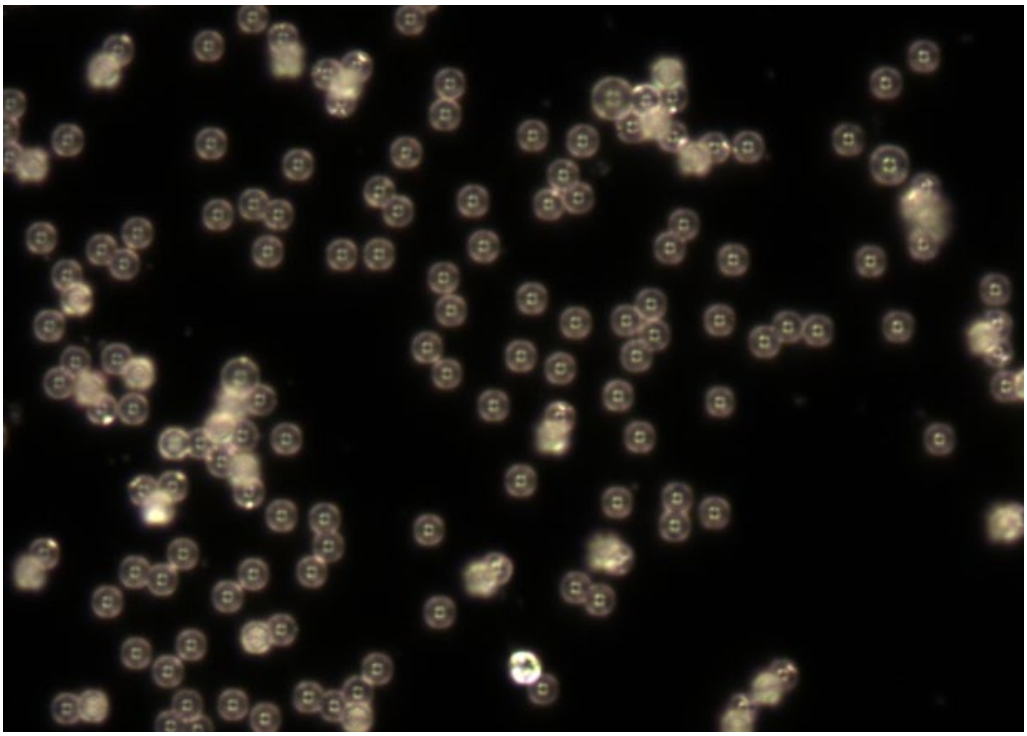

SCCWRP Director's Report

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SPRING 2021 ISSUE

International study to inform State microplastics policy

The State Water Resources Control Board has begun working to develop a draft policy requiring microplastics to be monitored in drinking water following an international, SCCWRP-facilitated study that evaluated multiple methods for measuring microplastics in aquatic environments.

The microplastics monitoring policy, expected to be released by State Water Board staff in draft form by the end of May, will specify how California should monitor microplastics in drinking water over an initial four-year period.

The development of the draft policy is being informed by an international study spanning 40 laboratories in six countries that examined precision, repeatability, cost and other issues associated with five different measurement methods: Raman spectroscopy, Fourier-transform infrared spectroscopy (FTIR), stereoscopy, stereoscopy with staining, and Pyrolysis-GCMS (gas chromatography/mass spectrometry).

The draft microplastics monitoring policy could be considered for State Water Board adoption as early as July.

Microplastics contamination is a growing management concern worldwide, with researchers finding microplastic particles in nearly every water body around the globe, although little is known about how they impact the health of humans and wildlife that inadvertently ingest them. Treatment processes are generally thought to be effective at reducing microplastics levels in drinking water.

During the method comparison study, the international research team developed SOPs (standard operating procedures) for the five measurement methods, as well as recommendations for how California could develop a formal statewide process for accrediting laboratories that measure microplastics in drinking water.

The draft microplastics monitoring policy will enable the State Water Board to meet a legislative deadline this year to begin

Contents

Cover photo: Clear polystyrene particles 5 microns in diameter glow in an image captured by Raman spectrometry technology in a SCCWRP laboratory. The technology is one of a handful of methods for quantifying microplastics contamination that researchers studied as part of an international effort to standardize measurement methods.

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

Calendar

Thursday, May 13
CTAG quarterly meeting
(Remote participation only)

Friday, June 11
Commission meeting
(Remote participation only)

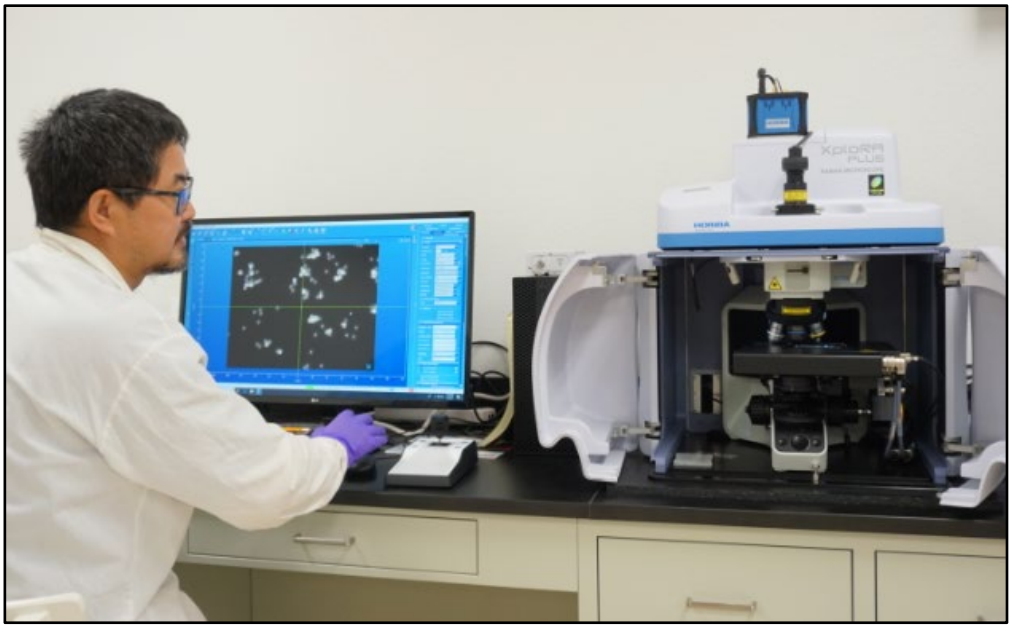
routinely monitoring microplastics in drinking water. The California Ocean Protection Council has a similar legislative deadline to develop capacity to monitor microplastics in the coastal ocean by the end of 2021.

The international research team expects that its suggested monitoring framework and laboratory best-practices recommendations for drinking water will be largely transferrable to the ambient environment – with some modifications. The main difference is that samples collected in the coastal ocean and other water bodies will require additional processing steps before microplastics levels and types can be accurately quantified.

International research participants view this work as a precedent-setting framework for how to improve the accuracy and comparability of microplastics measurement methods worldwide.

By the end of the summer, researchers anticipate reaching consensus on the effectiveness of these methods for measuring microplastics in seawater, sediment, and fish tissue samples. All of the findings and recommendations will be captured in journal manuscripts.

Microplastics are plastic particles that can be as small as 1 micron. Because they can be difficult to distinguish from other particles like plant material and cloth fibers using light microscopy, multiple measurements have been developed.



SCCWRP's Dr. Wayne Lao uses a Raman spectroscopy instrument to measure the levels of microplastic particles in a water sample. The laser-based microscope technology is one of a handful of microplastics measurement methods that an international team of researchers recently evaluated as part of an effort to support development of a draft policy requiring microplastics to be monitored in drinking water statewide.

Until the international method standardization study co-facilitated by SCCWRP, the relative effectiveness of these methods had never been compared in a side-by-side evaluation.

Last fall, SCCWRP began working to build international expert consensus on the health-based thresholds at which microplastics of different sizes, shapes and compositions can be expected to trigger adverse effects in wildlife and humans. The findings from this workshop are expected to be finalized later this year.

For more information, contact Dr. Charles Wong.

Study offers insights for measuring COVID-19 in wastewater, reducing variability

SCCWRP and its partners have developed an improved understanding of what contributes to sources of variability in methods for measuring COVID-19 virus levels in wastewater streams – key insights that can help water-quality managers use wastewater influent to track the prevalence of COVID-19 infections in communities.

The SARS-CoV-2 measurement methods comparison study, completed in April, examined how efforts to quantify virus levels in wastewater can be impacted by numerous sources of variability in the specific measurement methods used.

Because the virus is so new, multiple measurement methods – and multiple variations of methods – are presently being used to store, process and analyze wastewater samples for the COVID-19 virus. Improved standardization will help ensure that the methods can produce reliable, comparable data.

Water-quality managers need to understand the impacts of all of these potential sources of variability as they work toward building a wastewater surveillance system that can provide ongoing, routine monitoring of COVID-19 community infection rates.

COVID-19 wastewater monitoring has the potential to provide an early-warning indicator of upticks in community infections, providing critical lead time for public health officials working to contain outbreaks.

Wastewater monitoring also could offer more comprehensive, accurate insights about community infection rates than individual testing, which is disproportionately weighted to the subsets of the population choosing to be tested.

Already, more than 40 wastewater treatment agencies in California – including all four of SCCWRP's wastewater member agencies – have begun measuring the COVID-19 virus in their wastewater streams.

Although the data are being reported to public health officials, researchers first need to understand how variations in the methods used to measure virus levels may have affected the accuracy and comparability of the results.

During the measurement methods comparison study, SCCWRP and its partners conducted a series of controlled experiments to directly compare the accuracy, repeatability and comparability of different measurement methods and variations of methods.

Researchers found that some variables have a disproportionately large impact on measurement sensitivity, including the use of pasteurization to neutralize viral particles and the use of freezing to preserve samples. Researchers have recommended avoiding both techniques, and instead chemically inactivating viruses and concentrating viruses on a filter before freezing, respectively.

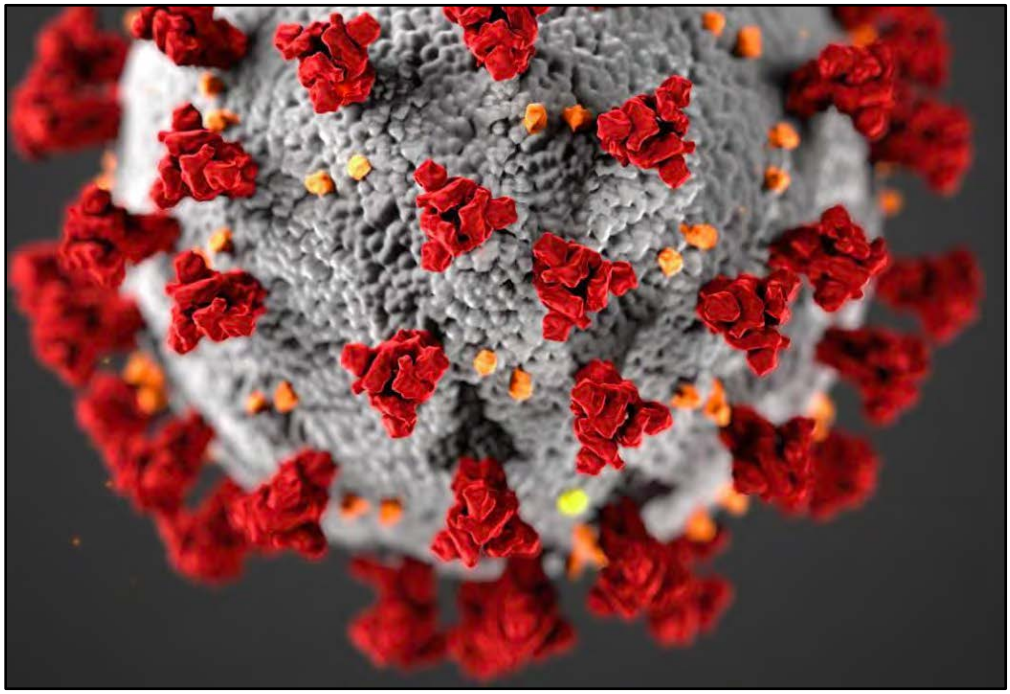


Image courtesy of U.S. Centers for Disease Control and Prevention

The SARS-CoV-2 virus, pictured in this artist rendering, is prevalent in wastewater streams entering treatment plants. SCCWRP and its partners, including all four of SCCWRP's wastewater member agencies, have developed best-practices guidance for how to improve methods for measuring COVID-19 virus levels in wastewater streams. The work is a key part of an ongoing national effort to use wastewater influent to track the prevalence of COVID-19 infections in communities.

Researchers, meanwhile, found that other types of variability in measurement methods had less of an impact on results, including which specific gene target is used to quantify the virus's RNA, and whether grab vs. composite samples are collected.

The study also identified approaches that could improve the accuracy of results, including inactivating the virus chemically and concentrating the virus using filters.

The California Water Quality Monitoring Council, which has formed a subcommittee to explore how to synchronize and compare COVID-19 wastewater data, will use the results of the SCCWRP-led study to inform its ongoing deliberations. The subcommittee is working to develop recommendations about how California should make use of the data going forward, including correlating the data to clinical testing data.

The study's findings add to a growing body of knowledge about variability when measuring COVID-19 virus levels in wastewater.

For example, an interlaboratory comparison study published earlier this year by the Water Research Foundation found that laboratories analyzing the same set of samples can generate data with 100- to 10,000-fold differences in virus concentrations measured, underscoring the importance of reducing these sources of measurement variability.

SCCWRP has been coordinating closely with multiple organizations that are working to reduce measurement variability.

For more information, contact Dr. John Griffith or Dr. Joshua Steele.

Agreement reached on process for evaluating environmental flow needs of L.A. River

A diverse coalition of water-quality managers has reached agreement on a scientific process for evaluating whether flows in the Los Angeles River can be reduced for water-recycling purposes while simultaneously protecting the ecological and recreational benefits provided by the river's flows.

The agreed-upon process for evaluating environmental flow requirements – described in a SCCWRP technical report published in early May – represents the culmination of three years of research and extensive deliberations about how to use science to inform managers' options for balancing competing demands on the L.A. River's limited flows.

The study, which was co-led by SCCWRP, is expected to serve as a precedent-setting template that paves the way for managers to set environmental flow decisions statewide.

More than 50 stakeholders endorsed the technical approach for evaluating environmental flow targets, including wastewater agencies that discharge treated effluent into the river, stormwater management agencies that manage wet and dry weather runoff into the river, water-quality regulatory agencies and other stakeholders.

Water-quality managers for the L.A. River and similar effluent-dominated streams plan to immediately use the new approach to evaluate if and/or how much flows can be diverted while still protecting ecological and recreational benefits.

Already, two wastewater agencies that discharge treated effluent into the L.A. River have applied for regulatory approval, under State Water Code Section 1211, to begin recycling more of their effluent. More agencies are expected to seek this regulatory approval in the coming years as more water gets recycled across drought-prone Southern California.

Treated wastewater effluent is discharged into the Los Angeles River from the nearby L.A.-Glendale Water Reclamation Plant. A diverse coalition of water-quality managers for the river has reached agreement on a scientific process for evaluating if and how the river's flows can be reduced for water-recycling purposes while simultaneously protecting the ecological and recreational benefits provided by the river's flows.

The agreed-upon approach for evaluating environmental flow targets consists of a scientifically defensible toolkit that enables managers to systematically consider the ecological flow needs of multiple sensitive species and habitats along an urban, 45-mile stretch of the L.A. River. The approach also considers the multiple recreational benefits provided by the river's flows, including fishing and kayaking.

Historically, these types of environmental flow analyses have been limited in scope, consisting of just a few endpoints, such as protecting a single species or a single beneficial use.

The L.A. River approach also is aligned with the California Environmental Flows Framework, a standardized, multi-step process that guides managers in developing environmental flow targets for streams statewide. The L.A. River approach is designed specifically to help managers develop scientifically sound flow targets for Southern California's effluent-dominated streams.

The tools built to support the L.A. River's flow evaluation approach already have been adapted and used for other projects, including an ongoing effort to restore more natural flow patterns to streams in southern Orange County and a study examining how future expected changes in stream flow patterns across the San Diego region will impact sensitive aquatic species and habitats.

For more information, contact Dr. Eric Stein.

Tool released to help determine whether streams subject to Clean Water Act oversight

A SCCWRP-developed tool that can help watershed managers determine which streams the federal government has jurisdiction to regulate under the Clean Water Act has been released in beta form for use across the nation's arid western states.

The Streamflow Duration Assessment Method for the Arid West (SDAM AW), released in March by the EPA and the U.S. Army Corps of Engineers, is designed to help managers rapidly distinguish among intermittent, ephemeral and perennial stream reaches.

This distinction is important because under a rule change finalized in early 2020 by the Trump administration, entities that discharge into certain ephemeral streams may not be required to obtain discharge permits from the federal government.

In Southern California, the SDAM AW tool also can be used to help identify stream reaches that watershed managers would vs. wouldn't want to consider evaluating during routine stream assessments, and to identify stream reaches where stream biological integrity goals may vs. may not apply.

Ephemeral streams, which are streams that only experience brief surface flows as a direct result of rain events, are often difficult to distinguish from intermittent streams, which experience sustained seasonal flows from snow melt and groundwater, unless managers have collected long-term hydrologic data for the site.

In recent years, the EPA has prioritized improving regulatory agencies' ability to distinguish among different stream types. Traditionally, distinguishing ephemeral streams from intermittent streams has required obtaining long-term records from gauges or rigorous hydrologic models – neither of which exists for most streams.

The SDAM AW tool determines the duration of stream flows using easily observed field indicators, including wetland vegetation and aquatic invertebrates.

SCCWRP's Dr. Raphael Mazor, left, and Hayden Franciscus take measurements in the dry streambed of a tributary to Lytle Creek in San Bernardino County in an effort to determine whether the stream is intermittent or ephemeral. SCCWRP has developed a new tool that uses easily observable field indicators to determine the flow duration of stream reaches across the nation's arid western states.

Although California does not distinguish among ephemeral, intermittent and perennial streams under the Porter-Cologne Water Quality Control Act of 1969, the tool is being used for more than just jurisdictional determination. For example, watershed managers plan to use the tool to map the locations of intermittent and perennial stream reaches across Southern California during the next cycle of the Southern California Stormwater Monitoring Coalition (SMC) Regional Watershed Monitoring Program, which kicks off this spring.

A number of court cases that center around the Clean Water Act have underscored the importance of being able to distinguish among streams by their flow patterns. For example, the 2006 Supreme Court case Rapanos V. U.S. affirmed that the Clean Water Act applies only to traditionally navigable waters and to tributaries that have a "significant hydrologic nexus" with navigable waters.

In interpreting these court decisions, the executive branch then typically uses stream flow duration information as the basis for developing rules clarifying the Clean Water Act's applicability to streams.

SCCWRP's SDAM AW tool has resonated with the EPA, which has asked SCCWRP to develop comparable versions of the SDAM AW tool for other regions of the U.S., including Western Mountains and Great Plains.

To support the tool's implementation across the Arid West, SCCWRP has created a user manual, field data collection forms, a report generating tool, and extensive training resources – all available through a central hub.

The beta version of the SDAM AW tool is expected to be finalized about a year from now.

For more information, contact Dr. Raphael Mazor.

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

SCCWRP guiding development of DNA-based stream bioassessment programs in Alaska

SCCWRP has begun working with the federal Bureau of Land Management in Alaska to build capacity to evaluate the health of waterways using DNA-based tools for conducting routine bioassessment work.

The BLM's Alaska office in April asked SCCWRP – a national leader in the development of bioassessment tools for routine monitoring applications – to help incorporate DNA-based methods into its existing stream bioassessment programs. As in California, Alaska's bioassessment programs rely primarily on identifying organisms manually under a microscope, which is time- and labor-intensive.

SCCWRP is guiding the Alaska BLM program in selecting DNA-based tools for conducting routine bioassessment work across a large, remote region, including the best methods, protocols and applications to adopt for monitoring programs statewide.

Much of SCCWRP's expertise and perspective has been shaped through its leadership role with the California Molecular Methods Workgroup, a workgroup of the California Water Quality Monitoring Council that has been working to standardize DNA-based methods for bioassessment work in California.

A SCCWRP field crew collects algae samples from the Santa Margarita River that spans Riverside and San Diego Counties. The federal Bureau of Land Management in Alaska is tapping into SCCWRP's expertise adapting DNA-based methods to analyze stream algae samples to help the agency incorporate DNA-based methods into its existing stream bioassessment programs.

Stream causal assessment tool under development to ID likely causes of degradation

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

The web interface for the Rapid Screening Causal Assessment tool – which researchers began building in March – is designed to speed up the traditionally time-consuming process of analyzing stream bioassessment data to pinpoint which stressors are responsible for poor stream condition. It builds on previous work in the San Diego and Santa Ana River watersheds.

The screening tool will consider a wide range of potential stressors, including habitat degradation, eutrophication, elevated ionic concentration, altered water temperature and altered flows. Causal assessment analyses for individual stream sites will be presented on an interactive, visual dashboard. The project also will focus on developing protective tools to maintain the biological integrity of streams already in good health.

The screening tool is initially being built for application in the San Gabriel River watershed, with the goal to eventually scale it up for use statewide.

CLIMATE CHANGE

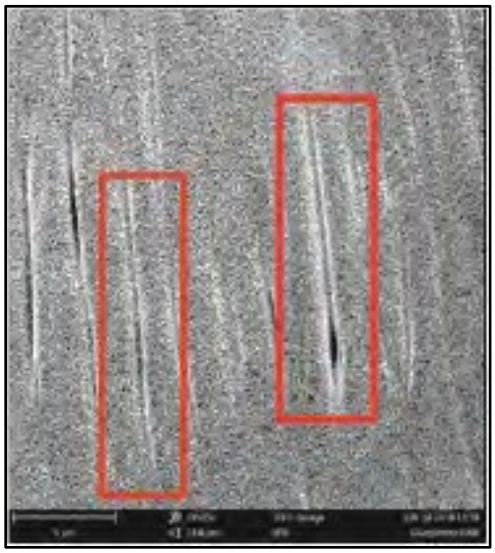
Workshop teaching stakeholders how to evaluate uncertainty in acidification modeling

SCCWRP and two of its member agencies have helped launch a multi-part workshop to teach coastal water-quality managers how to evaluate uncertainty in a set of West Coast models that predicts how marine life could be adversely affected by ocean acidification and hypoxia (OAH).

The workshop, which began in mid-April and concludes May 28, is educating Southern California and San Francisco Bay Area stakeholders about the uncertainty associated with the West Coast physical-biogeochemical ocean models that were developed to estimate how OAH will intensify in the coming years. The workshop also is examining the uncertainty associated with predicting how marine life will respond to changing OAH conditions.

The modeling uncertainty workshop is taking place as a team of researchers begins using the West Coast models to estimate OAH's intensifying effects on marine life, including what role, if any, land-based nutrient discharges play in exacerbating biological impacts.

The workshop was co-organized by the Sanitation Districts of Los Angeles County, City of San Diego, San Francisco Estuary Institute and the Bay Area Clean Water Agencies. The workshop will culminate with a May 28 panel discussion among researchers and stakeholders about how to provide input and perspectives on uncertainty in the ongoing modeling work.



Extensive pit marks are visible on the carapace, or exoskeleton, of Dungeness crab larvae magnified 11,000 times, as a result of coastal ocean acidification. SCCWRP and two of its member agencies have helped launch a multi-part workshop to teach coastal water-quality managers how to evaluate the modeling uncertainty associated with predicting how marine life will respond to changing OAH conditions in the coming decades.

Modeling effort examining role of kelp farms in potentially mitigating coastal acidification

SCCWRP and its partners have begun working to integrate a pair of Southern California Bight computer models as part of an ongoing study examining how future offshore kelp farms could potentially offset the impacts of coastal ocean acidification.

Model integration, which began earlier this year, involves coupling a model that predicts how coastal waters will be impacted by intensifying ocean acidification with a model that predicts, among other things, how kelp farms could potentially lower nutrient and carbon dioxide levels in coastal waters.

Researchers hope to use the coupled model to help managers identify optimal, potential future locations for offshore kelp farms, which use up – and thus remove – nutrients and carbon dioxide from the water column as part of their natural photosynthetic processes.

Excess nutrients and elevated carbon dioxide levels can exacerbate coastal acidification, underscoring the need to identify potential management solutions for mitigating these changes to seawater chemistry.

CONTAMINANTS OF EMERGING CONCERN

Methods to be standardized for 3 additional bioanalytical screening tools

SCCWRP and its partners have launched a two-year effort to develop standardized methods for screening water bodies for bioactive chemical contaminants using three bioanalytical screening tools – an effort to more than double the number of bioanalytical tools standardized for routine management use.

The project, launched in January, will focus on optimizing procedures for sample extraction and analysis for the glucocorticoid receptor (GR) assay, androgen receptor (AR) assay and peroxisome proliferator-accelerated receptor (PPAR) assay. The first two assays screen for certain classes of endocrine disruptors, while the third assay screens for classes of metabolism-disrupting chemicals.

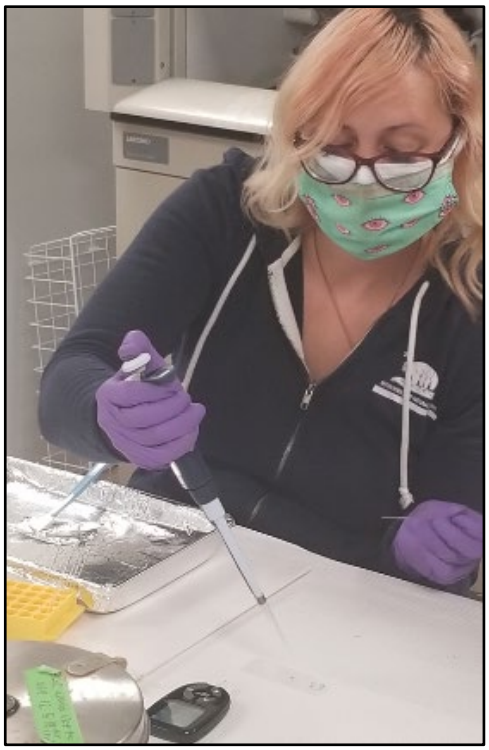
Researchers already have developed standardized methods for the estrogen receptor assay and the aryl hydrocarbon receptor assay. Last year, California responded by becoming the first U.S. state to require recycled water for potable reuse to be screened using these two assays.

The development of standardized methods for the three additional assays will be done through an expanded partnership with the Water Research Foundation, a strategic SCCWRP partner in transitioning these tools into routine use by the water-quality management community.

Effort launched to link glucocorticoid receptor bioassay to biological impacts in fish

SCCWRP and its partners completed an initial round of lab experiments in March for a study investigating how the glucocorticoid receptor (GR) assay could be used to provide an early-warning indicator that certain classes of bioactive chemical contaminants in aquatic environments are potentially triggering adverse biological impacts in fish.

Researchers' goal is to understand the relationship, or linkage, between how this type of bioanalytical assay responds to exposure to glucocorticoid chemical contaminants, and how fish respond to exposure to the same contaminant levels. The study will pave the way for developing bioscreening thresholds for the GR assay that are sufficiently protective of fish health.



SCCWRP's Ellie Wenger transfers a small aliquot of plasma from a fish exposed to a synthetic glucocorticoid to a specimen slide for analysis under a microscope. Researchers are seeking to document adverse health effects from exposure to this bioactive contaminant, part of an ongoing study investigating how the glucocorticoid receptor (GR) assay could be used to provide an early-warning indicator of potentially adverse biological effects in fish that have been exposed to glucocorticoids.

Previously, SCCWRP and its partners documented a similar linkage between the estrogen receptor assay and adverse biological effects in fish following exposure to estrogen-mimicking chemicals.

Researchers expect that developing such a linkage for glucocorticoids – commonly found in anti-inflammatory steroids – will be more challenging than estrogen-mimicking chemicals, as the biological effects of fish exposed to glucocorticoids are less well-documented than for fish exposed to estrogen-mimicking chemicals.

Researchers are initially tracking linkages between the fish's glucose metabolism and immune responses.

STORMWATER BMPs

SCCWRP asked to host upcoming international conference on stormwater modeling

SCCWRP has been asked to organize and host an international conference in early 2022 that will focus on improving modeling of urban stormwater drainage systems.

The triennial Urban Drainage Modeling Conference, scheduled to take place January 10-12, 2022 at SCCWRP, will provide a forum for engineers, scientists, and others to advance the modeling work that underlies many routine stormwater planning and permitting activities.

Topics relevant to Southern California will include changing assumptions about historical models due to climate change and fires, as well as Reasonable Assurance Analysis, a type of modeling used to demonstrate whether planned stormwater BMPs (best management practices) will achieve their intended water-quality improvement targets in the future.

SCCWRP is working closely with the Joint Committee on Urban Drainage to put together the conference, which will allow attendees to attend in person or via the web. For more information and to get involved, visit udm2022.org or contact Dr. Elizabeth Fassman-Beck.

Method being developed to quantify water-quality benefits of turf replacements

SCCWRP and its partners have launched a study with the County of San Diego to develop a method for measuring the water-quality benefits associated with replacing residential turf grass with native, drought-tolerant landscaping.

The study, launched in April, represents a first-of-its-kind effort to quantify the value of turf replacements, which are a type of stormwater BMP (best management practice) designed to reduce use of irrigation water and eliminate irrigation-derived runoff.

Municipalities commonly offer property owners rebates and incentives for turf replacements, even as their effectiveness in achieving runoff water-quality goals has historically not been measured.

The study could be used to help the County develop a crediting scheme for property owners who invest in turf replacements to reduce irrigation-derived runoff, which is a major source of dry-weather runoff contamination. Researchers also hope to develop evidence-based design guidance to help ensure that turf replacements achieve expected levels of performance.

REGIONAL MONITORING

Bight '18 study documents domoic acid across coastal ocean seafloor

The Southern California Bight 2018 Regional Monitoring Program has completed a study examining how a toxin produced by a certain ubiquitous type of marine algae can settle and stick to seafloor sediment, and then accumulate in the tissues of small, sediment-dwelling organisms exposed to the toxin.

The study, published in February as a Bight '18 final assessment report, detected domoic acid in sediment across 54% of the Southern California Bight continental shelf. Domoic acid also was consistently found throughout the year in the organisms that live in and on sediment – known as benthic infauna – even at times of the year when domoic acid isn't being produced, and even in places where the toxin could not be detected in the surrounding sediment.

Domoic acid is produced by *Pseudo-nitzschia*, the most common type of harmful algal bloom (HAB) found in Southern California's coastal ocean. The toxin can strand and kill marine mammals, and sicken humans who consume contaminated seafood.

The Bight '18 Harmful Algal Blooms (HABs) study marks the first regional assessment of domoic acid in Southern California coastal sediment and benthic tissue, and lays the groundwork for future research, including probing whether the toxin is being transferred from benthic infauna to fish consumed by humans.

Draft SOPs developed for monitoring estuaries statewide

SCCWRP and its partners have developed a set of standardized methods for collecting field data on the health of California's coastal estuaries, part of an ongoing effort to develop a consistent, statewide estuarine monitoring framework.

The draft monitoring SOPs (standard operating procedures), which were completed in March, will enable estuary managers to evaluate priority ecological functions of estuary sites over a three-day field sampling period.

Researchers are using the SOPs to support development of a comprehensive monitoring framework for coastal estuaries, including California's two dozen estuarine Marine Protected Areas (MPAs). Although monitoring programs exist for estuaries across California, these programs have never been coordinated, limiting data comparability and managers' ability to track the overall health of estuaries statewide.

Estuary managers have completed a first round of testing of the SOPs at 15 estuary sites statewide. The California Ocean Protection Council intends to use the new monitoring framework to report on the health of California's estuarine MPAs in 2024.

Image courtesy of Wood Environment and Infrastructure

SCCWRP and its partners are working to develop and a standardized monitoring framework for assessing the condition of California's coastal estuaries, including Upper Newport Bay in Orange County, above, one of the State's estuarine Marine Protected Areas (MPAs).

ADDITIONAL RESEARCH

Phase 2 sampling underway for study examining how to update copper concentration limits for streams

SCCWRP and its partners have begun collecting water quality data from three additional watersheds in the Los Angeles region as part of an ongoing effort to evaluate the feasibility of using a toxicity analysis method known as the Biotic Ligand Model (BLM) to develop copper site-specific objectives for freshwater streams.

The expanded Phase 2 sampling effort, launched in February, will complement data collected from two watersheds during an initial sampling phase last year. The goal of both sampling efforts is to fill in data gaps that researchers identified after inventorying historical water quality data from streams.

Collecting the data is a necessary precursor for researchers to generate BLM results for Los Angeles-area streams. The BLM estimates how chemical characteristics of a water body influence the bioavailability and, ultimately, the toxicity of metal contaminants such as copper.

The Los Angeles Regional Water Quality Control Board is interested in potentially using the BLM to 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.

New SCCWRP Publications

Journal Articles

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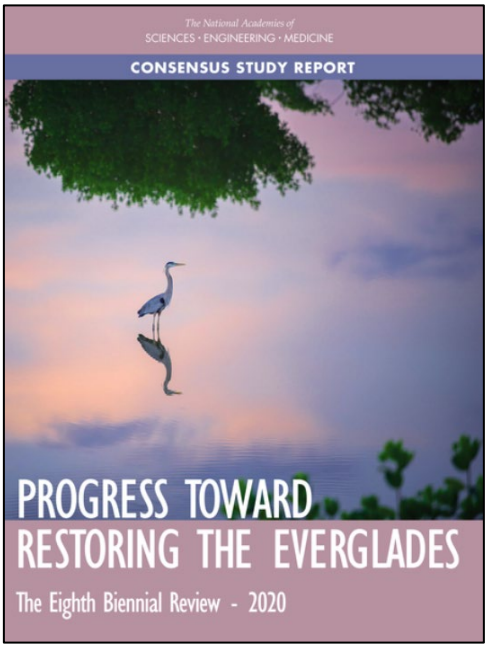
Gillett, D.J., L. Gilbane, K.C. Schiff. 2021. Characterizing Community Structure of Benthic Infauna from the Continental Slope of the Southern California Bight. *Frontiers in Marine Science* 8:605858.

Mehinto, A.C., L.M. Thornton Hampton, D. E. Vidal-Dorsch, N. Garcia-Reyero, M.A. Arick 2nd, K.A. Maruya, W. Lao, W., C. D. Vulpe, M. Brown-Augustine, A. Loguinov, S. M. Bay. 2021. Transcriptomic response patterns of hornyhead turbot (Pleuronichthys verticalis) dosed with polychlorinated biphenyls and polybrominated diphenyl ethers. *Comparative Biochemistry and Physiology. Part D, Genomics & Proteomics*, *38*, 100822. DOI:10.1016/j.cbd.2021.100822.



The National Academies of Sciences, Engineering and Medicine has published its 2020 biennial review of ongoing restoration efforts in the ecologically fragile habitats of the Florida Everglades. SCCWRP's Dr. Martha Sutula was invited by the prestigious organization to serve as one of the book's co-authors.

Nissen, K.A., M. Borst, E. Fassman-Beck. 2020. Bioretention planter performance measured by lag and capture. *Hydrological Processes* DOI:10.1002/hyp.13927.

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Quarter in Review

Conference Presentations

Coffin, S., S. Weisberg, C. Wong, L.M. Thornton Hampton, A. Mehinto, E. Miller. California's Path Towards Assessing Risks and Developing Regulations for Microplastics. Southern California Chapter of the Society of Environmental Toxicology and Chemistry 2021 Annual Meeting. April 26-28, 2021. Via webinar.

Ho, M. Contamination and anthropogenic effects (session moderator). Pacific Estuarine Research Society-California Estuarine Research Society 2021 Joint Annual Meeting. April 22-24, 2021. Via webinar.

McLaughlin, K., K. Schiff. Using Collaborative Regional Surveys to Assess Ocean Acidification. National Monitoring Conference. April 19-23, 2021. Via webinar.

McLaughlin, K. Regional Monitoring in an Era of Shifting Baselines (session moderator). National Monitoring Conference. April 19-23, 2021. Via webinar.

McLaughlin, K. Estuaries (session moderator). National Monitoring Conference. April 19-23, 2021. Via webinar.

McLaughlin, K. Posters (session moderator). National Monitoring Conference. April 19-23, 2021. Via webinar.

Smith, J., M. Sutula, K. Bouma-Gregson, M. Van Dyke. Development of a Multifaceted Statewide Strategy for the Monitoring and Assessment of Freshwater Harmful Algal Blooms in California. National Recreational Water Quality Workshop. April 6-8, 2021. Via webinar.

Schiff, K., R. Mazor. The California Stream Quality Index: A tool that helps quantify and assess impacts from multiple stressors. National Monitoring Conference. April 21, 2021. Via webinar.

Schiff, K. Illegal Discharge Detection and Elimination (IDDE) for human sources of bacteria (workshop facilitator). National Stormwater Conference. April 16, 2021. Via webinar.

Stein, E. Wildfire Effects on Coastal Ecosystems (talk and panel discussion). Implementing and Scaling Resilient Solutions in Coastal California conference. March 2-3, 2021. Via webinar.

Theroux, S. California Dreaming of Molecular Methods for Bioassessment. National Water Monitoring Conference. April 20, 2021. Via webinar.

Thornton Hampton, L.M., S. Coffin. ToMEx: Toxicity of Microplastics Explorer Demonstration. Pacific Northwest Consortium on Plastics 2021 Annual Meeting. April 15-16, 2021. Via webinar.

Wong, C.S. Microplastics measurement interlaboratory calibration study for drinking water. ThermoFisher Global Microplastics Symposium. April 13-15, 2021. Via webinar.

Wong, C.S. What we know and what we need to know: the analysis, monitoring and effects of microplastics in humans and the environment. Society of Environmental Toxicology and Chemistry Europe virtual seminar. March 23, 2021. Via webinar.

Conference Posters

Renick, V., E. Wenger, V. Phonsiri, C. Nguyen, G. Robertson, A. Mehinto. An Evaluation of Bioanalytical Screening Tools to Assess Contaminants of Emerging Concern in Wastewater and in the Receiving Environment. Southern California Chapter of the Society of Environmental Toxicology and Chemistry 2021 Annual Meeting. April 26-28, 2021. Via webinar.

McLaughlin, K. The Southern California Bight Regional Marine Monitoring Program: A Collaborative Monitoring Program Assessing Human Impacts on Coastal Marine Habitats. California Estuarine Research Society/Pacific Estuarine Society Joint Conference. April 22-24, 2021. Via webinar.

Other Presentations

McLaughlin, K. Results of the Southern California Bight Regional Marine Monitoring Program Trash Assessment. OC Stormwater Trash and Debris Task Force. February 16, 2021. Via webinar.

Schiff, K. Water Quality Research at SCCWRP. California State University, Fullerton. February 3, 2021. Via webinar.

Stein, E., and K. Taniguchi-Quan. Characterizing Environmental Flows Using a Functional Flows Approach. Australian Commonwealth Environmental Water Office Flow-Mer Webinar Series. March 11, 2021. Via webinar.

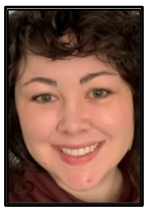
Sutula. M. Ingredients to a Solution: Addressing Climate Change Stress on Nearshore Ecosystems in the Southern California Bight. US Coastal Research Program Harmful Algal Bloom and Nutrients. January 6, 2021. Via webinar.

Weisberg, S.B. California Water Quality Monitoring Council activities to enhance use of wastewater based epidemiology. California Water Environment Association seminar series on COVID. April 21, 2021. Via webinar.

Weisberg, S.B. Closing plenary talk. USEPA National Beach Conference. April 8, 2021. Via webinar.

SCCWRP Personnel Notes

New Faces



Dr. **Kylie Langlois**, who just earned a Ph.D. in biological oceanography from Stony Brook University in New York, joined SCCWRP in March as a Senior Research Technician in the Microbiology Department.

Promotions

Kristine Gesulga, who has worked as a part-time Laboratory Assistant in the SCCWRP Chemistry Department since fall 2019, is being promoted to a full-time Research Technician in the Biology Department in mid-May. She just earned a B.S. in microbiology from California State University, Long Beach.

Emily Darin, who has worked as a part-time Laboratory Assistant in the SCCWRP Toxicology Department since early 2020, was promoted to a full-time Research Technician in May. She is expected to earn a B.S. in marine biology from California State University, Long Beach later this year.

CTAG

Dr. **Jason Freshwater**, an Environmental Scientist for the Santa Ana Regional Water Quality Control Board, was appointed a CTAG Representative in April, replacing Jason Bill, who is leaving the Santa Ana Regional Board. Bill served on CTAG for two years.

Scientific Leadership

Dr. **Elizabeth Fassman-Beck** has been appointed conference chair for the 12th Urban Drainage Modeling Conference, an international conference of the International Working Group on Data and Models scheduled for January 2022.

Dr. **David Gillett** has been appointed a panelist for the Alabama Center of Excellence RESTORE Act proposal review panel.

Dr. **Karen McLaughlin** was appointed to the Planning and Program Committees for the National Monitoring Conference, held April 19-23, 2021 via webinar.

Ken Schiff has been appointed to the Whole Effluent Testing Advisory Technical Committee and Interest Group for the Society of Environmental Toxicology and Chemistry.

Ken Schiff has been re-appointed Editor of the journal *Marine Pollution Bulletin*.

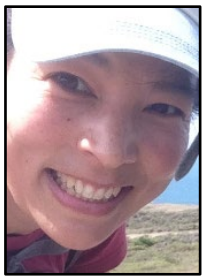
Dr. **Eric Stein** has been appointed an Associate Editor for the Hydrology and Hydroecology section of the journal *Water*.

Dr. **Eric Stein** has been appointed a Topic Editor for the "Environmental Flows in an Uncertain Future Research" topic of the journal *Frontiers in Environmental Science.*

SCCWRP COMMISSIONER SPOTLIGHT

EPA regulator prioritizes forming partnerships

The enforcement aspects of Tina Yin's job with the U.S. Environmental Protection Agency, Region 9 aren't what get her most excited.



Tina Yin

Although Yin's job is to provide regulatory oversight of water-quality standards and assessment programs across multiple states, territories and tribes, Yin's office also partners with these same agencies to collaboratively develop, fund and implement water-quality management programs. These on-the-ground interactions are what makes Yin's job so personally rewarding.

"I'm a partner helping helping my clients to build and implement effective clean water programs," said Yin, Standards and Assessment Section Manager in EPA Region 9's Water Division. "I'm not just a regulator – I'm in it to win it."

Yin, who has served as a SCCWRP Alternate Commissioner since 2019, holds the EPA role formerly occupied by Janet Hashimoto, a SCCWRP Alternate Commissioner for 28 years until she relocated to Hawaii in 2018 on a work assignment.

Yin oversees a nine-member staff that partners with a diverse range of water-quality managers across the U.S. Pacific Southwest region to develop and implement water-quality assessment programs and standards that comply with the federal Clean Water Act.

Yin has spent her entire 19-year EPA career in Region 9's Water Division in San Francisco. She started as an EPA Presidential Management Fellow in 2002 after finishing grad school at the University of Michigan School of Natural Resources and Environment, and has worked in multiple Water Division programs.

Tina Yin enjoys a walk with her foster dog, Bubba-Smurf, in Wildcat Canyon Regional Park in the San Francisco Bay Area in February.

Tina Yin

Job: Standards and Assessment Section Manager, Water Division, U.S. Environmental Protection Agency, Region 9 (2019-present)

SCCWRP role: Alternate Commissioner (started December 2019)

Prior jobs: Life Scientist/Environmental Protection Specialist, EPA Region 9 (2004-2019); EPA Presidential Management Fellow (2002-2004); Environmental Programs Associate, National Association of Service and Conservation Corps (1998-2000); Conservation Program Associate, American Rivers (1996-1998)

Education: M.S. environmental resources management, University of Michigan (2002); B.A. environmental studies, State University of New York, Binghamton (1996)

Residence: Berkeley, California

Pets: Foster dog Bubba-Smurf, a blue nose pitbull/genetic anomaly

Birthplace: Falls Church, Virginia

Hobbies: Hiking; reading and watching sci-fi/fantasy; camping and backpacking; surfing; snowboarding; international travel

"I believe in the Clean Water Act, and I believe that effective implication of programs at the regional level can lead to real water-quality improvements and protection," Yin said.

Yin, who was born and raised in the U.S. but moved with her family to Singapore during her teen years, got her first brush with environmental work in high school. Yin's biology teacher invited her to help track the health of a small, urban rain forest by studying gaps in the rainforest canopy where sunlight comes through.

After earning a B.A. in environmental studies, Yin worked in the environmental advocacy world, including a two-year stint as an Environmental Programs Associate for American Rivers in Washington, D.C.

One thing Yin appreciates about being part of the SCCWRP Commission is the diversity of voices.

"We need all the stakeholders coming together, so everyone develops confidence in the science," Yin said. "Good policy is based on strong, sound science."

In her spare time, Yin spends lots of time outdoors – hiking, camping, kayaking and surfing. After a long surfing hiatus, she looks forward to returning to her favorite Bay Area surfing spot in Bolinas in Marin County.

SCCWRP PARTNER SPOTLIGHT

Drinking water manager tackles microplastics

When the State Legislature passed a law three years ago requiring microplastics to be monitored in drinking water, Dr. Terri Slifko knew California would have a long way to go to successfully implement this requirement by 2021.

Dr. Terri Slifko

That's why Slifko and her team at the Metropolitan Water District of Southern California decided to take part in an international, SCCWRP-facilitated study to standardize laboratory methods for measuring microplastics in drinking water and other matrices.

"As a stakeholder with water supplies to monitor, we wanted to help advance the science, to contribute the drinking water perspective," said Slifko, Water Quality Manager for Metropolitan's Chemistry Unit. "We understood there was a big knowledge gap between the science and the State's new monitoring requirements."

Since the study kicked off in 2019, participants have developed SOPs (standard operating procedures) for multiple microplastics measurement methods that will support development of a draft State Water Board microplastics monitoring policy. Slifko and her team, meanwhile, gained valuable, hands-on experience and perspective about microplastics monitoring.

"We came in with zero experience, and now we're able to support our member agencies, plan for our future research needs and better gauge the directions the State is taking," Slifko said.

On a personal level, Slifko's interactions with SCCWRP date back more than a decade. Her prior job was working as an Associate Environmental Scientist for the Sanitation Districts of Los Angeles County from 2007 to 2012 – during which she supported development of rapid DNA-based methods for monitoring recreational waters in California through the SCCWRP-hosted Southern California Beach Water Quality Workgroup.

Dr. Terri Slifko, third row center, and members of her staff hold up artwork they created as part of a "You are Part of the Big Picture" team-building exercise in February 2020. Slifko organized the event, in which each staff member painted a segment of a bigger image of Riverside County's Diamond Valley Lake.

Theresa Slifko, Ph.D.

Job: Water Quality Manager, Chemistry Unit, Metropolitan Water District of Southern California (2012-present)

SCCWRP role: SCCWRP collaborator on microplastics research

Prior jobs: Associate Environmental Scientist, Sanitation Districts of Los Angeles County (2007-12); part-time Assistant Professor of Biomolecular Sciences, University of Central Florida (2004-07); Staff Scientist, Orange County Utilities in Orlando (2000-07); Graduate Research Assistant, University of South Florida (1995-2001); Undergraduate Research Assistant, USF (1993-95)

Education: Ph.D. Oceanography, University of South Florida (2001); M.S. Marine Science, USF (1997); B.S. Health Sciences, USF (1995)

Residence: Whittier

Family: Son Joshua, 14; mother Rachael; dog Draco, a Boston terrier

Hometown: St. Petersburg, Florida

Hobbies: Bike-riding; indoor cycling via the Zwift team app; hiking; walking on the beach; paddleboarding; yoga

As head of Metropolitan's Chemistry Unit for the past nine years, Slifko oversees a 35-member team spread across six laboratories. She's responsible for setting the unit's long-term research directions, in areas like drinking water supplies, water recycling, and detection of priority contaminants, including cyanotoxins, disinfection byproducts, bioactive chemicals, and now microplastics.

A native of St. Petersburg, Florida, Slifko earned her bachelor's, master's and Ph.D. from the University of South Florida. Although initially thinking she'd become an academic researcher, Slifko had a change of heart after attending an American Water Works Association scientific conference in grad school.

"I found my tribe," Slifko said. "I saw opportunities to advance science in the public sector – and it was very fulfilling for me."

In her spare time, Slifko is an avid cyclist. She enjoys riding in the hills near her home in Whittier, and during the COVID-19 pandemic, also has been particpating in competitive, remote indoor cycling through the Zwift app.

SCCWRP STAFF SPOTLIGHT

Researcher drawn to applied side of science

Since she was an undergraduate, Dr. Kylie Langlois has known she's wanted a career on the applied side of environmental research.

Dr. Kylie Langlois

At UC Santa Barbara, she worked in labs studying how marine microbes can influence the ecological impacts of oil spills, and how climate change is impacting marine life biogeography.

In grad school at Stony Brook University in New York, Langlois lobbied her adviser to let her focus on a real-world environmental issue – an insistence that eventually led to her doctoral dissertation study examining how private septic systems remove nitrogen from wastewater.

Now, Langlois is looking forward to continuing her focus on applied research at SCCWRP.

"I have always liked the idea of using science to solve problems," said Langlois, who earned her Ph.D. in biological oceanography in December. "SCCWRP is the perfect nexus of research and solving real-world problems."

Langlois started in March as a Senior Research Technician in the Microbiology Department. She will support multiple SCCWRP projects that involve molecular laboratory work – skills she honed during her six years as a Ph.D. student.

Langlois is proficient in DNA sequencing and quantification, as well as bioinformatics analyses and visualization work.

"I knew I didn't want to go into academia or a post-doc after my Ph.D., so I was really glad to find a place where I could get some experience and gain a foothold in this industry," she said.

Dr. Kylie Langlois lounges at the beach during a 2019 trip to the Montauk Lighthouse on the easternmost tip of Long Island. Langlois spent six years living in Long Island while earning her Ph.D.

Kylie Langlois, Ph.D.

Job: Senior Research Technician, SCCWRP Microbiology Department (started in March 2021)

Prior jobs: Research Assistant and Teaching Assistant, Stony Brook University (2014-2020)

Education: Ph.D. biological oceanography, Stony Brook University (2020); B.A. biology, University of California, Santa Barbara (2012)

Residence and hometown: El Segundo

Pets: A desert Russian tortoise named Flash Gordon

Hobbies: Spending time at the beach; camping; knitting, embroidery and other fiber art

Langlois's interest in environmental sciences was shaped by her lifelong love for the Southern California beach scene. A native of the Hawthorne-El Segundo area, Langlois participated in the Junior Lifeguard program in high school, and continues to enjoy spending time swimming, body-surfing and just lounging at local beaches.

After earning a biology degree from UC Santa Barbara in 2012, Langlois ventured east to Stony Brook University on Long Island to work under Dr. Jackie L. Collier, a professor of microbial ecology.

"I got so fascinated with plankton and microbial community and how it's so often overlooked – even though it has such a huge role in shaping what goes on in our environment," Langlois siad.

Although Langlois's Ph.D. adviser was more focused on basic research, Langlois stressed her strong preference for a more applied-research topic for her dissertation.

The cards all fell into place by the end of Langlois's first year of grad school: In 2015, Stony Brook launched the solutions-oriented Center for Clean Water Technology. Collier agreed to serve on the Center's advisory board, and Langlois began working with the Center on an initiative to improve understanding of the performance of Long Island's many private septic systems.

Langlois's dissertation – one chapter of which already has been published by the *Journal of Sustainable Water in the Built Environment* – provides insights into the microbial communities in septic systems that denitrify wastewater.

Right now, Langlois is living with her parents in El Segundo, but is planning to get her own place in Long Beach in the coming months.

In addition to enjoying Southern California's beach scene, Langlois does embroidery and other fiber art in her spare time. She runs a small Etsy shop online and does custom orders.

SCCWRP SCENES

Engineering ingenuity at work

SCCWRP has begun testing and calibrating flow sensors for a custom-built system that's designed to reliably measure the volume and flow rate of stormwater runoff entering and exiting bioretention planters. The flow-measurement system was built in SCCWRP's warehouse in April to give researchers an opportunity to fine-tune the system's flow sensors prior to their deployment at a pair of bioretention planters in Riverside County. Researchers intend to use the flow-measurement system to optimize the physical design and configuration of bioretention planters, which are a type of stormwater BMP (best management practice) that absorbs and retains runoff to prevent its discharge into storm drains.

Clockwise from top left: SCCWRP's Brandon Fong calibrates flow sensors in SCCWRP's warehouse that are downstream of a series of zig-zagging pipes that create predictable rates of flow; a close-up of a weir-based flow sensor that is measuring water flowing out of SCCWRP's custom-built flow-measurement system; and an under-construction Riverside County bioretention planter receives runoff that has been redirected from a nearby rooftop to prevent discharge into storm drains.