



SCCWRP Director's Report



PUBLISHED OCTOBER 27, 2017 | COVERING JULY 29-OCTOBER 27, 2017

FALL 2017 ISSUE

Bight '18 kickoff brings together dozens of agencies

A collaboration involving dozens of environmental organizations will examine how human activities have affected the ecological health of Southern California's coastal waters during the sixth cycle of the Southern California Bight Regional Monitoring Program, which officially kicked off in September at SCCWRP.

Participants of the 2018 cycle of the regional marine monitoring initiative are considering featuring up to six distinct study elements – sediment quality, ocean acidification, harmful algal blooms, trash, microbial water quality and marine protected areas – that together will help paint a picture of regional ecosystem condition.

Bight '18 participants are planning to repeat some of their previous regional monitoring efforts to document trends, particularly to sediment quality in the Southern California Bight. They also will ask new scientific questions that require novel measurements, testing of prototype technologies, and additional assessments that extend the program into previously

unmonitored habitats. The program's focus area encompasses more than 1,500 square miles of Southern California's coastal waters.

More than 140 people representing nearly 80 organizations attended an all-day Bight '18 kickoff meeting on September 14 at SCCWRP to begin fleshing out the management questions that the regional program will address. Potential questions were ranked and prioritized based on how environmental managers will respond once they obtain answers to these questions. At the meeting, more than 20 questions made the short list for consideration.

In the coming months, Bight '18 participants will further refine the list of management questions and develop technical study designs that will ensure the program can get scientifically rigorous answers. Field sampling will begin July 1, 2018.

The Southern California Bight Regional Monitoring Program, which has been

Contents

- 4 | Updates by Thematic Area
- 9 | New SCCWRP Publications
- 10 | Quarter in Review
- 12 | SCCWRP Personnel Notes
- 13 | SCCWRP Spotlights

Cover photo: Participants of the Southern California Bight 2013 Regional Monitoring Program collect sediment samples in San Diego Bay. The program's sixth cycle, Bight '18, kicked off in September at SCCWRP.

To subscribe: The SCCWRP Director's Report is published quarterly by the Southern California Coastal Water Research Project. To receive this newsletter by email, contact pubrequest@sccwrp.org.

Calendar

Thursday, November 2
CTAG quarterly meeting

Friday, November 3
Seminar: "[Analysis of urban water quality with high resolution mass spectrometry](#)"

Friday, December 1
SCCWRP Commission meeting



Participants of the Southern California Bight 2018 Regional Monitoring Program attend the program's all-day kickoff meeting at SCCWRP in September. Nearly 80 organizations from across Southern California and beyond have committed to participating in the regional monitoring collaboration, which examines how human activities have impacted the ecological health of Southern California's coastal waters.

facilitated by SCCWRP since its inception in 1994, mobilizes Southern California environmental management agencies to collect data from across a much greater expanse than just their local discharge zones. Both regulated and regulatory agencies, as well as non-governmental and academic organizations, come together to collaboratively design the study and interpret findings.

Southern California's environmental management community relies on the Bight program to better direct resources and to maintain focus on the areas and issues that are disproportionately impacted by human activities.

Planning and final assessment reports from the previous cycle of the Bight monitoring program, Bight '13, are [available online](#).

For more information and to learn about becoming a Bight '18 program participant, contact [Ken Schiff](#).

International expert panel convened to develop acidification thresholds for pteropods

A 10-member panel made up of leading global experts on pteropods, or sea snails, convened at SCCWRP in September to develop consensus around biologically relevant thresholds at which these ubiquitous marine calcifying organisms are affected by ocean acidification (OA).

During three days of deliberations, the international pteropod panel reached consensus on the thresholds at which various specific environmental conditions linked to more intensive OA in the California Current Ecosystem are expected to trigger specific adverse effects in pteropods and similar calcifying organisms.

Pteropods, which depend on minerals in seawater to form their highly soluble calcified shells, are sensitive to changes in seawater chemistry, enabling them to serve as early-warning indicators



An expert panel of 10 leading global experts on pteropods convenes at SCCWRP in September to reach consensus on biologically relevant thresholds for tracking the impacts of ocean acidification on coastal marine health. The experts, pictured with SCCWRP staff who facilitated the panel's deliberations, traveled from as far away as Great Britain, Italy and British Columbia.

for how OA can be expected to impact the health of marine ecosystems.

The international pteropod panel is the first of three expert panels that will be convened and facilitated by SCCWRP and its partners over the next few years. Researchers' goal is to use the consensus opinion of experts to develop an interpretation framework that coastal resource managers can use to glean ecologically relevant insights from the copious data they collect via chemistry-based measures of OA, including measuring seawater pH.

During its deliberations, the pteropod panel agreed that the most relevant OA chemical parameter for assessing impacts to pteropods is aragonite saturation state, which reflects the concentration of a

dissolved mineral called aragonite in seawater.

Additionally, panelists reached consensus on which key biological processes in pteropods – including shell dissolution, egg development and mortality – are critically impacted at specific aragonite saturations state thresholds. Panelists also agreed on the critical magnitudes and durations of exposure at which pteropods exhibit increasing levels of adverse biological effects, and identified data gaps and priority future research to address these gaps.

Finally, panelists developed recommendations on how to apply their recommended biological endpoints to existing OA monitoring data and computer models that track and predict OA conditions.

A group of West Coast ocean modelers, including SCCWRP, is planning to immediately use the panel's recommendations to interpret the outputs of a state-of-the-art, high resolution model that predicts which West Coast habitats and marine communities will be most vulnerable to the impacts of corrosive conditions. Coastal resource managers will be able to use this West Coast OA model to better protect and minimize ecological damage to vulnerable areas during critical periods.

The pteropod panel will draft a review article summarizing its consensus findings and recommendations that will be submitted to a peer-reviewed journal next year.

For more information, contact Dr. [Nina Bednarsek](#).

Draft framework unveiled for assessing human health impacts of contaminated sediment

SCCWRP and its partners have completed development of a standardized sediment assessment framework intended to better protect the health of humans who consume seafood caught in enclosed bays and estuaries in California.

The draft framework, published as a [SCCWRP technical report](#) in October, is being considered for adoption by the State Water Board to define for environmental managers how to implement California's Sediment Quality Objective (SQO) for protection of human health.

The human health SQO – one of three adopted by the State Water Board in 2008 for enclosed bays and estuaries – is a one-sentence regulatory target that calls on sediment contamination to not be present "at levels that will bioaccumulate in aquatic life to levels that are harmful to human health."

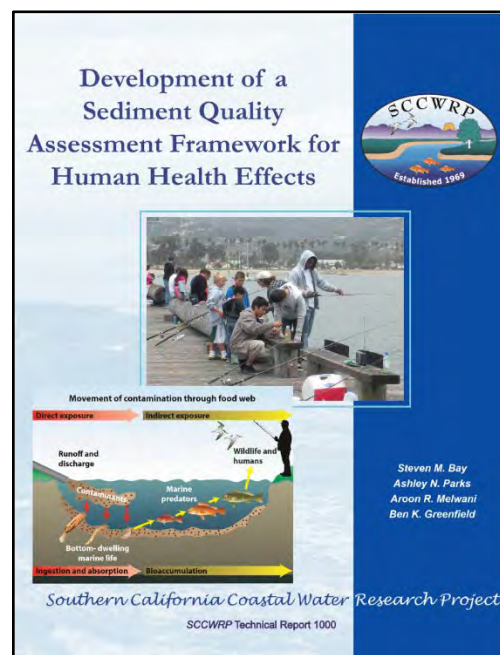
SCCWRP and its partners have spent more than a decade conceptualizing, building and vetting the human health SQO framework to create a standardized technical definition of what it means to be in compliance with this regulatory target.

California's environmental management community will be able to use the framework to inform decision-making on issues like setting appropriate sediment clean-up targets.

The draft framework relies on standardized, quantitative indicators of sediment contamination's human health effects to score the quality of sediment in enclosed bays and estuaries. Indicator scores are classified into condition categories ranging from "unimpacted" to "clearly impacted."

The human health framework is designed to complement California's SQO assessment framework for the protection of sediment-dwelling aquatic life, which was adopted by the State Water Board and approved for regulatory use in enclosed bays and estuaries in 2009. Both frameworks use standardized, quantitative indicators with defined thresholds to provide consistency and statewide comparability.

There is not yet an approved assessment framework in place to support California's



SCCWRP and its partners have developed a sediment quality framework that establishes a standardized technical definition of what it means to be in compliance with California's Sediment Quality Objective (SQO) for the protection of human health in enclosed bays and estuaries. The draft framework was published as a SCCWRP technical report, above.

third SQO, which applies to the protection of fish and wildlife.

Under the human health SQO framework, sediment sampling sites are assessed in two main ways:

» **Chemical exposure analysis:** Sportfish tissue chemistry data are compared to the advisory sportfish tissue contamination levels developed by California's Office of Environmental Health Hazard Assessment (OEHHA).

» **Site linkage analysis:** The linkage between site sediment contamination and tissue contaminant concentration is evaluated.

The framework features a three-tiered assessment process that provides capability to adapt the assessment to a

wide range of situations. The framework also makes use of a food web bioaccumulation model to evaluate site linkage.

Assessments using the framework will be focused around PCBs (polychlorinated biphenyls) and chlorinated pesticides – two major chemical drivers of seafood consumption risk.

SCCWRP and its partners began conceptualizing pieces of the draft framework in 2005, and started developing the technical aspects in 2009 with the guidance of a scientific steering committee as the project came into sharper focus. A stakeholder advisory committee that included participation by SCCWRP member agencies also played a key role in shaping the framework.

Final refinements to the framework, which were completed over the past year, included harmonizing tissue chemistry evaluation thresholds with OEHHA's seafood consumption advisory tissue levels, completing a four-year test drive of the framework in the greater Los Angeles Harbors area, and refining the bioaccumulation model used to evaluate sediment contamination.

The State Water Board will solicit public comments on the draft framework through the end of 2017, and hold an informational public workshop on December 5, 2017 in Sacramento. The draft framework is scheduled to be considered for adoption by the State Water Board in March 2018.

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

Updates by Thematic Area

SCCWRP Research Themes **BIOASSESSMENT** • **ECOHYDROLOGY** • **EUTROPHICATION** • **CLIMATE CHANGE** • **SEDIMENT QUALITY** • **CONTAMINANTS OF EMERGING CONCERN** • **MICROBIAL WATER QUALITY** • **REGIONAL MONITORING** • **INFORMATION TECHNOLOGY & VISUALIZATION**

BIOASSESSMENT

Effort launched to develop prototype causal assessment screening tool

SCCWRP and its partners in October began developing a management tool for rapidly narrowing down potential causes of degraded ecological condition in California streams and coastal waters, part of an ongoing effort to improve causal assessment methods as water-quality managers increasingly rely on biology-based condition assessments.

The screening-level causal assessment tool is being designed for use alongside biology-based condition assessment tools, which water-quality managers have become more dependent on in recent years to prioritize their remediation efforts.

The tool will draw upon a standard list of possible stressors that can either be rapidly eliminated from consideration or



SCCWRP and its partners are working to develop a causal assessment tool to help water-quality managers rapidly narrow down potential causes of degraded ecological condition in coastal waters and streams, such as San Diego Creek in Orange County, above.

identified as a possible cause of impairment based on a standard set of evidence types.

The tool is intended to serve as the first tier of a proposed three-tiered framework for conducting causal assessments in California streams and coastal waters.

The proposed framework consists of a "screening" assessment, a "detailed" assessment and a "confirmatory" assessment; it is designed to provide water-quality managers with an empirical, transparent and repeatable method for identifying the most likely cause(s) of water body impairment. Both regulated and regulatory parties would be able to use the framework to prioritize clean-up, restoration and remediation efforts.

SCCWRP developed the proposed causal assessment framework after evaluating the utility of a stream causal assessment framework developed by the U.S. Environmental Protection Agency known as the Causal Analysis/Diagnosis Decision Information System (CADDIS). During the CADDIS evaluation, which consisted of [four case studies published in 2015](#), SCCWRP and its partners determined that the CADDIS framework would need to be modified for application in California.

The development of the screening-level tier will take place over three years and will include field testing on degraded streams in San Diego.

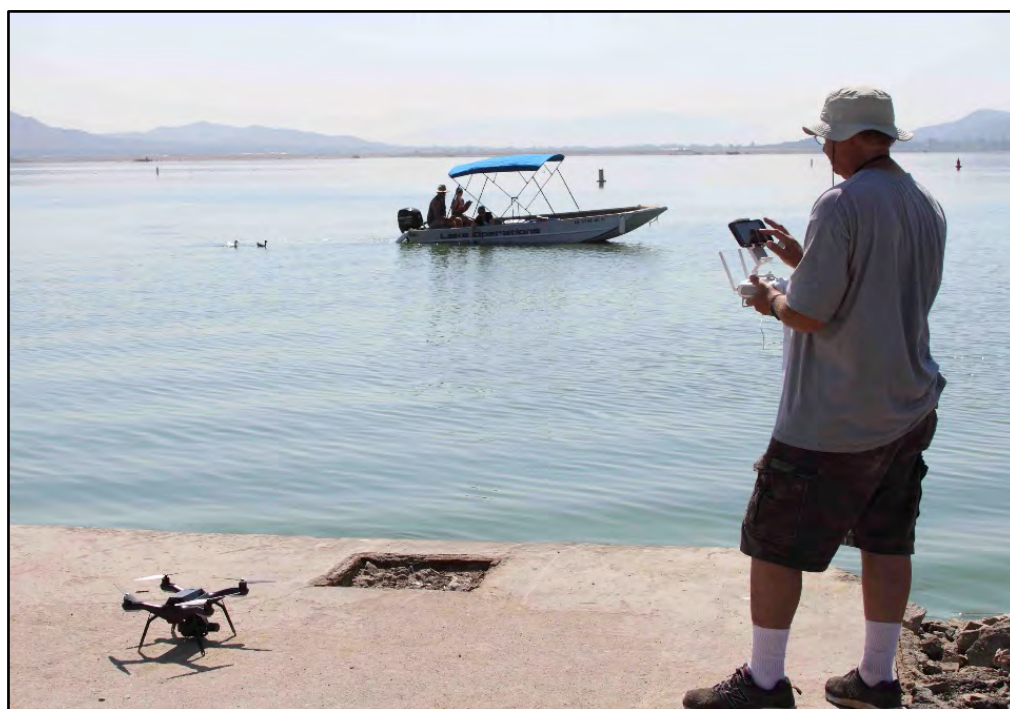
SCCWRP and its partners will look for opportunities to flesh out the other two tiers of the proposed framework as part of ongoing and planned projects.

EUTROPHICATION

Effort launched to adapt UAS to monitor HABs in lakes

SCCWRP and its partners have launched an effort to adapt commercially available unmanned aerial systems (UAS) for routine monitoring of lakes susceptible to ecologically disruptive cyanobacteria blooms.

UAS technology – commonly known as drones – offers the potential to conduct more comprehensive, frequent HABs



SCCWRP's Dario Diehl prepares to fly a multispectral imaging sensor mounted to an unmanned aerial system (UAS), bottom left, over Lake Elsinore in Riverside County. In the background, researchers in a boat collect surface water samples. SCCWRP and its partners are working to adapt UAS technology to cost-effectively monitor lakes for evidence of harmful algal blooms.

monitoring at a lower cost than is feasible with traditional boat-based field sampling.

During initial test flights in August and September, digital cameras and multispectral imaging sensors mounted to UAS were flown over Lake Elsinore in Riverside County to map chlorophyll-a concentrations across the lake's surface.

Researchers then analyzed patterns in the chlorophyll-a concentrations to look for evidence of harmful algal blooms (HABs).

The goal is to develop standardized, reliable methods for conducting UAS-based surveys and analyzing the chlorophyll-a maps, including being able to differentiate cyanobacteria from other phytoplankton groups.

HABs events, which have led to multiple lake closures across California in recent years, trigger production of cyanobacteria toxins that can impair water quality and threaten the health of humans, wildlife and domestic pets.

During the initial test flights, researchers also collected water samples from Lake Elsinore in boats to evaluate the accuracy of the chlorophyll-a analyses. Additionally,

a team from the University of Southern California deployed an autonomous underwater vehicle (AUV) to provide information on conditions beneath the lake's surface.

SCCWRP and its partners are evaluating these data sets to determine how well UAS image-based mapping data for HABs corresponds to data from water samples collected at and below the surface.

Study launched to document fate of algal toxin in sediment

SCCWRP and its partners have initiated a study examining whether an algal toxin known as domoic acid can linger in seafloor sediment following a harmful algal bloom (HAB) event.

The study, launched this summer, will seek to quantify domoic acid concentrations in the Southern California Bight following a domoic acid event last spring.

Researchers are interested in understanding the fate of domoic acid in seafloor sediment. Little is known about

how long domoic acid takes to break down in sediment and whether it can pose a long-term threat to organisms that come into contact with it. Most efforts to date have focused on short-term ecological impacts.

Domoic acid is a common toxin produced during HABs events. The spring 2017 bloom in the Bight caused widespread mortality among bird populations, sickened marine mammals, and prompted a six-month shellfish consumption advisory for Santa Barbara, Los Angeles and Orange Counties.

The Sanitation Districts of Los Angeles County and the Orange County Sanitation District already have collected sediment and benthic infauna samples for the analysis. Results are expected to be available in early 2018.

Utah officials trained on HABs monitoring techniques at SCCWRP

SCCWRP in August trained representatives from the Utah Department of Agriculture and Food on techniques for monitoring harmful algal blooms (HABs) in irrigation systems in Utah, part of an effort to examine whether cyanotoxins are being transferred to agricultural products intended for human consumption.

The Utah Department of Agriculture and Food visited SCCWRP to learn how to deploy a passive sampling technology known as Solid Phase Adsorption Toxin Tracking (SPATT). SPATT consists of a device that absorbs biotoxins onto porous, resin-filled sachets; the biotoxins are then extracted and analyzed.

Utah officials are interested in monitoring HABs in irrigation systems because toxins have been documented in vegetables. Researchers want to learn whether irrigation water can provide a pathway for toxins to be transferred into agricultural products.

The Utah pilot project is part of a coordinated, multi-agency effort to develop more robust HABs monitoring methods for a variety of aquatic

systems, and to understand relationships among HABs events at the land-sea interface.

Field data collection completed for Santa Margarita River nutrient management study

SCCWRP and its partners have completed field data collection for a three-year project seeking to establish scientifically defensible nutrient loading targets for reducing eutrophication and improving biological integrity in the Santa Margarita River watershed.

The data collection phase, which wrapped up in August, will enable researchers to develop an integrated toolkit of mechanistic computer models and empirical statistical models that water-quality managers can use to optimally protect biointegrity and human uses in the lower mainstem of the Santa Margarita River.

The Santa Margarita River watershed, which spans Riverside and northern San Diego Counties, has been grappling with algal overgrowth, low dissolved oxygen, and other eutrophication-related issues as a result of excess nutrient inputs.

The tools and concepts being developed and applied to Santa Margarita are expected to influence how nutrient management is approached in eutrophic Wadeable stream systems across California.

In particular, the project is serving as a key California case study for test-driving elements of a proposed State Water Board Wadeable stream biointegrity and biostimulatory policy, which could be adopted as early as 2019 to govern the health of Wadeable streams statewide.



Representatives from the Utah Department of Agriculture and Food receive training in a SCCWRP laboratory on how to deploy a passive sampling technology to monitor for harmful algal blooms (HABs) in irrigation systems in Utah. The pilot project is part of a coordinated, multi-agency effort to develop robust HABs monitoring methods for more types of aquatic environments.

CLIMATE CHANGE

Ocean acidification model development moves into second validation phase

West Coast researchers working to develop a computer model that predicts how the region's coastal waters will be affected by ocean acidification and hypoxia have advanced to a second phase of validation to increase confidence in the model's outputs.

The focus of this validation phase is to confirm that the West Coast ocean acidification model is accurately reflecting the biogeochemical cycling patterns of nutrients that enter West Coast waters from a variety of land-based and air-based sources, including wastewater outfalls and atmospheric deposition. This validation step will pave the way for coastal resource managers to have confidence in the model's ability to answer regional management questions.

Researchers are comparing the model's predicted outputs to field data collected by SCCWRP member agencies and other partners, including a series of biogeochemical process rates studies focusing on the fate of nutrients from wastewater effluent in the Southern California Bight.

The modeling project is a five-year initiative to help West Coast managers understand which coastal marine habitats are most vulnerable to ocean acidification and to what extent local, land-based sources of nutrients are exacerbating acidification conditions. The modeling work involves coupling West Coast physical and biogeochemical ocean models to understand the relative contributions of local and global carbon dioxide emissions, natural upwelling processes, and nutrients introduced via wastewater effluent, stormwater runoff and atmospheric deposition.

During the model's first validation phase, completed in 2016, researchers focused on confirming that the model is accurately capturing large-scale, dynamic oceanic forcing at the scale of the Pacific Ocean basin, including coastal upwelling events

that pull deeper waters to the ocean's surface.

The second validation phase is expected to be completed in summer 2018, at which time researchers will use the model to begin answering management questions about West Coast ocean acidification and hypoxia patterns.

CONTAMINANTS OF EMERGING CONCERN

Fish exposed to flowing river water to monitor for biological changes

SCCWRP and its partners exposed fish to flowing Los Angeles River water for two weeks in September as part of a pilot study examining potential biological impacts from exposure to chemical contaminants in the receiving water.

The fish were housed in mobile exposure chambers set up along the river bank in two locations – just downstream of the L.A.-Glendale Water Reclamation Plant, and in the Sepulveda Basin just upstream of the Tillman Water Reclamation Plant at a site that receives urban runoff.

This study marks the first time that mobile environmental monitoring units have been used to evaluate water quality in Southern

California. Mobile exposure units offer the potential to replicate environmental conditions more accurately than exposing fish to water samples in a lab setting; the units control for factors such as flow rate, food source, illumination and dissolved oxygen.

SCCWRP and the City of Los Angeles Environmental Monitoring Division monitored the chambers daily for 14 days, removing some fish after six days and the remainder at the end of the 14th day.

The fish – all adult male fathead minnows – were dissected, and tissue samples were collected for analysis in the coming months. Meanwhile, river water collected during the exposure study also will be analyzed to identify CECs and priority pollutants.

CECs and priority pollutants, which can be found in both wastewater effluent and land-based runoff, have the potential to trigger biological effects in fish, including changes in gene expression, tissue integrity and sex characteristics.

The study design will be refined and repeated in spring 2018.



SCCWRP's Syd Kotar monitors water quality inside a mobile exposure unit on the banks of the Los Angeles River just downstream of the L.A.-Glendale Water Reclamation Plant. The units house fish that are exposed to flowing river water in real time, enabling researchers to evaluate the fish afterward for potential biological impacts from exposure to chemical contaminants in the water.



A metal cage containing passive sampling arrays is retrieved off the coast of Santa Rosa Island in the Channel Islands National Marine Sanctuary in August following a two-month deployment. The passive samplers help measure the chemical concentration of persistent organic pollutants (POPs) at the site; the findings will feed into an international study documenting background concentrations of POPs in coastal ocean water around the world.

Passive samplers retrieved from Channel Islands for international oceanic pollutants study

SCCWRP and its partners in August successfully retrieved two sets of passive sampling arrays that were deployed over a two-month period near the Channel Islands to help establish baseline concentrations of persistent organic pollutants (POPs) in coastal ocean water around the world.

SCCWRP was invited to take part in establishing the international POPs baseline by the Aquatic Global Passive Sampling Network (AQUA-GAPS), a consortium of scientists and resource

managers working to create a global database of oceanic water quality.

The passive sampling arrays were deployed at two locations – the windward side of Santa Cruz Island and in Bechers Bay, a protected anchorage of Santa Rosa Island – that represent areas of the Southern California Bight minimally influenced by discharges from the mainland. The passive samplers were suspended about 4 meters from the ocean surface in metal cages; an anchor was used to keep the cages from drifting.

Passive samplers are constructed using widely available polyethylene and silicone materials, and offer a cost-effective way to measure low levels of chemical contaminants.

During the deployment, researchers tested various materials, and will use different analysis methods to compare performance.

POPs are problematic because they are resistant to breakdown and can accumulate to high levels in organisms; they encompass multiple chemical classes, including PCBs, DDTs and flame-retarding PBDEs – all now banned in the United States.

EMERGING RESEARCH AREAS

Bioretention soil media being tested to compare effectiveness at treating stormwater

SCCWRP and its partners in October launched a year-long project to test the performance of six types of bioretention soil media designed to remove pathogens, indicator bacteria, nutrients, metals and other contaminants from stormwater runoff.

SCCWRP's goal is to identify for Southern California stormwater managers the most cost-effective and efficient bioretention soil media to install in BMPs for improving the quality of stormwater runoff.

The media, which are intended to be placed in stormwater BMPs (best management practices) such as bio-swales and treatment wetlands, will be bench-scale tested in a SCCWRP laboratory prior to field-scale testing. Bench-scale testing utilizes 9-inch columns packed with various bioretention soil media types



SCCWRP's Dr. Nabiul Afroz prepares to evaluate the ability of bioretention soil media to remove contaminants from stormwater runoff. The lab setup is designed to mimic much larger stormwater biofiltration units that are constructed in areas such as parking lots.

through which stormwater runoff will be pumped.

The SCCWRP laboratory setup is designed to mimic much larger biofiltration units that are constructed in areas such as parking lots to filter stormwater runoff on site.

The media types being tested include three types of biochar, which are particles created by pyrolyzing biomass materials such as wood at high heat with no oxygen – a process that results in no atmospheric carbon dioxide emissions. Researchers also will explore using biofilter media created from wastewater treatment sludge, which could provide an

environmentally friendly reuse option for SCCWRP's wastewater treatment member agencies.

Bioretention soil media remove stormwater contaminants through a combination of physical and chemical processes, including absorption, straining and biodegradation.

New SCCWRP Publications

Journal Articles (Published)

[Bednaršek](#), N., R.A. Feely, N. Tolimieri, A.J. Hermann, S.A. Siedlecki, G.G. Waldbusser, P. McElhany, S.R. Alin, T. Klinger, B. Moore-Maley, H.O. Pörtner. 2017. [Exposure history determines pteropod vulnerability to ocean acidification along the US West Coast](#). *Scientific Reports* 7:4526.

Brooks, B.W., J.M. Lazorchak, M.D.A. [Howard](#), M-V.V. Johnson, S.L. Morton, D.A.K. Perkins, E.D. Reavie, G.I. Scott, S.A. Smith, J.A. Stevens. 2017. [In some places, in some cases, and at some times, harmful algal blooms are the greatest threat to inland water quality](#). *Environmental Toxicology and Chemistry* 36:1125-1127.

Cao, Y., M.R. Raith, P.D. [Smith](#), J.F. [Griffith](#), S.B. [Weisberg](#), A. Schriewer, G. Amenu, A. Sheldon, C. Crompton, X. Yu, J. Gregory, J. Guzman, K. D. Goodwin, L. Othman, M. Manasjan, S. Choi, S. Rapoport, S. Steele, and T. Nguyen. 2017. [Regional assessment of human fecal contamination in southern California coastal drainages](#). *International Journal of Environmental Research and Public Health* 14:874.

[Howard](#), M.D.A., C. Nagoda, R.M. Kudela, K. Hayashi, A. Tatters, D.A. Caron, L. Busse, J. Brown, M. [Sutula](#), E.D. [Stein](#). 2017. [Microcystin prevalence throughout lentic waterbodies in coastal southern California](#). *Toxins* 9:231.

[McLaughlin](#), K., N.P. [Nezlin](#), S.B. [Weisberg](#), A. Dickson, C.L. Cash, A. Feit, J.R. Gully, S. Johnson, A. Latker, M.J. Mengel, G.L. Robertson, A. Steele, and L. Terriquez. 2017. [An evaluation of potentiometric pH sensors in coastal monitoring applications](#).

Limnology and Oceanography Methods 15:679-689.

[Mehinto](#), A.C., D.R. Vandervort, W. [Lao](#), G. He, M.S. Denison, S.M. Vliet, D.C. Volz, R.D. [Mazor](#), K.A. [Maruya](#). 2017. [High throughput in vitro and in vivo screening of inland waters of southern California](#). *Environmental Science Processes and Impacts* 19:1142-1149.

[Sutula](#), M., R. Kudela, J.D. Hagy, L.W. Harding, D. Senn, J.E. Cloern, S. Bricker, G.M. Berg, M. [Beck](#). 2017. [Novel analyses of long-term data provide a scientific basis for chlorophyll-a thresholds in San Francisco Bay](#). *Estuarine, Coastal and Shelf Science* 197:110-118.

Tatters, A.O., M.D.A. [Howard](#), C. Nagoda, L. Busse, A.G. Gellene, D.A. Caron. 2017. [Multiple stressors at the Land-Sea Interface: Cyanotoxins at the land-sea interface in the Southern California Bight](#). *Toxins* 9:95.

Journal Articles (Online)

Ulrich, E.M., P. TenBrook, L.M. McMillan, Q. Wang, W. [Lao](#). [Enantiomer-specific measurements of current-use pesticides in aquatic systems](#). *Environmental Toxicology and Chemistry* DOI: 10.1002/etc.3938.

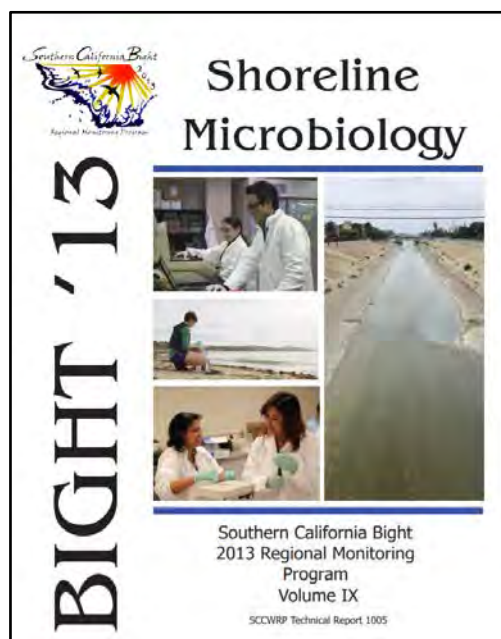
Journal Articles (Accepted)

Clatterbuck, C.A., R.L. Lewison, N.G. Dodder, C. Zeeman, K. [Schiff](#). In press. Seabirds as regional biomonitors of legacy toxicants on an urbanized coastline. *Science of the Total Environment*.

DeFlorio-Barker, S., B.F. Arnold, E.A. Sams, A.P. Dufour, J.M. Colford, S.B. [Weisberg](#), K.C. [Schiff](#), and T.J. Wade. In press. Child environmental exposures to water and sand at the beach: Findings from studies of over 68,000 subjects at 12 beaches. *Journal of Exposure Science and Environmental Epidemiology*.

Feely, R.A., R.R. Okazaki, W.-J. Cai, N. [Bednaršek](#), S.R. Alin, R.H. Byrne. In press. The combined effects of acidification and hypoxia on pH and aragonite saturation in the coastal waters of the California Current Ecosystem and the northern Gulf of Mexico. *Continental Shelf Research*.

[Nezlin](#), N.P., K. [McLaughlin](#), J.A.T. Booth, C.L. Cash, D.W. [Diehl](#), K.A. Davis, A. Feit, R. Goericke, J.R. Gully, M.D.A. [Howard](#), S. Johnson, A. Latker, M.J. Mengel, G.L. Robertson, A. Steele, L. Terriquez, L.



The Shoreline Microbiology element of the Southern California Bight 2013 Regional Monitoring Program has published its final assessment report.

Washburn, S.B. [Weisberg](#). In press. Spatial and temporal patterns of chlorophyll concentration in the Southern California Bight. *Journal of Geophysical Research: Oceans*.

Pelletier, M.C., D.J. [Gillett](#), A. Hamilton, T. Grayson, V. Hansen, E.W. Leppo, S.B. [Weisberg](#), and A. Borja. In press. Adaptation and application of multivariate AMBI (M-AMBI) in US coastal waters. *Ecological Indicators*.

Technical Reports

[Bay](#), S.M., A.N. [Parks](#), A.R. Melwani, and B.K. Greenfield. 2017. [Development of a](#)

[sediment quality assessment framework for human health effects](#). Technical Report 1000. Southern California Coastal Water Research Project. Costa Mesa, CA.

Cao, Y., M.R. Raith, P.D. [Smith](#), J.F. [Griffith](#), S.B. [Weisberg](#), A. Schriewer, A. Sheldon, C. Crompton, G.G. Amenu, J. Gregory, J. Guzman, K.D. Goodwin, L. Othman, M. Manasjan, S. Choi, S. Rapaport, S. [Steele](#), T. Nguyen, X. Yu. 2017. [Southern California Bight 2013 Regional Monitoring Program: Volume IX. Shoreline Microbiology](#). Technical Report 1005. Southern California Coastal Water Research Project. Costa Mesa, CA.

Steele, J., J. Griffith, R. Noble, K. Schiff. 2017. [Tracking human fecal sources in an urban watershed during wet weather](#). Technical Report 1002. Southern California Coastal Water Research Project. Costa Mesa, CA.

[Sutula](#), M., and D. Senn. 2017. [Scientific basis for assessment of nutrient impacts on San Francisco Bay](#). Technical Report 864. Southern California Coastal Water Research Project. Costa Mesa, CA.

Quarter in Review

Conference Presentations

[Afrooz](#), A.R.M.N., and A.B. Boehm. Biochar Amendments for Enhanced Pathogen and Coliphage Removal in Stormwater Biofilters. California Stormwater Quality Association (CASQA) Annual Conference. September 25-27, 2017. Sacramento, CA.

[Afrooz](#), A.R.M.N., and A.B. Boehm. Role of Microbial Cell Properties on Bacterial Pathogen and Bacteriophage Removal in Biochar-modified Biofilters. 18th International Water Association (IWA) International Conference on Diffuse Pollution & Eutrophication. August 14-17, 2017. Los Angeles, CA.

[Bednarsek](#), N., R. Feely, B. Carter, R. McCabe. Pelagic calcifiers use avoidance mechanisms and activated oxidative pathways under multiple stressors. IMBeR IMBIZO 5 Meeting. Woods Hole Oceanographic Institution. October 5-9, 2017. Woods Hole, MA.

[Kacev](#), D. Biomonitoring using eDNA. California Society for Freshwater Science Annual Meeting workshop (co-hosted by California Aquatic Bioassessment Workgroup). October 25, 2017. Davis, CA.

[Kessouri](#), F., J. McWilliams, C. Deutsch, M. [Sutula](#), D. Bianchi, L. Renault. Role of submesoscale processes on the biogeochemistry of the California Current

Ecosystem. 64th Annual Eastern Pacific Ocean Conference. September 17-20, 2017. South Lake Tahoe, CA.

[Mazor](#), R. Tools to Support a Biointegrity-Biostimulatory Policy. California Aquatic Bioassessment Workgroup. October 24-25, 2017. Davis, CA.

[Nezlin](#), N.P., K. [McLaughlin](#), J.A.T. Booth, C.L. Cash, D.W. Diehl, K.A. Davis, A. Feit, R. Goericke, J.R. Gully, M.D.A. [Howard](#), S. Johnson, A. Latker, M.J. Mengel, G.L. Robertson, A. Steele, L. Terriquez, L. Washburn, S.B. [Weisberg](#). Spatial and Temporal Patterns of Chlorophyll Concentration in the Southern California Bight. 64th Annual Eastern Pacific Ocean Conference. September 17-20, 2017. South Lake Tahoe, CA.

[Schiff](#), K. State and Regional Biomonitoring Programs as the Bridge to Support Local Stormwater Compliance and Management. California Stormwater Quality Association (CASQA) Annual Conference. September 25-27, 2017. Sacramento, CA.

[Schiff](#), K. Human health effects from water contact exposure following urban wet weather discharges. 18th International Water Association (IWA) International Conference on Diffuse Pollution & Eutrophication. August 14-17, 2017. Los Angeles, CA.

[Schiff](#), K. Status and Trends of Contaminant Impacts in Southern California Embayments from Diffuse Sources. 18th International Water Association (IWA) International Conference on Diffuse Pollution & Eutrophication, August 14-17, 2017. Los Angeles, CA.

[Schiff](#), K. Human Health Effects from Water Contact Exposure Following Urban Wet Weather Discharges. Water Environment Federation WEFTEC 2017 Conference. October 1-4, 2017. Chicago, IL.

[Schiff](#), K. Climate change impacts in Southern California: Ocean Acidification. American Water Resources 2017 Specialty Conference on Climate Change. June 26-28, 2017. Annapolis, MD.

[Schiff](#), K. How toxic is your stormwater? StormCon 2017. August 27-30, 2017. Bellevue, WA.

[Schiff](#), K. Human health effects from water contact exposure following urban wet weather discharges. StormCon 2017. August 27-30, 2017. Bellevue, WA.

[Stein](#), E. Considerations for applying molecular methods for bioassessment index development and application. European Union Cooperation in Science and Technology (EU-COST) 3rd Management Committee Meeting of the DNA Aqua-Net Workgroup opening talk.

September 25-27, 2017. Sarajevo, Bosnia & Herzegovina.

[Stein, E.](#) Bioassessment and barcoding: Improving our diagnostic capacity. Southeast European Ichthyological Conference plenary session. September 28-29, 2017. Sarajevo, Bosnia & Herzegovina.

[Stein, E.](#) Ecology based watershed management. Chinese American Environmental Protection Association Forum on Low Impact Development and Stream Ecology. October 15-20, 2017. Suzhou and Hefei, China.

[Stein, E.](#) Low impact development (LID) and managing environmental flows. Chinese American Environmental Protection Association Forum on Low Impact Development and Stream Ecology. October 15-20, 2017. Suzhou and Hefei, China.

Other Presentations

Afrooz, N. The use of Biochar-amended media in stormwater biofilters. San Diego County Water Quality Equivalency Technical Advisory Committee. July 24, 2017. San Diego, CA.

Afrooz, N. The use of Biochar-amended media in stormwater biofilters. Los Angeles County Department of Public Works. July 18, 2017. Alhambra, CA.

Bednarsek, N. Using pteropod in disentangling multiple stressor effects in the California Current Ecosystem. University of California, Los Angeles. October 25, 2017. Los Angeles, CA.

Du, B. Towards Sustainable Urban Water Quality: Environmental Health Challenges

and Opportunities with Contaminants of Emerging Concern. University of California, Riverside. October 11, 2017. Riverside, CA.

Gillett, D. Causal assessment v3.0. Surface Water Ambient Monitoring Program Bioassessment Workgroup. September 7, 2017. Costa Mesa, CA.

Maruya, K. Modernizing water quality monitoring of environmental contaminants. American Chemical Society Orange County Section. October 26, 2017. Santa Ana, CA.

Mazor, R. and E. Stein. Bioassessment, regional monitoring and opportunities for partnership. California Department of Fish and Wildlife. October 10, 2017. Ontario, CA.

Schiff, K. Stormwater impacts in Southern California. University of Tennessee seminar. October 26, 2017. Knoxville, TN.

Schiff, K. Latest advances from SCCWRP's 2017-18 Research Agenda. Ventura County Watershed Protection Division Co-Permittee Meeting. July 20, 2017. Ventura, CA.

Schiff, K. Climate change impacts on water quality management. Scripps Institution of Oceanography Master of Science Program in Climate Change. August 17, 2017. Costa Mesa, CA.

Schiff, K. Regional Monitoring of Southern California's Beaches. Malibu City Council. September 11, 2017. Malibu, CA.

Schiff, K. and J. Griffith. Quantitative Risk Assessment. Los Angeles County Department of Public Works. July 12, 2017. Alhambra, CA.

Weisberg, S. San Francisco Bay Regional Monitoring Program 25th Anniversary Meeting plenary talk. San Francisco Estuary Institute. October 6, 2017. San Francisco, CA.

External Sources Referencing SCCWRP

[Lake's E. coli status remains a mystery.](#) October 24, 2017. Western Nevada County Union.

[Health officials say testing San Diego River for hep A would waste resources.](#) October 23, 2017. San Diego Union-Tribune.

[San Diego's been losing a century-long battle against poop.](#) October 17, 2017. Voice of San Diego.

[San Diego waterways are not being tested for hepatitis amid health crisis.](#) October 13, 2017. San Diego Union-Tribune.

[San Diego River experienced a spike in human feces last winter -- county says no link to hep A.](#) October 12, 2017. San Diego Union-Tribune.

[Fueled by summer heat, algae blooms persist in renovated Oxford Basin.](#) October 11, 2017. The Argonaut.

[U.S. Department of Energy's Advanced Research Projects Agency-Energy funds UCI-led study of kelp farming.](#) September 13, 2017. University of California, Irvine.

[Malibu water quality is 97 percent perfect.](#) September 13, 2017. Malibu Times.

SCCWRP Personnel Notes

Commission

Nancy Woo, Assistant Director of the U.S. Environmental Protection Agency Region 9 Water Division, was appointed to the Commission in August, filling a vacancy. Janet Hashimoto will continue to serve as Alternate Commissioner.

CTAG



Dave Laak, Stormwater Resources Manager for the Ventura County Watershed Protection District, was appointed to CTAG in October, replacing Arne Anselm.

Anselm will continue to serve as Commissioner.



Steven Webb, Water Resource Control Engineer for the Los Angeles Regional Water Quality Control Board, was appointed to CTAG in August, replacing Michael

Lyons, who retired. Lyons served for 27 years on CTAG, beginning in 1990.



Holly Wyer, Program Manager for the California Ocean Science Trust, was appointed to CTAG in August, replacing Jennifer Phillips. Phillips will continue to serve as

Alternate Commissioner.

New Faces



Dr. **Marcus Beck**, who just completed a postdoctoral fellowship with the U.S. Environmental Protection Agency's Gulf Ecology Division in Florida, joined

SCCWRP in September as a Scientist in the Biology Department. He will focus on developing environmental scoring tools for assessing water body condition.

Scientific Leadership

Dr. **Nabiul Afrooz** has been appointed to the County of San Diego Watershed Protection Program's Technical Advisory Committee overseeing Phase 2 Updates to the Regional Water Quality Equivalency Guidance Document.

Steven Bay has been appointed to the Pulsed Exposure Scientific Advisory Panel for a project titled "Derivation and Demonstration of an Environmentally Relevant Approach for Stormwater Toxicity Testing Compliance Monitoring," which will be conducted by the U.S. Navy's Space and Naval Warfare Systems Command (SPAWAR) Systems Center Pacific in cooperation with the U.S. Department of Defense Environmental Security Technology Certification Program.

Dr. **Nina Bednarek** was appointed moderator for a session titled "What interdisciplinary understanding is needed to improve ecosystem models developed for multiple scales and systems to allow projection and prediction of future states and evaluation through scenario development?" at the IMBeR IMBIZO 5 Meeting in October at the Woods Hole Oceanographic Institution in Massachusetts.

Dr. **Meredith Howard** has been appointed to the Technical Advisory Committee for the National Oceanic and Atmospheric Administration's Alliance for Coastal Technologies (ACT) Program on Technology Evaluation of Algal Toxin Detection Field Sensors and Kits.

Dr. **Alvina Mehinto** has been elected to the Board of the Southern California chapter of the Society of Environmental Toxicology and Chemistry.

Dr. **Eric Stein** has been selected to serve on a science review panel convened by City of Ventura, Heal the Bay, and the Los Angeles Regional Water Quality Regional Board that is examining effects of reduced discharge of treated wastewater on the Santa Clara estuary.

Dr. **Eric Stein** has been selected to serve on a national advisory committee on Compensatory Mitigation Evaluation and Monitoring by the Army Corps of Engineers and the Association of State Wetland Managers.

Dr. **Eric Stein** has been selected for a workgroup preparing a section of the California fourth climate assessment, focusing on impacts of climate change on habitat and species distributions.



Lindsay Darjany, a former SCCWRP Laboratory Assistant who has worked since 2013 as a Lecturer and Laboratory

Coordinator for California State University, Long Beach, joined SCCWRP in August as a Senior Research Technician in the Microbiology Department.

Departures

Dr. **Yiping Cao**, a Senior Scientist in the Microbiology Department since 2007, left SCCWRP in October to pursue a job in the private sector.

Meredith Raith, a Senior Research Technician in the Microbiology Department who started at SCCWRP in 2008 as a Laboratory Assistant, left SCCWRP in September to relocate with her family to the East Coast.

SCCWRP COMMISSIONER SPOTLIGHT

Civil engineer pivots to water-quality regulation

David Barker was a second-year civil engineering major at Virginia Tech in the early 1970s when he first learned the university was launching a new environmental engineering program.



David Barker

Barker, who had initially planned to focus on public-works infrastructure, was immediately drawn to this area of study. He signed up to be part of the program's first cohort of about a dozen students.

"Major environmental legislation like the Clean Water Act was just starting to come out of Congress, so this program really captured my imagination," said Barker, now a Supervising Water Resource Control Engineer for the San Diego Regional Water Quality Control Board. "I

was attracted to how an engineer could work on cleaning up pollution for the benefit of society at large."

Now in his 42nd year working for the San Diego Regional Board, Barker heads the agency's Surface Water Protection Program, a 21-member branch organized into units that administer all of the surface water discharge permitting functions. He has served as a SCCWRP Alternate Commissioner since 2007.

Over the past four decades, Barker has witnessed a dramatic evolution in water-quality management. When he started at the Regional Board in 1976, the agency focused on improving wastewater treatment processes. Today, the focus is on more vexing, non-point pollution sources, especially stormwater runoff.

"Dealing with pollution problems where the sources are more diffuse and difficult to regulate has been a very motivating thing for me," Barker said. "I just am constantly absorbing new information and learning."



David Barker, left, and his son Jonathan play guitar together in 2008. David Barker plays for fun, while his son plays professionally.

David Barker, P.E.

Job: Supervising Water Resource Control Engineer and Branch Chief, Surface Water Protection Program, San Diego Water Quality Control Board

SCCWRP role: Alternate Commissioner (2007-present)

Prior jobs: Branch Chief, Healthy Waters Program, S.D. Regional Board (2000-2008); Senior, Associate and Water Resource Control Engineer, S.D. Regional Board (1976-2000); Water Resource Control Engineer, State Water Resources Control Board in Sacramento (1975-76)

Education: Master's-level civil engineering courses, San Diego State University (1977-78); B.S. engineering technology and civil engineering, Virginia Polytechnic Institute and State University (1975)

Residence: San Diego

Family: Son Jonathan, a music teacher and band guitarist in Portland

Hometown: Richmond, Va.

Hobbies: Reading history books; recreational bicycling with the San Diego Major Taylor Cycling Club; playing guitar

Barker spent his early childhood in Richmond, Va. But in the sixth grade, Barker's father, a civil engineer, was transferred to the San Francisco Bay Area for a year, and then to London, where Barker completed middle and high school. Barker didn't return to the U.S. until he started college in 1971.

After graduating from Virginia Tech, Barker moved to California to take a job with the State Water Resources Control Board in Sacramento. Although he fell in love with California's weather and recreational opportunities, the State Water Board wasn't the right fit for him.

A year later, he transferred to the San Diego Regional Board, seeking an opportunity to interact directly with dischargers in a more on-the-ground role. He's never looked back.

"The State Water Board operates more at the policy level, whereas the Regional Board is the first line of defense," he said. "I like being on that front line."

When he's not working, he enjoys reading history books ("There's literally not another inch of my house to put another book," he insists) and going bicycle riding. He's traveled as far as Normandy in France with a bicycle touring group.

CTAG SPOTLIGHT

Program manager drawn to coastal ocean work

Holly Wyer was a newly minted Environmental Scientist for the California State Lands Commission when she first saw the positive impact the California Ocean Protection Council could have on the work of other state agencies.



Holly Wyer

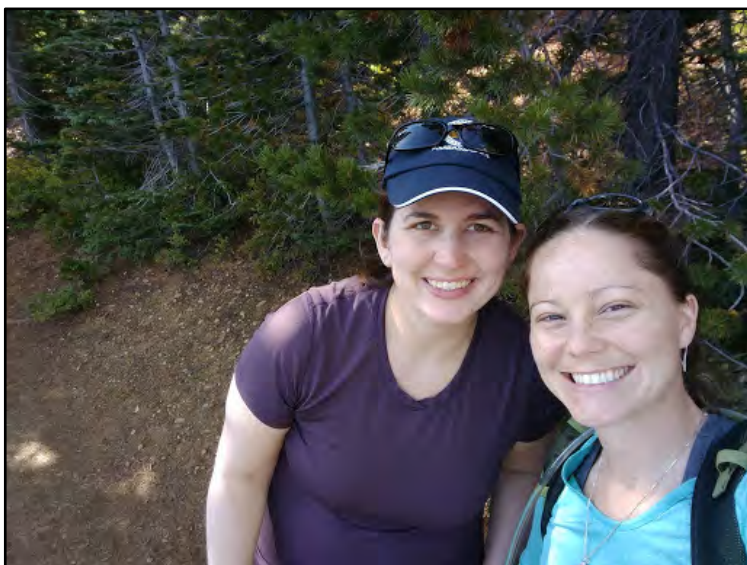
OPC had just released its seminal Sea Level Rise Guidance Document in 2013. The report, which offers pointed recommendations on how state agencies should factor sea level rise into their long-term planning, had an immediate ripple effect on how the State Lands Commission performed its work.

"Before that document, we didn't have the same set of sea level rise numbers to work off of, so it made permitting for construction and development more difficult," Wyer said. "I saw how this document made our work at State Lands much smoother."

Wyer, who joined OPC as a Program Manager in 2016, serves as OPC's lead on trash and marine pollution issues, as well as oversees OPC's awarding of Proposition 1 grants for low impact development (LID) and restoration projects. She was appointed to CTAG in August, replacing Jennifer Phillips, who will continue to serve as OPC's Alternate Commissioner.

Wyer's love for the coastal ocean was first shaped as a child, when she'd accompany her father – who worked as a purchaser in the fish cannery industry – on business trips to Alaska.

But Wyer, a native of the Seattle area, didn't initially pursue coastal resource management as a career path. She majored in anthropology as a Western Washington University undergraduate,



Holly Wyer, left, enjoys a day hike through Tahoe National Forest with friend Missy Orr in September 2017.

Holly Wyer

Job: Program Manager, California Ocean Protection Council

SCCWRP role: CTAG Representative (started August 2017)

Prior jobs: Environmental Scientist and California Sea Grant Fellow, California State Lands Commission (2012-16); sales associate, Home Depot gardening department (2009); office manager for a veterinary ophthalmology practice (2008-09)

Education: Master of environmental science and management, University of California, Santa Barbara (2011); B.A. anthropology, Western Washington University (2008)

Residence: Sacramento

Family: Parents Malcolm, an accountant, and Nancy, a retired hospital records manager; brother Matthew, an industrial metal finisher

Hometown: Kenmore, a suburb of Seattle, Wash.

Hobbies: Jogging; camping trips in the Sierras; museums

then took a year off school and worked temp jobs.

In 2009, Wyer enrolled in an environmental studies master's program at UC Santa Barbara and, upon graduation, was named a Sea Grant Fellow. She was placed at the State Lands Commission, where she focused on chronicling ecological impacts to the coastal ocean from the marine renewable energy sector. The fellowship led to a full-time job with the State Lands Commission for 3-1/2 years.

Wyer says she's drawn to studying the coastal ocean because of its resilience to human impacts.

"There's this unique opportunity to do restoration work in the ocean and see it bounce back in ways that don't often happen on land," she said. "That's what really attracts me to this work."

Through CTAG, Wyer is looking forward to opportunities to interact directly with the Southern California water-quality managers who are affected by the OPC's work.

"It's really valuable to me to ensure my work is relevant to the people doing the work on the ground," Wyer said.

Wyer lives in Sacramento with two friends and, in her spare time, enjoys camping trips of all kinds, including car camping. She recently visited Yosemite National Park's Tuolumne Meadows for the first time.

SCCWRP PARTNER SPOTLIGHT

Postdoc studying stressors on MPA communities

As a Ph.D. student, Dr. Olivia Rhoades examined how feeding behaviors and movement patterns of marine organisms change following the establishment of Marine Protected Areas (MPAs). Her goal was to understand how curtailing fishing practices in MPAs could help restore ecological processes that have been impacted by fishing and other human-induced influences.



Dr. Olivia Rhoades

As she prepared to graduate, she increasingly thought about how this multitude of factors cumulatively affects the health of marine populations. She became especially interested in how land-based discharges into the coastal ocean also could significantly alter the ecological functioning of marine communities—and how climate change will continue to alter them in the decades to come.

"I realized how much we still need a broad understanding of how all of these water-quality stressors are impacting the recovery of kelp forest ecosystems in MPAs," said Rhoades, who started a one-year joint postdoctoral fellowship with the California Ocean Science Trust (CalOST) and SCCWRP in July. "My fellowship is a great opportunity to work on these types of questions."

During her postdoc, Rhoades is splitting her time between CalOST and SCCWRP, working to form new bridges of understanding between the fisheries management community and the water-quality management community, which historically have not been well-integrated.

Rhoades will seek to identify synergies and overlaps between the monitoring programs administered by each sector, as well as study a broad swath of human-induced ecosystem stressors, including land-based pollution, ocean acidification and fishing pressures.



Dr. Olivia Rhoades holds up a yellowtail that she speared off the coast of Catalina Island in October 2016.

Olivia Rhoades, Ph.D.

Job: Joint Postdoctoral Research Fellow, California Ocean Science Trust and SCCWRP

Started: July 2017

Prior jobs: Research Technician, University of North Carolina (2009-10); Research and Field Assistant, Prince Edward Island, Laval University in Canada (2009)

Education: Ph.D. Population Biology, University of California, Davis (2017); B.S. Biology, Brown University (2009)

Residence: Oakland (permanent residence: Valley Ford in Sonoma County)

Family: Partner Jerrad Swaney, a California Department of Fish & Wildlife Officer; dog Strider, a black mouth cur; four chickens; three ducks; honeybee hive

Hometown: Tucson, Ariz.

Hobbies: Free diving; fishing; trail running; swimming and body surfing; traveling; reading classic fiction novels

Rhoades is particularly excited about spending part of her postdoc at SCCWRP; she'll spend three to four days here every four to six weeks. While Northern and Central California MPAs were the focus of her Ph.D., they tend to face different water-quality challenges than Southern California MPAs, she noted. At the same time, Southern California's water-quality management community has been eager to confront these challenges head-on, Rhoades said.

"Southern California is bracing itself for major changes to the environment over the next few decades," she said. "That makes it a really exciting place for an ecologist to work."

Rhoades' love for the natural environment was shaped by growing up in the high desert of Tucson, Ariz. Every summer as a child, she and her family also visited the tiny coastal town of Ocean Park, Maine, where she explored tidepools and the sandy shore.

Rhoades is certified as an AAUS research diver and has worked in habitats ranging from the mussel farms of Canada's Prince Edward Island to the coral reefs of the Galápagos Islands. Her favorite free-diving spot is off Arrow Point on the north side of Catalina Island.

She is living in an apartment in Oakland during her postdoc, but her permanent home is in rural Sonoma County, where she and her partner have a large garden, chickens, ducks and honeybees.

SCCWRP STAFF SPOTLIGHT

Analytical chemist studies toxicants in runoff

Dr. Bowen Du's first assignment when he began his postdoc in 2014 was to get a time-of-flight mass spectrometer up and running. For Du, it was initially an academic exercise. But then he learned how this powerful, high-resolution instrument would be applied to research projects at his University of Washington lab.



Dr. Bowen Du

Each fall, coho salmon in the waterways draining to Seattle's Puget Sound experience neurotoxic symptoms, erratic swimming patterns and loss of equilibrium after being exposed to stormwater runoff. Du's lab was using the high-resolution mass spectrometer to help understand what toxicants in the runoff might be responsible for these dramatic – and lethal – impacts to the fish.

"It's shocking to see the coho salmon – 3 or 4 feet long – experiencing these symptoms in the field," said Du, who spent 2-1/2 years working at the Center for Urban Waters at the University of Washington Tacoma. "High-resolution mass spectrometry allows us to screen non-targeted chemicals in the water that could be potentially responsible for the biological effects we're seeing in the fish."

Du, who started in July as a Scientist in SCCWRP's Chemistry Department, is an expert in applying high-resolution mass spectrometry to characterize potential toxicant classes and identify high-priority, high-risk contaminants in urbanized ecosystems.

Du became interested in applying mass spectrometry to characterize contaminants of emerging concern (CECs) after reading about the occurrence of pharmaceuticals in fish exposed to treated wastewater effluent.



Dr. Bowen Du tours the grounds of Oregon's state capital in Salem in 2016 with, from left, sons Daven and Evan and wife Daisy.

Bowen Du, Ph.D.

Job: Scientist, Chemistry Department

Started: July 2017

Prior jobs: Postdoctoral Research Scientist, Center for Urban Waters, University of Washington (2014-17); Research and Teaching Assistant, Baylor University (2006-14); Technician, Environmental Protection Bureau, Daqing, China (2004-06)

Education: Ph.D. Ecological, Earth and Environmental Sciences, Baylor University in Texas (2014); M.S. Environmental Science, Baylor University (2009); B.S. Environmental Science, Northeast Forestry University in China (2004)

Residence: Irvine (previously Auburn, Wash.)

Family: Wife Daisy, statistician for a clinical trials consulting company in the pharmaceutical industry; sons Daven, 5, and Evan, 2

Hometown: Daqing in northeast China

Hobbies: Golfing; watching sports (football, golf and car racing); growing an edible backyard garden; taking his kids to the beach

"It was fascinating to me looking at how CECs move into aquatic species – this research area hadn't been extensively developed back then," Du said.

Du has been drawn to the environmental sciences since he was a child. He grew up in Daqing, a city in northeastern China dominated by oil production and refineries – and he saw the resulting environmental impacts.

Du sees SCCWRP as an ideal place to blend his interest in academic research with his commitment to solving real-world environmental problems.

"I want to be able to use my skill set to do state-of-the-art applied research," Du said. "There's a really unique opportunity to do that here."

Du is looking forward to living in Southern California, especially being able to take his young sons to the beach.

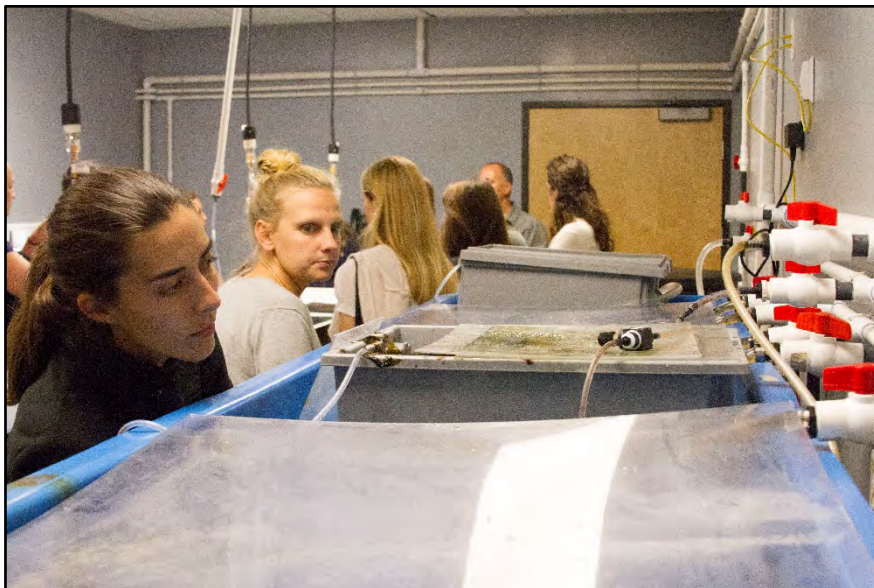
"It's too cold to go to the beach in Seattle, but it's a tradeoff – I'll miss seeing Mount Rainier," Du said.

Du's wife, Daisy, a statistician in the pharmaceutical industry, also is switching jobs. Her new job, with a Massachusetts-based company, will allow her to work from home.

SCCWRP SCENES

Training the next generation of climate scientists

Students enrolled in a master's program in climate science and policy at the University of California, San Diego visited SCCWRP in August for a special seminar on SCCWRP's climate change research program. SCCWRP was one of several institutes specializing in climate change research that the students toured to broaden their horizons. SCCWRP has committed to mentoring two of the students on an ongoing basis as part of its commitment to helping train the next generation of environmental scientists.



Clockwise from top left: A UC San Diego master's student peers into a tank with purple sea urchin cultures in SCCWRP's culture room; students take notes during a SCCWRP seminar about climate change and water quality; students explore SCCWRP's Biology Lab; Deputy Director Ken Schiff discusses sediment water quality objectives and testing for CECs during a tour of SCCWRP's Toxicity Lab.