technical Advisory Group for

this study met on August 25 to discuss design of the survey instrument for the project. Presentations describing both the bioaccumulation and consumption studies were given on August 13 to San Diego Regional Water Quality Control Board members as part of a special workshop on San Diego Bay water-quality issues.

Lead Investigator: [Bay](#)

3. [Flow Criteria](#)

Purpose: Define the relationship between stream flow and biological community impacts as measured by benthic macroinvertebrate communities

Update: The project team completed the statewide stream classification and hydrologic variability analysis. The overall goal of the classification process was to group California streams into relatively homogenous classes based on their setting and expected flow properties, in the absence of substantial anthropogenic alteration (i.e. in a semi-natural state). Each class was then characterized in terms of its overarching physical and hydrological properties, and the flow metrics most influential in determine altered vs. unaltered streams in each class were identified. More than 150,000 stream reaches were classified into seven groups based on physical features of watersheds that are known to control streamflow (e.g. climate, topography, geology). Ten variables that distinguish reference from non-reference sites within a stream class were identified. Most of the 10 variables are associated with low-flow conditions or flow recession, and all variables appear to be sensitive to anthropogenic alterations and will be further analyzed as priority candidates for subsequent analysis of relationships with instream biology. Results of these analyses were provided in a Technical Memo to the SWRCB on October 1. Finally, 22 gaged watersheds in San Diego County were selected for development of models that can be used to predict priority flow metrics in ungaged stream segments.

Lead Investigator: [Stein](#)

4. Modeling

a. [Modeling of BMPs](#)

Purpose: Develop a toolkit of linked models that will optimize BMP density, type and location at a watershed scale

Update: Staff continued developing a decision support tool to optimize water resource management in the Maribyrnong River and Jackson Creek Watersheds in Australia. Staff is exploring newer areas, such as urban connectivity to estimate pollutant loads to be integrated in the decision support tool. Staff has submitted a book chapter and a special-issue journal article on the topic.

Lead Investigator: [Sengupta](#)

b. [Stressor Response Modeling](#)

Purpose: Begin developing linked stressor-response models that managers can routinely use for protecting estuaries

Update: Staff continued estuarine model setup and parameterization for the Santa Margarita estuary and other selected estuaries in Southern California.

Lead Investigator: [Sengupta](#)

5. Freshwater Biological Objectives

a. [Analysis of Biological Thresholds](#)

Purpose: Continue developing the technical foundation for biological objectives, after previously helping to develop the technical foundation for bio-objectives based on benthic macroinvertebrate indicators.

Update: Staff worked with State Water Board staff over the past quarter to develop a scope of work and budget for automation of the California Stream Condition Index (CSCI). State Water Board staff are evaluating this proposal. Staff also conducted training during the past quarter on use of the CSCI for the SMC partners.

Lead Investigator: [Stein](#)

b. [Causal Assessment](#)

Purpose: Develop guidance and training for assessing causative stressors affecting the biology of streams.

Update: SCCWRP has partnered with San Diego city, county and regional water officials, plus Tetra Tech, to develop appropriate post-causal assessment actions for the two primary stressors identified during the San Diego River CADDIS (Causal Analysis/Diagnostic Decision Information System) case study: synthetic pyrethroid pesticides and physical habitat. SCCWRP has developed a new assessment tool for pyrethroids and other potentially toxic chemicals that makes use of Toxicity Identification and Evaluation (TIE) data. Staff has developed the altered physical habitat stressor conceptual model into six individual models (loss of complex habitat, loss of shallow water habitat, altered food sources, low dissolved oxygen, increased water temperature, and smothering) to improve clarity and discern ways that altered habitat can negatively influence stream biota. The approach of using simplified models provided more definitive diagnoses of the different aspects of altered physical habitat than the single model. Future meetings planned for December will help finalize the case definition and begin the causal assessment training series for stakeholders. Also, based on needs from stakeholders, SCCWRP is assisting the Santa Ana Regional Water Quality Control Board with conducting a multi-site, stream reach-scale approach to causal assessment in San Diego Creek. This project is evolving the CADDIS causal assessment framework beyond its current limitations to better deal with chronic nonpoint source stressors found throughout Southern California. This element of the project will also include technology

transfer and training Santa Ana Regional Water Quality Control Board staff and watershed stakeholders in the San Diego Creek watershed.

Lead Investigator: [Gillett](#)

C. REGIONAL MONITORING

1. Regional Marine Monitoring

a. [Southern California Bight Regional Monitoring Program](#)

Purpose: Coordinate the Bight '13 Program to monitor regional environmental conditions

Update: All five Bight '13 elements continue to make tremendous progress. After one of the most successful sampling surveys in the history of the Bight program, the contaminant impact assessment element has completed data analysis for toxicity samples and trawl sites; each of these technical committees will give oral presentations in December to the Planning Committee for approval. Chemical analysis and identifying species in biological samples from approximately 400 sites is nearing completion. Samples to assess food web bioaccumulation in marine birds were distributed to participating labs in August.

The debris element has collected trash and plastic samples from more than 300 sites – half from streams and half from the ocean – to link land- and sea-based debris. In addition, researchers have finished measuring plastic in the stomachs of over 1,400 fish for a dedicated study to examine debris effects in wildlife. The focus has turned to data management and analysis.

The microbiology element continues to sample discharges at contaminated beaches to characterize the prevalence of human waste. Although dry weather sampling is successfully moving forward, less than 20% of the planned wet weather samples were collected because of last winter's drought. The Planning Committee met in October to review progress and decide future wet weather activities.

The nutrient element initiated field work by conducting a series of rate process studies – *in situ* experiments designed to measure nutrient uptake and growth in plankton – at two POTW outfalls offshore (OCSD and LACSD) and at two reference locations. Sample analyses continue, and the next round of experiments will occur in winter quarter.

Lead Investigator: [Schiff](#)

b. [Pollutant Sources Data Cataloguing](#)

Purpose: Continue compiling long-term pollutant mass emission estimates from different sources to assess relative inputs and track trends in response to management actions

Update: Corrections were received from the four large POTWs on the effluent data through 2012. Monitoring data from small POTWs, power generating stations and oil platforms for the 2010 index year have been compiled and entered into the master database.

Lead Investigator: [Stein](#)

c. [Areas of Special Biological Significance \(ASBS\)](#)

Purpose: Evaluate BMP projects for reducing pollution inputs to ASBS and report to the California Legislature on success of the Proposition 84 water bond program

Update: Staff is continuing to compile data to assess load reductions from bond-funded improvements as the 14 ASBS water bond grantees complete monitoring activities. Staff has finished compiling water quality data from more than 65 storm events at reference locations throughout the state. These data were compared to similar data collected at ocean sites near ASBS discharges. Results presented at south, central and north coast regional monitoring meetings in August indicated that, although some sites or storms had specific issues, most ASBS were maintaining natural water quality established by the reference sites. Staff is completing data analysis and initiating technical reports.

Lead Investigator: [Schiff](#)

2. Regional Watershed Monitoring

a. [Stormwater Monitoring Coalition \(SMC\) Regional Watershed Monitoring](#)

Purpose: Support implementation of the SMC's regional watershed monitoring program for Southern California's coastal streams and rivers

Update: The draft project report on the first five years of the Regional Watershed Monitoring program was completed and has been reviewed by the technical workgroup and the executive committee. Final edits are being made to the report. A short fact sheet will be developed over the next quarter to accompany release of the five-year report. In addition, the first draft work plan for the 2015-19 monitoring program was prepared for review by the technical workgroup. The initial sample draw was conducted and will be refined over the next quarter. Consistent with the updated program design, 30% of the sites will be revisits of previously sampled sites to facilitate trend monitoring.

Lead Investigator: [Stein](#)

b. [Background Concentrations of Contaminants in San Diego Reference Streams](#)

Purpose: Derive natural, background-level numeric targets for bacteria, nutrients and heavy metals from unimpacted streams

Update: Sampling was completed for the third year of wet and dry weather monitoring in reference streams for nutrients, metals and bacteria. Efforts are now directed at reporting for the dry weather sampling program. Wet weather sampling will begin next quarter for the 2014-2015 season. The beach bacteria study began in October 2014.

Lead Investigator: [Sutula](#)

Highlight

c. [Atmospheric Deposition of Nutrients to Coastal Watersheds](#)

Purpose: Refine measurement techniques and estimate rates of atmospheric nutrient deposition in Southern California watersheds

Update: The project has been completed and the [final report](#) is available on SCCWRP's website. The study helped establish: 1) the best performing samplers of nutrient atmospheric deposition; 2) that dry nitrogen and phosphorus deposition was a significant fraction of the total annual atmospheric deposition of nutrients (average nitrogen dry deposition is ~70% and average phosphorus dry deposition is ~30% of the total load), counter to what many other studies in wetter regions of the country have found; 3) that there was a high degree of spatial and temporal variability, and; 4) that direct deposition of nutrients is likely small because of the small surface area of rivers and streams in southern California, but that indirect atmospheric deposition likely accumulates nutrients in streams by first depositing on the landscape and entering streams through storm induced runoff or groundwater.,

Lead Investigator: [McLaughlin](#)

3. Regional Wetland Monitoring

Highlight

a. [Wetlands Status and Trends](#)

Purpose: Develop tools for tracking wetland conditions and support implementation of state and national wetland monitoring programs

Update: The project team released the final wetland mapping protocols and Standard Operating Procedures document following its review and approval by the California Wetland Monitoring Workgroup. The three mapping teams have completed about half of their plots for the pilot implementation. Upon each team completing the first ten plots, a successful QC exercise was conducted to ensure all data quality objectives were being achieved. Mapping of the pilot plots should be completed over the next quarter. For the eelgrass mapping project, spatial and tabular data for 59 individual eelgrass mitigation projects have been incorporated into the [EcoAtlas](#) database (www.ecoatlas.org). In addition, regional survey data on the known extent and distribution of eelgrass in southern, central, and northern California bays and estuaries have also been incorporated into the database. This project is concluding and won't be reported on in future quarterly updates.

Lead Investigator: [Stein](#)

b. [Depressional Wetlands](#)

Purpose: Develop and test assessment tools and a monitoring approach for depressional wetlands throughout the state

Update: All field work has been completed. Staff is working on the final project report, which will summarize refinements made to the sampling protocols, report on ambient condition of depressional wetlands, and compare results from the different regions sampled as part of this project.

Lead Investigator: [Stein](#)

D. INFORMATION MANAGEMENT AND ANALYSIS

1. [Mobile Data Acquisition Technologies](#)

Purpose: Extend the capabilities of field sampling programs using smart phone applications, image capture devices, and wireless sensors

Update: Staff has been working on development of the mobile applications backbone, which will provide a reusable and easily modified mobile data acquisition platform in support of future development projects. Specific improvements include development of a multi-platform (Android, Apple and web-based) toolset. Specific applications include the upcoming San Diego epidemiology study (Surfer Health Study) and San Diego Bay Fish Consumption Study.

Lead Investigator: [Steinberg](#)

2. [Seamless Data Sharing](#)

Purpose: Facilitate data collection and submission to, as well as access data and analytical results from, a common server for use by the scientific and management communities

Update: The Beachwatch data system, which SCCWRP has maintained for several years, was successfully connected to the California Water Quality Monitoring Council's "*Safe to Swim*" web portal, making the most current beach water quality and advisory data available to the public.

Lead Investigator: [Steinberg](#)

3. [Dynamic Data Processing and Visualization](#)

Purpose: Develop data visualization and geospatial visualization capabilities to support projects across SCCWRP's research portfolio and enhance management communication tools

Update: Staff has developed a web-based tool called the algaeMetrics Calculator, which uses algal community composition and species-specific traits to calculate three benthic indices used to make inferences about wadeable stream conditions in Southern California. Implementation of this tool through a web interface will make it easy for users to upload their data and get instant results via a downloadable Excel file. This tool is expected to be released in the near future and is being prepared for CTAG review.

Lead Investigator: [Steinberg](#)

4. [San Diego Integrated Water Resource Data Management System](#)

Purpose: Develop recommendations and specifications for the future development of a web-based water data management system for the San Diego County region

Update: Stakeholder meetings have been completed and staff is helping develop a draft report, including recommendations, for review by the project Technical Advisory Group next quarter.

Lead Investigator: [Steinberg](#)

E. MEMBER AGENCY SUPPORT

1. [Effects of Ocean Outfall Diversion on Nutrient Cycling](#)

Purpose: Assess changes in the Newport Coast nearshore waters related to nitrogen cycling and primary production resulting from diversion of the Orange County Sanitation District (OCSD) ocean outfall

Update: A manuscript was completed this quarter and submitted to a special issue of *Estuarine, Coastal and Shelf Science*.

Lead Investigator: [Howard](#)