

# SCCWRP Director's Report



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FALL 2022 ISSUE

## Workshop works to transition eDNA methods to managers

More than 300 researchers and environmental managers gathered at SCCWRP and online during a national scientific workshop in September to coordinate and advance strategies for transitioning DNA-based methods for identifying aquatic organisms from pilot-scale studies to broad-scale adoption by the end-user management community.

The [2nd National Workshop on Marine Environmental DNA](#), hosted by SCCWRP, showcased for managers that identifying aquatic organisms by the DNA they shed into their environment, known as environmental DNA (eDNA), is a proven technology that is ready for incorporation into routine environmental management programs. The biggest remaining barrier is the lack of coordination among the many researchers and management agencies that are working – largely in siloes – to standardize eDNA sampling, processing and analysis protocols.

During breakout sessions at the conference, attendees identified the need to develop a coordinated national strategy

to improve standardization and harmonization of eDNA methods across agencies and monitoring programs. Attendees also discussed the need to make strategic investments in building more DNA reference libraries for key biological communities.

California's work in recent years to advance eDNA-based monitoring – an effort led by the California Water Quality Monitoring Council's [Molecular Methods Workgroup](#) – is expected to serve as a template and a guide for developing a national eDNA implementation strategy. SCCWRP's Dr. Susanna Theroux, who co-organized the conference, leads the California Molecular Methods Workgroup.

eDNA-based monitoring has the potential to serve as a cost-effective complement and/or alternative to traditional morphology-based monitoring, where specific types of aquatic organisms are sampled and identified to gain insights into biodiversity and ecosystem health. Managers can use eDNA-based methods

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**Cover photo:** SCCWRP's Dr. Susanna Theroux delivers a presentation during the 2nd National Workshop on Marine Environmental DNA, hosted by SCCWRP in September to help transition eDNA-based methods for identifying aquatic organisms to broad-scale, nationwide adoption.

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### Calendar

**Thursday, November 3**  
CTAG quarterly meeting  
(Remote participation only)

**Friday, December 2**  
Commission meeting  
(Remote participation only)

to monitor a broader range of organisms – from endangered species to invasive species – with greater speed and accuracy than traditional approaches.

The workshop – which attracted more than 100 attendees in person and 200 more online – included attendance by dozens of federal, State and local management agencies, as well as the White House, which kicked off the workshop with [welcome remarks](#) by Dr. Jane Lubchenco, Deputy Director for Climate and Environment at the White House's Office of Science and Technology Policy.

The workshop is a follow-up to the [1st National Workshop on Marine Environmental DNA](#), held in 2018 in New York. Since that time, eDNA-based monitoring has evolved from a series of experimental, pilot-scale studies to a rigorously vetted science with potentially wide-ranging applications. Presenters at the SCCWRP workshop highlighted efforts to incorporate eDNA monitoring into broadscale fisheries stock assessments, marine mammal surveys and harmful algal bloom monitoring programs, among others.

Two SCCWRP member agencies – the State Water Resources Control Board and the City of San Diego – were among the participants in a roundtable panel discussion; they discussed the state of eDNA implementation within their agencies and remaining barriers and challenges.



Courtesy of Austen Thomas

**Attendees at the 2nd National Workshop on Marine Environmental DNA learn about field sampling methods for environmental DNA (eDNA) during a hands-on demonstration in a SCCWRP conference room during the September workshop. The national scientific workshop focused on identifying strategies and solutions for transitioning eDNA methods to routine management adoption and use.**

The conference consisted of two days of public lectures, trainings and demonstrations, followed by two days of breakout sessions in which invited participants began discussing strategies and solutions for overcoming method adoption issues.

Within a year, attendees anticipate publishing a special issue of the journal *Environmental DNA* that articulates a

coordinated strategy and roadmap for expeditiously building management capacity to incorporate eDNA-based methods into aquatic monitoring programs nationwide.

All recordings and presentation materials from the conference are available on the [workshop's website](#). For more information, contact Dr. [Susanna Theroux](#).

## Study examines how marine mammals are affected by summer HABs toxin exposure

SCCWRP and its partners have launched a yearlong study to document the severity of a harmful algal blooms (HABs) event that sickened hundreds of sea lions and other marine mammals in August and September – an effort that will help researchers better understand and predict the ecological consequences of these seasonally disruptive blooms.

The study, which featured an intensive, six-week offshore sampling effort that wrapped up in mid-September, will focus on domoic acid, a neurotoxin produced by a ubiquitous HAB organism known as *Pseudo-nitzschia*. Marine mammals exposed to elevated levels of domoic acid can experience seizures, disorientation and even death.

During the investigation, researchers will explore a potential link between the offshore domoic acid data and more than 250 marine mammals that were reported stranded on Southern California beaches in August and September. The project's goal is to refine a set of modeling tools that can predict the locations and severity of neurotoxin-producing blooms, as well as



the likelihood of marine mammals becoming stranded on the beach as a result of neurotoxin exposure.

During major bloom events, marine mammal rescue centers – which are mostly volunteer-driven operations – struggle to keep up with dramatic spikes in marine mammal strandings on beaches across Central and Southern California. Generally, about 40%-60% of all stranded mammals can recover if rescue teams are able to administer appropriate anti-seizure

medications and/or get them moved from populated beaches to local rehabilitation centers.

*Pseudo-nitzschia* and other HABs organisms are becoming increasingly commonplace and increasing in intensity in lockstep with climate change. Researchers are working to document the magnitude of the problem – including the extent to which marine mammals are adversely affected – and to help managers develop science-informed response and

mitigation strategies.

Researchers last had the opportunity to collect offshore domoic acid data during a major [Pseudo-nitzschia bloom in 2017](#). At the time, water-quality data were paired with strandings data from just one marine mammal rescue center.

The [2022 bloom event response](#) involved four research cruises and strandings data from four marine mammal rescue centers. The marine mammal centers collected urine and other fluid samples from the stranded animals to confirm neurotoxin poisoning and measure domoic acid levels.

Researchers will use these new data sets to improve understanding of how to predict domoic acid-producing bloom events at the earliest possible stages, as well as how the bloom will spread and how vulnerable marine life will be adversely affected.

Marine mammal rescue centers intend to use the predictive tools to better prepare for future seasonal beach strandings, while water-quality managers will use the insights to develop mitigation and management strategies that match the scope and scale of the ecological threat.

The new HABs data collected offshore also will help contextualize existing nearshore data. Much of the HABs data being collected along the coastline have historically occurred in the areas closest to the shoreline. For example, [California's Harmful Algal Bloom Monitoring and Alert Program](#) (HABMAP) has been collecting coastal HABs data for more than a decade via weekly sampling at piers statewide.

For more information, contact Dr. [Jayme Smith](#).



Courtesy of Channel Islands Marine & Wildlife Institute

A rescue crew from the Channel Islands Marine & Wildlife Institute prepares to transport a sea lion stranded on the beach as a result of neurotoxin exposure to a rehabilitation center for treatment. Researchers are exploring a potential link between an offshore, toxin-producing HAB event in late summer 2022 and the strandings of more than 250 marine mammals on Southern California beaches during the same time period.

## SMC study to probe effectiveness of street sweeping for reducing runoff pollution

The Southern California Stormwater Monitoring Coalition (SMC) has launched a three-year study to investigate the

effectiveness of routine street sweeping in removing contaminants that enter storm drains and contribute to runoff pollution.

The project, launched this summer and led by SCCWRP, will use a novel study design to measure how much bacteria, nutrients, trace heavy metals and other common

stormwater contaminants are transported from streets into storm drains during both dry- and wet-weather flows, and if street sweeping is effective in preventing the transport of at least some of this pollution into storm drains.

The study represents the first known field-scale effort to isolate and study just the portion of street pollution that gets removed during routine street sweeping. Past studies have not sufficiently controlled for real-world environmental conditions and other confounding factors, stymieing researchers' ability to quantify the effectiveness of street sweeping with statistical confidence.

Street sweeping is a routine part of stormwater management programs in communities across Southern California; managers rely on street sweeping to remove trash, plant material, sediment and other debris that is unsightly and can clog storm drain systems.

Previous studies of street sweeping have established that conventional stormwater pollutants are present in the material collected by street sweepers, but what stormwater managers don't know is what portion of this pollution remains on the roadway after street sweeping. This information is needed for water-quality improvement modeling and planning, especially as managers work to measure and predict progress toward hitting their long-term water-quality improvement goals.

Under stormwater discharge permits, managers commonly receive a runoff pollution credit for implementing routine street sweeping as part of a broader set of non-structural source-control measures. The SMC study will probe whether this credit – which is based on limited data and best professional judgment – has been appropriately set.

During the study, segments of streets will be isolated in a way that prevents runoff



**Street sweeping is a stormwater management strategy commonly used to prevent trash, bacteria, nutrients, trace heavy metals and other pollutants from entering storm drain systems. The Southern California Stormwater Monitoring Coalition (SMC) is working to quantify the effectiveness of routine street sweeping in removing contaminants that contribute to runoff pollution.**

from buildings, parking lots and other surfaces from mixing with the runoff generated by the street segments. One set of street segments will be swept, while a corresponding set of similar street segments that will serve as the control group will not be swept. A rainfall simulator will be used to create controlled rainfall patterns for both street segments, ensuring results are not confounded by the unpredictable timing, intensity and duration of real-life wet-weather events.

Researchers will compare any differences in pollutant levels generated by the street segments that are swept vs. not swept.

If researchers are able to measure a difference in pollutant levels generated by swept vs. unswept street segments, the

study could be scaled up and incorporated into the SMC's [Regional Stormwater BMP Monitoring Network](#).

Researchers are in the process of identifying candidate sites for the study, which is scheduled to start dry-weather testing in spring 2023 followed by wet-weather testing in winter 2023-2024.

The SMC is receptive to adding more project partners that could help scale up the study, including by expanding the number of pollutants, monitoring sites and/or types of rainfall simulations.

For more information, contact Dr. [Elizabeth Fassman-Beck](#).



# Updates by Thematic Area

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

## BIOASSESSMENT

### Interactive, web-based stream causal assessment tool developed to ID likely causes of degradation

SCCWRP and its partners have developed a user-friendly, web-based tool to help managers rapidly evaluate the likely vs. unlikely causes of degraded biological condition in streams in the San Gabriel River watershed.

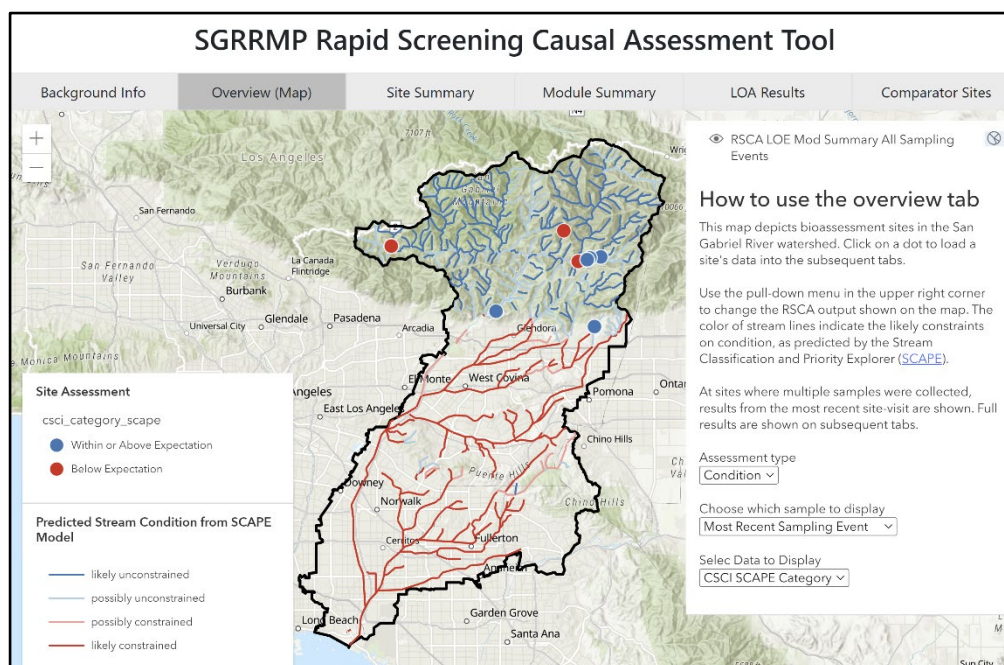
The [web interface for the Rapid Screening Causal Assessment \(RSCA\) tool](#) – completed in October – is designed to speed up the traditionally time-consuming process of analyzing stream bioassessment data to pinpoint which stressors are responsible for poor stream condition. It builds on previous work in the San Diego and Santa Ana River watersheds.

The screening tool considers a wide range of potential stressors, including habitat degradation, eutrophication, elevated ionic concentration, altered water temperature and altered flows. Screening-level causal assessment analyses for individual stream sites are presented on an interactive, visual dashboard.

Although the screening tool was initially built for application in the San Gabriel River watershed, researchers' goal is to eventually scale it up for use statewide.

### eDNA-based methods being developed to identify endangered, invasive freshwater species

SCCWRP and its partners have begun developing methods for monitoring Southern California endangered and invasive freshwater species by detecting the DNA they shed into their environment, known as environmental DNA (eDNA).



The web interface for the Rapid Screening Causal Assessment (RSCA) tool – developed initially for the San Gabriel River Regional Monitoring Program (SGRRMP) – is intended to help managers rapidly evaluate the likely vs. unlikely causes of degraded biological condition across a watershed. Researchers' goal is to eventually scale up the web tool for use statewide.

The work, launched in spring 2022, involves selecting primers and probes for droplet digital PCR (polymerase chain reaction) technology that target specific species, including the endangered Arroyo chub and threespine stickleback.

Researchers will validate the eDNA findings with data collected through the San Diego Regional Water Quality Control Board's annual stream sampling program. The work follows the successful completion of a 2020 eDNA pilot study.

eDNA-based monitoring of endangered and invasive species has the potential to provide more cost-effective, insightful information about the presence and abundance of certain aquatic species of interest.

### Sediment contamination from oil platform installations to be studied for potential ecological impacts

SCCWRP has begun working to study piles of seafloor debris known as shell mounds that were created during installation of 26 offshore oil platforms in the Santa Barbara Channel decades ago – a sediment quality condition assessment that will shed light on whether contaminants in the shell mounds are adversely affecting marine life.

The three-year project, launched in October, will use passive sampling technology to measure chemical contaminants leaching from the shell

mounds and surrounding sediment. Researchers will determine the viability of passive sampling for assessing shell mound contamination, as shell mounds cannot be sampled via traditional sediment grab or sediment core sampling methods due to their density.

Passive sampling devices measure the portion of contamination in seafloor sediment that dissipates into the water column over time, creating potential exposure routes for sediment-dwelling marine life.

The insights from the study will help inform the ongoing development of plans by federal and State agencies to decommission and potentially remove the 26 Southern California oil platforms in the coming years.

## ECOHYDROLOGY

### Technical foundation drafted for cannabis growers to request stream flow diversions

SCCWRP and its partners have developed the first draft of a 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, presented in August to the project's interagency workgroup, consists of a process to develop in-stream flow criteria using the recently developed [California Environmental Flows Framework](#), as well as a suite of technical 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 whether the individual and cumulative effects of cannabis growers' proposed stream flow diversions will adversely affect the flow regimes 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.

### Statewide environmental flows framework being transitioned to end-user managers

SCCWRP and its partners have begun training the end-user management community on how to use a newly developed statewide framework designed to bring consistency and standardization to how environmental flow targets are set for California streams.

During a half-day workshop at the California Aquatic Bioassessment Workgroup's annual meeting in October, end users learned how to apply the [California Environmental Flows Framework](#) (CEFF) – which was co-developed by SCCWRP – to set scientifically defensible stream flow targets that protect ecosystem health while balancing the many competing demands on these limited flows.

Workshop participants spanned multiple sectors of the water-quality management community, including State and regional agencies, public utilities, academia, NGOs, tribal communities and consulting firms.

Already, CEFF has been used to help inform a range of management decisions, including for wastewater reuse, dry-weather diversions, dam operations and groundwater management.

### Study launched to probe how water temperature affects stream biological health

SCCWRP and its partners have launched a two-year study to improve understanding of how water temperature affects the health of sensitive aquatic life in Southern California streams where treated wastewater effluent is being discharged.

The study, launched in August and focusing on the upper Santa Clara River watershed, is motivated by a new generation of wastewater discharge permits that have lowered the maximum temperature at which receiving water is required to be maintained. Wastewater effluent is typically discharged into streams above the stream's ambient temperature.

The study's goal is to generate insights that can inform management decision-making regarding permissible temperatures for wastewater discharges, groundwater management and stream rehabilitation efforts.

## EUTROPHICATION

### Technical foundation established for protecting sediment-dwellers in estuaries from organic matter

SCCWRP has developed a technical foundation for protecting sediment-dwelling organisms in California estuaries from the harmful effects of exposure to excess organic matter.

The technical work product, described in an [article published in September](#) by the journal *Ecological Indicators*, consists of a set of nitrogen thresholds for estuary sediments that is intended to clarify for managers when the estuary's sediment-dwelling invertebrate communities are likely to be adversely affected by excessive levels of organic matter. Sediment organic matter accumulation, a consequence of eutrophication, occurs primarily as a result of overproduction of algae, which eventually degrades and settles on the seafloor.

Measuring nitrogen levels is a way to estimate the amount of degraded organic matter in sediment. Excess levels of this organic matter can be toxic to aquatic life.

Already, California's coastal Regional Water Quality Control Boards have begun using the sediment nitrogen thresholds to guide development of TMDLs (total maximum daily loads) for nitrogen.

Managers also have used the thresholds to identify locations where high levels of degraded organic matter already exist, so that these areas can be targeted for cleanup.

## CLIMATE CHANGE

### SCCWRP partners with new undergraduate fellowship program to advance climate change research

SCCWRP has partnered with a newly launched California undergraduate fellowship program to train a new generation of students to help solve pressing societal issues.

The [#CaliforniansforAll College Corps Fellowship Program](#) – an initiative of the Office of the Governor launched earlier this year – will initially place two students at SCCWRP from nearby Vanguard University in Costa Mesa.

The initial cohort of Climate Action Fellows will work part time in SCCWRP's Biogeochemistry Department on a range of research projects related to climate change, including harmful algal blooms, ocean acidification and eutrophication. The State-funded program will pay the fellows a stipend to help with college expenses.

Over the next four years, more than 10,000 college students will be placed in fellowship positions across California to tackle issues across three priority areas: climate action, K-12 education, and food security.

featured in a newly developed set of international guidance documents intended to promote adoption of the technology across the European Union and other parts of the world.

The [guidance documents](#) – unveiled during a September workshop hosted by the international Global Water Research Coalition (GWRC) – cover sampling strategies, selection and application of relevant bioanalytical tools, and interpretation and monitoring of trigger levels. SCCWRP's Dr. Alvina Mehinto contributed to the documents as a member of the project's international nine-member advisory group.

SCCWRP also shared with the group the experiences and lessons learned from California, which became the first entity in the world to require the use of bioanalytical screening technology for monitoring recycled water for potable reuse under a 2018 State policy amendment.

Already, the Organization for Economic Co-operation and Development (OECD) has begun discussing how to use the GWRC workshop's products to recommend development of policy around bioanalytical screening technology. During an OECD workshop in October, SCCWRP

was invited to share perspectives from California on regulatory implementation of the tools.

### Effort underway to begin closing gaps in microplastics exposure data

SCCWRP and its partners have begun working to close knowledge gaps in how aquatic life are adversely affected by exposure to microplastics pollution, following the release of a statewide microplastics management strategy that called on researchers to fill these data gaps.

The work kicked off in September with a two-year toxicity and bioaccumulation study examining how fish, oysters and other marine life are affected by exposure to microplastic fibers.

This microplastics exposure study is one of the first to be launched that is specifically designed to address research needs and data gaps identified by the California Ocean Protection Council in its [Statewide Microplastics Strategy](#), published earlier this year.

## CONTAMINANTS OF EMERGING CONCERN

### California's experiences with bioanalytical screening included in new international guidance documents

California's recent experiences incorporating bioanalytical screening technology into recycled-water monitoring programs are prominently



SCCWRP's Dr. Alvina Mehinto transfers cells into assay wells for a bioanalytical screening test. A newly developed set of guidance documents intended to promote international adoption of bioanalytical screening technology prominently incorporates California's recent experiences using the technology for routine recycled-water monitoring applications.



The additional microplastics exposure data will help researchers refine a set of preliminary exposure thresholds that clarify for managers when aquatic organisms may begin to experience adverse biological effects from exposure to microplastics pollution.

## Effort launched to reassess sediment contamination at Palos Verdes Superfund site

SCCWRP has launched a follow-up study examining the state of sediment contamination along the Palos Verdes shelf a decade after completing the Superfund site's last ecological condition assessment in 2012.

The 13-month study, launched in September, involves deploying passive samplers to measure levels of the pesticide DDT and an industrial class of chemicals known as PCBs that are leaching out of surface layers of sediment into the water column above.

Although DDT and PCBs were banned decades ago, millions of pounds of these chemicals were discharged to the 17-square-mile Superfund site in the years prior. The chemicals can continue to exert toxic effects for decades.

Passive sampling devices measure the portion of contamination in seafloor sediment that dissipate into the water column over time, creating potential exposure routes for sediment-dwelling marine life. SCCWRP is using the same passive sampling-based study design that was used during the site's [2012 sediment quality assessment](#).

### STORMWATER BMPs

## Study to quantify benefits of replacing turf being expanded following first phase

SCCWRP and the County of San Diego are moving to the next phase of a study seeking to quantify the runoff water quality benefits of replacing residential

grass with drought-tolerant landscaping, following the successful completion of the study's initial phase.

The study, which the County extended and expanded in October, represents a first-of-its-kind effort to quantify how much runoff can be eliminated by replacing turf and traditional spray irrigation with drought-tolerant landscaping and drip irrigation. The study's first phase – in a residential community in Spring Valley – demonstrated that it is possible to measure reductions in the volumes of runoff from irrigation following turf replacement.

During the next phase, researchers will continue measuring dry-weather irrigation runoff volumes, as well as examine whether turf replacement also can reduce volumes of wet-weather runoff by absorbing more rainfall on site.

Water districts commonly offer property owners rebates and incentives for turf replacements. By assessing the potential of turf replacements to improve runoff water quality, the County of San Diego study will help stormwater management agencies decide whether they also should

expand their turf replacement investments.

### REGIONAL MONITORING

## Estuarine monitoring framework piloted in Baja California, to be applied in California next year

SCCWRP and its partners have completed a pilot effort to assess the ecological health of two Baja California estuaries using a newly developed estuarine monitoring framework that is expected to be applied to California estuaries next year.

The pilot assessment, completed in September, involved field assessments of two Mexican estuaries and was made possible via an international research partnership.

SCCWRP and its partners developed the estuarine monitoring framework last year to bring statewide consistency to estuarine



A field crew works in a San Diego County residential community to quantify the runoff water-quality benefits of replacing turf and traditional spray irrigation with drought-tolerant landscaping and drip irrigation. The study focuses on a site where grass was recently replaced with drought-tolerant landscaping.



monitoring efforts. The framework is expected to be used by the California Ocean Protection Council to report on the health of California's estuarine Marine Protected Areas (MPAs) in 2024, as well as by the Southern California Bight 2023

Regional Monitoring Program to conduct a regional assessment of estuarine health.

In addition to the benefit of being able to test the framework outside California, the more pristine condition of Baja California's

estuaries has provided an additional point of comparison for Southern California estuaries.

## New SCCWRP Publications

### Journal Articles

Brand, M.W., K. Buffington, J.B. Rogers, K. Thorne, [E.D. Stein](#), B.F. Sanders . 2022. [The Multi-Decadal Simulation of Marsh Topography Under Sea Level Rise and Episodic Sediment Loads](#). *Journal of Geophysical Research* 127:1-20.

Howard, M.D.A., [J. Smith](#), D.A. Caron, R.M. Kudela, K. Loftin, K. Hayashi, R. Fadness, S. Fricke, J. Kann, M. Roethler, A. Tatters, [S. Theroux](#). 2022. [Integrative monitoring strategy for marine and freshwater harmful algal blooms and toxins across the freshwater-to-marine continuum](#). *Integrated Environmental Assessment and Management* DOI:10.1002/ieam.4651.

Kenkel, C.D., [J. Smith](#), K.A. Hubbard, C. Chadwick, N. Lorenzen, A.O. Tatters, D.A. Caron. 2022. [Reduced representation sequencing accurately quantifies relative abundance and reveals population-level variation in \*Pseudo-nitzschia\* spp.](#) *Harmful Algae* 118:1-13.

Kotar, S., R. McNeish, C. Murphy-Hagan, V. Renick, C.T. Lee, C. Steele, A. Lusher, C. Moore, E. Minor, J. Schroeder, P. Helm, K. Rickabaugh, H.D. Frond, K. Gesulga, [W. Lao](#), K. Munno, [L.M. Thornton Hampton](#), [S.B. Weisberg](#), [C.S. Wong](#), G. Amarpuri, R.C. Andrews, S.M. Barnett, S. Christiansen W Cowgeri, K. Crampond, F. Du, A.B. Gray, J. Hankett, K. Ho, J. Jaeger, C. Lilley, L. Mai, O. Mina, E. Lee, S. Primpke, S. Singh, J. Skovly, T. Slifko, S. Sukumaran, B. Bavel, J.V. Brocklin, F. Vollnhals, C. Wu, C.M. Rochman. 2022. [Quantitative assessment of visual microscopy as a tool for microplastic research: Recommendations for improving methods and reporting](#). *Chemosphere* 308:1-9.

Kim, S., L.C. Kennedy, M.K. Wolfe, C.S. Criddle, D.H. Duong, A. Topol, B.J. White, R.S. Kantor, K.L. Nelson, [J.A. Steele](#), [K. Langlois](#), [J.F. Griffith](#), A.G. Zimmer-Faust, S.L. McLellan, M.K. Schussman, M. Ammerman, K.R. Wigginton, K.M. Bakker, A.B. Boehm. 2022. [SARS-CoV-2 RNA is enriched by orders of magnitude in primary settled solids relative to liquid wastewater at publicly owned treatment works](#). *Environmental Science Water Research and Technology* 8:757-770.

Moreno, A.R., C. Anderson, R.M. Kudela, M. [Sutula](#), C. Edwards, D. Bianchi. 2022. [Development, calibration, and evaluation of a model of \*Pseudo-nitzschia\* and domoic acid production for regional ocean modeling studies](#). *Harmful Algae* 118:102296.

[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.

### Journal Articles (Accepted)

Zimmer-Faust, A.G., J.F. [Griffith](#), J.A. [Steele](#), B. Santos, Y. Cao, L. Asato, T. Chiem, S. Choi, A. Diaz, J. Guzman, D. Laak, M. Padilla, J. Quach-Cu, V. Ruiz, M. Woo, S.B. [Weisberg](#). In press. Relationship between coliphage and Enterococcus at Southern California beaches and implications for beach water quality management. *Journal of Water Research*.

### Book Chapters

[Stein, E.D.](#), M.E. McClain, A. Sengupta, T.E. Grantham, J. Zimmerman, S.M. Yarnell . 2022. [Allocations and Environmental Flows](#). in: J. Rouillard, C. Babbitt, E. Challies, J.D. Rinaudo (eds.), *Water Resources Allocation and*

*Agriculture: Transitioning from Open to Regulated Access* pp. 49-59. IWA Publishing. London, UK.

### Technical Reports

[Fassman-Beck, E.](#), [K.C. Schiff](#). 2022. [SMC Regional BMP Monitoring Network Work Plan 2022-2023 - Version 1.0](#). Technical Report 1270. Southern California Coastal Water Research Project. Costa Mesa, CA.

James, A., T.-L. Nadeau, K.M. Fritz, B. Topping, R.F. Edgerton, J. Kelso, R. [Mazor](#). 2022. [User Manual for a Beta Streamflow Duration Assessment Method for the Great Plains of the United States](#). Version 1.0. EPA-840-B-22009.

[Schiff, K.C.](#), E. Darin, [E. Fassman-Beck](#), G. Shusterman, L. Flores, T. Hale, C. Beegan. 2022. [Monitoring Guidance To Support Adaptive Watershed Management](#). Technical Report 1257. Southern California Coastal Water Research Project. Costa Mesa, CA.

Winston, R.J., [E. Fassman-Beck](#). 2022. [Permeable Pavement Maintenance: A Review of Literature to Assess Clogging, Predict Maintenance Frequency, and Compare Maintenance Techniques](#). Technical Report 1280. Southern California Coastal Water Research Project. Costa Mesa, CA.

# Quarter in Review

## Conference Presentations

Du, B., W. Lao, C.S. Wong, K. McLaughlin, K. Schiff. Scrutinizing surficial sediment along a 600-km-long urban coastal zone: Occurrence and risk assessment of fipronil and its three degradates. Canadian Ecotoxicology Workshop. October 2-5, 2022. Winnipeg, Canada.

Irving, K. Vulnerability of Arroyo Toad to hydrologic change. California Bioassessment Workgroup Annual Meeting. October 12, 2022. Sacramento, CA.

Irving, K. Hybrid species distribution models inform flow management in a world of water scarcity. International Society of Limnology 36<sup>th</sup> Congress. August 8, 2022. Berlin, Germany.

Smith, J., D. Shultz, K. Langlois, E. Duncan, S. Theroux. Molecular Approaches to Identify and Monitor Toxicogenic Cyanobacteria in California Lakes. Joint California Aquatic Bioassessment Workgroup Meeting & California Chapter Society for Freshwater Science Meeting. October 11-12, 2022. Sacramento, CA.

Taniguchi-Quan, K. Workshop on the California Environmental Flows Framework. California Aquatic Bioassessment Workgroup Annual Meeting. October 11, 2022. Sacramento, CA.

Schiff, K. Monitoring to Support Adaptive Watershed Management. California Stormwater Quality Association Annual Meeting. October 25-27, 2022. Palm Springs, CA.

Stein, E. Prioritizing Stream Protection, Restoration and Management Actions Using Landscape Modeling and Spatial Analysis. California Bioassessment Workgroup Annual Meeting. October 12, 2022. Sacramento, CA.

Theroux, S. eDNA Training Day (session co-organizer). 2<sup>nd</sup> National Workshop on Marine eDNA. September 12-13, 2022. Costa Mesa, CA.

Theroux, S. DNA-based approached for biomonitoring: what's next? California Aquatic Bioassessment Workgroup Annual Meeting. October 11, 2022. Sacramento, CA.

Theroux, S. eDNA biomonitoring applications (session co-organizer). California Bioassessment Workgroup Annual Meeting. October 11, 2022. Sacramento, CA.

Wong, C.S. International interlaboratory intercalibration study for microplastics in environmental media. Canadian Ecotoxicology Workshop. October 2-5, 2022. Winnipeg, Canada.

Wong, C.S. Microplastics in California wastewater treatment plants. California Association of Sanitation Agencies Annual Conference. August 10-12, 2022. Olympic Valley, CA.

Wong, C.S. Measuring microplastics: Best practices, quality data, sound conclusions (short course). Canadian Ecotoxicology Workshop. October 2-5, 2022. Winnipeg, Canada.

Walker, J. Improving Monitoring and Assessment of Resilience for Dune Habitats in California (session co-organizer). American Shore & Beach Preservation Association National Coastal Conference. September 15, 2022. Long Beach, CA.

## Other Presentations

Mehinto, A.C. Critical elements to facilitate endorsement and implementation of bioassays in regulatory policies. Organization for Economic Co-operation and Development Workshop. October 19, 2022. Via webinar.

Schiff, K. Workshop Panel. State Water Resources Control Board Bacteria Summit. October 14-16, 2022. Sacramento, CA.

Schiff, K. Tracking Human Sources of Fecal Pollution ins San Diego. South Orange County Water Quality Improvement Committee. September 26, 2022. Via webinar.

Schiff, K. Assessing ecological impacts from urban stormwater to rivers, streams and estuaries (Keynote Speaker). National Science Foundation Stormwater Workshop. University of Minnesota. October 13, 2022. Minneapolis, MN.

Schiff, K. Research at SCCWRP. Ventura County Watershed Protection Division Watershed Management Committee. October 17, 2022. Via webinar.

Sutula, M. How Can Modeling Support Evaluation of OAH Water Quality Impacts. West Coast Ocean Acidification and Hypoxia Symposium. October 14, 2022. Via webinar.

Taniguchi-Quan, K. South Orange County Flow Ecology Study Napa County Groundwater Sustainability Agency Technical Advisory Group. September 8, 2022. Via webinar.

Taniguchi-Quan, K. Los Angeles River Flows Study. GreenLA Water Coalition. September 22, 2022. Via webinar.

Thornton Hampton, L.M. Microplastic Research to Inform Management Strategies in California. San Diego Environmental Professionals. October 4, 2022. San Diego, CA.

Thornton Hampton, L.M. ToMEx: Toxicity of Microplastics Explorer. University of California, Riverside. October 5, 2022. Riverside, CA.

Von Mayrhauser, M., T. Grantham, A. Ruh, R. Mazar. Changing river flows and novel ecosystems in the Los Angeles and Santa Clara Rivers. League of Women Voters Beach Cities Water Infrastructure Group. September 8, 2022. Via webinar.

Weisberg, S. Outcome of the Second National Marine eDNA Workshop. White House Office of Science and Technology Policy. October 5, 2022. Via webinar.



# SCCWRP Personnel Notes

## Introducing SCCWRP's newest department

SCCWRP in November will officially create an Engineering Department that will focus on implementing SCCWRP's research vision for improving the design, implementation and maintenance of stormwater BMPs (best management practices) across Southern California.

Dr. **Elizabeth Fassman-Beck**, a SCCWRP Principal Engineer who has led SCCWRP's Stormwater BMPs thematic research area since 2019, is being promoted to Department Head.

SCCWRP's decision to create an Engineering Department is the culmination of years of strategic, increasing investments in the Stormwater BMPs research theme, which was developed in 2019. Other members of the department include: Dr. **Edward Tiernan**, an Engineer who joined SCCWRP in September, and **Cody Fees**, who was promoted to a Research Technician in September after working at SCCWRP for the past eight years as a part-time Laboratory Assistant.

## New Faces



Dr. **Edward Tiernan**, who just earned a Ph.D. in civil engineering from the University of Texas at Austin, joined SCCWRP in September as an Engineer in the Engineering Department. He will apply

his watershed modeling skills to understand and improve effectiveness of stormwater BMPs (best management practices).

## Scientific Leadership

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

Dr. **Susanna Theroux** co-organized and co-led the 2nd National Workshop on Marine eDNA, held September 12-13, 2022 at SCCWRP.

Dr. **Jan Walker** has been appointed to the master's thesis committee of David Boehmer at California State University, Long Beach.

Dr. **Charles Wong** has been appointed to the master's thesis committee of Amy Fethers at California State University, Bakersfield.



Dr. **Alle Lie**, who just completed a postdoctoral research position at the University of Southern California, will join SCCWRP in early November as a Senior

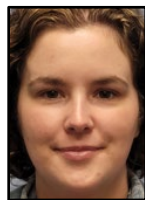
Research Technician in the Biogeochemistry Department.

## Promotions



Dr. **Elizabeth Fassman-Beck**, who has worked as a Principal Engineer at SCCWRP since 2019, is being promoted in November to Department Head of the newly created

Engineering Department.



**Kelsey Cherland**, who has been working since March as a part-time Laboratory Assistant for SCCWRP's IT and data management team, was promoted in September to a full-time

Data Analyst. She just earned a M.S. in statistics from California State University, Fullerton.

## Departures

**Kelcey Chung**, a Senior Research Technician in the Biogeochemistry Department who has worked at SCCWRP since 2019, left SCCWRP in October to take a position at the Scripps Institution of Oceanography.

SCCWRP COMMISSIONER SPOTLIGHT

# Watershed manager shares data to build trust

As head of one of Orange County's two watershed management areas, Grant Sharp's job revolves around connecting and coordinating numerous water resources agencies and programs.



Grant Sharp

And the most effective strategy he's found to build bridges of trust and understanding among these groups is by freely sharing data and information.

"When we're at our best, we're providing information that's helping others to manage their programs and to decide what strategies they might want to implement," said Sharp, Manager for the South Orange County Watershed Management Area at Orange County Public Works. "That's when we're making a difference – and that's where I get the greatest amount of satisfaction and joy."

Sharp, who has served in his current role since 2018, was named in June as a SCCWRP Alternate Commissioner and CTAG Representative. He replaces Chris Crompton, who served as an Alternate Commissioner for 14 years and on CTAG for 17 years. Sharp oversees a team of 11 people and a \$3 million annual budget, plus co-manages a \$7.1 million annual cost-share program for the County's stormwater program permittees.

Sharp, who has been with OC Public Works for the past 22 years, started as an Environmental Resources Specialist in 2001. A year later, he was promoted to a stormwater program manager. In 2013, he became Manager of the Environmental Monitoring Division, assuming responsibility for water quality and hydrologic monitoring as well as data management and assessment.

Along the way, he has witnessed a radical transformation in how monitoring data can be collected, analyzed, and used to inform decisions. Managers can collect more data than ever before, and



Grant Sharp, right, enjoys a hike near Rainbow Falls with his family, from left, daughter Analeigh, son P.J., dog Molly, and wife Julie during a 2020 trip to Mammoth Lakes.

## Grant Sharp

**Job:** Manager, South Orange County Watershed Management Area, Orange County Public Works

**SCCWRP role:** Alternate Commissioner and CTAG Representative (started June 2022)

**Prior jobs:** 22 years at OCPW: Manager, Environmental Monitoring Division (2013-2018), County of Orange Stormwater Program Manager (2002-2013), Environmental Resources Specialist (2001-2002); Environmental Management Contractor, Pt. Mugu Naval Air Weapons Station (1999-2001); Laboratory Technician, North Island Naval Air Station Environmental Chemistry Lab (1998-1999)

**Education:** B.A. environmental studies, University of California, Santa Barbara (1994)

**Residence:** San Clemente

**Family:** Wife Julie, a writer and stay-at-home mom; son P.J., 15, and daughter Analeigh, 13; dog Molly, a shepherd collie mix

**Hometown:** San Diego

**Hobbies:** Surfing; paddleboarding; spending time with family

use powerful analysis tools to increase the data's utility, Sharp said.

"My priority now is figuring out how we make the best use of big data," Sharp said.

Sharp grew up in San Diego and fell in love with the ocean at an early age. He majored in environmental studies at UC Santa Barbara, and a few years later, landed a position in OC Public Works' stormwater monitoring program.

"Every day I consider myself very fortunate to be surrounded by so many talented and capable people," Sharp said. "I love my job and still have to pinch myself to make sure I am not dreaming."

Sharp is looking forward to being part of both the SCCWRP Commission and CTAG. He has been interacting with SCCWRP for the past two decades, relying on the tools, guidance and insights produced by SCCWRP.

"Whenever we have a tough problem to solve, often we don't have to look any further than the resources at SCCWRP," Sharp said.

In his spare time, Sharp enjoys frequenting the beaches of San Clemente with his family. Sharp also is an avid surfer, hitting the waves two to three times a week, typically after work. His favorite surfing spot is Baja Malibu in northern Baja, Mexico.



## CTAG SPOTLIGHT

# Scientist jumps from research to management

As a college undergraduate, Dr. Eric Dubinsky knew he wanted a career in something related to environment management. But he was torn between becoming a researcher or a policymaker.



Dr. Eric Dubinsky

For much of his career, Dubinsky chose research. He worked in environmental consulting and laboratory research jobs for four years, earned his Ph.D. in environmental science, policy and management at UC Berkeley, and worked for 12 years as a Project Scientist for Lawrence Berkeley National Laboratory, where he studied how to use microbial communities to better understand and monitor ecosystem health.

In 2020, Dubinsky decided to pivot his career to environmental management, taking a position as a Life Scientist with the U.S. Environmental Protection Agency, Region 9 in San Francisco.

"I'd lie to say I don't miss the process of research and discovery, but I always had a desire to come back to policy," Dubinsky said. "I really like where I'm at now in the chain – creating a bridge between federal, state and local Clean Water Act activities."

Dubinsky, who works in the EPA Region 9 Water Division's Standards and Assessment section, started in July as a CTAG Representative, replacing Terry Fleming. Fleming retired after serving on CTAG for 25 years.

Dubinsky serves as Region 9 coordinator for the EPA's BEACH (Beaches Environmental and Coastal Health Act) Act Grant Program that provides federal funding to support clean beaches, as well as coordinator for California's TMDL (total maximum daily load) regulatory targets, among other duties.



Dr. Eric Dubinsky hikes along the North Rim of Yosemite National Park during a backpacking trip in October.

## Eric Dubinsky, Ph.D.

**Job:** Life Scientist, U.S. Environmental Protection Agency, Region 9 (since 2020)

**SCCWRP role:** CTAG Representative (started July 2022)

**Prior jobs:** Project Scientist, Lawrence Berkeley National Laboratory (2008-2020); Graduate Student Researcher and Instructor, UC Berkeley (2001-2007); Staff Research Associate II, UC Berkeley (1999-2001); Biologist, Tetra Tech (1997-1999)

**Education:** Ph.D. environmental science, policy and management, University of California, Berkeley (2008); M.A. biology and B.A. biology, University of Pennsylvania (1997)

**Residence:** Berkeley, California

**Family:** Wife Heather; son Miles, 14, and daughter Alex, 11

**Hometown:** Cleveland, Ohio

**Hobbies:** Kayaking; skiing and snowboarding; road trips; coaching son's mountain biking team

For Dubinsky, the transition from research to management felt seamless. At Lawrence Berkeley, his research brought him into close contact with managers, including a project that examined microbial communities in the Gulf of Mexico in the wake of the 2010 Deepwater Horizon oil spill, and another project to track fecal contamination in Northern California watersheds using microbial source tracking methods.

"It was really inspiring to me to see how the science I was doing was actively informing management responses," Dubinsky said.

Dubinsky has been interacting with SCCWRP since his postdoc, when he participated in a seminal, SCCWRP-facilitated study published in 2013 comparing the performance of multiple types of microbial source tracking technologies for identifying the sources of fecal contamination. Dubinsky contributed a method focused around DNA analysis of microbial communities to track contamination.

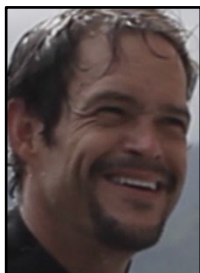
A native of Cleveland, Ohio, Dubinsky grew up in the city's rural outskirts and gained an appreciation for the environment from spending much of his free time outdoors. He earned both his M.A. and B.A. in biology from the University of Pennsylvania in 1997.

In his free time, Dubinsky remains an avid outdoor adventurer, routinely taking roadtrips with his two children to various California nature spots. He also volunteers as a coach for his son's mountain-biking team at his Berkeley middle school.

SCCWRP PARTNER SPOTLIGHT

# Researcher's love of biodiversity shaped as child

As a child growing up in Pittsburgh, one of Dr. Chris Meyer's fondest memories was visiting the Carnegie Museum of Natural History. He would beg his mother to drop him off so he could spend hours wandering its halls. His appetite for studying the natural world was so insatiable that when his mother went shopping, he'd ask to spend time at the local pet store studying the aquaria.



Dr. Chris Meyer

In college, Meyer learned that he could parlay his passion for collecting and sorting into a career as a biodiversity researcher, beginning with a yearlong Watson Fellowship that took him from Fiji to eastern Africa to study a ubiquitous type of seashell known as cowries.

By the time he returned to school to earn his master's and Ph.D. at UC Berkeley in paleontology and integrative biology, respectively, the field of biodiversity monitoring was undergoing a transformation: The laborious

process of identifying organisms manually under microscopes was giving way to novel, DNA sequencing-based taxonomic identification methods.

"I saw that DNA had the potential to transform and democratize the way we document diversity," said Meyer, now a Research Zoologist and Curator for the Smithsonian Institution's National Museum of Natural History in Washington, D.C. "It fascinated me that anyone anywhere in the world could identify creatures using the same genomics-based approach."

For the past decade, Meyer has been a key SCCWRP research collaborator in ongoing efforts to facilitate the transfer of DNA-based biodiversity monitoring methods into routine use by managers and researchers worldwide.



Dr. Chris Meyer, left, ice-skates with, from left, son Fox, son Elliot and wife Sarah during a 2020 family vacation at Ross Lake in Washington state.

## Christopher Meyer, Ph.D.

**Job:** Research Zoologist and Curator, Smithsonian Institution National Museum of Natural History (since 2007)

**SCCWRP role:** Research partner on efforts to monitor biodiversity via DNA sequencing methods

**Prior jobs:** Moorea Biocode Project Manager, UC Berkeley (2006-2007); Postdoctoral Research Associate, University of Washington (2005-2006); Postdoctoral Research Associate, University of Florida (2000-2005); Postdoctoral Research Fellow, University of Guam (1998-2000)

**Education:** Ph.D. integrative biology, University of California, Berkeley (1998); M.A. paleontology, UC Berkeley (1992); B.S. biology and geology, Colgate University (1988)

**Residence:** Washington, D.C.

**Hometown:** Pittsburgh, Pennsylvania

**Family:** Wife Sarah, a Smithsonian research associate; sons Fox, 24, a magazine editor in New Zealand, and Elliot, 17

**Hobbies:** Playing in a remote darts league; speed golfing and regular golfing; swimming and diving; fishing

Most recently, Meyer helped SCCWRP organize a multi-day national scientific workshop in September examining how to promote management adoption of environmental DNA, or eDNA, as a routine biomonitoring tool. eDNA is the DNA that aquatic organisms shed into their environment.

At the Smithsonian's National Museum of Natural History, where Meyer has worked since 2007, Meyer is part of a curation and research team that oversees the U.S.'s definitive collections of a range of aquatic organisms, including the world's largest marine invertebrate collection. Meyer's job duties span research, mentoring, lecturing, curating museum exhibits, making resource planning decisions, and building external partnerships with organizations like SCCWRP.

"I just love the challenge," said Meyer, who lives within walking distance of the Smithsonian. "The museum is a really fun, creative place for addressing all kinds of interesting questions."

When he's not working, Meyer loves competing and playing sports – "anything but basketball," he said. During the COVID-19 pandemic, he formed a remote darts league that allows each player to compete from their own home.



## SCCWRP STAFF SPOTLIGHT

# Engineer rewrites code for stormwater model

At the time that Dr. Edward Tiernan started his master's in 2016, he committed to a five-year research project for the U.S. Environmental Protection Agency that would span both his master's and Ph.D. He made the commitment even knowing he still needed to learn the core technical skill sets to complete his project.



**Dr. Edward Tiernan**

Tiernan's ambitious project focused on rewriting and modernizing the computer engine that powers a commonly used watershed modeling tool known as Storm Water Management Model (SWMM), originally developed by the EPA in the late 1960s.

Because he had virtually no computer programming experience, he spent his master's at the University of Texas at Austin teaching himself the skills he needed, including flow routing and network partitioning. Then, he devoted his Ph.D. program at UT Austin to

building a beta version of the revamped tool, known as SWMM5+.

"The project had so many moving parts that I could have gotten my Ph.D. without ever actually producing the beta version," said Tiernan, who managed a five-member team of students and postdocs. "But I was just very motivated by the challenge of feeling in over my head – it was sink or swim."

Tiernan released the SWMM5+ beta version in August, the same month he graduated with his Ph.D. in civil engineering. The main advantage of the rebuilt tool – which still needs to undergo EPA and peer review – is that it can produce modeling outputs up to 10 times faster than the existing tool. For a data-intensive modeling run, this improvement translates to results being available in a few hours instead of a few days.

Tiernan joined SCCWRP in September as an Engineer in the newly created Engineering Department. He will focus on applying his



**Dr. Edward Tiernan hikes near a waterfall during a 2018 trip to Sauðárkrúkur, Iceland.**

## Edward Tiernan, Ph.D.

**Job:** Engineer, SCCWRP Engineering Department (started September 2022)

**Prior jobs:** Graduate student modeler/programmer, University of Texas, Austin (2016-2022); Hyper-resolution Hydrologic Modeler, National Water Center (2017); Energy Fellow, Lawrence Berkeley National Laboratory (2019); Scholastic Basketball Official, Cardinal Basketball Officials Association/Austin Basketball Officials Association (2007-2020)

**Education:** Ph.D. civil engineering, University of Texas at Austin (2022); M.S.E. environmental and water resources engineering, University of Texas at Austin (2018); B.S. civil and environmental engineering, University of Virginia (2016)

**Residence:** Costa Mesa

**Family:** Parents Ed and Kathy; sister Murielle, a professional soccer player in Iceland

**Hometown:** Ashburn, Virginia

**Hobbies:** Running; listening to podcasts; eating fresh fruit

watershed modeling skills to understand and improve effectiveness of stormwater BMPs (best management practices).

"The purity of basic research has appeal," said Tiernan, who also considered pursuing a career in academia, "but the concept of applied research and getting stuff done feels more important and speaks to the type of citizen I want to be."

Tiernan's first SCCWRP project is helping with an ongoing County of San Diego study quantifying the benefits of replacing turf with drought-tolerant landscaping to reduce runoff. The field-oriented project has enabled him to work closely with a SCCWRP member agency.

"It's been a good introduction for me to the way that our projects are driven by member agency needs," Tiernan said.

Originally from Ashburn, Virginia near Washington, D.C., Tiernan was drawn to studying water during an undergraduate engineering seminar at the University of Virginia; water was presented as a vector for the flow of energy – a concept that fascinated him.

In early October, Tiernan relocated from his home in Austin, Texas to Costa Mesa with his girlfriend, Keri. He's looking forward to being able to run year-round in Southern California, especially at the beach – something that wasn't possible in Austin. He also enjoys listening to podcasts on a variety of topics, including health, physics and philosophy.

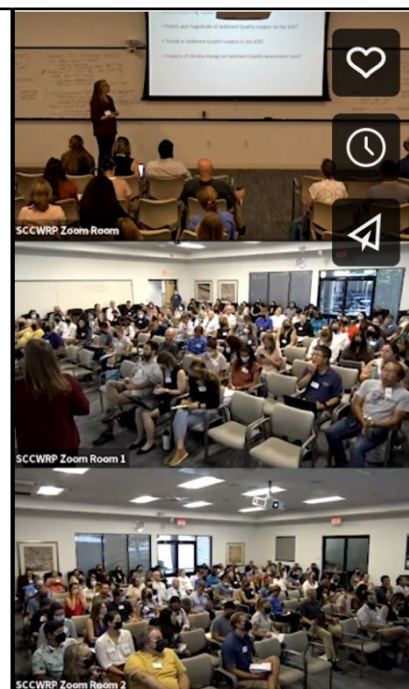
SCCWRP SCENES

# Kicking off Bight monitoring's seventh cycle

The Southern California Bight Regional Monitoring Program kicked off planning for its seventh monitoring cycle, known as Bight '23, during an all-day meeting in September at SCCWRP. During the meeting, which SCCWRP hosted and organized, participants from nearly 80 organizations discussed moving forward with up to seven study elements examining how human activities have affected the ecological health of Southern California's coastal waters. Over the next few months, participants will finalize the study elements; additional interested parties are welcome to join these planning conversations. Field sampling for many of the study elements, including the signature Sediment Quality element, will begin July 1, 2023.

## Monitoring Questions

- Extent and magnitude of Sediment Quality impacts on the SCB?
- Trends in Sediment Quality impacts in the SCB?
- Impacts of climate change on Sediment Quality assessment tools?



The kickoff meeting for the Southern California Bight 2023 Regional Monitoring Program was conducted at SCCWRP, with about 100 attendees showing up in person and about 100 more joining online. Above, a screenshot from the meeting's live webcast, featuring SCCWRP's Dr. Karen McLaughlin discussing the program's Sediment Quality study element in a SCCWRP conference room. The meeting was broadcast from multiple webcams in the room.