



PUBLISHED JANUARY 27, 2023 | COVERING OCTOBER 29, 2022-JANUARY 27, 2023

SCCWRP Director's Report



WINTER 2023 ISSUE

Study probes utility of virus method for fecal detection

The Southern California Bight 2018 Regional Monitoring Program has completed a study that found that an alternative, virus-based method for tracking fecal contamination can be used as an effective complement for established *Enterococcus* bacteria-based methods.

The method comparison study, [described in an article](#) published in November by the journal *Water Research*, involved testing water quality at 12 Southern California beaches using a commonly used *Enterococcus* method alongside a newer alternative method that uses coliphage viruses to detect fecal contamination.

The study, conducted as part of Bight '18 and led by SCCWRP, was motivated by recent efforts by the U.S. Environmental Protection Agency to develop regulatory thresholds for coliphage that will define for water-quality managers the levels at which coliphage contamination becomes indicative of a health threat to swimmers and others who enter recreational waters.

Coliphage, which is a virus that infects some fecal bacteria, more closely mimics the viral pathogens that sicken humans, underscoring the value of developing coliphage as a viral contamination indicator complementing *Enterococcus* and other bacteria indicators.

Human health thresholds for *Enterococcus*-based monitoring have been in place for more than two decades. In 2018, the EPA released an approved coliphage-based method for quantifying fecal contamination at beaches and other recreational water bodies.

In advance of the EPA's possible release of coliphage thresholds, the Bight '18 monitoring program tested the new coliphage method's utility side by side with a decades-old *Enterococcus* testing method. The study's goal was to evaluate the efficacy of routine monitoring of Southern California beaches using coliphage as an indicator for the presence of fecal contamination.

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Cover photo: A SCCWRP field crew samples water at Cabrillo Beach in Los Angeles County. Researchers have found that an alternative, virus-based method for testing beach water for fecal contamination can be used as an effective complement for established bacteria-based methods.

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, February 2
CTAG quarterly meeting
(Remote participation only)

Friday, March 3
Commission meeting
(In-person meeting)

The Bight '18 beach water-quality study showed that coliphage-based monitoring is more likely to protect the health of beachgoers in certain scenarios, including where a fresh sewage source is present, such as beaches in southern San Diego County where lightly treated sewage can travel north from Mexico and contaminate coastal waters. In this scenario, the data from coliphage-based monitoring are more likely to support beach-closure decisions and postings of advisory signs.

At the same time, the study found that if public health decisions were to be made based on the coliphage data instead of the *Enterococcus* data, fewer beaches would be closed and fewer beachgoers would be warned about potentially polluted waters – meaning that using coliphage testing method would, on average, be less likely to protect beachgoers from exposure to contaminated waters.

The study also found that both methods generally perform reliably for detecting fecal contamination at beaches, although the coliphage method is comparatively

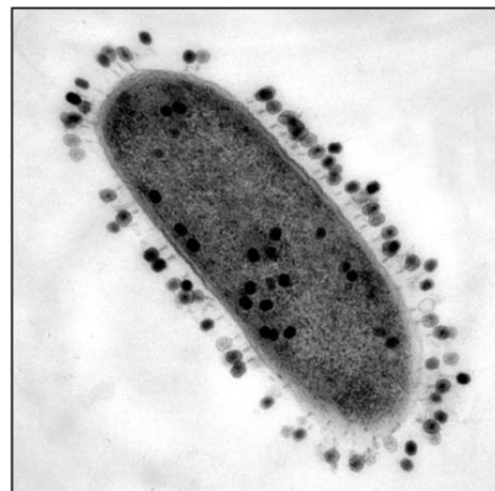
more difficult to perform and requires larger water sample volumes.

The Bight '18 study involved measuring fecal contamination at 12 beaches across Southern California measured during both wet and dry weather. The coliphage and *Enterococcus* methods produced statistically similar results at 73% of study sites.

No U.S. regulatory agency has indicated that coliphage-based fecal contamination testing will become a requirement for routine beach water-quality testing. The results of the Bight '18 study suggest that the coliphage method is a valuable supplement to – but not an appropriate replacement for – *Enterococcus* testing at Southern California beaches.

Prior to 2018, an EPA-approved coliphage method for detecting fecal contamination did not exist for beaches and other recreational waters, although a coliphage method for testing groundwater has been available since 2001.

For more information, contact Dr. [Joshua Steele](#).



Tiny coliphage viruses surround an E. coli cell. Coliphage, which is a virus that infects E. coli and other fecal bacteria, has been shown in a Bight '18 microbiology study to be an effective complement to established *Enterococcus* bacteria-based methods for tracking fecal contamination.

Initial phase of ocean health report card developed for California managers

The California Ocean Protection Council (OPC) has released the first phase of a multi-component ocean health report card designed to provide managers and policymakers with comprehensive annual snapshots about the condition of California's coastal ocean.

The report card, published in January as the agency's [Annual 2022 State of the California Ocean and Coast Report](#), consists of narrative summaries about the ecological condition of the coastal ocean across nine indicators, including fecal contamination, ocean acidification, marine mammals and kelp forests.

The OPC effort parallels a complementary ocean health report card being developed for the entire U.S. West Coast by the West Coast Ocean Alliance (WCOA), a regional ocean planning body constituted by the U.S.'s three West Coast states, tribes and

federal agencies. The OPC's Executive Director – SCCWRP Commissioner Jenn Eckerle – serves as California's representative on WCOA's Executive Council.

Development of ocean health report cards is a strategic priority for both WCOA and OPC, as the report cards can provide a foundation for prioritizing environmental issues that require management attention. The process of developing the report cards also can help align existing coastal ocean monitoring programs and data management systems to yield more managerially relevant insights.

SCCWRP is playing a key role in the development of both report cards, helping to craft several of the OPC report card's condition indicators and co-leading the team developing WCOA's indicators. SCCWRP's focus is on helping both

agencies develop a scientifically rigorous, consistent approach for conducting annual indicator assessments.

Conducting a scientifically defensible condition assessment requires developing consensus among scientific experts about which data sets should be used (a decision that needs to consider both data quality and data comparability over large spatial and temporal gradients), what thresholds to use as the basis of comparison, and what level of uncertainty is acceptable.

Both OPC and WCOA are planning to release fully built-out versions of their annual report cards in 2025. The final versions are likely to include some form of grading to help place trends in management context. Both agencies also are planning to develop websites to provide more information for each

indicator, plus link to the original data sets used for each indicator assessment.

The OPC report card is not California's first effort to assess coastal ocean health across multiple condition indicators, but stands apart because the assessments are directly aligned with California's long-term management goals for protecting the health of the coastal ocean.

By releasing a partial 2022 report card for California, the OPC can begin soliciting feedback from managers and policymakers about how ocean condition assessments have been presented, as well as begin documenting California's progress toward meeting its long-term, strategic goals around protecting coastal ocean health.

During a January 24 OPC meeting, the OPC's five-member board – known as the Ocean Protection Council – lauded the report card as a comprehensive, managerially relevant tool that provides a critical foundation for management decision-making and for tracking effectiveness of these decisions.

For more information, contact Dr. [Karen McLaughlin](#).



Courtesy of Occidental College Vantuna Research Group

SCCWRP is helping the California Ocean Protection Council and the West Coast Ocean Alliance to develop coastal ocean health report cards to provide managers and policymakers with comprehensive annual snapshots about the condition of multiple indicators of ocean health, including kelp forests, above. The OPC released a partial report card for California for 2022, enabling managers to begin tracking California's progress toward meeting its long-term management goals around protecting coastal ocean health.

Study probing variability in *Ceriodaphnia* toxicity testing results enters final phase

An ongoing, SCCWRP-facilitated [study](#) probing why California laboratories have been unable to produce consistent results with a toxicity test commonly used to evaluate discharge water quality has ruled out an initial set of possible causes and has begun pursuing more nuanced potential explanations.

The study's initial findings – reviewed in December by the project's five-member science advisory committee and 10-member stakeholder advisory committee – indicate that there is no "smoking gun" explanation for the variability in results for the *Ceriodaphnia dubia* chronic reproduction test, a test method that utilizes the *Ceriodaphnia dubia* water flea and has been used since the mid-1980s.

While some California laboratories during the study demonstrated consistent results, other laboratories' results were variable from test to test.

The approved method for conducting the *Ceriodaphnia* test gives laboratories some flexibility in adapting exactly how they perform the test, including limited options for what to feed the test organism, the laboratory reagents used to create dilution water, and age of the organisms used to initiate the test.

Project stakeholders in January recommended that researchers focus the study's final phase on education and training in an effort to constrain the number of variations in laboratory techniques. Participating laboratories will

implement the streamlined method options during a second and final round of split-sample testing to see if variability in results can be reduced.

Environmental managers have used the *Ceriodaphnia* test for decades as part of a suite of toxicity tests to protect California's enclosed bays, estuaries and inland water bodies from contaminated discharges. But in recent years, end users of the *Ceriodaphnia* test have expressed growing concerns about accuracy, repeatability and consistency associated with interpreting test results.

These concerns came into sharp focus in 2020, as the California State Water Resources Control Board was preparing to

adopt numeric water-quality objectives for a full suite of aquatic toxicity tests – a policy change known as the [Toxicity Provisions](#).

In response to end-user concerns about the *Ceriodaphnia* test, the State Water Board postponed implementing numeric objectives for the *Ceriodaphnia* test until early 2024. The numeric objectives for other toxicity test species were adopted in late 2020.

The *Ceriodaphnia* test is a foundational toxicity test for evaluating water quality for wastewater and stormwater discharges. Unlike some toxicity testing that focuses on whether the test organism lives or dies, the *Ceriodaphnia* reproduction test focuses on whether the fleas are able to reproduce – typically a more sensitive endpoint.

In 2020, both the regulated and regulatory communities [asked SCCWRP to lead](#) an investigation into the source(s) of variability in the test results.

Researchers initiated the study by compiling data from about 1,000 toxicity tests spanning the past three years and representing all 18 laboratories that are accredited to perform the test in California. More than 1,000 person-hours was spent compiling the data; however, the data analysis did not point to one lab technique as the source of variability in test results.

Project participants then completed an initial round of split-sample intercalibration testing last summer and last fall to generate new data for analysis.

What became clear from the split-sample testing is that no two laboratories in California are conducting the test exactly the same way. Moreover, the number and variety of method options in use are confounding researchers' ability to pinpoint which laboratory technique (or

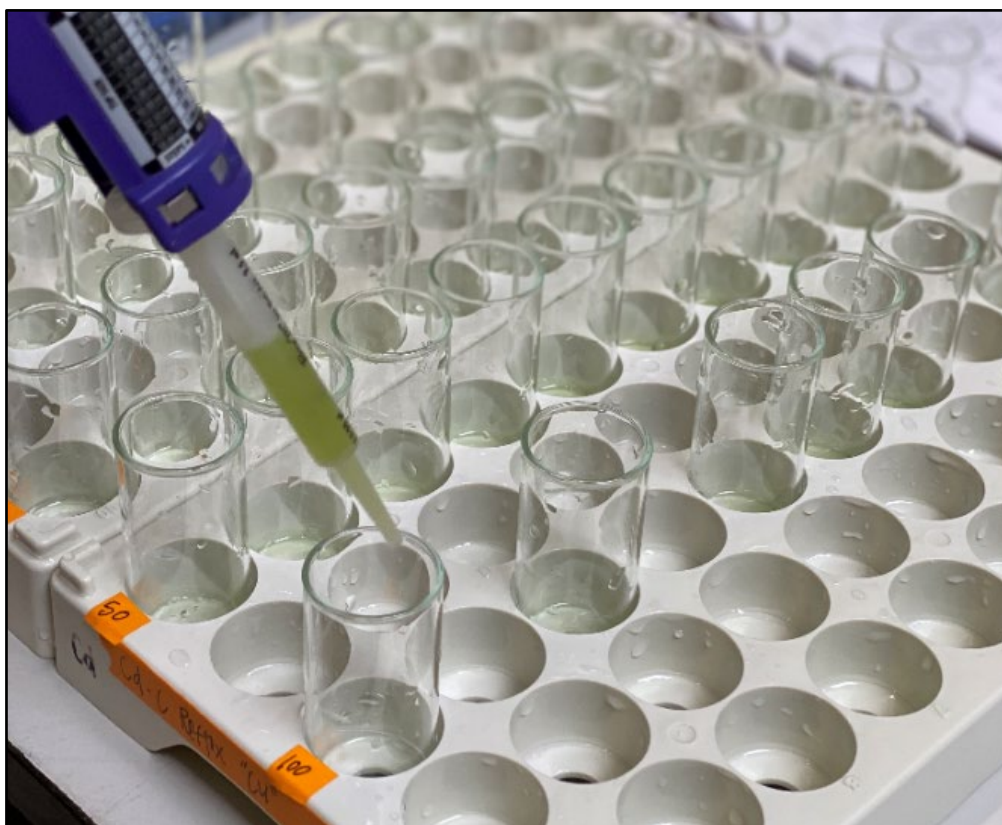


Photo courtesy of John Wood Group PLC

A water flea known as *Ceriodaphnia dubia* is placed in tubes and fed a nutrient mixture for a toxicity test in a laboratory. An ongoing, SCCWRP-facilitated study probing why California laboratories have been unable to produce consistent results with the *Ceriodaphnia dubia* chronic reproduction test has ruled out an initial set of possible causes and has begun pursuing more nuanced potential explanations.

techniques) is the source of variability in the results.

Thus far, the most promising – albeit far from conclusive – lead appears to be variations in the age of the female *Ceriodaphnia* used to initiate brood boards for the test. During the first round of split-sample testing, this organism ranged in age from 6 to 14 days old. Researchers will investigate this potential source of variability during the second and final round of split-sample testing.

The project is scheduled to be completed by this summer with development of best-

practices guidance to minimize variability of results; the guidance will be published in time to guide laboratories in implementing the State Water Board's new toxicity provisions for the *Ceriodaphnia* reproduction toxicity test.

To receive periodic updates on the ongoing study, [sign up](#) for the State Water Board's toxicity listserv.

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

Updates by Thematic Area

SCCWRP Research Themes **BIOASSESSMENT** • **ECOHYDROLOGY** • **EUTROPHICATION** • **CLIMATE CHANGE** • **CONTAMINANTS OF EMERGING CONCERN** • **MICROBIAL WATER QUALITY** • **STORMWATER BMPs** • **REGIONAL MONITORING**

BIOASSESSMENT

Modeling analysis completed in effort to predict biological consequences of ionic stress

SCCWRP and its partners have completed an analysis of where levels of chlorine, sodium and other ions in the Santa Ana watershed have been elevated above background concentrations – a milestone in ongoing efforts to build a modeling tool for predicting how aquatic life are being stressed as these ion levels rise.

The modeling analysis, completed in January, accounts for dynamic climate conditions that cause background concentrations of the ions to vary naturally in response to precipitation, temperature and drought.

The goal of the project, which kicked off 2021, is to help watershed managers protect aquatic life by appropriately applying a set of existing Santa Ana basin objectives that call for capping the concentrations of multiple major ions. Managers also intend to develop prescriptive requirements for related indicators of ionic stress, including water hardness.

Managers have been limited in their ability to effectively use these indicators to manage ionic stress across the Santa Ana region because none of the indicators have been correlated with biological effects in aquatic life.

ECOHYDROLOGY

Draft technical foundation developed for cannabis growers to request stream flow diversions

SCCWRP and its partners have completed the development of a proposed scientific workflow intended to provide the technical foundation for California cannabis growers to demonstrate that the water they are requesting to divert from nearby streams to support cannabis cultivation does not adversely affect the streams' ecological health.

The draft workflow, submitted in December for review by the State Water Resources Control Board, consists of a process to develop in-stream flow criteria using the recently developed [California Environmental Flows Framework](#), as well as a suite of web-based tools to assess potential ecological risks from diverting stream flows to support cannabis cultivation. Recreational marijuana was legalized in California in 2016.

The workflow will help the State Water Board determine how the individual and cumulative effects of cannabis growers' proposed stream flow diversions could

adversely affect the flow patterns necessary to support aquatic life and ecosystem functioning.

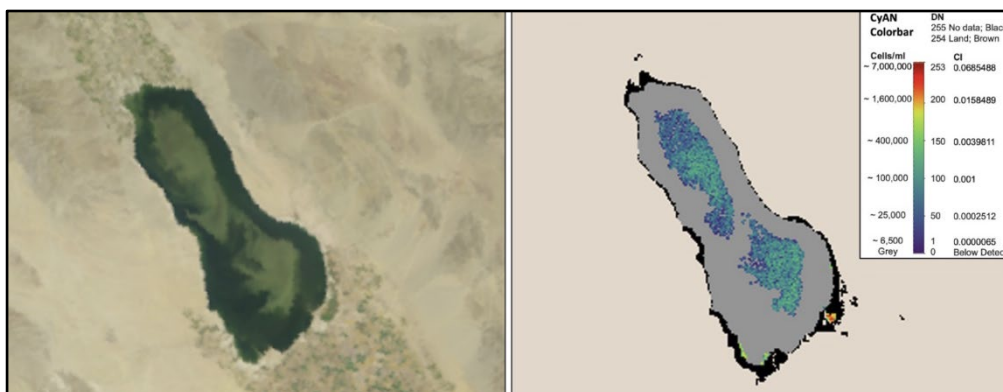
Researchers are initially focusing on developing tools to guide stream-diversion decisions in the North Coast region of California. Eventually, the State Water Resources Control Board's Division of Water Rights intends to complete similar analyses for each of 14 regions statewide.

EUTROPHICATION

Committee formed to advance use of satellite imaging for HABs monitoring

SCCWRP has convened a technical advisory committee to develop best-practices guidance for using satellite imaging data as a routine management tool to detect and monitor harmful algal blooms (HABs) in California lakes and reservoirs.

The committee, convened in December, will explore how to develop quality-assurance safeguards that improve management confidence in satellite imaging data as a decision-making tool.



The Salton Sea in Riverside and Imperial Counties, which was captured in a satellite image, left, shows potential visual signs of a cyanobacterial bloom that can be analyzed using a computer algorithm, right, that differentiates cyanobacteria from other algae and non-biological matter to produce an estimate of overall abundance. SCCWRP has convened a technical advisory committee to develop best-practices guidance for using satellite imaging data as a routine management tool for detecting and monitoring blooms in California lakes and reservoirs.

Satellite remote sensing data have the potential to provide a viable, cost-effective way to generate a continuous stream of real-time HABs monitoring data. In 2022, SCCWRP and its partners successfully used satellite imaging data to [build a comprehensive portrait](#) of when and where HABs have been occurring in California's large lakes and reservoirs over the past five years.

To date, managers have been reluctant to use satellite imaging as a HABs monitoring tool because of a lack of quality assurance information about the imaging data.

CLIMATE CHANGE

Toad distribution modeling completed for stream vulnerability study in San Diego region

SCCWRP and its partners have completed development of a species distribution model for assessing the vulnerability of the endangered arroyo toad to future changes in stream flow patterns in the San Diego region.

The statistical model, completed in December, is being coupled to a hydrologic model that explains how

climate change, future land-use changes and changing water management practices will change stream flow patterns across the San Diego region.

Together, the models predict how changes in stream flow patterns in the coming years are expected to affect critical arroyo toad habitat in the San Diego region.

Watershed managers will be able to use the insights as part of a risk decision framework for prioritizing which streams to protect and restore; the framework is expected to be completed this spring. The work builds off a similar 2019 [environmental flows analysis in the Los Angeles region](#) focusing on climate change impacts.

Experts help guide development of acidification assessment approach for Oregon

A West Coast technical advisory committee that was convened last year to guide the State of Oregon in developing a standardized approach for assessing the effects of ocean acidification on coastal marine life has completed a synthesis of the science and offered guidance for developing Oregon's assessment methodology.

The committee, which included participation by SCCWRP, was tasked with helping the Oregon Department of Environmental Quality develop an acidification assessment methodology that utilizes a combination of biological indicators and chemical measures to evaluate the health of marine aquatic life.

Following completion of the committee's work in December, Oregon Department of Environmental Quality staff began working to draft the assessment methodology. The draft methodology is expected to be released for public comment this May.

Ocean acidification is intensifying along the West Coast, with coastal marine life in the Pacific Northwest disproportionately affected by changing seawater chemistry conditions.

Effort launched to validate Newport Bay tool that predicts where seagrass restoration likely to be effective

SCCWRP and its partners have begun working to validate a newly developed computer modeling tool that predicts how algal blooms and turbidity in Newport Bay in Orange County can be expected to limit the potential for seagrass restoration at sites across the estuary.

The model validation phase, which began last fall, involves comparing modeling predictions about nutrients, algal blooms and light attenuation conditions in Newport Bay to field-collected measurements.

Significant investments have been made in recent years to restore seagrass beds in coastal estuaries like Newport Bay; eelgrass beds are in decline as a result of pollution and other stresses.

The modeling team, which includes SCCWRP and the University of Toulouse in France, envisions the tool as a prototype that could be expanded to guide seagrass restoration efforts in coastal estuaries across the State.



Courtesy of U.S. Fish and Wildlife Service

The endangered arroyo toad, which breeds at the edges of aquatic habitats, can be adversely affected by even small changes in stream flow patterns. Researchers are working to assess the vulnerability of the endangered arroyo toad to future changes in stream flow patterns in the San Diego region.

REGIONAL MONITORING

Statewide monitoring framework published for assessing health of estuaries statewide

SCCWRP and its partners have finalized and published a statewide monitoring framework intended to bring consistency to how California assesses the health of its coastal estuaries.

The framework, [described in a series of reports](#) published in January, is expected to be immediately incorporated into at least four estuarine monitoring assessment efforts in California: the California Ocean Protection Council's upcoming 2024 assessment of the health of California's estuarine Marine Protected Areas (MPAs), the Southern California Bight 2023 Regional Monitoring Program, coastal resiliency monitoring by the U.S. Environmental Protection Agency, and monitoring of smaller estuaries in Santa Monica Bay.

The estuary monitoring framework focuses on evaluating ecological functioning of estuaries – an approach that allows for greater flexibility and



Image courtesy of Wood Environment and Infrastructure

Researchers have finalized and published a statewide monitoring framework intended to bring consistency to how California assesses the health of its coastal estuaries, including Upper Newport Bay in Orange County, above, one of the State's estuarine Marine Protected Areas (MPAs).

comparability across California's highly heterogeneous estuaries. Ecological function-based assessments also are directly tied to the beneficial-use goals that environmental managers are working to protect.

Although monitoring programs already have been developed for estuary sites across California, these programs have never been coordinated, limiting data comparability and managers' ability to track the overall health of estuaries statewide.

New SCCWRP Publications

Journal Articles

Brander, S.M., J.W. White, B.M. DeCourten, K. Major, S.J. Hutton, R.E. Connon, [A.C. Mehinto](#). 2023. [Accounting for transgenerational effects of toxicant exposure in population models alters the predicted long-term population status](#). *Environmental Epigenetics* 8:1-12.

Cheng, Y., D.A. Vaccari, [E. Fassman-Beck](#). 2022. [Phosphorus Leaching Behavior from Extensive Green Roof Substrates](#). *Journal of Sustainable Water in the Built Environment* 8:06022003.

Cheng, Y., D.A. Vaccari, B.G. Johannesson, [E. Fassman-Beck](#). 2022. [Multiyear Study on Phosphorus](#)

[Discharge from Extensive Sedum Green Roofs with Substrate Amendments](#). *Journal of Sustainable Water in the Built Environment* 8:04022014.

Damien, P., D. Bianchi, J.C. McWilliams, F. [Kessouri](#), C. Deutsch, R. Chen, L. Renault. 2023. [Enhanced biogeochemical cycling along the U.S. West Coast shelf](#). *Global Biogeochemical Cycles* 37:e2022GB007572.

DeAngelo, J., B.T. Saenz, I.B. Arzeno-Soltero, C.A. [Frieder](#), M.C. Long, J. Hamman, K.A. Davis, S.J. Davis. 2023. [Economic and biophysical limits to seaweed farming for climate change mitigation](#). *Nature Plants* 9:45-57.

Kenitz, K.M., C.R. Anderson, M.L. Carter, E. Eggleston, K. Seech, R. Shipe, J. [Smith](#), E.C. Orenstein, P.J. Franks, J.S. Jaffe, and A.D. Barton. 2023. [Environmental and ecological drivers of harmful algal blooms revealed by automated underwater microscopy](#). *Limnology and Oceanography* DOI:10.1002/lno.12297.

[Kessouri, F.](#), L. Renault, J.C. McWilliams, P. Damien, D. Bianchi. 2022. [Enhancement of Oceanic Eddy Activity by Fine-Scale Orographic Winds Drives High Productivity, Low Oxygen, and Low pH Conditions in the Santa Barbara Channel](#). *Journal of Geophysical Research: Oceans* 127:1-14.

[Stein, E.D.](#), A.C. Horne, R.E. Tharme, J. Tonkin. 2022. [Editorial: Environmental flows in an uncertain future](#). *Frontiers in Environmental Science* 10:1-5.

Stepien, C.A., [S. Theroux](#), [S.B. Weisberg](#). 2022. [The Second National Workshop on Marine eDNA: A workshop to accelerate the incorporation of eDNA science into environmental management applications](#). *Environmental DNA* DOI:10.1002/edn3.379.

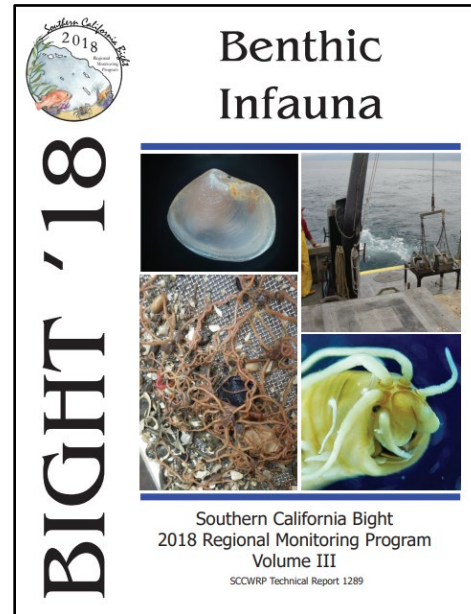
[Walker, J.B.](#), [D.J. Gillett](#), [M. Sutula](#). 2022. [Establishing biologically relevant sediment organic matter thresholds for estuaries and embayments of the Southern California Bight, USA](#). *Ecological Indicators* 143:1-12.

Wang, S., [W. Lao](#), Y. He, H. Shi, Q. Ye, J. Ma. 2021. [Promoting the stability and adsorptive capacity of Fe₃O₄-embedded expanded graphite with an aminopropyltriethoxysilane-polydopamine coating for the removal of copper\(II\) from water](#). *RSC Advances* 11:35673-35686.

Wang, S., [W. Lao](#), H. Li, L. Guo, J. You. 2023. [Assessing bioaccumulation potential of sediment associated fipronil degradates in oligochaete *Lumbriculus variegatus* based on passive sampler measured bioavailable concentration](#). *Science of the Total Environment* 863: 160514.

Journal Articles (Accepted)

Simons, A.L., N. Aulerich, H. Carlson, I. Chandra, J. Chancellor, G. Gemayel, D.J. [Gillett](#), D. Levene, J. Lin, G. Nichol, H. Patel, and S. Zhu. Using Zeta Diversity in Describing the Health of Soft Sediment Benthic Macroinvertebrates in the Southern California Bight. *Journal of Coastal Research*.



The Southern California Bight 2018 Regional Monitoring Program has published its final assessment report on the health of benthic infauna across Southern California's coastal ocean.

Book Chapters

Ainslie, W., [E.D. Stein](#). 2022. [Additional Considerations for Incorporating Ecosystem Services into Compensatory Mitigation Programs](#). in: C.A. Jackson, T.H. DeWitt (eds.), *Incorporating Ecosystem Services into Restoration Effectiveness Monitoring & Assessment: Frameworks, Tools, and Examples* pp. 177-201. U.S. Environmental Protection Agency. Washington, D.C.

Reed, D.J., C. Brown, A.D. Steinman, M.A. [Sutula](#), D.H. Wardrop. 2022. Restoration in the Context of Climate Change. in: National Academies of Sciences, Engineering, and Medicine (ed.), [Progress Toward Restoring the Everglades: The Ninth Biennial Review—2022](#). The National Academies Press. Washington, D.C.

Technical Reports

[Gillett, D.J.](#), W. Enright, [J.B. Walker](#). 2022. [Southern California Bight 2018 Regional Monitoring Program: Volume III. Benthic Infauna](#). Technical Report 1289. Southern California Coastal Water Research Project. Costa Mesa, CA.

Rasmus, J., E. Garvey, S. Brown, E. [Fassman-Beck](#), E. [Stein](#). 2022. Assessing the State of Knowledge and Research Needs for Stormwater Harvesting. Water Research Foundation. Alexandria, VA.

Quarter in Review

Conference Presentations

Fassman-Beck, E. Measuring Effectiveness of Turf-Replacement BMPs to Minimize Irrigation-Induced Dry Weather Runoff. California Stormwater Quality Association Conference. October 24-26, 2022. Palm Springs, CA.

Fassman-Beck., E., E. Darrin, M. McGauley, B. Wadzuk. A Data-informed Approach to Determining the Number of Monitoring Events Needed to Characterize BMP Performance. California Stormwater Quality Association Conference. October 24-26, 2022. Palm Springs, CA.

Greenstein D.J., A.C. Mehinto, and K.C. Schiff. Historical test variability for the *Ceriodaphnia dubia* chronic method: The California experience. Society of Environmental Toxicology and Chemistry North America Annual Meeting. November 13-17, 2022. Pittsburgh, PA.

McLaughlin, K. Incorporating & coordinating pollutant time series into a California pollutant monitoring program. CalCOFI 2022 Conference Workshop. December 7, 2022. La Jolla, CA.

Schiff, K., J. Griffith, J. Steele. Developing Novel Indicators of Sewage Collection Systems for Wet Weather Source

Tracking. Society of Environmental Toxicology and Chemistry Annual Meeting. November 14-17, 2022. Pittsburgh, PA.

Thornton Hampton, L.M. Microplastics Policy in California. Pacific Northwest Plastics Consortium Annual Meeting. December 12, 2022. Newport, OR.

Walker, J. Strategies for Coastal Lagoons and Recovery Efforts for Light Footed Ridgway's Rail: Assessment of Coastal Lagoons. Western Society of Naturalists presidential symposium. November 12, 2022. Oxnard, CA.

Wong, C.S. International interlaboratory intercalibration study for microplastics in environmental media. Society of Environmental Toxicology and Chemistry North America Annual Meeting. November 13-17, 2022. Pittsburgh, PA.

Conference Posters

Frieder, C.A. Model-derived spatial and temporal patterns in OAH habitat capacity in the southern California Current System. NOAA Ocean Acidification Community Meeting and Mini Symposium. January 4, 2023. La Jolla, CA.

Mehinto, A. C., M.D.A. Howard, J. Smith, E. Wegner, R. Linville, B. Stanton, B.W. Brooks, M.A. Sutula. Systemic Review of

the Ecotoxicity of Cyanotoxins on Aquatic Organisms in Freshwater Ecosystems. 11th U.S. Symposium on Harmful Algae. October 23-28, 2022. Albany, NY.

Smith, J., A. Deming, V. Hoard, M. Berndt, D. Shultz, J. Cram. Linking Regional Monitoring Observations to Domoic Acid Related Marine Mammal Stranding Events in Southern California. 11th U.S. Symposium on Harmful Algae. October 23-28, 2022. Albany, NY.

Thornton Hampton, L.M. ToMEx: A Powerful Tool for Hazard Characterization. Pacific Northwest Plastics Consortium Annual Meeting. December 12, 2022. Newport, OR.

Other Presentations

Mazor, R. Biological integrity in modified channels. Ditch Research Group. November 2, 2022. Via webinar.

Sutula, M. How Can Modeling Support Evaluation of OAH Water Quality Impacts. California Acidification Network Workshop. November 2022. Seattle, WA.

Taniguchi-Quan, K. The California Environmental Flows Framework: Progress and Challenges of Developing a Statewide Environmental Flows Program. San Jose State University's Biology Seminar Series. November 16, 2022. Via webinar.

SCCWRP Personnel Notes

Commission



Jenn Eckerle, the newly appointed Executive Director of the California Ocean Protection Council and Deputy Secretary of Oceans and Coastal Policy for the California Natural Resources Agency, was named a SCCWRP Commissioner in January, replacing Mark Gold, who served on the SCCWRP Commission for three years. Eckerle has been serving in her role on an acting basis since last fall, and served as OPC's Deputy Director for six years prior.



Rob Thompson, the incoming General Manager of the Orange County Sanitation District, will be named a SCCWRP Commissioner in mid-February, replacing Jim Herberg, who is retiring next month after serving on the SCCWRP Commission for five years. Thompson is the agency's Assistant General Manager.



Kelly Dorsey, Assistant Executive Officer for the San Diego Regional Water Quality Control Board since 2020, was named a SCCWRP Alternate Commissioner in January, replacing David Barker, who retired after serving on the SCCWRP Commission for more than 15 years.

Scientific Leadership

Dr. **Elizabeth Fassman-Beck** has been appointed to the Ph.D. examination committee of Forrest Bilek at the University of Canterbury in New Zealand.

Dr. **Eric Stein** has been appointed an Associate Editor for the journal *Frontiers in Environmental Science - Freshwater Science*.

Dr. **Kris Taniguchi-Quan** has been elected Vice President of the Pacific Southwest Regional Board of Directors for the American Society of Photogrammetry and Remote Sensing.

Dr. **Jan Walker** co-organized a workshop titled "Defining Coastal Resilience and Ecosystem Functions in California Dune Ecosystems," held in November at the University of California, Santa Barbara.



Renee Purdy, who has served as a SCCWRP Commissioner for the past 4-1/2 years, will retire in February as Executive Officer of the Los Angeles Regional Water Quality Control Board. Her replacement has not yet been named.

New Faces



Dr. **Adriana González-Fernández**, who just earned her Ph.D. in integrative biology from the University of South Florida, will join SCCWRP in February as a Scientist in the Microbiology Department. Her doctoral dissertation focused on quantifying pathogens at a polluted tropical beach and estimating illness risks for beachgoers.



Dr. **Danhui Xin**, who is completing her postdoctoral research at the University of Delaware, joined SCCWRP in January as a Scientist in the Chemistry Department. She will split her time between SCCWRP and the University of Delaware until May, then relocate to California to work full time at SCCWRP. Xin is an environmental chemist and engineer who specializes in waste management and environmental remediation.



Emily Lau, who has worked at SCCWRP part time since 2015, most recently as SCCWRP's technical editor, joined SCCWRP full time in January as a Communications Specialist. For the past five years, she has worked in corporate communications in the private sector.

SCCWRP COMMISSIONER SPOTLIGHT

Geologist fulfilled by executive-level role

Kelly Dorsey didn't have aspirations to be Assistant Executive Officer of the San Diego Regional Water Quality Control Board when she started working for the Water Boards as an intern in 1997.



Kelly Dorsey

But from the moment she was asked to assume the role on an acting basis in 2020, Dorsey realized the job was so much more fulfilling than what she'd imagined.

"I loved the job I had at the time, but once I got into this job, it opened up my world," said Dorsey, who previously headed up her agency's Site Restoration & Groundwater Protection Branch. "I have a bigger canvas to paint with now, and that means I get to have a bigger impact."

Dorsey, who was named permanently to the Assistant Executive Officer position in July 2020, was appointed a SCCWRP Alternate Commissioner in January, replacing David Barker, who retired. Barker served on the SCCWRP Commission for more than 15 years.

As Assistant Executive Officer, Dorsey partners closely with Executive Officer David Gibson to manage day-to-day operations for the 70-person agency. It's a job that enables her to apply management and problem-solving skills she honed in a prior, decade-long career in retail management.

"I love looking at problems from different angles to see if there is a solution that we're not noticing," said Dorsey, who worked as a store manager for Wherehouse Entertainment prior to graduating from college. "I always ask why, and I don't accept the answer: 'This is the way we've always done something.'"



Kelly Dorsey attends a youth golf competition with her daughter Skylar in 2019 in San Diego. The duo frequently play golf together.

Kelly Dorsey, P.G.

Job: Assistant Executive Officer, San Diego Regional Water Quality Control Board (started in 2020)

SCCWRP role: Alternate Commissioner (started January 2023)

Prior jobs: 25 years with the Water Boards: San Diego Regional Board Supervising Engineering Geologist (2018-2020), Senior Engineering Geologist (2012-2018), Engineering Geologist (2000-2012), Intern (1997-1998); San Francisco Bay Regional Board Engineering Geologist, (1999-2000), Intern (1998-1999); The Wherehouse Entertainment Store Manager (1987-1997)

Education: B.S. Geology, California State University, East Bay/Hayward (1999)

Residence and hometown: San Diego

Family: Daughter Skylar, 11; dog Boomer, a Labradoodle

Hobbies: Golfing; spending time with family and friends

A geologist by training, Dorsey figured out during college that she wanted to work in the public sector. She interned with the U.S. Geological Survey, then with the San Diego Regional Board and finally the San Francisco Bay Regional Board, which hired her as an Engineering Geologist upon graduation in 1999. After about a year, she transferred to the San Diego Regional Board, enabling her to return to her hometown of San Diego.

Dorsey has spent much of her career working on clean-up and restoration projects at polluted groundwater sites. Her first assignment at the San Diego Regional Board was managing clean-up activities at the Mission Valley Terminal above-ground fuel storage facility in San Diego that had polluted nearby groundwater with hundreds of thousands of gallons of petroleum. She worked on the project directly for nine years. Then, in a full-circle moment, she was asked last fall to formally close out the site's original 1992 clean-up and abatement order, following a successful, decades-long clean-up effort.

"I know it sounds cheesy, but I legitimately feel like I'm making a difference with my work at the Regional Board," Dorsey said.

Dorsey said she is looking forward to expanding her horizons on the SCCWRP Commission. She also is excited about engaging in the important policy debates that flow from SCCWRP's work.

In her spare time, Dorsey is an avid golfer. She is a member of the Coronado Women's Golf Club, plays golf with her daughter, and practices "every chance I get" using a golf simulator she installed in her garage during the COVID-19 lockdown.

SCCWRP PARTNER SPOTLIGHT

Professor pivots to running CSU water group

As a biology professor at Fresno State University for the past two decades, Dr. Steve Blumenshine has networked with colleagues interested in water research across the California State University system, as well as numerous other external partners. He's sought to build communities around water and pursued multidisciplinary research and funding opportunities linked to water.



Dr. Steve Blumenshine

Now he's doing the job full time as Interim Executive Director of California State University Water Advocacy for Education and Research (CSU-WATER), an affinity group that coordinates water research, education and policy issues across the CSU's 23 campuses and among external partners.

"I love the freedom to just get out there and make connections, figure out how to engage people and groups," said Blumenshine, who was named CSU-WATER's interim head in July 2022.

"When I encounter young, ambitious faculty interested in water, the environment, energy, I say: 'Come join our team.'"

In his new role, Blumenshine has begun interacting closely with SCCWRP, exploring opportunities to bring CSU researchers together with SCCWRP staff to tackle topics ranging from water recycling and stormwater capture to microplastics pollution. In particular, Blumenshine is looking at how to integrate economists into research projects.

"We want to serve and engage with as diverse a number of stakeholders as possible," said Blumenshine, who will run CSU-WATER from the Fresno State campus. "We're trying to form a culture of team and togetherness."



Dr. Steve Blumenshine, second from right, celebrates one of his children's college graduations from Cal Poly San Luis Obispo in 2022. Back row from left, his children Dixie, Gemma and Amethyst, and his spouse Nadine in front.

Steve Blumenshine, Ph.D.

Job: Interim Executive Director, California State University Water Advocacy for Education and Research (CSU-WATER) (started July 2022)

SCCWRP role: Research partner on water-related projects

Prior jobs: Professor of Biology, Fresno State (2001-2022); Research and Education Division Director, California Water Institute, Fresno State University (2021-2022); Assistant Professor of Biological Sciences, Arkansas State University (1999-2001)

Education: Ph.D. Biological Sciences, University of Notre Dame (1997); M.S. Environmental Biology, George Mason University (1992); B.S. Zoology and Environmental Studies, University of Wisconsin, Madison (1987)

Residence: Clovis, California

Hometown: Arlington Heights, Illinois

Family: Spouse Nadine, a caterer and LGBT nonprofit director; adult children Dixie, a medical school student, Gemma, an equine critical care specialist, and Amethyst, a community college student; dog Missy, a Staffordshire terrier

Hobbies: Cross-country skiing; playing racquetball and tennis; watching football; cooking

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Since 2001, Blumenshine has worked as a biology professor at Fresno State, teaching and running a 10-member research group that has been examining how to restore a self-sustaining Chinook salmon population in the San Joaquin River in the Central Valley. Blumenshine is still running this research group, but he formally stepped down from his Fresno State faculty position last year and is hoping to wind down his lab as well.

"My life is very different now – every day is different," he said. "It's been nice to get away from that cycle: wash, rinse, repeat."

Blumenshine's first act as CSU-WATER's interim head was rebranding the group, formerly known as Water Resources & Policy Initiatives. The new name reflects the group's broader focus on strengthening CSU water research and education, in addition to policy. The group will resolve the permanent Executive Director position in the coming months.

In his spare time, Blumenshine enjoys multiple sports – including cross-country skiing, racquetball and tennis – and cooking. Among his specialties are chicken burritos and smoked meats.

SCCWRP STAFF SPOTLIGHT

Scientist's career shaped by chance interaction

Dr. Adriana González-Fernández was working as a beach water-quality specialist in her native Costa Rica when she began an interaction with a U.S. postdoc in 2016 that would change the trajectory of her career.



Dr. Adriana González-Fernández

The postdoc, Dr. Erin Symonds of the University of South Florida (USF), came to González-Fernández's research institute for help executing a multi-year study quantifying pathogens at a polluted tropical beach and estimating illness risks.

As González-Fernández began interacting with Symonds, she realized how much more she still wanted to learn about beach water quality. Shortly thereafter, she decided to enroll a Ph.D. program in the USF laboratory of Dr. Valerie Harwood, a close SCCWRP collaborator.

"Before I started interacting with Dr. Symonds, I wasn't even planning to get a Ph.D.," González-Fernández said. "I just happened to be in the right place at the right time."

González-Fernández, who earned her Ph.D. in Integrative Biology from USF in December, will start in February as a Scientist in the SCCWRP Microbiology Department. The position will enable her to continue her work on beach water-quality issues in the public sector; her pre-Ph.D. job in Costa Rica from 2015 to 2017 also was with a government agency.



Dr. Adriana González-Fernández, center, at home with her family in San José, Costa Rica. From left, brother Daniel, father Edgar, brother Mauricio, mother Ana Lorena and three dogs, Tsuki, Tara and Lucas.

Adriana González-Fernández, Ph.D.

Job: Scientist, SCCWRP Microbiology Department (starting February 2023)

Prior jobs: Visiting Scientist, Nicoya Peninsula Waterkeeper (2022-2023); Graduate Student Researcher, University of South Florida (2017-2022); Beach Water Quality Specialist, Instituto Costarricense de Acueductos y Alcantarillados (2015-2017)

Education: Ph.D. Integrative Biology, University of South Florida (2022); B.S. Biology, Universidad Nacional de Costa Rica (2014)

Planned residence: Huntington Beach (temporary)

Hometown and current residence: San José, Costa Rica

Hobbies: Exploring, hiking

Among her first SCCWRP projects will be supporting an ongoing study examining the appropriateness of a bacterial water-quality numeric objective intended to protect the health of people who consume shellfish from Newport Bay in Orange County.

"I didn't really want to go into academia – I've always had this passion for the environment, and I like interactions with governments and the ability to change things," González-Fernández said. "SCCWRP is an opportunity I couldn't pass up."

González-Fernández, who grew up in the Costa Rican capital city of San José, initially studied architecture as an undergraduate at the Universidad Nacional de Costa Rica, but later switched her major to biology. After graduating in 2014, she took a job with the Instituto Costarricense de Acueductos y Alcantarillados, and was soon appointed to help coordinate the agency's beach water-quality testing programs.

Later, at USF, González-Fernández's dissertation focused on beach water-quality challenges at Costa Rica's Jaco Beach – the same project she conceptualized when USF began interacting with her agency in Costa Rica in 2016. González-Fernández's research helped provide a baseline of data about pollution levels and illness risks at the popular surfing beach.

Among her findings was that illness risks are higher during dry weather than dry weather at the beach – presumably due to a combination of increased visitation rates and pathogens becoming more concentrated in dry weather than wet weather.

When she relocates from her family's home in Costa Rica to Orange County in February, she's planning to stay temporarily with a friend in Huntington Beach while she looks for a place of her own. Once she settles in, the top things she wants to see in California are Yosemite National Park and California's giant sequoia trees.

SCCWRP SCENES

Brainstorming research collaborations

A California State University water research group known as Water Advocacy Towards Education and Research (CSU-WATER) hosted a joint workshop with SCCWRP in October to discuss opportunities for enhanced collaboration and engagement on water research issues between CSU faculty and external partners like SCCWRP. Attendees brainstormed ideas for joint projects that could bring CSU researchers closer to SCCWRP in areas ranging from microplastics pollution to water reuse to stormwater BMPs. Multiple white papers are being drafted from the workshop. A key area that workshop participants are exploring is how SCCWRP could take advantage of CSU faculty's expertise in water resources economics.



Left, Dr. Steve Blumenshine, Interim Executive Director of CSU-WATER, discusses his organization's goal of improving collaboration on water research issues across CSU's 23 campuses – as well as with SCCWRP and other partners – during a workshop in October at SCCWRP. Below, SCCWRP's Dr. Leah Thornton shares an overview of SCCWRP's microplastics research during the workshop.

