SCCWRP Director's Report

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WINTER 2025 ISSUE

Method developed to measure street sweeping's effectiveness

SCCWRP and its partners have developed a novel method for quantifying the effectiveness of routine street sweeping in removing contaminants that would otherwise enter storm drains and contribute to runoff pollution – a study that moves managers one step closer to being able to understand street sweeping's capacity to help protect runoff water quality.

The method, described in a SCCWRP technical report published in January, provides a feasible path forward for pursuing follow-up investigations that will shed light on what role street sweeping plays in reducing runoff pollution – and how managers might be able to optimize their routine street sweeping regimes.

As part of the method's development, which took place over the course of a three-year Southern California Stormwater Monitoring Coalition (SMC) project, researchers tested the method at a single site, generating preliminary data suggesting street sweeping may provide more benefits for improving runoff water quality than traditionally assumed. Historically, nonstructural BMPs like street sweeping have been assumed to reduce contamination in runoff by 5-10%.

While the method development study was not designed to identify alternate values for the pollution removal efficiency of street sweeping, the SMC already is developing plans for a follow-up investigation that will measure these values with statistical confidence.

Municipalities commonly rely on street sweeping to remove debris that is unsightly and can clog storm drain systems, but what has historically been unclear is what portion of stormwater pollutants – sediment, nutrients, trace heavy metals, microplastics and bacteria – remain on roadways after street sweeping.

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. Street sweeping is considered a type of

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Cover photo: Street sweeping is a stormwater management strategy commonly used to prevent pollutants from entering storm drain systems. The Southern California Stormwater Monitoring Coalition (SMC) has developed a novel method for measuring the role that street sweeping plays in improving runoff water quality.

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Calendar

Thursday, February 6
CTAG quarterly meeting
(In-person meeting)

Friday, March 7
Commission meeting
(In-person meeting)

non-structural BMP (best management practice).

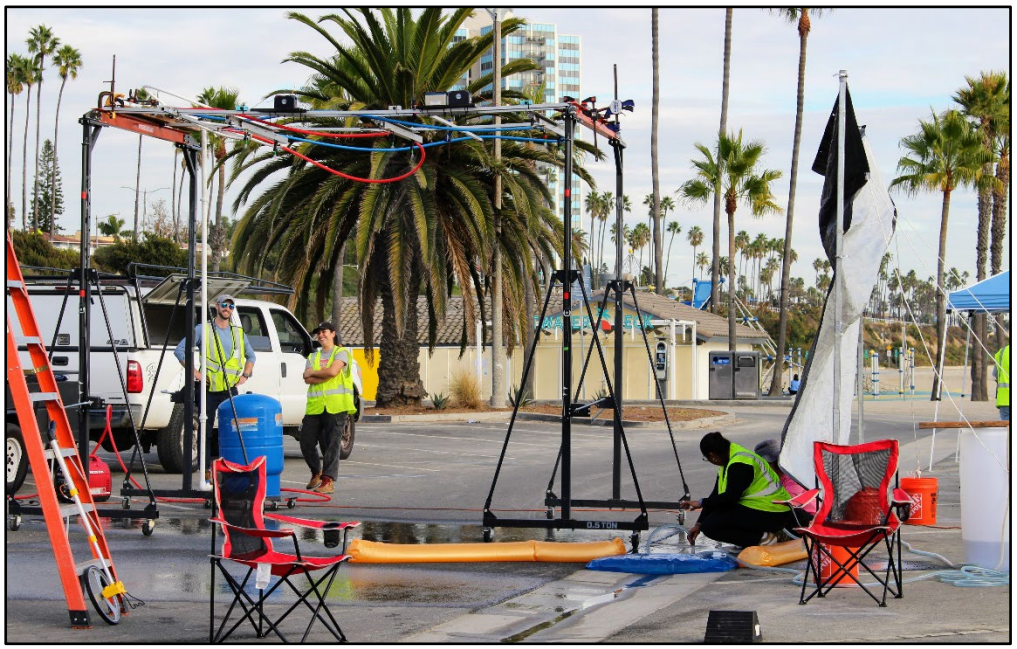
But this street sweeping credit – which assumes that street sweeping reduces runoff contamination by 5-10% – is based largely on best professional judgment, and less on scientific evidence. It's a knowledge gap that has confounded managers' ability to work toward meeting water-quality improvement goals, and some State regulators are moving away from granting this credit without scientific evidence.

To pursue this study, researchers' first step was to develop a robust study design that could quantify street sweeping's effectiveness for removing roadway pollution – a step that has stymied prior efforts to measure street sweeping's role. Importantly, any data generated through the method would need to be reproducible and representative.

Thus, the study design involved controlling the unpredictable timing, intensity and duration of real-life wet-weather events through simulated rainfall. Researchers designed and custom-built a rainfall generator capable of simulating rainfall at a controlled rate and duration across about 74 square feet of surface area; the simulated rainfall was designed to mimic rainfall energies typical for Southern California.

Full design specifications for the field-deployable instrument, which is envisioned to have widespread utility beyond the street sweeping study, are publicly accessible online.

Once the rainfall generator was operational, researchers isolated segments of roadway in a Long Beach parking lot. One set of roadway segments was swept, while a corresponding set of similar roadway segments that served as the control group was not swept.



A field crew uses a rainfall generator to create controlled wet-weather conditions in a Long Beach parking lot. Researchers custom-built this instrument and then used it to develop a novel method for quantifying the effectiveness of routine street sweeping in removing contaminants that would otherwise enter storm drains and contribute to runoff pollution.

Researchers used the rainfall generator to simulate rainfall on both roadway segments, then looked for differences in the pollutant levels from the generated runoff. Based on data from this single site, researchers were able to identify quantifiable differences in the levels of pollutants in runoff from the swept vs. unswept roadway segments.

Already, SCCWRP is working with the SMC on a broader study intended to support the validity of the initial findings, including developing and publishing a conceptual scope of work in the SMC's recently published 2024-2029 Research Agenda.

The scope of work calls for a multi-site study that could begin as early as this summer. Multiple sites will generate a more statistically robust data set, plus present opportunities to test the relative effectiveness of different types of street sweeping methods.

Meanwhile, SCCWRP also has begun working with the American Society of Testing and Materials (ASTM) to develop a standardized ASTM method for measuring the water-quality benefits of street sweeping.

For more information, contact Dr. Elizabeth Fassman-Beck and Dr. Edward Tiernan.

Effort launched to expand, formalize HABs monitoring in coastal waters

SCCWRP and its partners are launching an effort to expand and formalize Southern California's capacity to collect monitoring data on toxin-producing harmful algal blooms (HABs) in coastal waters – an initiative aimed at getting key data sets into the hands of managers and others when they need this information most.

The effort, which kicks off this spring, will develop a written HABs strategic response plan that enables the multiple researchers and agencies that monitor coastal HABs offshore to rapidly mobilize to initiate coordinated monitoring at the first signs of bloom events. The plan also will focus on improving the speed at which HABs monitoring data become available through California's 17-year-old Harmful Algal Bloom Monitoring and Alert Program (HABMAP) – a statewide monitoring program co-developed by SCCWRP that collects HABs data via weekly sampling at piers.

During major bloom events over the past decade, thousands of sea lions and other marine mammals have become stranded en masse at beaches as a result of poisoning by domoic acid, which is the toxin produced by a type of HAB known as *Pseudo-nitzschia*.

For mammal rescue organizations to mount an effective response during these seasonal bloom events, they need to know as soon as possible when a toxin-producing bloom event is starting. These organizations, mostly made up of volunteers, are often outnumbered during sudden, dramatic spikes in marine mammal strandings on beaches. Generally, about 40%-60% of all stranded mammals that are rescued can recover if administered appropriate anti-seizure medications and/or moved from populated beaches to local rehabilitation centers.

While HABMAP has long been generating foundational HABs data at pier sites statewide, there can be a lag time of a month or more for HABMAP data to be analyzed and made publicly available, limiting the data's utility for real-time management decision-making, particularly for marine mammal rescue centers.

Moreover, recent HABs monitoring investigations have found that targeting HABs monitoring at piers only is inadequate to serve as an early-warning indicator of larger-scale bloom events that can start further offshore, particularly *Pseudo-nitzschia*, which is among the most ubiquitous types of HABs in Southern California coastal waters. The reasons is that it can take days to weeks after a bloom starts for the bloom to be reflected in HABMAP pier data – a consequence of the fact that *Pseudo-nitzschia* blooms often begin offshore, causing the pier-based monitoring to miss the start of these events.

The written HABs strategic response plan will focus on formalizing networks of partners that can rapidly mobilize to collect offshore field sampling data as soon as a bloom event starts. In recent years, researchers and managers have come together in an informal, ad-hoc fashion to initiate offshore monitoring during bloom events.

To improve the speed at which HABMAP monitoring data become available, researchers will focus on updating monitoring methods to more rapidly and easily detect domoic acid at lower levels. The newer methods – which are better suited to running small batches of samples more frequently than the commonly used method – have the potential to shorten sample analysis turnaround times from months to days.

The written HABs strategic response plan will be initially piloted in Southern California during the next seasonal HABs event. Long term, researchers' goal is to expand the monitoring plan statewide.

For more information or to get involved, contact Dr. Jayme Smith.

Courtesy of Channel Islands Marine & Wildlife Institute / Note: Rescue activities conducted under a stranding agreement with the National Oceanic and Atmospheric Administration

A rescue crew prepares to transport a sea lion stranded on the beach as a result of domoic acid poisoning to a rehabilitation center for treatment. SCCWRP and its partners are working to expand and formalize how Southern California monitors toxin-producing harmful algal blooms (HABs) that can sicken and kill sea lions and other marine mammals.

Modeling phase launched in effort to open 'black box' of BMP mechanistic processes

SCCWRP and its partners have begun working to model the mechanistic inner processes by which a ubiquitous class of stormwater BMPs known as biofiltration systems removes pollutants from runoff – a key milestone in an ongoing study working to develop a next generation of BMP modeling tools that reflect the specific internal processes driving pollutant removal.

The study's modeling phase, which kicked off in November, follows the successful completion of laboratory-scale experiments last fall that generated quantifiable insights about how biofiltration BMPs treat contamination in runoff.

Significantly, the study's laboratory phase already has generated insights that are expected to be immediately actionable to stormwater managers who design BMPs. Through the lab work, researchers identified a pair of easy-to-measure properties of biofiltration treatment media that can serve as reliable indicators of how effectively the media will remove dissolved copper from runoff; the findings will be described in a forthcoming journal article.

Meanwhile, researchers are moving forward with developing BMP mechanistic modeling tools using data from the study's laboratory phase. The models will be capable of predicting pollutant effluent concentrations and removal capacity of biofiltration BMPs based on specific measurable properties of the biofiltration media used to construct the BMP.

Once the modeling tools are built, their predictive capabilities will be validated with monitoring data reflecting how biofiltration BMPs perform in the field.

The mechanistic inner processes by which structural BMPs like biofiltration systems remove contaminants have historically been a "black box" – with researchers routinely measuring the runoff entering and exiting the BMP, but not focusing what happens inside the BMP as this runoff is being treated, including understanding the influence that different

SCCWRP's Jerod Grey uses a syringe to collect a sample from a set of flow-through columns that mimic how runoff flows through a biofiltration BMP. Following the successful completion of the laboratory-scale experiments, researchers have begun working to model the mechanistic inner processes by which biofiltration BMPs remove pollutants from runoff.

BMP design specifications have on performance.

In the absence of understanding BMP mechanistic processes, common BMP modeling practice for water quality is to use assumptions that rely on rules of thumb and best professional judgment. Consequently, these predictions tend to have a high degree of uncertainty associated with them.

A biofiltration BMP is an engineered system consisting of engineered media, plus hydrologic and hydraulic controls, that are intended to remove contaminants such as sediment, metals, and nutrients as runoff filters gradually through the system.

By developing a next generation of mechanistic process-focused BMP modeling tools, researchers hope to enable managers to better pinpoint BMP design specifications and maintenance regimes that will optimize long-term BMP performance.

Already, the study's laboratory phase has identified two easily measurable biofiltration media properties – cation exchange capacity and bulk density – that are strong indicators of the media's capacity to remove dissolved copper from stormwater runoff. Once the findings are peer-reviewed and published, researchers envision BMP designers being able to routinely measure these two properties for all of their own biofiltration media, then to estimate the relative treatment effectiveness of different combinations and ratios of different types of biofiltration media.

Historically, BMP designers have lacked the tools for predicting the effectiveness of specific media; all media that bear the same name (e.g., biochar, zeolite, sand) have long been assumed to provide equal treatment effectiveness.

The BMP mechanistic processes study, which is a joint collaboration between SCCWRP, the State Water Board, and the Southern California Stormwater Monitoring Coalition (SMC), began with a laboratory-based phase that enabled researchers to quantify mechanistic processes under controlled environmental conditions.

For the lab phase, researchers constructed flow-through columns filled with different types of BMP treatment media to mimic how two types of contaminants are removed as runoff flows through a biofiltration BMP: dissolved copper, a

common runoff contaminant, and per- and poly-fluoroalkyl substances (PFAS), an emerging class of contaminants detected in stormwater runoff.

These column studies were designed to simulate real-world BMP operating conditions, including runoff infiltration rate and the complex matrix of contaminants found in Southern California runoff.

SCCWRP is finalizing a workplan for the field monitoring model validation phase, which will kick off in February.

For more information, contact Dr. Elizabeth Fassman-Beck and Dr. Danhui Xin.

Bight '23 regional survey assessing ecological health of eelgrass beds for first time

The Southern California Bight 2023 Regional Monitoring Program has completed field sampling for a first-of-its-kind multiagency survey evaluating the health of the region's eelgrass beds based on their ecological functioning – a regional effort that is expected to help close key data gaps as well as build California's capacity to implement standardized, ongoing monitoring of this ecologically fragile habitat.

The Bight '23 field sampling work, which wrapped up in December, is enabling researchers to test-drive newly developed bioassessment-based methods for quantitatively assessing eelgrass bed health. The methods evaluate the aquatic plants' ability to provide refugia to fish and other animals, as well as other ecosystem services, including attenuating ocean waves and sequestering carbon.

Traditionally, eelgrass bed assessments in Southern California have focused primarily on documenting the locations and size of eelgrass beds.

Eelgrass beds, which are scattered across shallow, soft-bottom coastal areas of Southern California, are the dominant type of seagrass found in California's coastal embayments. In recent years, California has invested significant resources into restoring and protecting seagrass beds, which have been decimated by a range of human activities.

Existing monitoring of Southern California eelgrass beds, however, has historically been uneven, with monitoring required at certain sites as part of regulatory compliance obligations, while other sites don't get monitored at all or get monitored using less rigorous, non-standardized assessment methods.

The Bight '23 Submerged Aquatic Vegetation (SAV) study element will use a set of consistent, robust assessment methods that were co-developed by SCCWRP in 2020 and piloted at smaller scales.

The regional assessment of eelgrass beds will enable coastal managers to place site-specific assessments into regional context, as well as enable managers to quantitatively assess the success of eelgrass restoration and mitigation projects, including for determining compliance with the California Eelgrass Mitigation Policy, which calls for no net loss of eelgrass habitat function.

More broadly, the assessment approach will help managers determine if coastal estuaries – of which eelgrass beds are a part – have achieved beneficial-use designations that are required under state and federal regulatory programs.

Eventually, the Bight '23 SAV assessment approach is expected to be incorporated into routine seagrass monitoring programs, including California's Estuarine Marine Protected Areas (EMPA) program.

During the Bight '23 field work, researchers collected data from 36 eelgrass beds across coastal Southern California over a two-month period. Researchers are now in the process of compiling and analyzing field data. Once the data are analyzed, researchers will use a condition index scoring tool co-developed by SCCWRP to produce an overall quantitative estimate of eelgrass condition.

The Bight '23 SAV study is one of seven study elements of the Bight program, which runs in five-year cycles to investigate different aspects of coastal ecosystem health.

For more information, contact Dr. David Gillett.

A nudibranch nestles in an eelgrass bed in Newport Bay. The Southern California Bight 2023 Regional Monitoring Program has completed field sampling for a first-of-its-kind survey evaluating the health of the region's eelgrass beds based on their ecological functioning.

Updates by Thematic Area

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

BIOASSESSMENT

Workshop to explore how to incorporate eDNA-based approaches into ocean acidification monitoring

SCCWRP and the California Ocean Protection Council will host a two-day workshop in March exploring how to incorporate environmental DNA (eDNA) methods into regional ocean acidification (OA) monitoring programs that track the biological effects of OA on aquatic life.

The workshop, which will be held March 17-18, 2025 at SCCWRP, will discuss idealized eDNA monitoring scenarios for organisms of interest, and develop recommendations to guide potential future investments in OA biological monitoring. eDNA-based monitoring uses the DNA that organisms shed into their environment – known as environmental DNA – to monitor a broad range of organisms, often with greater speed, accuracy, and precision than traditional monitoring methods that rely on manual observation of organisms.

The Southern California Bight Regional Monitoring Program is among the multiple West Coast programs that are tracking how corrosive seawater conditions can trigger shell dissolution in vulnerable aquatic life like pteropods, or sea snails.

While the existing OA biological effects monitoring focuses on manually analyzing organisms for signs of shell dissolution, Bight '23 will pilot the use of eDNA analysis methods this February when the program launches its cyclical OA biological monitoring survey. The eDNA monitoring will complement manual shell analyses, enabling researchers to begin tracking the relative abundance of the same organisms that are being monitored for shell dissolution.

Researchers are investigating how the endangered unarmored threespine stickleback, above, is affected by increases in water temperatures. These insights will be used to support an ongoing study examining how treated wastewater discharges in the upper Santa Clara River watershed may be affecting the health of vulnerable aquatic life.

ECOHYDROLOGY

Investigation probing how rising water temperatures affect endangered fish species

SCCWRP and its partners have launched an 18-month investigation to methodically probe how the health of an endangered fish species is affected by increases in water temperatures – granular insights that will help advance scientific understanding of how human-induced changes to stream temperature may be stressing aquatic ecosystems.

The investigation, which wrapped up its first phase in December, is quantifying the biological effects of rising water temperatures on a fish known as the threespine stickleback, including the fish's critical thermal maximum. Such granular insights historically have not existed for almost any temperature-sensitive aquatic species in Southern California – a shortcoming that has forced researchers to rely on less precise statistical analyses for estimating thermal tolerances.

The partially armored threespine stickleback is being used during the investigation as an analogue for the endangered unarmored threespine stickleback.

In the short term, the thermal tolerance data will be used to support an ongoing study examining how treated wastewater discharges in the upper Santa Clara River watershed may be affecting the health of vulnerable aquatic life. Treated wastewater effluent is typically discharged into streams above the stream's ambient temperature.

More broadly, the thermal tolerance study represents an important step forward in researchers' efforts to model how the health of Southern California aquatic ecosystems could be affected by rising water temperatures triggered by climate change and other stressors.

EUTROPHICATION

Resources developed to improve management of benthic HABs

A statewide HABs (harmful algal blooms) monitoring workgroup co-led-by SCCWRP has developed a set of resources intended to help managers better protect humans and domestic animals from toxin-producing benthic blooms, which tend to form mats along the bottom of streams, lakes, and other freshwater systems.

The resources, expected to be published in April, will provide monitoring guidance, field sampling protocols, an identification guide and updated signage guidelines to support managers in tracking and responding to benthic HABs. The resources were developed by the Benthic HABs Subcommittee of the California Cyanobacterial and Harmful Algal Bloom (CCHAB) Network.

The new resources build on an initial set of signage and posting guidelines that were developed in 2020.

Unlike planktonic HABs that grow in the water column, benthic HABs have not been as extensively studied. In California, existing HAB toxin thresholds designed to protect humans and wildlife from exposure are for water-column HABs only. Meanwhile, because benthic HABs form as mats, researchers believe humans and wildlife can be exposed to benthic HABs in more uneven and unpredictable ways (i.e., when pieces of the mat suddenly break off and become suspended in the water column).

Subcommittees launched to enhance freshwater HABs monitoring, assessment statewide

The California Cyanobacterial and Harmful Algal Bloom (CCHAB) Network is convening a trio of subcommittees to be co-led by SCCWRP that will work to improve how freshwater HABs (harmful algal blooms) get monitored statewide and how ecological effects get assessed.

The three subcommittees, which are expected to begin meeting this spring, will examine how to incorporate drones and other aerial technologies into HAB monitoring, how to update HAB field monitoring instruments, and how to assess the effects of HABs on fish and wildlife, respectively. The CCHAB Network is a workgroup of the California Water Quality Monitoring Council.

The groups are currently in the process of scoping their goals. For more information or to join one or more of the subcommittees, contact Dr. Jayme Smith.

Modeling team to develop quality assurance project plan for coastal OAH model

A research team that has been modeling how land-based nutrient discharges into Southern California coastal waters influences ocean acidification and hypoxia (OAH) is launching an effort to develop a quality assurance project plan (QAPP) that is intended to enhance transparency and stakeholder understanding of how these modeling tools are being used.

The work, which kicks off in February, will bring together the modeling team and a subcommittee formed by the SCCWRP Commission's Technical Advisory Group (CTAG) to collaboratively develop a written QAPP for the ROMS-BEC (Regional Ocean Modeling System-Biogeochemical Elemental Cycling) modeling tools.

The QAPP, which is expected to be finalized in late 2025, is designed to improve stakeholder understanding of how the ROMS-BEC is being applied to investigate the influence of land-based nutrient discharges in Southern California coastal waters and how uncertainty, or error, in the modeling predictions is being quantified. The goal is to enhance community confidence and acceptance of the modeling tools' predictive capabilities.

Developing this QAPP document was a recommendation of an expert review panel that was convened in 2023 to independently evaluate the coastal ocean water-quality modeling tools.

Courtesy of the California Freshwater and Estuarine Harmful Algal Bloom Program

Algal mats cover a submerged log in Eel River in Northern California. In California, a HABs monitoring workgroup co-led-by SCCWRP has developed a set of resources intended to help managers better protect humans and domestic animals from toxin-producing benthic blooms, which tend to form mats along the bottom of water bodies.

CLIMATE RESILIENCY

Expert panels convened to recommend ways to standardize, streamline coastal habitat mapping in California

SCCWRP and its partners have convened a series of expert advisory panels to develop recommendations for standardizing and streamlining how coastal habitats get mapped in California – part of an ongoing project to develop a more continuous, parsimonious process for keeping maps of coastal habitats up to date and relevant for supporting management decisions.

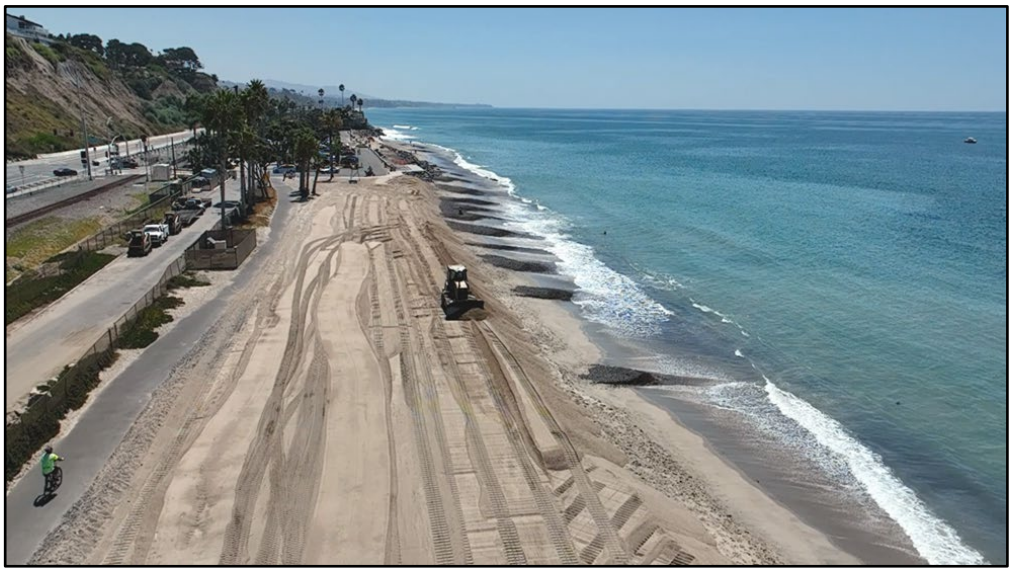
The four expert panels, which all held their first meetings in December, discussed priority objectives, potential cost-effective approaches, and other key technical needs to improve California's ability to do routine, consistent, sustainable mapping of four coastal habitats: rocky intertidal areas, coastal wetlands/estuaries, eelgrass beds, and beaches and dunes. Each workgroup, which consisted of about six members, is focusing on one of these four habitats.

The maps – which document key habitat features, including boundaries, topography, and relationships to adjacent habitats – are foundational in building California's capacity to monitor the long-term resiliency of coastal habitats to sea level rise and climate change. Because mapping is done at different times and varying frequencies, maps of California coastal habitats tend to be perpetually outdated, which can slow down progress on coastal restoration projects and impede managers' ability to evaluate restoration success.

The panelists are expected to develop their recommendations in spring 2025.

Workshops introduce new tool for encouraging beneficial sediment reuse

SCCWRP co-hosted a series of three workshops in October and November to introduce environmental managers to an app that helps agencies that routinely produce sediment from dredging and other activities to facilitate the sediment's reuse in coastal resiliency projects.



Courtesy of Orange County Parks

A bulldozer transports dredged sediment to replenish sand at Capistrano Beach as part of a beach nourishment project. SCCWRP is helping to publicize a new web-based tool called SediMatch that helps agencies that routinely produce sediment from dredging and other activities to identify opportunities to facilitate the sediment's reuse in coastal resiliency projects.

The web-based tool, known as SediMatch, was developed by the San Francisco Estuary Institute to convert what has historically been an underutilized and discarded resource into a strategic asset, available for use for beach nourishment, dune restoration and other coastal resiliency projects.

During the workshops, which were held in Southern California, participants uploaded information on 45 projects to the SediMatch database; the 45 entries include both projects that will generate sediment, and projects that have a need for sediment. These 45 entries alone resulted in one compatible match.

Dredging is a routine management practice intended to keep navigation channels clear and protect sensitive habitats from becoming buried by excess sediment. If clean sediment is not reused, it is commonly disposed of in the ocean.

CONTAMINANTS OF EMERGING CONCERN

Re-assessment of sediment contamination at Palos Verdes Superfund site completed

The U.S. Environmental Protection Agency, Region 9 has finalized an assessment of the state of sediment contamination along the Palos Verdes shelf – an effort that included participation by SCCWRP, which measured contaminant levels to support the study.

The study, summarized in an EPA technical report published last summer, found that levels of the pesticide DDT and an industrial class of chemicals known as PCBs have been slowly decreasing in seafloor sediment, overlying water column, and fish tissue, but still exceed the target levels for cleanup.

SCCWRP was not a co-author on the study, but contributed to the study by using passive samplers to measure the levels of DDT and PCBs that are leaching out of surface layers of sediment into the water column above.

The EPA will use the study's findings and updated human health and ecological risk

assessments to develop recommendations for cleanup remedies. The study's findings may also inform ongoing efforts to evaluate additional instances of offshore DDT contamination.

Lab accreditation assessors to be trained on *Ceriodaphnia* toxicity test during 3-day workshop

Assessors who audit environmental laboratories in California will be trained on standardized laboratory practices, test requirements and data quality standards for the *Ceriodaphnia dubia* survival and chronic reproduction test during a three-day workshop scheduled for April 28-30, 2025 that will be co-presented by SCCWRP.

The workshop, which is part of an ongoing series of California Environmental Laboratory Accreditation (ELAP) assessor training workshops, comes in response to recommendations developed by an expert science panel in 2023 for how to improve the quality and consistency of the *C. dubia* toxicity test. Among the panel's recommendations was training for all parties, including State assessors.

Already, the California Association of Sanitation Agencies (CASA) hosted a webinar in late 2023 to help agencies and ELAP-accredited laboratories enhance their performance with the *C. dubia* test.

SCCWRP, which kicked off the ELAP assessor training series in 2023, so far has offered trainings for a suite of commonly used fish bioassay toxicity tests, as well as how to measure PFAS in drinking water and environmental matrices.

STORMWATER BMPS

Study to quantify runoff coefficients associated with turf replacement BMPs

SCCWRP and the County of San Diego have begun working to measure how much rainfall and dry-weather irrigation soaks into the ground vs. runs off the land at sites where spray-irrigated turf has been replaced with drip irrigation and drought-tolerant landscaping.

The study, which will kick off with field testing in March, is a follow-up to a recently completed San Diego County study that found that turf replacement projects – a type of stormwater BMP – can successfully eliminate all irrigation runoff during dry weather, as well as all rainfall during an estimated 85% of all storms.

Stormwater managers need to know the ratio of water that soaks into the ground vs. runs off the land – known as the runoff coefficient – as they're modeling how much rainfall and irrigation is expected to be retained by different land-use types. Although managers typically take this information from reference textbooks and practitioner manuals, there are no published values for turf replacement projects because it is a novel BMP type.

Enabling this study will be a rainfall generator custom-built by SCCWRP that simulates relevant, controlled rainfall patterns, while eliminating much of the variability that surrounds real-world rainfall and runoff events.

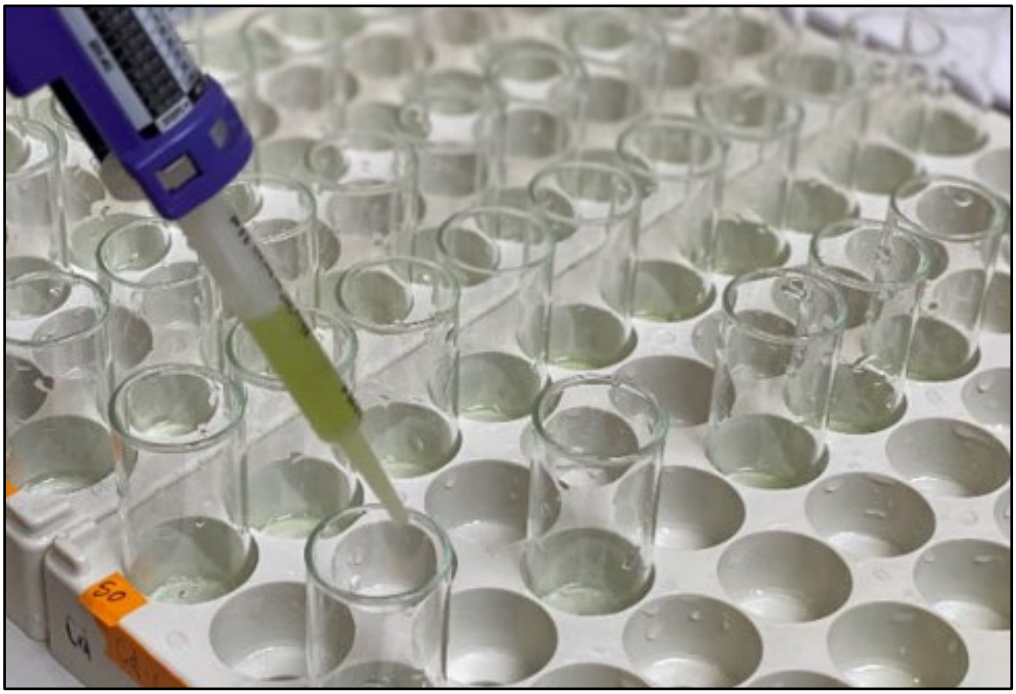
The runoff coefficients that researchers derive will be used to help improve a computer model developed by the County to prioritize applications within its Waterscape Rebate Program for areas where turf replacement projects are likely to maximize runoff water-quality benefits.

REGIONAL MONITORING

Bight '23 launching field sampling for ocean acidification monitoring survey

The 2023 cycle of the Southern California Bight Regional Monitoring Program is launching field sampling for a two-year monitoring survey that will track ocean acidification's trajectory in Southern California's coastal ocean and how shell-forming organisms are being affected.

The Bight '23 Ocean Acidification (OA) study element, which will start field sampling this February, will measure pH and oxygen levels in surface waters to look for changes in seawater chemistry, plus analyze pteropods, or sea snails, for signs of shell dissolution. The original planned



Courtesy of John Wood Group PLC

A water flea known as *Ceriodaphnia dubia* is placed in tubes and fed a nutrient mixture in advance of toxicity testing in a laboratory. SCCWRP is co-hosting an upcoming workshop that will train assessors who accredit environmental laboratories on the *C. dubia* survival and chronic reproduction test on best practices for improving the quality and consistency of the test.

field sampling start date was delayed by about six months.

In addition to the pteropod shell analyses, Bight '23 will use eDNA-based monitoring methods on a pilot basis to begin tracking the relative abundance of the same organisms that are being monitored for shell dissolution. eDNA-based monitoring uses the DNA that organisms shed into their environment – known as environmental DNA – to identify and count organisms; eDNA is envisioned as a complement to manual observation of organisms.

Bight '23 OA monitoring is being conducted in coordination with other West Coast OA monitoring programs, including the California Cooperative Oceanic Fisheries Investigations (CalCOFI) and the National Oceanic and Atmospheric Administration, enabling researchers to put the Bight program's findings into a West Coast-wide context.

Courtesy of National Oceanic and Atmospheric Administration

A pteropod, or sea snail, with pit marks on its shell, shows signs of shell dissolution in response to ocean acidification. The Bight '23 Ocean Acidification study element, which will start field sampling this February, will measure pH and oxygen levels in surface waters to look for changes in seawater chemistry, plus analyze pteropods for signs of shell dissolution.

SMC developing workplan for fourth cycle of regional stream monitoring program

The Southern California Stormwater Monitoring Coalition (SMC) has begun planning for the fourth cycle of its Regional Watershed Monitoring Program – a five-year stream survey that is expected to focus on evaluating the efficacy of stormwater management solutions.

The program's next five-year cycle, which is expected to kick off in spring 2026 or 2027, will be aligned to the strategic priorities outlined in the SMC's newly published 2024-2029 Research Agenda. This Research Agenda calls for optimizing the effectiveness of solutions designed to improve the biological health of urban streams, including stream restoration projects, stream protection initiatives, and stormwater BMPs (best management practices).

SCCWRP in November began developing the workplan for the regional stream survey's fourth cycle.

New SCCWRP Publications

Journal Articles

Callejas, I.A., Y. Kong, K. Osborn, W. Hung, M. Cira, T. Cason, A. Sloane, A. Shenkiryk, A. Masikip, A. Singh, A. Jones, J.A. Steele, J.A. Jay. 2024. The influence of urbanization and water reclamation plants on fecal indicator bacteria and antibiotic resistance in the Los Angeles River watershed: A case study with complementary monitoring methods. *Science of The Total Environment* 957:177577.

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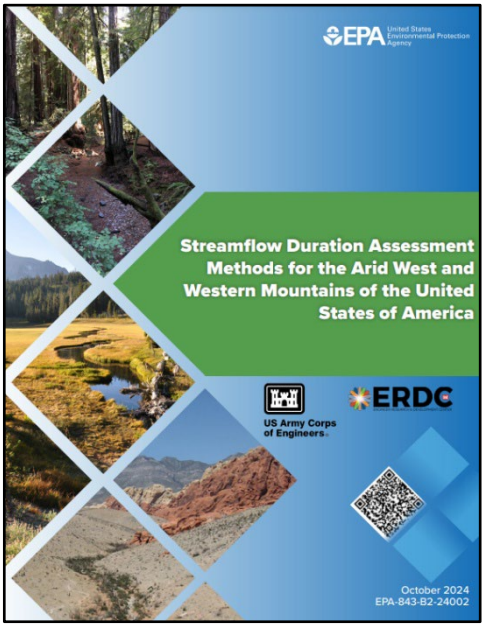

The U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers, in collaboration with SCCWRP, have begun publishing final regional versions of user manuals for the Streamflow Duration Assessment Methods. The user manual for the Arid West and Western Mountains regions, above, is designed for use in Southern California.

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Fassman-Beck, E., E. Tiernan, D. Xin, A.C. Mehinto, V. McGruer, S. Sauers. 2025. Development of a Method to Measure the Impacts of Street Sweeping on Wet Weather Runoff Water Quality. Technical Report 1411. Southern California Coastal Water Research Project. Costa Mesa, CA.

Fassman-Beck, E., K.C. Schiff. 2024. SMC Non-Structural BMP Workshop Report - March 1, 2022. Technical Report 1405. Southern California Coastal Water Research Project. Costa Mesa, CA.

James, A., K.M. Fritz, B. Topping, T. Nadeau, R.F. Edgerton, K. Nicholas, R.D. Mazor. 2024. Streamflow Duration Assessment Method for the Great Plains of the United States. Technical Report 1408. U.S. Environmental Protection Agency. Washington, D.C.

Mazor, R.D., A. James, K.M. Fritz, T. Nadeau, R.F. Edgerton, K. Nicholas. 2024. Streamflow Duration Assessment Methods for the Arid West and Western Mountains of the United States of America. Technical Report 1407. U.S. Environmental Protection Agency. Washington, D.C.

Mazor, R.D., R. Darling, J.S. Brown, C. Loflen, J. Olson, G.M. Keating, M. Robinson. 2024. Candidate metrics for an index to assess the ecological condition of intermittent and ephemeral streams in Southern California when they are dry. Technical Report 1398. Southern California Coastal Water Research Project. Costa Mesa, CA.

Wong, C.S., W. Lao, S. Sauers, D. Nguyen, L.M. Thornton Hampton. 2024. Multimedia investigations of microplastic concentrations in the Los Angeles and San Gabriel Rivers. Technical Report 1389. Southern California Coastal Water Research Project. Costa Mesa, CA.

Quarter in Review

Conference Presentations

Stein, E. Opening and closing remarks as the Society President. The Society of Wetland Scientists Annual Meeting. November 10-15, 2024. Taipei, Taiwan.

Stein, E. Assessing Wetland Condition, Function and Services from Landscapes to Communities. The Society of Wetland Scientists Annual Meeting. November 13, 2024. Taipei, Taiwan.

Stein, E., K Taniguchi-Quan. The California Environmental Flows Framework: Tools to inform water management decisions that benefit the environment. Santa Ana River Science and Conservation Symposium. January 22, 2025. Redlands, CA.

Tiernan, E., E. Fassman-Beck, K. Schiff. Measuring Runoff Water Quality Improvement from Street Sweeping in Southern California. California Association of Stormwater Quality Agencies (CASQA) Annual Meeting. October 21-24, 2024. Sacramento, CA.

Xin, D., E. Fassman-Beck, A.P. Davis. Media Cation Exchange Capacity as a Predictor of Copper Sorption in Biofiltration. California Association of Stormwater Quality Agencies (CASQA) Annual Meeting. October 21-24, 2024. Sacramento, CA.

Other Presentations

Fassman-Beck, E. Structural BMP Performance Index. Stormwater Equipment Manufacturer's Association. December 4, 2024. Via webinar.

Fassman-Beck, E., E. Tiernan, D. McCarthy. Automating Illicit Discharge Detection for North Orange County. Presentation to Compliance and Dry-Weather Monitoring groups at Orange County Public Works. January 13, 2025. Orange, CA.

Schiff, K. Results from human source tracking in the San Diego River watershed. South Orange County Water Quality Improvement Plan Committee. November 18, 2024. Via webinar.

Smith, J. Monitoring efforts and recreational use impacts from Harmful Algal Blooms (HABs) on marine coastal water quality. Coastal Beach Water Quality Workgroup. January 30, 2025. Via webinar.

Smith, J. Panelist. Dialogues with Industry, Dialogue 2 User-Driven Ocean Information: Downstream Services. January 29, 2025. Virtual.

Stein, E., D. Gillett. Mapping of eelgrass habitats. California Ocean Protection Council expert panel. December 19, 2024. Via webinar.

Steele, J. The future of wastewater microbiology. Microbes in Wastewater: Antibiotic Resistance, Public Health, and Climate Change seminar. January 16-17, 2025. Newport Beach, CA.

Steele, J. Panelist. The American Society for Microbiology Applied and Environmental Sciences Community Workshop. January 21, 2025. Via webinar.

Sutula, M. Increasing Resilience to Acidification (and Hypoxia) in Southern California Coastal Habitats: Scientific "Ingredients" to Accelerate Management Decisions. NOAA's Acidification in Estuaries Science Series. December 17, 2024. Via webinar.

Theroux, S. eDNA method standardization. The Marine Technology Society eDNA working group meeting. December 18, 2024. Via webinar.

Walker, J. Incorporating the Estuary Marine Protected Area Monitoring Program Standard Operating Procedures and estuary tools into SWAMP programs. SWAMP Bioassessment Workgroup. November 5, 2024. Via webinar.

Weisberg, S. Using models to assess potential environmental effects of nutrient discharges to the ocean. California Association of Sanitation Agencies Winter Conference. January 29, 2025. Palm Springs, CA.

Weisberg, S. West Coast Ocean Health Dashboard. West Coast Ocean Alliance. January 16, 2025. Quinault, WA.

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SCCWRP Personnel Notes

Commission

Dr. **Peter Kozelka**, Manager of the National Pollutant Discharge Elimination System (NPDES) Permits Office at U.S. Environmental Protection Agency, Region 9, was named a SCCWRP Alternate Commission in December, replacing Christina Yin, who served on the Commission for five years.

Departures

Christina Rivas, who has worked at SCCWRP as an Administrative Assistant since 2013, left SCCWRP in January to relocate to the East Coast.

Scientific Leadership

Dr. **John Griffith** co-organized the Microbes in Wastewater: Antibiotic Resistance, Public Health, and Climate Change seminar, held in January in Newport Beach, CA.

Dr. **Alvina Mehinto** has been appointed to the expert panel for the Water Research Foundation's 2025 Receiving Water Quality Management Planning.

Dr. **Joshua Steele** co-organized the American Society for Microbiology's Applied and Environmental Science Community Retreat and Workshop, held in January via webinar.

Dr. **Susanna Theroux** has been appointed to the Ocean Biomolecular Observing Network (OBON) policy working group.

Dr. **Jan Walker** has been appointed to the Environmental Monitoring Guidance Habitat and Ecosystems working group facilitated by the California Marine Sanctuary Foundation.

SCCWRP COMMISSIONER SPOTLIGHT

Manager oversees discharge permits for Region 9

Dr. Peter Kozelka began his 27-year career with the U.S. Environmental Protection Agency, Region 9 as a chemist working on lab and sampling methods for collecting trace metals at the Pacific Southwest Regional Laboratory.

Dr. Peter Kozelka

Kozelka used a new technique that EPA had promoted to help eliminate outside contamination when collecting samples for trace metals in ambient water, and helped set up a complementary lab environment for Region 9. After four years, he moved to the Monitoring and Assesesment section of the Water Division, where he became more familiar with policy development and management.

"Knowing a lot about biology and chemistry became useful in the context of understanding and developing policy around water quality and pollutants," Kozelka said.

Kozelka, who is now the Manager for the National Pollutant Discharge Elimination System (NPDES) Permits Office, became a SCCWRP Alternate Commissioner in December, replacing Christina Yin, who served on the Commission for five years.

In his current role, Kozelka oversees the process for issuing, renewing, and reviewing NPDES permits for discharges to surface waters in the Pacific Southwest region, which includes California, to ensure permittees comply with the Clean Water Act. He has also previously worked on assessing ambient water quality data for impaired water bodies and developing and reviewing total maximum daily loads (TMDLs) for ten years.

Before working at the EPA, Kozelka taught high school science in Arizona and California for seven years; he earned his secondary-education teaching certificate along with his undergraduate degree in biology from Beloit College. Kozelka then learned about the opportunity to apply his scientific expertise at the EPA.

Dr. Peter Kozelka and his daughter Bryn ride their bikes across the Bay Bridge in the San Francisco Bay Area.

Peter Kozelka, Ph.D.

Job: Manager, National Pollutant Discharge Elimination System (NPDES) Permits Office, U.S. Environmental Protection Agency, Region 9 (started 2023)

SCCWRP role: Alternate Commissioner (started December 2024)

Prior jobs: *27 years with U.S. EPA, Region 9 (1997-present)*: Permit Writer, NPDES Permits Office (2011-2023); 303(d)/TMDL Regional Coordinator, Monitoring and Assessment, Water Division (2006-2011) ; Scientist, Monitoring and Assessment, Water Division (2001-2006); Scientist, Pacific Southwest Regional Laboratory (1997-2001)

Education: Ph.D. marine chemistry, University of California, Santa Cruz (1996); B.A. biology and teaching certification, Beloit College (1983)

Residence: Albany, California

Hometown: Williamstown, Massachusetts

Family: Daughter Bryn, 25, a healthcare assistant

Hobbies: Biking; hiking; trail running; kayaking and canoeing; homebrewing

"I was drawn to staying in public service and wanted to be more involved in the realm of aquatic sciences," Kozelka said. "I've always been interested in the complexities of nature, and water is such an important part of it, so it seemed like a good fit to shift to working at the federal level."

Kozelka has been a long-time partner with SCCWRP, even preceding his time at the EPA. After grad school, Kozelka was interested in an open role at SCCWRP and met Dr. Steve Weisberg, who had just started as SCCWRP's Executive Director. Since then, he has been closely following SCCWRP's research for many topics, including stormwater and sediment quality.

Now as a Commissioner, Kozelka looks forward to partnering with regulated and regulatory agencies on setting and working on goals for water quality management.

"We're all here to try to collectively understand the information we need to make management decisions that make sense for both the public and the agencies," Kozelka said.

In his spare time, Kozelka enjoys all sorts of outdoor activities, from biking to kayaking. He has also been a homebrewer for more than 27 years – a hobby he picked up when when he first joined the EPA.

CTAG SPOTLIGHT

Scientist leads State's program for ocean standards

Before working at the California State Water Resources Control Board, Katherine Faick knew she wanted to work somewhere that connected her passions for aquatic science and policy management.

Katherine Faick

Faick studied environmental sciences and resource management and oceanography at the University of California, Davis for her undergraduate degree, where she became intrigued with understanding the environment from both a research and management perspective. So when Faick learned about an opportunity to work at the State Water Board as an environmental scientist, she knew it was the right career path for her.

"There's something quite special about working on State policies that have a legacy impact in protecting the water quality of our ocean," Faick said. "There are many nuances and specificity with this type of work that are really interesting to me."

Faick, who has worked at the State Water Board for 11 years, became her agency's Alternate CTAG Representative in January 2024.

In her current role, Faick leads the State Water Board's Ocean Standards Unit in the Division of Water Quality, which is responsible for developing statewide plans and policies for protecting marine benefitial uses and water quality.

Her team has worked on multiple facets of ocean water quality objectives, including developing amendments to the California Ocean Plan and the Once-Through Cooling Policy, managing Areas of Special Biological Significance, and administering the statewide Coastal Beach Water Quality Monitoring Program. They are also involved in several interagency working groups for topics such as marine protected areas, microplastics, offshore wind, and aquaculture.

Katherine Faick, right, enjoys a snowshoeing trip across Tahoe National Forest with friends.

Katherine Faick

Job: Senior Environmental Scientist, California State Water Resources Control Board (since 2018)

SCCWRP role: Alternate CTAG Representative (started January 2024)

Prior jobs: Environmental Scientist, California State Water Resources Control Board (2014-2018); Wine Chemist, Trinchero Family Estates (2010-2014)

Education: B.S. environmental sciences and resource management, University of California, Davis (2010)

Residence: Sacramento

Hometown: Sonoma County

Family: Dog Ellie, an 11-year-old Coton de Tuléar

Hobbies: Hiking; kayaking; baking; cooking; gardening; traveling

Growing up in Sonoma County, Faick is well-aquainted with the wineries and vineyards in the region and surrounding Napa Valley. She landed her first post-grad job as a wine chemist at Trinchero Family Estates – the second largest family-owned winery in the United States – where she helped with early development of their facility's wastewater treatment systems and supported efforts to become accredited by the Environmental Laboratory Accreditation Program (ELAP).

Faick worked in the winery's laboratory for four years before joining the State Water Board as an environmental scientist in 2014. She was quickly introduced to SCCWRP on her first day and has since partnered with SCCWRP on various research projects, including the Southern California Bight Regional Monitoring Program and the coastal ocean modeling work.

For Faick, the transition to joining CTAG felt natural since she had previously been involved in several SCCWRP research planning intersessional workshops.

"This experience has certainly strengthened and expanded my connections with other agencies in a way that allows me to see the work in this space from a different lens," Faick said. "It's helping to reinforce my ability to engage on plans and policies from the State."

In her spare time, Faick enjoys cooking and baking, which she learned from her dad when she was just four years old. She especially likes making tarts and sharing them with family and friends.

SCCWRP PARTNER SPOTLIGHT

HABs researcher leads regional observing network

When Dr. Clarissa Anderson first started doing predictive modeling work for harmful algal bloom (HABs) – specifically *Pseudo-nitzschia* blooms – more than 25 years ago, she could count the number of published papers about the topic on just one hand.

Dr. Clarissa Anderson

A biologist by trade, Anderson had previously worked with spiders, streams, and terrestrial plants but became interested in toxin-producing algae the more she learned about them in undergraduate coursework at UC Berkeley. There had been very few instances of HABs in California at the time.

"It started to become really clear that there were so many unanswered questions in that field, so I went into my Ph.D. program wanting to focus on these algae," said Anderson, a biological oceangrapher at Scripps Institution of Oceanography. "Since then, we've had so many events that the field has gone from having very few data points to being able to connect blooms to environmental conditions."

Now, HABs are receiving more attention than ever as major bloom events in Southern California coastal waters over the past decade have sickened or killed thousands of marine mammals.

In addition to doing HAB research, Anderson also oversees coastal and ocean montioring operations for the Southern California Coastal Ocean Observing System (SCCOOS), including HABs, storm surges, ocean acidifcation and hypoxia, and marine mammals. SCCOOS is one of 11 regional networks that is part of the larger national U.S. Integrated Ocean Observing System.

Dr. Clarissa Anderson performs a traditional Spanish flamenco dance called Alegrías in Santa Cruz in 2014.

Clarissa Anderson, Ph.D.

Job: Director, Southern California Coastal Ocean Observing System (SCCOOS) (since 2016); Director, Cooperative Institute for Marine, Earth and Atmospheric Systems (CIMEAS) (since 2023)

SCCWRP role: Partner on harmful algal blooms in Southern California coastal waters

Prior jobs: Research Faculty, Institute of Marine Sciences, University of California, Santa Cruz (2012-2016); Postdoctoral Research Scientist, University of California, Santa Cruz (2009-2012)

Education: Ph.D. marine science, University of California, Santa Barbara (2007); B.A. integrative biology and art history, University of California, Berkeley (1999)

Residence: Vista

Hometown: West Hills, Los Angeles

Family: Sons Felix, 12, and Casper, 8; dogs Bodhi and Ginga, greyhounds

Hobbies: Dancing; yoga; hiking; skiing; camping; playing piano with her sons

"My research really complements and dovetails with SCCOOS's objectives, which are part of the grander effort for a HAB early warning system for California," Anderson said.

Anderson is also the Director of the Cooperative Institute for Marine, Earth and Atmospheric Systems (CIMEAS), a group of nine California academic institutions that partners with the National Oceanic and Atmospheric Administration on a range of observation, modeling, and resource management programs.

Anderson is a long-time partner who has worked with SCCWRP on various climate change and coastal HAB monitoring projects. Recently, she has been working with SCCWRP to expand and improve how Southern California collects and analyze coastal HABs data through California's Harmful Algal Bloom Monitoring and Alert Program (HABMAP) – a statewide monitoring program co-developed by SCCWRP.

She also chairs multiple national and international HAB groups, including GlobalHAB, the National HAB Committee, and the National HAB Observing Network Community of Practice.

Anderson is also a semi-professional dancer and dedicates most of her spare time performing around the world. She is trained in many styles – from ballet to contemporary to salsa – and has specialized in Brazilian dance and flamenco for the past 15 years.

SCCWRP STAFF SPOTLIGHT

Data analyst develops visualizations for models

When Nicholas Lombardo wanted to enter the field of data management and analysis, he realized his pure math degree would not provide him with the technical skills he needed.

Nicholas Lombardo

Lombardo graduated from the University of California, Santa Barabara in 2019 with a B.S. in mathematics and landed a job at a private software company as a technical account manager, but he didn't feel fulfilled doing work that didn't interest him.

After two years in the workforce, Lombardo decided to go back to school to get his master's in statistics from California State University, Fullerton.

"I wasn't using my degree at all, which made me feel really dejected," Lombardo said. "That's why I felt like statistics was the right move for me since it's very applicable to the data work I want to do."

While working on his master's, Lombardo was hired as a part-time IT assistant providing programming and data processing support. Following his graduation, he was promoted to a full-time Data Analyst in the Biogeochemistry Department in September 2023.

Nicholas Lombardo explores the Japanese Friendship Garden in San Diego during a cultural festival in 2023.

Nicholas Lombardo

Job: Data Analyst, SCCWRP Biogeochemistry Department (started September 2023)

Prior jobs: Laboratory Assistant, SCCWRP Cross-Departmental Technical Support (2022-2023); Technical Account Manager, Yardi Systems (2019-2021)

Education: M.S. statistics, California State University, Fullerton (2023); B.S. mathematics, University of California, Santa Barbara (2019)

Residence: Santa Ana

Hometown: Paso Robles

Hobbies: Playing grand strategy video games; watching anime; attending extreme metal concerts; reading fantasy books

In his role, Lombardo develops data visualization for outputs from ocean numerical models for climate change. He also continues to support other departments with analyzing data and developing applications and calculators for various projects.

"Contributing to work that has a positive impact on the Earth is a big motivator for me, so I'm glad to be involved in that sort of thing," Lombardo said.

Since he was young, Lombardo has been known as the "math guy" by his peers. He remembers his classmates would approach him whenever they needed help with math homework. In elementary school, he would even show them how to solve long division equations on the overhead projector during lunch breaks.

Lombardo never lost his early interest in numbers and math and wants to find new ways to continue expanding his knowledge; he previously thought about getting a Ph.D. in mathematics and later in statistics but that idea is not completely off the table yet.

Lombardo likes listening to extreme metal music, which includes subgenres like black and thrash metal. After his friend introduced him to the genre, he began listening to early pioneers in metal like Black Sabbath and Judas Priest and chronologically worked his way through the decades to more modern groups.

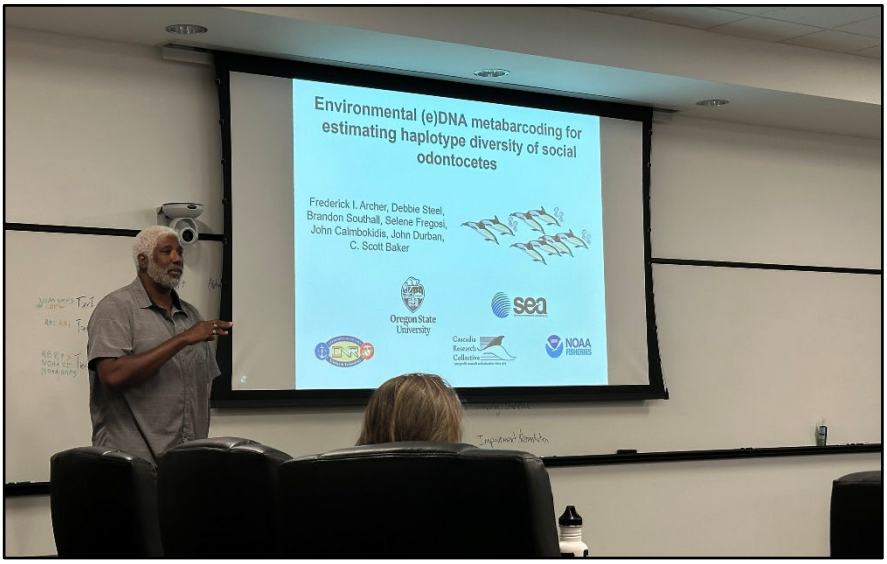
In his spare time, Lombardo enjoys playing grand strategy video games such as Civilization and Stellaris. He also enjoys reading fantasy books and is currently finishing the *Wheel of Time* series.

"It's taken me two years to get through seven of the 14 books – each about 1,000 pages long – so I'm almost done," Lombardo joked.

SCCWRP SCENES

Sharing knowledge through monthly seminars

SCCWRP kicked off its Spring 2025 Seminar Series in January with a presentation by Dr. Eric Archer, Program Lead of Marine Mammal Genetics at NOAA Southwest Fisheries Science Center. Archer discussed how researchers are working to use environmental DNA (eDNA) methods to estimate the genetic diversity of dolphin and whale populations. SCCWRP's Seminar Series is a monthly event that invites researchers and policy experts from all around the world to give a one-hour seminar covering a range of topics related to the stewardship of water and the environment. The seminars are webcast and recorded; past seminars can be viewed on SCCWRP's website.



Dr. Eric Archer, Program Lead of Marine Mammal Genetics at NOAA Southwest Fisheries Science Center, discusses how researchers use environmental DNA (eDNA) methods to estimate genetic diversity during the first seminar in SCCWRP's Spring 2025 Seminar Series, held in January. SCCWRP seminars cover a range of topics related to the stewardship of water and the environment, and are open to the public.