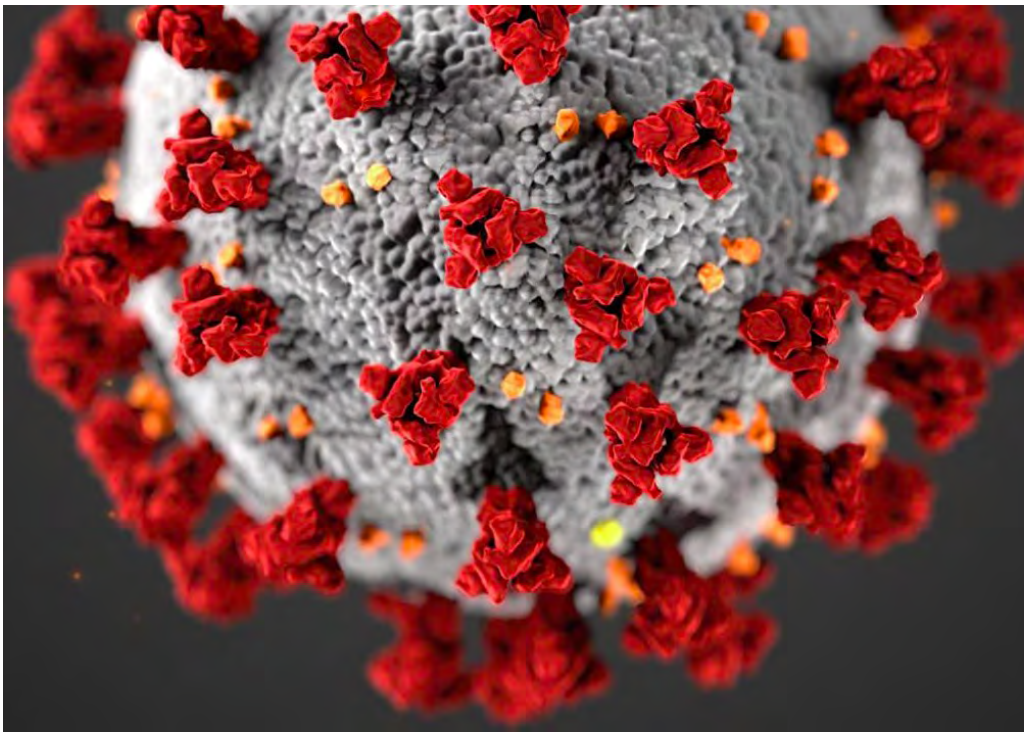

# SCCWRP Director's Report

PUBLISHED MAY 8, 2020 | COVERING FEBRUARY 1-MAY 8, 2020

SPRING 2020 ISSUE

## Wastewater being used to track COVID-19 infections

A national research team that includes SCCWRP has begun investigating how wastewater influent could be used to monitor the prevalence of COVID-19 infections in communities in near real time.

The study, launched in February and led by researchers at the University of Michigan and Stanford University, will measure the levels of virus entering wastewater treatment plants – with the intent to eventually correlate the data to levels of COVID-19 infections in local populations. Wastewater streams have the potential to offer more comprehensive, accurate insights about community infection rates than targeted testing, which so far has been centered primarily around individuals with illness symptoms.

Researchers hope to design a wastewater surveillance system that can provide an early-warning indicator of increases in COVID-19 community infection rates, providing critical lead time for public health officials. This information also could help governments make better-informed decisions to close businesses and restrict movement in a more targeted fashion.

During the study, researchers will capture the SARS-CoV-2 virus in wastewater influent samples, then use PCR (polymerase chain reaction) technology to quantify the virus's RNA.

Researchers' goal is to correlate the virus counts with community infection rates, which will allow public health officials to compare COVID-19 infection data for sewer-sheds across the nation.

To build capacity to translate quantified virus RNA counts into a total number of individuals infected, researchers intend to model multiple scenarios, including how much RNA is shed in fecal material of infected individuals, and how these levels vary by factors such as age, gender and ethnicity. Researchers also plan to model how the virus's genetic material decays as it moves through sewer systems.

The use of wastewater streams to track infectious diseases in a community is not a

## Contents



**Cover photo**: The SARS-CoV-2 virus, pictured in this artist rendering, is prevalent in wastewater streams entering treatment plants. Researchers are investigating how to routinely monitor the virus to provide an early-warning indicator of COVID-19 infections in a community. Image courtesy of U.S. Centers for Disease Control and Prevention

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## Calendar

**Thursday, May 14**
CTAG quarterly meeting
(Remote participation only)

**Friday, June 5**
Commission meeting
(Remote participation only)

novel concept. The approach has been used previously to track polio and salmonella outbreaks.

Furthermore, the SARS-CoV-2 virus already has been measured in wastewater samples. The journal Nature reported in April that more than a dozen research groups around the world have begun working to track the virus in wastewater.

The wastewater study that SCCWRP is participating in is the largest of its kind in the world; samples are being collected at about 50 wastewater plants across the nation. SCCWRP is serving as a study facilitator for eight Southern California wastewater treatment facilities operated by SCCWRP's four POTW member agencies.

SCCWRP's role in the study also will include development of advanced measurement methods. SCCWRP, a national leader in the development of the droplet digital PCR (ddPCR) method for water-quality monitoring, will adapt this technology to measure the COVID-19 virus; ddPCR is a more sensitive quantification approach than older, more commonly used PCR techniques.

Study participants began collecting wastewater samples in February.

Photo courtesy of Sanitation Districts of Los Angeles County

**Wastewater treatment operators like the Sanitation Districts of Los Angeles County, above, are at the center of a newly launched study examining how wastewater influent could be used to monitor the prevalence of COVID-19 infections in communities in near real time. SCCWRP is part of a national research team that is seeking to build a routine COVID-19 surveillance system using wastewater streams.**

Researchers are working to build sufficient capacity to conduct ongoing COVID-19 surveillance monitoring as early as this fall, which could provide an early-warning indicator of a possible second wave of infection as schools and other gathering places re-open.

For more information, contact Dr. John Griffith.

# Study shows acidification triggering adverse biological impacts in Dungeness crab larvae

A three-year study examining the sensitivity of Dungeness crab larvae to ocean acidification along the U.S. West Coast has found that this commercially important species already is being adversely impacted by intensifying ocean acidification – a finding that has reshaped scientists' understanding of the intensity and speed at which low pH waters can impact coastal biological resources.

The study, published in February by the journal *Science of the Total Environment*, documented dissolution of the exoskeleton, or carapace, and mechanical sensory organ loss in the larvae of Dungeness crab in the Pacific Northwest marine environment.

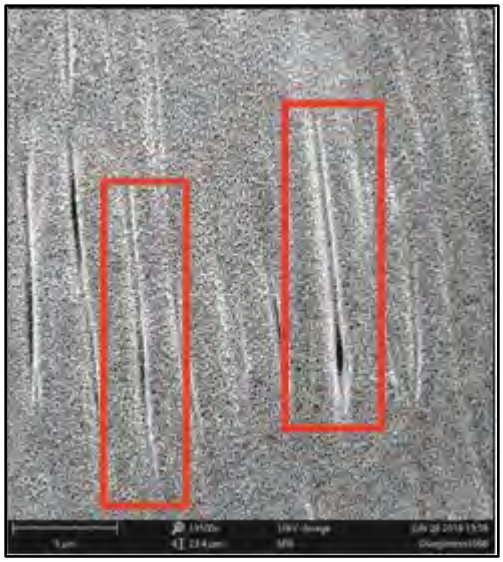
Previously, scientists thought that Dungeness crab were comparatively much less sensitive to acidification than other marine calcifiers, and that impacts of this magnitude would not manifest for decades.

The study, which was led by SCCWRP in cooperation with the National Oceanic and Atmospheric Administration, emphasizes that much more research is needed to understand the long-term implications of this stress on crab growth and development.

For example, if crab larvae are diverting more energy to repair their exoskeletons, the portion that develop into adulthood may be decreasing over time – a trend that could fundamentally alter harvest yields and timelines for a $270 million U.S. West Coast industry.

During the study, researchers analyzed crab larvae samples collected during a 2016 NOAA research cruise along the U.S. West Coast. The study documented severe dissolution in the exoskeleton that is leading to slower growth.

Researchers also for the first time found that the changing ocean chemistry is causing damage to receptors on the shell that transmit important chemical and mechanical sensations, including potentially helping the crab navigate its



**The carapace, or exoskeleton, of Dungeness crab larvae is vulnerable to shell dissolution as a result of ocean acidification. Above, extensive pit marks are visible on the carapace of a crab larva magnified 11,000 times. SCCWRP and its partners also have found mechanical sensory organ loss in the larvae, reshaping scientists' understanding of how low pH waters can impact coastal biological resources.**

environment. The canals from which these mechanoreceptors extend are being damaged by acidification and, in some cases, the receptor is falling out entirely.

Dungeness crab depend on a seawater mineral known as calcite – a less soluble form of calcium carbonate – to build their exoskeleton. Researchers previously believed the organism's reliance on calcite would make it less vulnerable than organisms like pteropods that rely on calcium carbonate. Calcium carbonate is becoming increasingly less available as a result of coastal acidification.

The study's findings underscore the potential to use crabs as a management tool for tracking the intensifying biological impacts of West Coast acidification. SCCWRP in February convened a panel of leading global experts on decapods to develop consensus on biologically relevant thresholds at which these marine organisms can be expected to experience adverse impacts from acidification.

These tools, combined with field monitoring data, will help researchers develop methods to delineate hotspots for Dungeness crab sensitivity and design routine monitoring programs for tracking biological impacts, especially in combination with other stressors.

Already, SCCWRP has begun working with the University of Southern California to design laboratory experiments examining how acidification in combination with other climate changes stressors like low dissolved oxygen levels can impact physiological development for Dungeness crab larvae.

For more information, contact Dr. Nina Bednarsek.

# Pilot study incorporates eDNA identification methods into routine stream monitoring

SCCWRP and its partners have shown in a proof-of-concept study that regional stream monitoring programs can be used to track endangered and invasive aquatic species using the environmental DNA – or eDNA – they have shed into their environment.

The three-year pilot study, completed in March, involved incorporating molecular sampling and analysis methods into routine stream monitoring programs in the San Diego region. Researchers successfully identified multiple species that passed through the water column, including the Arroyo toad, stickleback, steelhead and pond turtle – all endangered – and the swamp red crayfish, an invasive species from the southeastern U.S.

Incorporating eDNA methods into routine stream monitoring programs has the potential to provide additional lines of evidence about ecological health, helping stream managers paint a more comprehensive picture of overall condition.

Having information about specific target species also could inform management efforts to better protect specific endangered and vulnerable organisms – and to better control the spread of invasive organisms.

These organisms traditionally have been impractical and/or costly to monitor in aquatic environments because of their motility and often disparate distribution. Consequently, most stream monitoring programs in California are built around tracking more ubiquitous species that can be readily sampled in the field, including insects and algae.

During the SCCWRP-led study, researchers developed a series of custom genetic probes to identify target organisms; a DNA quantification method known as ddPCR (droplet digital polymerase chain reaction) was used to quantify DNA levels for target species. ddPCR already is routinely used to identify bacterial indicators of fecal contamination in aquatic environments.

The application of molecular methods to identify eDNA, however, remains in its infancy. eDNA methods are largely confined to the individual research labs that developed the methods. Not only do different labs use different methods – and different variations of methods – to identify the same target organisms, but there also is not yet agreement among labs about how to standardize eDNA methods to ensure results are comparable.

SCCWRP, which holds a leadership role on the California Water Quality Monitoring Council's Molecular Methods Workgroup, is working to standardize eDNA methods so they can be incorporated into routine stream monitoring programs statewide.

SCCWRP and its partners also are working to better define how to interpret the strength of eDNA signals. Signal strength in a water sample is influenced by a number of environmental factors, including organism shedding rates, water velocity, temperature, and grazing activity. Furthermore, the ability to detect eDNA from known upstream sources can be highly variable, according to the initial findings of ongoing SCCWRP investigations.

A final study report is expected to be published this summer.

For more information, contact Dr. Susanna Theroux.

Photo courtesy of U.S. Fish and Wildlife Service

**The endangered Arroyo toad is among the species that SCCWRP and its partners tracked in San Diego-area streams using the environmental DNA – or eDNA – that organisms have shed into their environment. Incorporating eDNA methods into routine stream monitoring programs has the potential to provide additional lines of evidence about overall stream health.**

# SMC study suggests not all strategies to protect health of erosion-prone streams created equal

The Southern California Stormwater Monitoring Coalition (SMC) has completed an analysis shedding light on whether next-generation management strategies for reducing erosion risk in streams could be more effective at protecting a stream's ecological health than traditional approaches that rely on channel hardening.

The SCCWRP-led study, completed in April, found that the biological integrity of hydromodification-prone streams is much more likely to be degraded in streams lined with concrete, rocks and other armoring modifications than in non-armored streams, where low-impact development (LID) and other strategies are often deployed instead. LID strategies, which are newer approaches to guarding against both flooding and erosion risk, are designed to minimize direct channel hardening that can be harmful to aquatic life.

The study underscores the value of continuing to investigate whether newer hydromodification management strategies could serve as a more effective management pathway for protecting stream biology than traditional channel hardening. Hydromodification is defined as any unwanted change to channel form caused by altered hydrological flow patterns.

In Southern California, hydromodification risk has historically been managed by armoring channels, especially with concrete lining. These hardened channels, however, tend to be associated with severe biological degradation, which has paved the way for development of alternative LID strategies that are intended to promote more natural movement of water.

In recent years, LID strategies have been codified in hydromodification management plans for streams across Southern California. LID strategies include bioretention, rain gardens and other solutions for minimizing alterations to how water flows through an area following development and redevelopment.

The SMC hydromodification analysis represents the first region-wide effort to explore the relationships between hydromodification, channel armoring and biological condition; previous efforts have looked at these issues in isolation only. Southern California stream managers are responsible for protecting the ecological health of streams, in addition to managing both hydromodification and flooding risk.

During the study, researchers analyzed five years of data collected as part of the SMC's stream survey. The data sets are unique in that they include detailed information on both biological condition and hydromodification potential for nearly 300 stream sites across the South Coast region; these two types of data are typically not collected in tandem.

Researchers compared biological condition in hydromodification-prone channels (e.g., low-gradient sandy streams) to hydromodification-resistant streams (i.e., both hardened channels and channels naturally resistant to hydromodification).

The study found that biological condition tends to be worse in hydromodification-prone channels than in naturally hydromodification-resistant channels (e.g., streams with extensive cobbles or bedrock). Naturally hydromodification-resistant channels have coarse substrate such as gravel or boulders, or intact floodplains that allow stream energy to dissipate naturally.

The potential of LID strategies to better support stream biology has underscored the need for tools that will enable managers to systematically evaluate the effectiveness of LID-based hydromodification management approaches.

SCCWRP is continuing to lay a scientific foundation for this work, ensuring managers can take science-informed actions to optimally protect and restore stream biology – while simultaneously guarding against erosion and flooding.

The SMC hydromodification study is scheduled to be published as an SCCWRP technical report in the coming weeks.

For more information, contact Dr. Kris Taniguchi-Quan.

Photo courtesy of Los Angeles County Public Works

**Runoff flows into a bioswale in Marina del Rey in Los Angeles County. The Southern California Stormwater Monitoring Coalition (SMC) is examining whether bioswales and other low-impact development (LID) approaches for reducing erosion risk in streams could be more effective at protecting stream biological health than traditional approaches that rely on channel hardening.**

# Updates by Thematic Area

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

## BIOASSESSMENT

### Guidance developed on how to work through issues affecting usability of stream bioassessment data

SCCWRP has developed detailed guidance for California watershed managers on how to identify and work through common factors that can affect the usability of stream bioassessment data, including when it's most appropriate to use the outputs of two recently developed bioassessment tools.

The guidance manual, published in April as a SCCWRP technical report, is intended to help end users optimally use the California Stream Condition Index bioassessment scoring tool and the Stream Classification and Prioritization Explorer (SCAPE) tool, which predicts the degree to which bioassessment scores are likely to be limited, or "constrained," by urban and agricultural development.

The idea for the guidance manual originated with the San Gabriel River Regional Monitoring Program, which was concerned that only a limited number of staff were fully trained in the tools' use.

SCCWRP is working to develop similar guidance for the Algal Stream Condition Index bioassessment scoring tool, then consolidate this guidance with existing end-user documentation to create a single protocol document.

ECOHYDROLOGY

## L.A. River environmental flows study receives key stakeholder endorsement

A two-year study working to determine the potential ecological and recreational effects of diverting treated wastewater effluent and runoff from the Los Angeles River for water recycling purposes has received a key endorsement from project stakeholders.

At a March meeting, the Stakeholder Workgroup for the Los Angeles River Flows Project endorsed the technical approach that SCCWRP and its partners are using to analyze the impacts of various water-recycling scenarios.

The analysis involves developing a series of hydrologic sensitivity curves, then using these curves alongside a series of key hydrologic metrics to evaluate how sensitive species, habitats and recreational benefits like kayaking will be impacted by changes in river flows.

The project marks the first effort by California's water-quality management community to study both the ecological and recreational impacts of increased water-recycling practices. Three wastewater treatment plants discharge into the effluent-dominated L.A. River.

## Initial analysis completed in effort to restore more natural flows to south O.C. streams

SCCWRP has completed a screening-level analysis of how streams in southern Orange County have been altered from their historical hydrologic flow patterns, the first phase in an ongoing effort to restore more natural flow patterns to the region's streams.

The South Orange County Flow Ecology Study screening, completed in May, involved comparing existing hydrologic conditions at about 30 stream reaches to modeled reference conditions.

Researchers followed the approach outlined in the California Environmental Flows Framework, a proposed, multi-tiered management framework for setting appropriate environmental flow targets for streams statewide. The Orange County study will serve as a key demonstration project supporting development of the statewide framework, which is ongoing.

Findings will be presented to a technical advisory committee at a June meeting.

EUTROPHICATION

## Workgroup develops recommendations for statewide HABs monitoring strategy

A workgroup tasked with developing a statewide strategy for monitoring harmful algal blooms (HABs) in freshwater environments has reached consensus on how California should enhance existing its HABs monitoring infrastructure.

During three meetings in January and February that were facilitated by SCCWRP, the workgroup recommended that California should focus on expanding remote sensing capabilities, including a statewide HABs satellite imagery analysis tool developed by the San Francisco Estuary Institute.

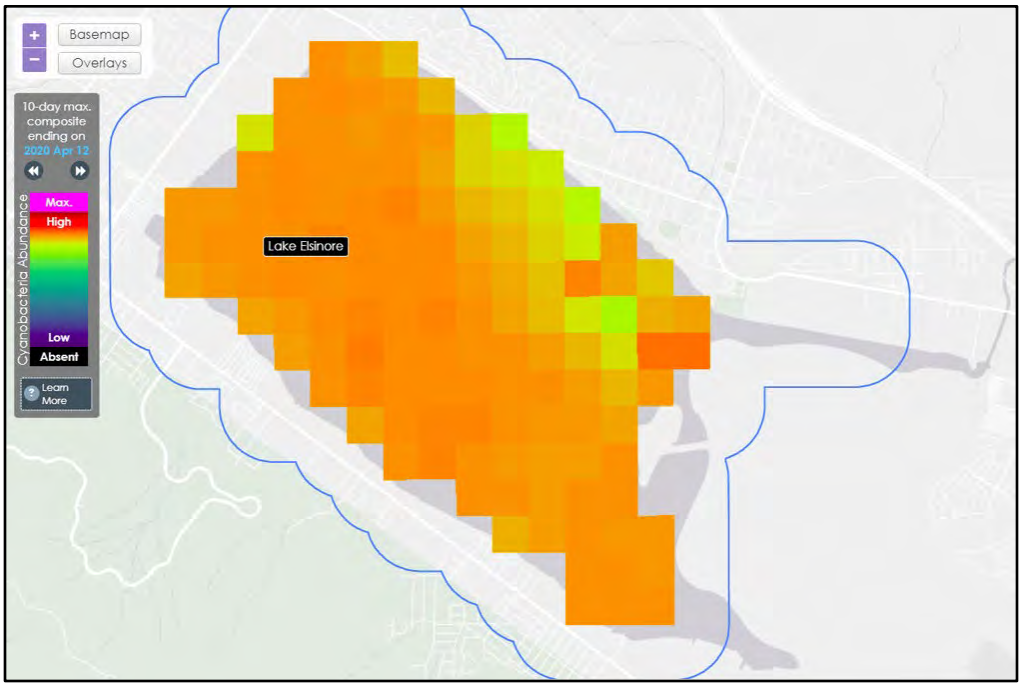
The need for a freshwater HABs monitoring program was articulated in a 2016 HABs strategy report co-authored by SCCWRP.

The workgroup's recommendations will be incorporated into a HABs monitoring strategy report scheduled to be published this summer.

## DNA-based methods used to identify toxin-producing cyanobacteria in Northern California rivers

SCCWRP has completed a six-month pilot study with the North Coast Regional Water Quality Control Board examining how to use DNA-based methods to identify the types of bacteria responsible for producing ecologically disruptive cyanotoxins in Northern California rivers.

The study, completed in March, found that




**The San Francisco Estuary Institute has developed a web tool that uses satellite imaging data to help water-quality managers monitor HABs in freshwater systems. A workgroup tasked with developing a statewide strategy for monitoring harmful algal blooms (HABs) in freshwater environments has recommended increased investments in such remote sensing capabilities.**

using DNA barcoding to identify cyanobacteria enabled researchers to identify about twice as many distinct types of toxin-producing cyanobacteria compared to traditional taxonomic identification under a microscope.

The study's findings underscore the potential of DNA-based identification methods to complement microscope-based identifications for routine cyanobacterial monitoring.

The study is expected to be published by California's Surface Water Ambient Monitoring Program as a technical report in the coming months.

## Signs developed to warn visitors about harmful algae in recreational water bodies

SCCWRP and California's Surface Water Ambient Monitoring Program have developed a series of customized signs for water bodies vulnerable to toxin-producing algal blooms that are designed to raise awareness of the dangers of coming into contact with the water.

The warning signs, which were finalized and printed in April, inform visitors that algae in the water can be harmful to humans and kill animals, including dogs. Researchers based the signs' designs on existing signage and guidance developed by the California CyanoHAB Network and the U.S. Environmental Protection Agency.

The signs, which are intended to be posted outdoors, will be distributed for free via an application process to California water-body managers that serve economically disadvantaged communities. For information about acquiring the signs, contact Dr. Keith Bouma-Gregson with the State Water Board.

CLIMATE CHANGE

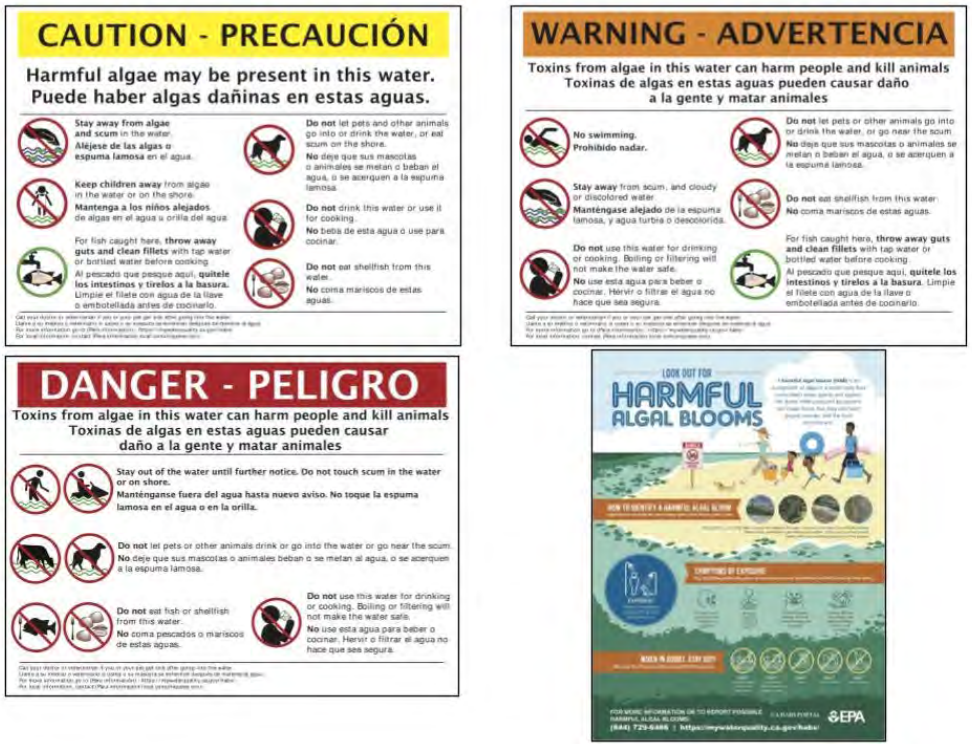
## Heatmapping capabilities developed to capture dispersal patterns of wastewater effluent plume

SCCWRP has developed computer mapping capabilities that capture the dispersal patterns of the Orange County Sanitation District's wastewater effluent plume, the second phase of a three-year study exploring how the plume's dilution and mixing patterns are expected to change as more treated effluent is recycled in drought-prone California.

The plume dispersion mapping capabilities, completed in April, were developed using particle tracking in a numerical ocean model that simulates biogeochemical cycling in the Southern California Bight.

Increased wastewater recycling in the coming years is expected to reduce effluent volumes, leading to a more concentrated plume that may have different buoyancy and mixing characteristics.

When completed, the model will be able to simulate plume dispersion patterns – as well as impacts on biogeochemical cycling in coastal waters – under a variety of potential water-recycling scenarios.




**SCCWRP has co-developed a series of warning signs to educate visitors at recreational water bodies vulnerable to toxin-producing algal blooms about the dangers of coming into contact with the water. The signs will be distributed for free to water-body managers that serve economically disadvantaged communities.**

SEDIMENT QUALITY

## Monitoring effort underway in study examining how to update copper loading limits for streams

SCCWRP has begun collecting water-quality monitoring data on copper levels in Los Angeles-area streams to support an ongoing study examining the feasibility of using a toxicity analysis method known as the Biotic Ligand Model (BLM) to update stream copper loading limits.

The monitoring effort, launched in May and expected to last six months, will help fill in data gaps that researchers identified after inventorying historical water-quality data for copper from about 645 unique site-events over a 20-year period.

Collecting the data is a necessary precursor to using the BLM, which estimates how chemical characteristics of a water body influence the bioavailability and toxicity of metal contaminants such as copper.

The Los Angeles Regional Water Quality Control Board is interested in using the BLM to potentially update site-specific water-quality objectives for streams across the Los Angeles region. The BLM is an alternative to the established Water Effects Ratio toxicity analysis method.

## Study offers insights into origins of contaminants found in San Diego Bay fish tissue

SCCWRP and its partners have completed a two-year study shedding light on what portion of the legacy contaminants found in fish tissue in San Diego Bay is coming from contaminated bay sediment.

The study, published as a SCCWRP technical report in March, found that contaminant levels in the water column were strongly associated with contaminant levels in nearby sediment. Furthermore, contaminant concentrations in sediment correlated with concentrations in the tissues of some fish species.

Field data collected during the study also helped researchers evaluate the performance of bioaccumulation models co-developed by SCCWRP that predict how contaminants in sediment can diffuse back into the water column and enter marine food webs. These bioaccumulation models form the technical foundation for California's Human Health Sediment Quality Objective, a regulatory target designed to protect the health of humans who consume seafood caught in enclosed bays and estuaries statewide.

**A passive sampling device is deployed into San Diego Bay on a mooring to measure the concentrations of legacy chemical contaminants. Researchers found that contaminant levels in the water column were strongly associated with contaminant levels in nearby sediment.**

**STORMWATER BMPs**

## Strategy developed for how to quantify stormwater capture statewide

SCCWRP and its partners have developed a six-part strategy that California could use to begin tracking how much stormwater is being captured statewide, part of an ongoing effort to improve water use and reuse practices across drought-prone California.

The strategy, published in April as a SCCWRP technical report, outlines a series of technical approaches that the State Water Resources Control Board could implement to quantify stormwater capture across six distinct components of water resources infrastructure, from stormwater BMPs (best management practices) to inflows at wastewater treatment plants.

The report's authors examined the complexity, accuracy and level of effort associated with implementing various quantification methods.

The State Water Board intends to use the report as it works to build capacity to track the total volume of stormwater being captured statewide – consistent with a mandate outlined in its Recycled Water Policy.

**REGIONAL MONITORING**

## First Bight '18 Sediment Quality assessment report published, three others nearing completion

The Southern California Bight 2018 Regional Monitoring Program has published the first of its Sediment Quality assessment reports, with three others expected to undergo internal review this summer.

The Bight '18 Sediment Toxicity report, published as a technical report in April, found that sediment toxicity across Southern California's coastal ocean remained low overall. Although sediment toxicity declined or remained the same in some habitats compared to Bight '13 toxicity data, toxicity was higher in marinas and estuaries, according to the study. And sediment toxicity was highest in brackish estuaries, which were assessed by the Bight program for the first time.

The planning committees for three other Bight '18 Sediment Quality assessment reports – Sediment Chemistry, Bioaccumulation in Sportfish, and Trawl-Caught Fish and Invertebrates – are scheduled to meet this summer to review draft reports.

## Initial round of bioanalytical screening completed for Bight '18 sediment, fish samples

SCCWRP and its partners have completed screening Southern California Bight sediment and fish tissue samples for chemical contaminants that activate the aryl hydrocarbon receptor – the first of three bioanalytical screening analyses that will be applied at a regional scale through the Southern California Bight 2018 Regional Monitoring Program.

The results of the analysis, completed in February, are being compared to Bight '18

sediment toxicity and chemistry data to examine whether bioanalytical screening can identify the same impacted sites as traditional sediment-quality analysis methods. Furthermore, the comparison with chemistry data will help understand which chemical classes are likely to impact aquatic life.

In addition to the aryl hydrocarbon receptor assay, researchers also will screen more than 100 sediment and fish tissue samples using the androgen receptor assay and estrogen receptor assay. A subset of the samples, meanwhile, will be analyzed using non-targeted chemical analysis, with a goal to establish habitat-specific chemical fingerprints and identify bioactive chemicals.

The project is expected to be completed in summer 2021.

**SCCWRP's Dr. Alvina Mehinto transfers small aliquots of cells into assay wells for a bioanalytical screening test. The Southern California Bight 2018 Regional Monitoring Program is screening sediment and fish tissue samples for chemical contaminants using three bioanalytical assays: the aryl hydrocarbon receptor assay, the androgen receptor assay and the estrogen receptor assay.**

# New SCCWRP Publications

## Journal Articles (Published)

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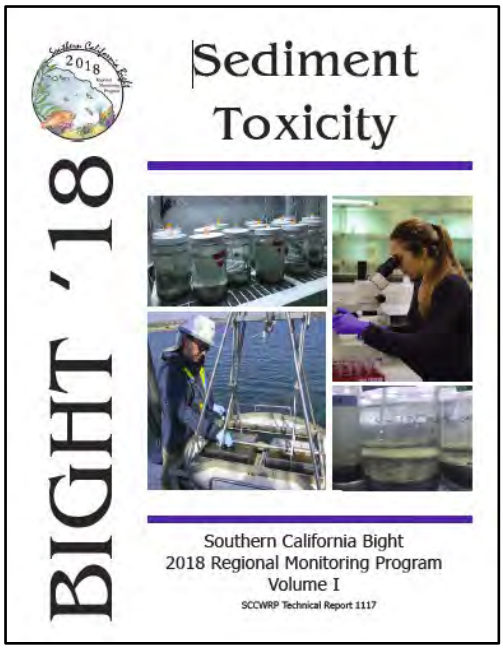


**The Southern California Bight 2018 Regional Monitoring Program has published its first assessment report examining sediment toxicity in the coastal ocean.**

## Journal Articles (Online)

Baalousha, M., J. Wang, M. Nabi, F. Loosli, R. Valenca, S.K. Mohanty, N. Afrooz, E. Cantando, N. Aich. 2020. Stormwater green infrastructures retain high concentrations of TiO2 engineered (nano)-particles. *Journal of Hazardous Materials* DOI:10.1016/j.jhazmat.2020.122335.

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Nezlin, N.P., C. Beegan, A. Feit, J.R. Gully, A. Latker, K. McLaughlin, M.J. Mengel, G.L. Robertson, A. Steele, S.B. Weisberg. 2020. Colored Dissolved Organic Matter (CDOM) as a tracer of effluent plumes in the coastal ocean. *Regional Studies in Marine Science* DOI:10.1016/j.rsma.2020.101163.

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Stein, E.D., J.S. Brown. 2020. Aquatic Resource Type Conversion Evaluation Framework. Technical Report 1110. Southern California Coastal Water Research Project. Costa Mesa, CA.

# Quarter in Review

## Conference Presentations

Bednarsek, N. Biological implications of ocean acidification in the North Pacific (session leader). Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Chen, R., J.C. McWilliams, L. Renault, and F. Kessouri. Momentum and climate governors of the California Undercurrent transport. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Cooksey, E., A.G. Zimmer-Faust, R.E. Diner, J.A. Steele, J.F. Griffith, M. Verhougstraete. Prevalence of pathogenic V. parahaemolyticus and V. vulnificus in oysters harvested from Newport Bay, California. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Damien, P., F. Kessouri, D. Bianchi, J.C. McWilliams, L. Renault and C.A. Deutsch. US west coast variability of low-oxygen conditions. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Diner, R., A. Rabines, H. Zheng, J.A. Steele, J.F .Griffith and A.E. Allen. Microbiomes of pathogenic vibrio species elucidate environmental and planktonic associations. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Frieder, C., K.A. Davis, M. Chamecki, J.C. McWilliams, M. Sutula, R.M. Kudela, J. Infante, C. Yan, F. Kessouri. A Modeling Platform to Evaluate Offshore Macroalgal Farming. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Guiet, J., D. Bianchi, O. Maury, F. Kessouri and N. Barrier. Biomass flows between pelagic predator communities in the California Current. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Hoel, P., D. Bianchi, C. Anderson, R. Kudela, F. Kessouri, M. Sutula, C.A. Deutsch, J. Smith and A. Moreno. Integrated Modeling of Harmful Algal Genus Pseudo-Nitzschia to Support Ecosystem Prediction and Environmental Management in the Southern California Current System. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Howard, E.M., C.A. Deutsch, H. Frenzel, L. Renault, J.C. McWilliams, D. Bianchi and F. Kessouri. Basin-scale water biogeochemistry and stratification changes are decisive factors in the response of the California Current System to climate change. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Hypolite, D., J.C. McWilliams, P. Damien, F. Kessouri and L. Renault. Why is there an eddy gap in the Northern California Current System? Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Kapsenberg L., H. Carter, F. Kessouri, C Braby. Ocean based solutions to address local to global human impact. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Kessouri, F., D. Bianchi, J.C. McWilliams, L. Renault, K. McLaughlin, P. Damien, C.A. Deutsch, H. Frenzel, M. Ho, and M. Sutula. Temporal modulation of biogeochemical cycles and phytoplankton biomass by submesoscale circulation in the California Current System. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

McLaughlin, K., K. Schiff, N. Bednarsek, B. Du, D. Gillett, J.F. Griffith, D. Greenstein, A. Parks, J. Smith and S. Weisberg. Regional Monitoring for Sediment and Water Quality in the Urban Ocean of the Southern California Bight. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Roethler, M., M.D.A. Howard, D.A. Caron, R. Kudela, K. Negrey, A.O. Tatters and J. Smith. Marine and Freshwater Algal Toxins Co-occur at the Land-Sea Interface in Coastal California. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Schiff, K. The California Web App: Predicting the probability of BMP effluent concentrations. Center for Watershed Protection National Watershed and Stormwater Conference. April 14-16, 2020. Via webinar.

Sutula, M., F. Kessouri, J.C. McWilliams, D. Bianchi, C.A. Deutsch, N. Bednarsek, E.M. Howard, L. Renault, K. McLaughlin, M. Ho, R.A. Feely, and S. Weisberg. Local Anthropogenic Nutrients Effects on Coastal Acidification and Hypoxia in Southern California Bight: A Case Study Linking Integrated Systems Modeling to Support Management Decisions. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Steele, J. Human Populations and Influences in the Coastal Zone: Effects on Ocean and Human Health (session co-chair). Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Steele, J. Microbial source tracking in wet weather (session co-chair). Coastal and Estuarine Research Federation Biennial Conference. November 3-7, 2019. Mobile, AL.

Steele, J.A., R. Diner, A.G. Zimmer-Faust, M.L. Griffith, T. Harper, J. Chokry, D. Wanless, J.F. Griffith. Antimicrobial Resistance in Wastewater Effluent Streams and in Urban Coastal Waters Influenced by Effluent Discharge. Ocean

Sciences Meeting. February 16-21, 2020. San Diego, CA.

Steele, J.A., D. Ebentier McCarger, A.G. Zimmer-Faust, J.F. Griffith, R.T. Noble, K.C. Schiff. Tracking human fecal sources in an urban, coastal watershed during wet weather. Coastal Estuarine Research Federation Biennial Meeting. November 3-7, 2019. Mobile, AL.

Weisberg, S. Standardizing microplastics measurement methods. California Society of Environmental Analysts Forum on Environmental Accreditation. February 3, 2020. Newport Beach, CA.

## Conference Posters

Carlin, K., C. Sosa, D. Shultz, K. Sorensen, M. Sutula, and I. Rivera. Comparison of Methods to Sample Abundance of Estuarine Subtidal Macroalgae: Novel Core Sampling Method, Using Multi-SUBstrate Subtidal (SUBS) Sampler, Versus Standardized Methods. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Davis, K., C. Frieder, M. Chamecki, J. McWilliams, M. Sutula, R. Kudela, J. Infante, J. Yan, F. Kessouri, D. Dauhajre, and M. McPherson. Modeling offshore macroalgal farming as a contributor to energy security. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Frieder, C., K. Davis, M. Chamecki, J. McWilliams, M. Sutula, R. Kudela, J. Infante, J. Yan, F. Kessouri, D. Dauhajre, and M. McPherson. Modeling Platform to Evaluate Offshore Macroalgal Farming. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Ho, M., F. Kessouri, M. Sutula, D. Bianchi, J. McWilliams, M. Molemaker, T. Gallien and G. Robertson. Impact of water recycling on wastewater effluent plumes in drought-stricken regions in ocean acidification and hypoxia contexts. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Hoel, P., D. Bianchi, C. Anderson, R. Kudela, F. Kessouri, M. Sutula, C. Deutsch, J. Smith and A. Moreno. Integrated Modeling of Harmful Algal Genus Pseudo- Nitzschia to Support Ecosystem Prediction and Environmental Management in the Southern California Current System. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Kessouri, F., D. Bianchi, J. McWilliams, L. Renault, K. McLaughlin, P. Damien, C. Deutsch, H. Frenzel, M. Ho and M. Sutula. Temporal modulation of biogeochemical cycles and phytoplankton biomass by submesoscale circulation in the California Current System. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Shultz, D., K. McLaughlin, N. Bednarsek, M. Sutula, K. Chung, and S. Bowen. Characterization of Ocean Acidification Impacts in the Southern California Bight with a Coupled Chemical-Biological Monitoring Program. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Sutula, M., F. Kessouri, J. McWilliams, D. Bianchi, C. Deutsch, N. Bednarsek, E. Howard, L. Renault, K. McLaughlin, M. Ho, R. Feely and S. Weisberg. Local Anthropogenic Nutrients Effects on Coastal Acidification and Hypoxia in Southern California Bight: A Case Study Linking Integrated Systems Modeling to Support Management Decisions. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Taylor, J.B., E.D. Stein, R. Zembal, R.F. Ambrose. Sorting Out Spatial Distributions and Temporal Population Fluctuations of the Endangered Light-footed Ridgway's Rail in Southern California Coastal Salt Marshes. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

Taniguchi-Quan, K., J. Wolfand, K. Irving, J. Taylor, C. Bell, D. Philippus, E. Stein, T. Hogue. Establishing environmental flows for the Los Angeles River: Striking the balance between wastewater reuse, aquatic life, and recreational uses. 5th Symposium on Urbanization and Stream Ecology. February 12-15, 2020. Austin, TX.

Zimmer-Faust, A., J. Steele, M. Griffith, J.F. Griffith. Understanding cross border fecal pollution flows at the Southwest US Border. Ocean Sciences Meeting. February 16-21, 2020. San Diego, CA.

## Other Presentations

Bednarsek, N. Ocean Acidification Impacts on Dungeness Crab in the Wild. Ocean Acidification Alliance. March 2020. Via webinar.

Fassman-Beck, E. BMP Research to Practice. California Stormwater Quality Association Monitoring and Science Committee Meeting. April 16, 2020. Via webinar.

Fassman-Beck, E. BMP Research to Practice. University of California Multicampus Research Programs and Initiatives Bioretention Research Group. April 22, 2020. Via webinar.

Mehinto, A.C. Bioanalytical tools: Emerging technology to assess the impact of environmental contaminants. San Francisco Bay Regional Monitoring Program Introduction to Predictive Toxicology. March 10, 2020. Via webinar.

Schiff, K. Regional Monitoring of the Southern California Bight. California State University, Fullerton.

Steele, J.A. Quantifying Sources of Fecal Loading to the San Diego River: IO Workplan. Orange County NPDES Permittees Technical Advisory Committee Meeting. January 9, 2020.

Sutula, M. Ingredients to A "Solution": Increasing Resilience to Acidification, Deoxygenation, and Harmful Algal Blooms in the Southern California Bight, Multi-faceted integration for more accurate ocean acidification assessment in the open-coastal ocean. National Oceanic and Atmospheric Administration Strategic Planning and Implementation of the Ocean Acidification Program. March 4, 2020. Los Angeles, CA.

Taylor, J.B., E.D. Stein. Impact of Climate Change on Aquatic Habitats in Southern California. Los Angeles Water Quality Control Board. January 2020. Los Angeles, CA.

Zimmer-Faust, A. Evaluation of coliphage as a beach water quality indicator in Southern California. California Stormwater Quality Association Watershed Management and Impaired Waters Subcommittee Meeting. April 23, 2020. Via webinar.

Zimmer-Faust, A. Understanding microbial pollution patterns to protect human health and shellfisheries. Scripps Institute of Oceanography. February 18, 2020. La Jolla, CA.

# SCCWRP Personnel Notes

## New Faces

Dr. **Leah Thornton Hampton,** who just earned a Ph.D. in biology from the University of North Texas, joined SCCWRP in March as a Scientist in the Toxicology Department; she will focus on the health effects of microplastics exposure.

## Promotions

**Scott Martindale,** SCCWRP's Communications Coordinator since 2014, was promoted in April to Communications Director.

**Jeffrey Chokry**, who has worked as a part-time Laboratory Assistant in the Microbiology Department since June 2019, was promoted in February to a full-time Research Technician.

## Departures

Dr. **Rachel Diner,** a joint postdoctoral researcher at SCCWRP and the J. Craig Venter Institute since June 2019, left in March to become a Postdoctoral Fellow at the University of California, San Diego.

## Scientific Leadership

Dr. **Elizabeth Fassman-Beck** has been appointed co-chair for the International Water Association's International Conference on Urban Drainage Modeling, scheduled for September 2021 in Southern California.

Dr. **Elizabeth Fassman-Beck** has been appointed lead guest editor for a special collection of the *Journal of Sustainable Water in the Built Environment* that will focus on pathogens and fecal indicator bacteria in stormwater.

Dr. **Karen McLaughlin** has been appointed to the Planning Committee for the National Monitoring Conference, scheduled for April 2021 in Providence, Rhode Island.

Dr. **Alvina Mehinto** has been appointed guest editor for a special issue of the journal *Toxics* that will focus on the impacts of agrochemicals on aquatic ecosystems.

**Ken Schiff** has been appointed to the Water Quality Benefits Evaluation Advisory Committee for King County, Washington.

Dr. **Joshua Steele** has been appointed a guest editor for a special collection of the *Journal of Sustainable Water in the Built Environment* that will focus on pathogens and fecal indicators in stormwater.

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

SCCWRP COMMISSIONER SPOTLIGHT

# POTW manager thrives on projects that persist

For Martha Tremblay, one of the best parts of working at the Sanitation Districts of Los Angeles County (LACSD) is that projects never seem to neatly wrap up. New regulatory requirements are constantly being introduced that introduce new complexities and challenges into the agency's ongoing waste management work.

**Martha Tremblay**

When Tremblay started working at LACSD 24 years ago, for example, her first assignment was conducting soil aquifer treatment studies in the Montebello Forebay to support LACSD's use of recycled water for groundwater recharge. Two decades later, she's overseeing the latest generation of regulatory compliance requirements for the site.

"Some projects will forever be part of my career, and that's OK – that's what makes the work rewarding," said Tremblay, LACSD's Department Head for Technical Services. "It's our job to keep moving forward, building on what we've already learned."

Tremblay, who leads a 260-member department that handles all of the regulatory needs for LACSD's wastewater treatment plants and landfills, was appointed last year as a SCCWRP Alternate Commissioner. She replaces Robert Ferrante, who became LACSD's Commissioner following the retirement of Grace Hyde.

Tremblay, who has spent her entire professional career at LACSD, has been drawn to wastewater management since she was an undergraduate USC civil engineering major. She loves that the field combines civil engineering, biology and chemistry.

"I've always admired big structures, but areas like transportation and structural engineering are just a little too dry for me," she said.

After graduating, Tremblay enrolled in a master's program in civil engineering at UC Berkeley, where she did lab work on activated sludge and its role in wastewater treatment. The experience cemented her interest in working in wastewater.

**Martha Tremblay explores downtown Montreal with sons Leo, left, and Raymond during a family vacation in 2019.**

## Martha Tremblay, P.E.

**Job**: Department Head, Technical Services, Sanitation Districts of Los Angeles County (LACSD)

**SCCWRP role**: Alternate Commissioner (started August 2019)

**Prior jobs**: 24 years with LACSD: Assistant Department Head, Technical Services (2015-2017); Manager, Wastewater Collection Systems (2012-2015); Section Head, Sewer Design (2006-2012); Project Engineer/Supervisor, Monitoring Section (1996-2006)

**Education**: M.S. Civil Engineering, University of California, Berkeley (1996); B.S. Civil Engineering, University of Southern California (1995)

**Residence**: Torrance

**Hometown**: South Los Angeles

**Family**: Husband Ray, LACSD Department Head for Facilities Planning; sons Raymond, 12, and Leo, 10; dog Roscoe, a Chihuahua mix

**Hobbies**: Taking family vacations; hiking and walking; reading science fiction novels

At LACSD, Tremblay has worked in three departments. She started her career in treatment plant monitoring, which is part of the department she now heads. She's also worked in the Engineering Department's Sewer Design Section and the Wastewater Management Department's Collection Systems Section, where she served as a Manager.

In her current role, much of her time is spent looking at the big picture, tracking not only how LACSD will potentially be impacted by proposed legislative and regulatory actions, but also how the agency can advance and share science to potentially help inform these actions.

"I'm very appreciative of the work SCCWRP does to connect the dots and create a forum for us to engage with the agencies that regulate us," Tremblay said.

Much of her spare time is spent raising her two sons, ages 10 and 12, with husband Ray, also an LACSD Department Head.

"We try to have lots of family time," she said. "The kids are at that age where they need you to be engaged."

CTAG SPOTLIGHT

# Microbiologist expands horizons in wastewater

When Dr. Sam Choi began his career in wastewater a decade ago, he'd just completed a Ph.D. and postdoc at UC Irvine focused on tracking microbial contamination in aquatic environments. His dissertation examined how to use the quantitative polymerase chain reaction, or qPCR – an emerging technology at the time – to rapidly detect viruses in urban rivers.

**Dr. Sam Choi**

But Choi lacked an understanding of the engineering behind wastewater treatment processes – and that bothered him.

"I could have easily just generated data without understanding why or how it gets used," said Choi, an Environmental Supervisor for the Orange County Sanitation District (OCSD). "But the more I worked with Operations and Engineering, the more I wanted to speak their lingo, so I could enhance opportunities for collaboration and support."

In 2013, Choi enrolled in an online master's program in environmental engineering at Cal State Fullerton. Choi did so well in the program that he now teaches its Water Treatment and Design course.

"The program really provided me with a broader perspective on how I can better support the functions of the District," said Choi, who manages the microbiology, general chemistry and sampling sections of OCSD's laboratory.

In September 2019, Choi replaced Lisa Haney on CTAG; Haney left OCSD to take a position with the Irvine Ranch Water District. In February, Choi was unanimously elected CTAG Vice Chair.

Choi started grad school at UC Irvine in 2002 thinking he would pursue a career in academia. But during his program, he met a part-time UC Irvine research associate, Dr. Yu-Li Tsai, who also worked full time for OCSD as a research scientist. Tsai, now OCSD's QA Administrator, introduced Choi to wastewater, and he was hooked.

**Dr. Sam Choi explores Waimea Canyon State Park with wife Eunice and son Elijah during a 2019 vacation in Hawaii's Kauai County.**

## Samuel Choi, Ph.D.

**Job**: Environmental Supervisor for Microbiology, General Chemistry and Sampling, Orange County Sanitation District (OCSD); Part-time Lecturer in Environmental Engineering, California State University, Fullerton

**SCCWRP role**: CTAG Vice Chair

**Prior jobs**: OCSD Principal Laboratory Analyst for Microbiology (2011-2017); Research/Laboratory Technician, Sanitation Districts of Los Angeles County (2010-2011); Postdoctoral Fellow, University of California, Irvine (2009-2010); Teaching Assistant/Graduate Researcher, UC Irvine (2002-2008); Lab Technician, UC Irvine (2001-2002)

**Education**: Ph.D. environmental health, science and policy, UC Irvine (2008); M.S. environmental engineering, California State University, Fullerton (2015); M.S. environmental health, science and policy, UC Irvine (2004); B.S. applied ecology, UC Irvine (2001)

**Residence**: Aliso Viejo

**Hometown**: Los Angeles

**Family**: Wife Eunice, a part-time college instructor and a full-time Ph.D. student in social psychology; son Elijah, 3; dog Mandoo, a French bulldog

**Hobbies**: Spending time with wife and son; jogging with dog; watching movies; hiking

"It's exhilarating to work at an agency that strives to protect public and environmental health, and to be a part of the lab team that oversees a wide range of work, from overseeing the beach monitoring program to producing lab data to demonstrate effective wastewater treatment," Choi said.

Choi has been interacting with SCCWRP throughout his nine-year tenure at OCSD, beginning with the Microbiology element of the Southern California Bight 2013 Regional Monitoring Program. On CTAG, he appreciates the opportunities to expand his horizons beyond microbiology.

"I'm excited to be to be a conduit that helps drive the research that both my agency and SCCWRP need done," Choi said.

Choi spends much of his free time bonding with his 3-year-old son. They fly kites together and, until the COVID-19 pandemic, were frequent visitors to the Disneyland Resort.

SCCWRP PARTNER SPOTLIGHT

# Professor drawn into applied side of research

Dr. Andrew Gracey has spent much of his career building a foundational understanding of how marine organisms adapt physiologically to changes in their environment over time.

**Dr. Andrew Gracey**

As a tenured USC professor, Gracey has focused primarily on collecting data and publishing and presenting findings – these were the things expected of him.

But in recent years, he's been interacting more with SCCWRP – and thinking more about how to make scientific knowledge actionable and relevant to the environmental management community.

"In academia, we sometimes shy away from management and policy because we're just focused on getting answers," said Gracey, a USC Associate Professor of Biological Sciences for the past 15 years. "Now, as we shift to using the ocean for more farming, we have a different audience for our work – and that's exciting."

Over the past few months, Gracey has been working with SCCWRP to design a laboratory study examining how two sentinel marine species – Dungeness crab and red urchin – are being impacted by a double whammy of intensifying coastal ocean acidification and lower dissolved-oxygen levels.

Gracey's role in the project is to look for gene-expression changes in these species as a way to track if and/or how these organisms might be adapting to their changing environment.

"Understanding how organisms adapt to environmental change is so important in the context of climate change," Gracey said.

**Dr. Andrew Gracey, an avid fisherman, proudly holds up the first trout caught by one of his children during a family vacation in Yellowstone National Park in 2018.**

## Andrew Gracey, Ph.D.

**Job**: Associate Professor, Biological Sciences, University of Southern California (2005-present)

**SCCWRP role**: Partner on SCCWRP research investigating impacts of ocean acidification and hypoxia on marine communities

**Prior jobs**: Research Associate Professor, Physiology, Stanford University (2002-2005); Postdoctoral Researcher, University of Liverpool in the U.K. (2000-2002); Postdoctoral Researcher, Stanford University (1997-2000); Researcher, International Institute of Genetics & Biophysics in Italy (1995-1996); English teacher in Colombia (1991-1992)

**Education**: Ph.D. comparative and molecular physiology, University of Liverpool (1996); B.Sc. marine biology, University of Liverpool (1991)

**Residence**: Arcadia

**Family**: Wife Rhoda, a family physician; four children ages 3, 6, 12, and 15; two dogs and two cats

**Hometown**: The Wirral, U.K. (outside Liverpool)

**Hobbies**: Fly fishing and surf fishing; vegetable gardening; aquarium fishkeeping

Gracey's interest in marine biology was forged as a child growing up near Liverpool in the U.K. He often accompanied his father, an avid amateur fisherman, on fishing trips. By age 14, he was raising discus fish – a notoriously finicky tropical species – in his home aquarium.

During college, Gracey initially planned to pursue a career in aquaculture, but ended up enrolling in a Ph.D. program that introduced him to the world of adaptive physiology. His doctoral research examined how small crustaceans known as copepods adapt to colder water temperatures.

As a USC professor, one of Gracey's main responsibilities is teaching freshman biology to about 250 students every fall. He describes the experience as "hard, hard work." He struggles to get students engaged, and he acknowledges he doesn't make any friends when he gives hard exams.

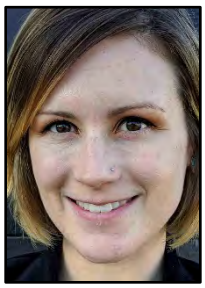
"But then you see students grow, and some students really get something out of the class – that's rewarding," he said.

In his spare time, Gracey is an avid fisherman. His favorite spots are the Los Angeles River in the Atwater Village area for carp fishing, and wading into the surf in Santa Monica before sunrise.

SCCWRP STAFF SPOTLIGHT

# Toxicologist inspired by field's many tradeoffs

Since she was an undergrad, Dr. Leah Thornton Hampton has been drawn to the tradeoffs associated with environmental toxicology work.



**Dr. Leah Thornton Hampton**

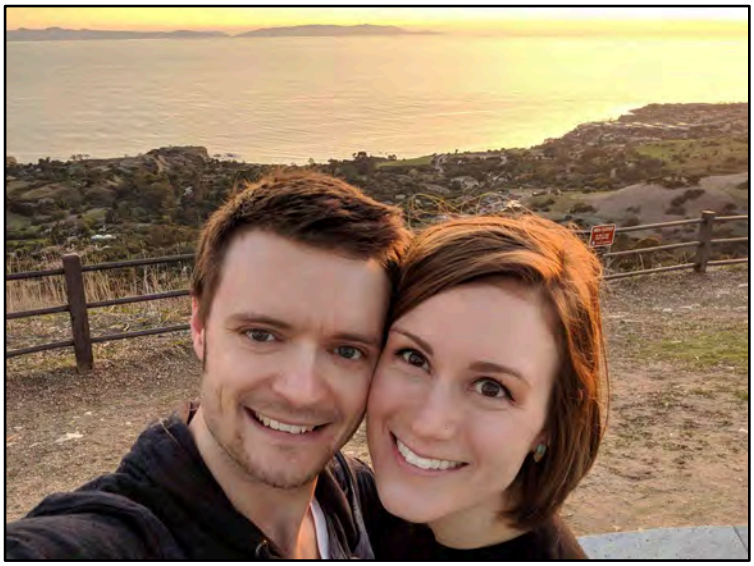
She loves the tension between the different possible toxicological approaches scientists can take to examining environmental challenges – and the inherent resource limitations that force them to make tough choices about which investigations to undertake.

"There are so many different directions and ways to approach problems in environmental toxicology," said Thornton Hampton, a toxicologist. "Some people get really stressed with environmental risk assessment, but that's what makes toxicology so fun to me – it's a giant puzzle where you're trying to meet everyone's needs."

Thornton Hampton, who defended her doctoral dissertation in March via videoconferencing, started a week later as a Scientist in the Toxicology Department.

She will focus on studying the fate and effects of microplastic particles in drinking water and ambient ecosystems – a foundational element of SCCWRP's rapidly expanding research program to understand how ubiquitous microplastics pollution may be impacting the health of aquatic animals and humans.

A zoology major in college, Thornton Hampton's career trajectory was shaped when she took her first undergraduate environmental risk assessment course at Miami University in Ohio.



**Dr. Leah Thornton Hampton enjoys a sunset hike near the Palos Verdes coast with husband Dalton in 2018.**

## Leah Thornton Hampton, Ph.D.

**Job**: Scientist, SCCWRP Toxicology Department (started March 2020)

**Prior jobs**: Graduate teaching assistant, Texas Christian University and University of North Texas (2013-2020)

**Education**: Ph.D. biology, University of North Texas (2020); M.S. biology, Texas Christian University (2015); B.S. zoology, Miami University (2013)

**Residence**: Long Beach

**Family**: Husband Dalton, an aerospace engineer; two cats, Archer and Morty

**Hometown**: Helena, Alabama

**Hobbies**: Scuba diving; baking; hiking

Soon after, she began working in a campus toxicology lab, where she met postdoctoral researcher Dr. Marlo Jeffries.

After Jeffries took a faculty position at Texas Christian University in Fort Worth, Thornton Hampton followed, training as a toxicologist under Jeffries and earning her M.S. in biology. She went on to earn her Ph.D. in biology from the University of North Texas, about 45 minutes north of Fort Worth.

Thornton Hampton's dissertation examined the effects of early-life-stage thryoid suppression on long-term immune function in fish.

About two years ago, Thornton Hampton began looking for jobs in the Los Angeles area, after her husband relocated to Hawthorne to work as a SpaceX engineer. Jeffries, who had collaborated in the past with SCCWRP's Dr. Alvina Mehinto, introduced her to SCCWRP.

"SCCWRP is my dream job," Thornton Hampton said. "We have such an incredibly unique opportunity here to influence environmental policy and real-world decisions."

A native of Helena, Alabama outside Birmingham, Thornton Hampton started swimming competitively at age 10. At Miami University, she swam the 100- and 200-yard backstroke and 200-yard medley. The highlight of her swimming career was competing in the 2012 U.S. Olympic Trials.

Now retired from swimming, she has transitioned to scuba diving – just for fun. In Southern California, she's most looking forward to exploring underwater kelp forests.

SCCWRP SCENES

# Virtual face to face

SCCWRP staff have not been able to see one another in person since the COVID-19 pandemic closed SCCWRP's offices in March. But that hasn't stopped staff from continuing to interact closely and regularly from home. Most SCCWRP meetings, trainings, workshops and other interactions are still being conducted face to face – they're just being done now through videoconferencing.


**SCCWRP staff assemble for a training workshop in April on how to use videoconferencing software to participate in and run virtual meetings. SCCWRP staff have learned how to effectively work from home during the COVID-19 pandemic.**