SCCWRP Director's Report

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WINTER 2019 ISSUE

Report outlines strategy for protecting coastal wetlands

Coastal resources managers have an opportunity to increase the total size of Southern California's coastal wetlands in the coming decades even as rising sea levels permanently submerge existing wetland areas, according to a newly published report co-authored by SCCWRP.

The Wetlands on the Edge: The Future of Southern California's Wetlands report, published in November by the Southern California Wetlands Recovery Project, lays out a long-term management strategy for converting thousands of acres of land along Southern California's coastline to vegetated marshes and flats, assuming 5-1/2 feet of sea level rise by the end of the century.

Nearly half of Southern California's remaining coastal wetland areas are projected to become permanently submerged by 2100, the report concludes.

The multi-pronged management strategy outlined in the report calls for raising the elevation of existing wetlands, acquiring adjacent upland areas where wetlands could migrate over time, and reconfiguring bridges and removing levees, among other strategies. Removal of homes and commercial buildings would not be necessary under this management paradigm, according to the report.

Under a best-case wetlands management scenario, Southern California could experience a net gain of as much as 7,700 acres of wetlands by 2100.

The 128-page report is the culmination of a four-year effort by a consortium of Southern California's wetland management agencies to develop a regional strategy and quantitative objectives to guide restoration and management efforts in the coming decades.

The report predicts that the worst wetland losses will not occur until around 2050, when sea level rise is projected to reach 2 feet. This will give managers about two decades to make long-range planning decisions intended to optimally protect,

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Cover photo: A field crew documents the condition of nesting birds in Orange County's Upper Newport Bay for a study by SCCWRP and its partners examining the vulnerability of plant and animal communities in Southern California wetlands to sea level rise.

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

Calendar

Thursday, February 7
CTAG quarterly meeting

Friday, February 8
Seminar: "Research and monitoring for environmental management at Lake Tahoe"

Friday, March 8
Commission meeting

restore and enhance the region's network of coastal watersheds.

Already, the region's wetlands management community has embraced the report and plans to use it help prioritize proposed wetland restoration projects for future funding via multiple grant programs.

Sea level rise is expected to threaten the ability of coastal wetlands to help buffer against coastal flooding, filter and retain contaminants, and provide critical habitat for vulnerable plant and animal communities. More than half of Southern California's coastal wetlands already have been lost as a result of human development since the mid-1800s.

The regional strategy is an effort to overcome a historical tendency to manage remaining wetlands as discrete, disconnected ecological resources. Coastal wetlands function best when they're managed as interconnected, interdependent network.

Managing wetlands at the regional scale may not result in being able to save every individual wetland area vulnerable to sea level rise. Rather, researchers say the strategy could result in an overall net benefit for the region's wetlands that is greater than the sum of its parts.

For more information, contact Dr. Eric Stein.

High tides surround an endangered Ridgeway's rail as it tends to its nest at the Seal Beach National Wildlife Refuge in Orange County. Such low-lying wetland areas are vulnerable to rising sea levels; a new report co-authored by SCCWRP outlines strategies for protecting and preserving these unique ecological habitats.

Science workshop to jump-start planning for microplastics monitoring in California

Photo courtesy of Dr. Marcus Eriksen, 5 Gyres

A rainbow runner caught the North Pacific Gyre is dissected to reveal the fish ingested more than a dozen pieces of plastic, including microplastic particles less than 5 millimeters in diameter. Experts on aquatic microplastic pollution will convene at SCCWRP in April for a two-day meeting exploring how to develop standardized methods for monitoring microplastics.

Leading international experts on aquatic microplastic pollution will convene at SCCWRP this spring to begin exploring how California could monitor microplastic particles in drinking water and the coastal ocean, a response to newly enacted legislation.

During a two-day meeting scheduled for April 4-5, microplastics experts from around the world will discuss how to develop standardized methods for measuring microplastic particles in aquatic environments statewide.

California Senate Bill 1422, which was signed into law in September 2018, requires the State Water Board to develop plans for quantifying microplastic particles in drinking water by 2021. Similarly, California Senate Bill 1263, also signed into law in September 2018, requires the California Ocean Protection Council to

adopt and implement a statewide strategy for illuminating the ecological risks of microplastics in marine environments.

Defined as plastic particles less than 5 mm in diameter, microplastics have become ubiquitous in aquatic environments, even as scientists have relatively little understanding of their health impacts for humans and wildlife that ingest microplastics.

Since November, SCCWRP and its partners have been working to bring together leading scientific experts on microplastics to develop a study plan for evaluating and standardizing measurement methods. Particularly challenging are microplastics so small that they're invisible to the naked eye.

Microplastics have been documented in the guts of fish and other marine life; they've also been found in human feces. In aquatic environments, chemical contaminants can stick to microplastics, compounding the health risks for organisms that inadvertently ingest microplastics.

In California, most trash management programs to date have focused on curbing the spread of larger trash particles in aquatic environments. Larger plastic particles, however, can break down in aquatic environments to become microplastics.

SCCWRP and its member agencies have been working for more than two decades to document the presence of microplastics in aquatic environments. Beginning in the late 1990s, researchers completed a series of studies that showed tiny plastic pellets known as preproduction plastic pellets have become a ubiquitous presence in Southern California beach sand.

SCCWRP and its partners also have documented the prevalence of tiny plastic debris particles in Southern California's ocean, including a Southern California Bight 2013 Regional Monitoring Program study that found microplastics had accumulated in more than one-third of Bight seafloor sediment.

The microplastics workshop, open to the public, will be co-hosted by scientific instrumentation company HORIBA, the University of Toronto and SCCWRP. RSVPs are required via the workshop's Eventbrite registration page.

For more information, contact Shelly Moore.

New modeling tool to help speed up causal assessment work

SCCWRP and its partners have developed a statistical modeling tool for conducting causal assessments that could help shave a year or more off the time required to narrow down potential causes of degraded ecological condition in streams and estuaries.

Instead of conducting a water body condition assessment first, and then following up with a causal assessment afterward, the Comparator Site Selection tool will enable environmental managers to use data from the condition assessment to simultaneously conduct a rapid, screening-level causal assessment. The tool, completed in December, is described in an upcoming article in the journal *Freshwater Science*.

Using the Comparator Site Selection tool, environmental managers will be able to quickly go through a standard list of possible stressors – including elevated conductivity, pesticides and excessive sedimentation – to narrow down potential causes of degraded biological condition. Each stressor is either rapidly eliminated

Photo courtesy of Brina Kamae

A field crew collects biological, habitat and water-quality data from a stream in the Big Bear Lake watershed as part of a stream condition assessment. SCCWRP and its partners have developed a modeling tool that will enable environmental managers to use data from condition assessments to simultaneously conduct a rapid, screening-level causal assessment of the site.

from consideration or identified as a possible cause of degradation based on a standard set of evidence types. SCCWRP and its partners are continuing to work on building this analytical framework.

The screening-level causal assessment approach is intended to serve as the first tier of a proposed three-tiered framework for conducting causal assessments in streams and estuary environments across California, with subsequent tiers providing more intensive and stressor-specific analysis.

Causal assessment work is expected to become increasingly important in California as environmental managers turn to condition scoring tools such as the California Stream Condition Index to identify water bodies in degraded ecological condition.

The Comparator Site Selection tool uses a statistical modeling approach known as "modeled expectations of biological similarity" to automatically generate appropriate comparator sites to use during the screening-level causal assessment analysis. Comparator sites are other water bodies that – based on site-specific environmental conditions such as elevation and weather patterns – would be expected to support biological communities similar to the site being studied, but that aren't experiencing one or more of the suspected stressors.

Traditionally, the process of selecting appropriate comparator sites has been done via best professional judgment. A group of local stakeholders familiar with the area being studied identifies three to four sites believed to be reasonable comparator sites. The process often takes 12 to 18 months – and is not started until after the site's condition assessment work is completed.

To automatically generate an appropriate list of reasonable comparator sites, the Comparator Site Selection tool draws on data from hundreds to thousands of sites representative of the diverse water bodies across coastal California. This same modeling approach also is used in the California Stream Condition Index, a condition assessment tool co-developed by SCCWRP in 2015.

Last year, SCCWRP and its partners launched a three-year case study in San Bernardino County's Big Bear watershed to test-drive the new causal assessment approach. Additionally, these tools are being tested and refined in the San Diego River, Los Peñasquitos Creek and Chollas Creek watersheds – all in San Diego County.

For more information, contact Dr. David Gillett.

Puget Sound study shows coastal estuaries could be impacted by acidification

SCCWRP and its partners have shown in a set of preliminary analyses of Washington's Puget Sound that coastal estuary environments have the potential to be impacted by ocean acidification (OA) faster and with greater intensity than comparable areas of the open ocean.

The ongoing study, which involves linking biological field data to OA chemistry data for Puget Sound, is among the first to chronicle how pteropods, or sea snails, are being impacted by OA in estuaries – and how these impacts are predicted to intensify in response to increasing ocean acidity and other stressors, including nutrient loading, local atmospheric carbon dioxide releases and freshwater inputs that reduce Puget Sound's buffering capacity.

For more than a decade, scientists have focused on chronicling how the open ocean will be impacted by a gradual increase in seawater acidity stemming from increased atmospheric carbon dioxide emissions. This work includes the ongoing development of a West Coast computer model by SCCWRP and its partners that predicts how OA's impacts will play out in the coastal ocean.

Pteropods, or sea snails, are sentinel indicators of the biological impacts of ocean acidification. SCCWRP and its partners are using pteropods to show that coastal estuary environments could be impacted by acidification faster and with greater intensity than comparable areas of the open ocean. Washington's Puget Sound could be on a trajectory to experience fundamental changes to ecosystem integrity in just a few decades.

Comparatively less attention has been focused on semi-enclosed estuary environments like Puget Sound, which as recently as five years ago were hypothesized to be more ecologically resilient to the impacts of OA than the open ocean. Unlike the open ocean, estuaries can experience dramatic swings in pH, aragonite saturation state and dissolved oxygen levels across various time scales, from hourly to daily to seasonally; researchers initially believed this variability would make estuaries less susceptible to OA's impacts.

The Puget Sound study, initiated in summer 2018, is analyzing three years of data on pteropods – among the most sensitive organisms that form calcium carbonate shells – then linking the pteropod data to OA and nutrient loading data to understand how OA's complex

interaction with co-occurring stressors appears to be triggering a ripple effect of ecological impacts to estuarine health.

The preliminary results indicate that during certain seasonal periods, Puget Sound has already surpassed critical physiological thresholds for pelagic calcifiers. At this rate, Puget Sound could be on a trajectory to experience fundamental changes to ecosystem integrity in the timespan of just a few decades. Detrimental impacts to pelagic calcifiers are projected to play out more intensely and rapidly in Puget Sound than in adjacent areas of the open and coastal ocean, according to the study's initial analyses.

Based on the study's findings, other estuary environments that share similar physical and chemical characteristics with Puget Sound could be similarly susceptible, including estuaries in California.

Meanwhile, SCCWRP is participating in a recently initiated effort to assess the biological vulnerability of the San Francisco Bay estuary to OA and co-occurring stressors, which will improve understanding of OA in West Coast estuarine systems.

Much more OA monitoring would be needed to begin tracking potential OA-related estuary impacts in Southern California.

For more information, contact Dr. Nina Bednarsek.

Updates by Thematic Area

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

BIOASSESSMENT

Study examining extrapolation limits of bioassessment scores in engineered channels

SCCWRP and its partners have launched a study exploring the spatial extent to which ecological condition scores calculated for sites in engineered and modified channels may be extrapolated to upstream and downstream reaches.

The study, launched in December, is a follow-up to a 2017 pilot study examining this extrapolation issue in six watersheds. The 2017 study found that the extent to which bioassessment scores can be extrapolated varies by watershed, limiting scientists' ability to offer general rules of thumb for extrapolating bioassessment scores.

SCCWRP and its partners are exploring the spatial extent to which ecological condition scores calculated for sites in engineered and modified channels, including the Los Angeles River, above, may be extrapolated to upstream and downstream reaches.

Stream managers don't have the resources to conduct bioassessment work along every stream reach in California, underscoring watershed managers' interest in understanding the limits of extrapolating condition scores.

The follow-up study will focus on sites with channel engineering in both Northern and Southern California; results are expected to be available in summer 2019.

SCCWRP participating in EPA study on how green infrastructure influences stream water quality

SCCWRP has been asked to participate in a national study by the U.S. Environmental Protection Agency's Office of Research and Development evaluating whether low impact development (LID) solutions for improving runoff water quality have led to improvements in stream water quality.

In November, SCCWRP began identifying stream sites across Southern California

that are the intended beneficiaries of these green infrastructure solutions. LID solutions, including pervious pavement, treatment wetlands, rain barrels and bioswales, are designed to retain and filter runoff before the runoff enters streams and other receiving waters.

Researchers will conduct bioassessments at the sites to quantify ecological condition; field sampling will begin in spring 2019.

EUTROPHICATION

Effort launched to develop statewide monitoring strategy for freshwater HABs

SCCWRP and its partners have kicked off a two-year effort to develop a statewide strategy for monitoring California freshwater bodies for harmful algal blooms (HABs).

The initiative, which launched in January, is intended to provide the State Water Board and its management partners with a roadmap for how California's water-quality management community could systematically assess water bodies' susceptibility to HABs, understand drivers and optimally respond.

SCCWRP is planning to assemble a working group of managers and scientific experts who will identify managers' key data needs, assessment questions, and recommended indicators and protocols.

The HABs monitoring strategy will build off a 2015 report co-authored by SCCWRP that laid out a broad strategy for how California managers could respond to HABs events. The monitoring strategy will be a key component of operationalizing California's HABs response strategy.

Expert panel reviewing science tools for proposed stream biointegrity-biostimulatory policy

A panel of scientific experts has launched a comprehensive review of a suite of technical products co-authored by SCCWRP that are intended to support the State Water Board in developing a biointegrity-biostimulatory policy for California wadeable streams.

A SCCWRP field crew explores novel methods for monitoring harmful algal blooms in Lake Elsinore in Riverside County. SCCWRP and its partners have kicked off an effort to develop a statewide strategy California's water-quality management community could use to systematically assess water bodies' susceptibility to HABs.

The review, which began in December with a two-day meeting at SCCWRP, encompasses draft versions of technical reports, journal manuscripts and tools that collectively are serving as the technical foundation for the State in developing the policy. The policy's goal is to protect the biological integrity of wadeable streams from the impacts of eutrophication and other stressors.

The six-member expert panel is scheduled to report out on its findings during a February 13, 2019 public forum at SCCWRP.

CLIMATE CHANGE

Modeling run underway to predict acidification's impacts in Bight

SCCWRP and its partners have begun running a computationally intensive, high-resolution computer model that predicts how the Southern California Bight will be affected by ocean acidification and hypoxia (OAH).

The modeling run, launched in January, will model OAH's impacts using a grid size of 300 meters. It is expected to take up to a month for the computers to complete the run; results will be shared during a stakeholder meeting this spring.

Researchers changed the resolution size of the model from 1 kilometer to 300 meters last year in response to feedback from SCCWRP member agencies and other managers, who determined that the higher resolution is necessary to properly capture how nutrients are transported to and through Bight coastal waters.

The modeling work involves coupling physical and biogeochemical ocean models together to understand the roles of global carbon dioxide emissions, natural upwelling processes and nutrients introduced via wastewater effluent, stormwater runoff and atmospheric deposition in driving OAH.

Study launched to model how effluent plume dispersal will change with more wastewater recycling

SCCWRP and its partners have launched a three-year study examining how the dilution and mixing patterns of the Orange County Sanitation District's wastewater effluent plume will change in response to changing water recycling practices.

The study, launched in November, will use a computer model to determine what happens to the plume's dispersal characteristics as effluent volume is reduced and as nutrients and other contaminants become more concentrated.

The Orange County Sanitation District, like other wastewater dischargers across drought-prone California, is planning to divert more of its wastewater effluent for water recycling practices, which will make its effluent discharges more concentrated.

The goal of the modeling effort is to help the Sanitation District optimize plume dispersal patterns even as effluent volumes are reduced. Effluent is discharged into Orange County's coastal ocean at a depth of 180 feet about 5 miles from shore.

Water-quality regulatory targets for copper in Marina del Rey Harbor, above, have been exceeded. SCCWRP and its partners are pursuing a study examining whether existing copper targets for the Los Angeles County boat harbor accurately reflect copper's ecological threat.

SEDIMENT QUALITY

Advisory committee endorses workplan for study revisiting copper TMDL in Marina del Rey Harbor

A technical advisory committee has endorsed the draft workplan for a study that will examine whether existing regulatory targets for dissolved copper in Marina del Rey Harbor should be modified to more accurately reflect the ecological threat posed by copper.

At an all-day meeting in December, the committee concluded the workplan was appropriate to accomplish the study's goal and recommended enhancements to the study's sampling design to improve representativeness and accuracy of the results.

The two-year study, led by SCCWRP, will document the concentrations of copper that aquatic organisms in the Los Angeles County boat harbor are exposed to at different times of the year, and how toxic these copper levels are at different sites across the harbor.

Under the harbor's existing Total Maximum Daily Load (TMDL) regulatory target, Marina del Rey Harbor is required to reduce copper loading by 85%, which would require boat owners to make significant changes to the types of anti-fouling paint they typically use on the underside of boats.

The technical advisory committee is scheduled to release a report on its recommendations in February; the committee's report will include responses to stakeholder comments about the study workplan.

CONTAMINANTS OF EMERGING CONCERN

SCCWRP aiding effort to transfer bioanalytical assay technology to end users

SCCWRP has been working to build the California water-quality management community's capacity to screen for bioactive contaminants using bioanalytical cell assays, a response to a State Water Board's decision to begin incorporating the screening technology into some routine water-quality monitoring applications.

SCCWRP hosted two meetings last year – in September and November – that brought together cell assay vendors, consultants and the end-user community to discuss how to meet the new State requirements.

Separately, SCCWRP's Dr. Alvina Mehinto has been asked to serve as an *ex officio* member of a newly formed statewide scientific advisory group that will guide California's water recycling community in implementing the bioanalytical screening requirements.

The State Water Board in December 2018 adopted a policy amendment requiring bioanalytical screenings to be incorporated into monitoring of certain types of recycled water, including groundwater recharge for indirect potable reuse.

MICROBIAL WATER QUALITY

Fecal contamination study shows sewers have unique microbial, chemical characteristics

SCCWRP and its member agencies have shown in a pair of initial proof-of-concept studies that sanitary sewer systems have unique microbial and chemical characteristics that may help water-quality managers track the origins of human fecal contamination in urban waterways.

The ongoing work, launched last year, involves examining whether the microbial community that lives inside sanitary sewer pipes is unique to sanitary sewer pipes. A parallel study is examining whether the chemical properties of the wastewater also are unique.

Researchers have found that the microbial community coating the inside of the sewer pipes – known as biofilm – has a different DNA-based community profile from the microbial community that lives inside storm drain systems. Meanwhile, via the use of nontargeted chemical analysis, researchers have found that the chemical fingerprint of the contents in sanitary sewer pipes is different from the chemical fingerprint in storm drain pipes.

Both studies are now expanding to look at how reliably these trends hold up with samples collected from different locations with different pipe characteristics at different times.

SCCWRP's Dr. John Griffith works with a field crew to sample the biofilm community that lives inside a sanitary sewer pipe in San Diego using a vacuum device. Researchers want to know if sanitary sewer systems have unique microbial and chemical characteristics that can be tracked in the environment.

The goal of both studies is to shed light on whether leaking sewer pipes could be responsible for the human fecal contamination found in urban waterways across Southern California during wet weather.

New SCCWRP Publications

Journal Articles (Published)

Afrooz, A.N., A.K. Pitol, D. Kitt, A.B. Boehm. 2018. Role of microbial cell properties on bacterial pathogen and coliphage removal in biochar-modified stormwater biofilters. *Environmental Science: Water Research & Technology* 4:2160-2169.

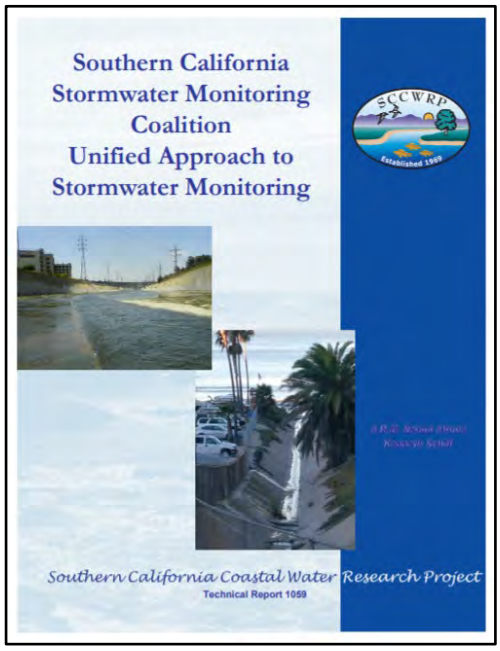
Bednarsek, N., R.A. Feely, M.W. Beck, O. Glippa, M. Kanerva, J. Engstrom-Ost. El Nino-related thermal stress coupled with upwelling-related ocean acidification negatively impacts cellular to population-level responses in pteropods along the California Current System with implications for increased bioenergetic costs. *Frontiers in Marine Science* 5:1-17.

Doughty, C.L., K.C. Cavanaugh, R.F. Ambrose, E.D. Stein. 2019. Evaluating regional resiliency of coastal wetlands to sea level rise through hypsometry-based modeling. *Global Change Biology* DOI:10.1111/gcb.14429.

Journal Articles (Online)

Coates, J., K.C. Schiff, R.D. Mazor, D.J. Pondella II, R.A. Schaffner, E. Whiteman. 2018. Development of a biological condition assessment index for shallow, subtidal rocky reefs in Southern California, USA. *Marine Ecology* DOI:10.1111/maec.12471.

Greenstein, D.J., A.S. Parks, S.M. Bay. 2019. Using spatial and temporal variability data to optimize sediment toxicity identification evaluation (TIE) study designs. *Integrated Environmental Assessment and Management* DOI:10.1002/ieam.4104.



The Southern California Stormwater Monitoring Coalition (SMC) has published a report outlining its strategy for creating a standardized, unified approach to stormwater monitoring in the region.

Lane, B.A., S. Sandoval-Solis, E.D. Stein, S.M. Yarnell, G.B. Pasternack, H.E. Dahlke. 2018. Beyond metrics? The role of hydrologic baseline archetypes in environmental water management. *Environmental Management* DOI:10.1007/s00267-018-1077-7.

Zimmer-Faust, A.G., C.A. Brown, A. Manderson. 2018. Statistical models of fecal coliform levels in Pacific Northwest estuaries for improved shellfish harvest area closure decision making. *Marine Pollution Bulletin*137:360-369.

Journal Articles (Accepted)

Cossaboon, J.M., E. Hoh, S.J. Chivers, D.W. Weller, K. Danil, K.A. Maruya, N.G. Dodder. In press. Apex marine predators and ocean health: proactive screening of halogenated organic contaminants reveals ecosystem indicator species. *Chemosphere.*

Gillett, D.J., R.D. Mazor, S.B. Norton. In press. Selecting comparator sites for ecological causal assessment based on expected biological similarity. *Freshwater Science*.

Technical Reports

Afrooz, A.R.M.N., K.C. Schiff. 2018. Southern California Stormwater Monitoring Coalition Unified Approach to Stormwater Monitoring. Technical Report 1059. Southern California Coastal Water Research Project. Costa Mesa, CA.

McCune, K. and R. Mazor. 2019. Review of flow duration methods and indicators of flow duration in the scientific literature: Arid Southwest. SCCWRP Technical Report 1063. Southern California Coastal Water Research Project. Costa Mesa, CA.

Quarter in Review

Conference Presentations

Bay, S. Variability in sediment toxicity and TIE response: an underappreciated contributor to unknown toxicity in California bays. Society for Environmental Toxicology and Chemistry 39th Annual Meeting. November 4-8, 2018. Sacramento, CA.

Beck, M.W., K. Kittleson, O'Connor. Customized web-based exploration of a long-term fisheries monitoring program - Ignite presentation. California Estuarine Research Society. December 9, 2018. Long Beach, CA.

Du, B. K. Peter, J. Steele, J. Griffith, E. Kolodziej, K. Maruya. Non-Target HRMS for tracking sources of human contamination to stormwater conveyances. Society for Environmental Toxicology and Chemistry 39th Annual Meeting. November 4-8, 2018. Sacramento, CA.

Gillett, D.J., R.D. Mazor, S.B. Norton, J. Diamond, A. Roseberry-Lincoln. Comparator site selection to inform screening-level causal assessments. Society for Environmental Toxicology and Chemistry 39th Annual Meeting. November 4-8, 2018. Sacramento, CA.

Greenstein, D. Optimization of sediment toxicity identification evaluation study designs to account for spatial and temporal variability. Society for Environmental Toxicology and Chemistry 39th Annual Meeting. November 4-8, 2018. Sacramento, CA.

Stein, E.D. and S. Theroux. Introduction to eDNA and potential uses in estuarine and coastal management. Restore Americas Estuary Meeting. December 12, 2018. Long Beach, CA.

Schiff, K. Diffuse sources of fecal indicator bacteria in stormwater: does it make you sick and where is it coming from? Society for Environmental Toxicology and Chemistry 39th Annual Meeting. November 4-8, 2018. Sacramento, CA.

Conference Posters

Schiff, K. Assessing stormwater mitigation measures in California's Areas of Special Biological Significance. Society for Environmental Toxicology and Chemistry 39th Annual Meeting. November 5-8, 2018. Sacramento, CA.

Other Presentations

Bednaršek, N. Integrated ocean acidification bioassessments. U.S. West Coast Biological Observations Workshop. November 7-9, 2018. Santa Cruz, CA.

Bednaršek, N. Biological effects of ocean acidification in situ: Moving towards integrated bioassessment. North American Ocean Acidification Hub Workshop. October 17-18, 2018. Victoria, B.C.

Bednarsek, N. Pteropods under multiple stressor effects in the California Current Ecosystem. University of Southern California. November 2018. Los Angeles, CA.

Schiff, K. SCCWRP 2018-19 Research Plan. Ventura County Watershed Protection District. November 15, 2018. Ventura, CA.

Schiff, K. and A.R.M. Afrooz. Stormwater BMP performance assessment. California Stormwater Quality Association Performance Assessment Committee. January 16, 2019. Via webinar.

Stein, E.D. How much is enough? Optimizing flows for ecological and human uses. University of Nevada Desert Research Institute. December 18, 2018. Reno, NV.

Stein, E.D. Los Angeles River Environmental flows study. L.A. River Master Plan Committee. December 17, 2018. Los Angeles, CA.

Stein, E.D. Historical ecology and the Ballona Wetlands. Culver City Historical Society. January 16, 2019. Culver City, CA.

SCCWRP Personnel Notes

Commission

Glenn Shephard, Director of the Ventura County Watershed Protection District, was appointed Alternate Commissioner in November, filling a vacancy.

Daniel Lafferty, Deputy Director of Water Resources for the Los Angeles County Department of Public Works, was appointed Commissioner in December, replacing Angela George-Moody, who was promoted to a new position with the County.

Jim Colston, Director of Environmental Services for the Orange County Sanitation District, stepped down as Alternate Commissioner in December to take a position with the Irvine Ranch Water District.

Jennifer Phillips, Program Manager for the California Ocean Protection Council, stepped down as Alternate Commissioner in November to take a Senior Scienist position with the California Governor's Office of Planning and Research.

Promotions

Dr. **Jayme Smith,** a joint postdoctoral researcher with the University of Southern California and SCCWRP since October 2018, was promoted in February to a full-time Scientist in SCCWRP's Biogeochemistry Department.

Scientific Leadership

Steve Bay organized and co-chaired a session titled "Advances in Sediment Quality Assessment for Regulation and Management" at the Society of Environmental Toxicology and Chemistry 39th Annual Meeting, held November 4-8, 2018 in Sacramento, CA.

Dr. **Bowen Du** co-chaired a session titled "Chemical mixtures in urban systems – screening and prioritization of emerging contaminants" at the Society of Environmental Toxicology and Chemistry's 39th Annual Meeting of the, held November 4-8, 2018 in Sacramento, CA.

Dr. **David Gillett** was appointed in January to the Ph.D. committee of Osmar Roberto Araujo-Leyva at the Universidad Autonoma de Baja California.

Dr. **Keith Maruya** co-chaired a session titled "Nonconventional exposure routes and transport media of consumer product chemicals to improve environmental policy" at the Society of Environmental Toxicology and Chemistry North America 39th Annual Meeting, held November 4-8, 2018 in Sacramento, CA.

Dr. **Alvina Mehinto** organized and co-chaired two sessions titled "Incorporating effect-based molecular assays in environmental monitoring and risk assessment" and "Ecotoxicological impact of multiple stressors in aquatic ecosystems" at the Society of Environmental Toxicology and Chemistry's 39th Annual Meeting, held November 4-8, 2018 in Sacramento, CA.

Dr. **Alvina Mehinto** has been appointed an *ex officio* member of the National Water Research Institute's Bioanalytical Implementation Advisory Group.

Dr. **Ashley Parks** organized and co-chaired a session titled "Ecotoxicological impact of multiple stressors in aquatic ecosystems" at the Society of Environmental Toxicology and Chemistry 39th Annual Meeting, held November 4-8, 2018 in Sacramento, CA.

Ken Schiff has been asked to organize a special session on regional monitoring at the National Water Quality Monitoring Conference, to be held March 25-28, 2019 in Denver, CO.

Dr. **Kris Taniguchi-Quan** has been elected a member of the Board of Directors for the Pacific Southwest Region of the American Society of Photogrammetry and Remote Sensing.

Departures

Dr. **Nikolay Nezlin,** a Scientist since 2002, left SCCWRP in November to take a position with the oceanographic instrument company RBR.

SCCWRP COMMISSIONER SPOTLIGHT

Engineer passionate about protecting nature

Daniel Lafferty originally was drawn to a career in civil engineering because he wanted to build dams and other public-sector infrastructure.

Dan Lafferty

But upon graduating from college in 1986, he was hired by the Los Angeles County Department of Public Works – a job that convinced him his true interest was in finding ways to minimize and offset the environmental impacts of building public infrastructure.

"Engineers tend to get a reputation for just wanting to pour concrete, but working for the County, I've really had opportunities to do meaningful environmental work," said Lafferty, now the County's Deputy Director for Water Resources. "It's not just about being environmentally sensitive when designing projects – it's truly an effort to move environmentalism forward."

Lafferty joined the SCCWRP Commission in December, replacing Angela George-Moody, who was promoted to a new position.

During his 32-year career with the L.A. County Department of Public Works, Lafferty has had the opportunity to work on multiple projects with a prominent environmental offset component.

One of his proudest achievements was helping the County acquire a few dozen acres of pristine sage scrub habitat along the Tujunga Wash in the San Fernando Valley in the early 1990s; the land was used to offset County flood control infrastructure projects.

"It's right off the 210 freeway – people drive by it not realizing it's going to look that way forever," Lafferty said. "And it's because of efforts by me and my colleagues that it's now locked up in this more natural, pristine state."

Dan Lafferty explores Utah's Park City with wife Barbara on a day hike in 2017.

Daniel Lafferty, P.E., J.D.

Job: Deputy Director, Water Resources, Los Angeles County Department of Public Works

SCCWRP role: Commissioner (started December 2018); formerly CTAG Representative (2004-07)

Education: J.D., Loyola Law School (1993); B.S. civil engineering, Marquette University in Wisconsin (1986)

Residence: Monrovia

Hometown: Stamford, Connecticut

Family: Wife Barbara, a banking executive; four children ages 27 to 34; one stepchild; one grandchild; dog Bailey, a Labradoodle

Hobbies: Sampling craft beers and whiskey; touring breweries; attending Dave Matthews Band concerts across the country

Lafferty is no stranger to SCCWRP. He was part of the L.A. County team in the early 2000s that researched SCCWRP before the County decided to become a SCCWRP member agency. Then, he was appointed the County's first CTAG Representative, a role he held from 2004 to 2007.

"SCCWRP opened me up to a new arena I was oblivious to: the science behind the regulations," Lafferty said. "There is so much value in havng a voice at the table during this process."

From a very early age, Lafferty's parents instilled in him not only a love of nature, but also a strong environmental education. Every time the family went on a camping trip, they also made an effort to visit a specific point of interest, such as a rock formation, a cave, a museum, even a hydroelectric plant.

"These experiences really got me thinking: How do we as humans make the best use of our natural resources, and at the same time preserve them?" he said.

Early into his career with L.A. County, Lafferty decided to go to law school, thinking he would become in-house legal counsel for a water district. He graduated from Loyola Law School and briefly set up a part-time law practice. But his law career didn't pan out; Lafferty is now an inactive member of the California State Bar.

In his spare time, Lafferty loves visiting breweries. He also is a die-hard fan of the Dave Matthews Band; he once attended 10 of the band's concerts in 10 cities in a single year.

SCCWRP PARTNER SPOTLIGHT

L.A. region a focus of Colorado professor's work

Dr. Terri Hogue's research revolves around improving management of water resources in semi-arid regions – a focus that has centered big portions of her work squarely on the greater Los Angeles region.

Dr. Terri Hogue

Although Hogue is a Professor of Civil & Environmental Engineering at the Colorado School of Mines outside Denver, she views Southern California as an ideal place to study how big demands on limited water resources intersect with environmental protection and management goals.

In 2017, she completed a study for the City of Los Angeles Bureau of Sanitation examining how the City can meet water-quality compliance goals in urban waterways even as more stormwater is diverted for other uses.

And she is just starting a two-year study with SCCWRP and multiple other partners to determine the potential ecological and recreational effects of diverting treated wastewater effluent and runoff from the Los Angeles River for water recycling purposes. Hogue will conduct a hydrologic modeling analysis for the study using a high-resolution physical model of the L.A. River.

"There's so much happening in L.A. to help us better understand how to utilize our water," Hogue said. "I'm fortunate to work on a really critical topic that I am passionate about."

Hogue's love of hydrology was formed as an undergraduate geology major at the University of Wisconsin, Eau Claire. After completing her B.S., she went on to earn an M.S. and Ph.D. from the University Arizona. Then, she spent nine years teaching at UCLA, rising to Associate Professor.

Dr. Terri Hogue, center, in a light blue jacket, enjoys a ski/snow-shoe day with members of her research group at Colorado's Snow Mountain Ranch last year.

Terri Hogue, Ph.D.

Job: Professor and Department Head, Department of Civil & Environmental Engineering, Colorado School of Mines (2012-present); Founding Director, Center for a Sustainable WE²ST (2014-present)

Prior jobs: Associate Professor, University of California, Los Angeles (2003-2012); research technician, University of Colorado (1987-91); medical lab technician, Mayo Clinic in Minnesota (1979-87)

Education: Ph.D. hydrology and water resources, University of Arizona (2003); M.S. hydrology and water resources, University of Arizona (1998); B.S. geology, University of Wisconsin, Eau Claire (1995)

Residence: Golden, Colorado

Hometown: La Crosse, Wisconsin

Hobbies: Spending time with her adult son Garratt; hiking with her two dogs Rio, a shepherd mix, and Samson, a long-haired dachshund; mountain and road biking; skiing; reading

In 2012, Hogue decided to leave UCLA. She was drawn to the Colorado School of Mines – a 5,900-student, public research university – because of its smaller, science-and-engineering-focused environment and interdisciplinary water programs. In 2014, she became the founding director of the school's Center for a Sustainable WE²ST, an interdisciplinary research center that studies the intersection of water resources and energy production.

What Hogue loves most about SCCWRP is its connections to stakeholders and decision-makers in Southern California.

"Having these connections allows new tools and products to go more easily from research to practice," Hogue said. "This is something that academics don't typically have access to."

For Hogue, being a hydrologist is a second career. Before earning her B.S., she worked for 12 years as a laboratory technician, both for an endocrinology lab analyzing patient samples and for a biochemistry research lab at the University of Colorado.

In her spare time, Hogue loves Colorado's outdoors lifestyle – skiing, hiking and biking. She also enjoys reading a wide variety of genres – everything from fiction to policy.

SCCWRP STAFF SPOTLIGHT

Brush with HABs reshapes researcher's career

When Dana Shultz graduated from college in 2012, she knew she wanted to pursue a career in marine science. She just wasn't sure how to focus her diverse interests.

Dana Shultz

Over the next two years, she conducted field work in Santa Barbara-area salt marshes, took part in a pair of month-long research cruises off the California coast, and monitored freshwater mussels in lakes and reservoirs across Southern California.

However, it was a chance encounter with a harmful algal blooms (HABs) monitoring crew in San Diego County that finally illuminated her path forward.

While doing field work at El Capitan Reservoir, Shultz noticed a separate field crew placing small resin-filled bags into the water. Known as passive samplers, these teabag-sized devices are used to provide early warnings for ecologically disruptive blooms.

Intrigued, Shultz immersed herself in scientific literature on HABs. She quickly realized HABs would be the perfect research niche for her.

"This research area brought together a lot of interests I had – the different techniques that are used to study HABs, the applied science aspect where both consumers and marine food webs are impacted," Shultz said. "HABs has a lot of intriguing parts and interesting questions still to be answered."

Shultz, who earned a master's in ocean science at UC Santa Cruz last year, joined SCCWRP in March 2018 as a Research Technician in the Biogeochemistry Department.

Dana Shultz stops at a popular lookout in Castle Rock State Park during a hike in the Santa Cruz Mountains in 2017.

Dana Shultz

Job: Research Technician, Biogeochemistry Department

Started: March 2018

Prior jobs: Laboratory Assistant, California Sea Grant Extension Program (2013); Laboratory Assistant, UC Santa Barbara Marine Science Institute (2013)

Education: M.S. ocean science, University of California, Santa Cruz (2018); B.S. biological sciences, University of California, Santa Barbara (2012)

Residence: Irvine

Family: Parents Joe, a retired FBI agent, and Robin, a real estate agent; brother Kevin, a UC Santa Barbara chemistry major

Hometown: San Diego

Hobbies: Nature walks; cooking

During her master's program, Shultz worked under Dr. Raphael Kudela, an international HABs expert and close SCCWRP collaborator. Shultz's master's thesis showed that persistent low levels of a toxin produced by *Dinophysis* algae are found across Monterey Bay; the diarrhetic toxin can contaminate shellfish consumed by humans.

"I really like applied science because there's a clear reason why you're doing what you're doing," Shultz said.

A career in marine science has long been Shultz's dream. As a child, she loved being in nature, especially visiting tidepools. In college at UC Santa Barbara, she majored in biological sciences and interned at the university's Marine Science Institute.

What Shultz loves most about working at SCCWRP are the opportunities to expand her horizons and assist SCCWRP scientists in implementing their research vision.

"I like pairing up with someone with the big ideas," she said. "When you're the one implementing, you get to be hands-on and interact in a hands-on way with the science."

When she's not working, Shultz loves going on nature walks. In Orange County, she enjoys Upper Newport Bay and Crystal Cove State Park.

Her favorite hiking spot in Santa Cruz, where she earned her master's, is West Cliff Drive, a 3-mile walking path straddling the Pacific Ocean.

SCCWRP SCENES

Towing for zooplankton

SCCWRP and the Orange County Sanitation District tested towing zooplankton nets through Southern California coastal waters in November for a Southern California Bight 2018 Regional Monitoring Program study that will examine how coastal ocean acidification is impacting sensitive marine organisms such as pteropods, or sea snails. The study, which is planned to be launched in 2020, marks the first effort by Bight '18 to link changes in Bight seawater chemistry to changes in the biological health of shell-forming organisms.

A field crew for Bight '18's Ocean Acidification study element deploys and then retrieves large nets used to collect zooplankton from the marine pelagic zone. Researchers' goal is to learn how to collect pteropods and other sensitive organisms for a study that will examine how ocean acidification across the Southern California Bight continental shelf is impacting them.