

FEATURE ARTICLE

The Present and Future of the Salton Sea

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Its beginning dates back more than a century ago. That's not much for a lake, but for sure its birth was eventful. A 1905 massive breach in a levee of the newly inaugurated canal system of the Imperial Valley Water District changed the course of the Colorado River flow. The diverted water collected into the Salton Sink, an ancient natural depression some 200 ft below sea level. Water had collected in the depression in the past. At one point, an even larger lake, named Lake Cahuilla, had extended from northern Mexico all the way to Palm Springs, only to dry up in the 16th century, when the Colorado River changed its course. This time water collected in the Salton Sink suddenly and fast. It would flow into the depression for the better part of two years, until engineers fixed the breached levee. The resulting water basin would be baptized the Salton Sea. The name was hardly an exaggeration: the Sea was California's largest lake, twice as large as Lake Tahoe, and hosting California's largest fishery. It was also twice as salty as ocean water.

Its salinity didn't block out development, or tourism for that matter. In the 1950s, the resort towns of Bombay Beach and Desert Shores were born. At the peak of this era 1.5 million visitors would

golf and waterski, and fish and dine on the diverse community of one hundred million fishes that lived in the Sea. At night the visitors would be entertained by the likes of Frank Sinatra, Bing Crosby, and the Beach Boys. It was all a collective dream, fun until it lasted. And it didn't last long. A series of storms in the 1970s flooded Bombay Beach. Houses and infrastructure around the lake were damaged beyond repair. Tourism dwindled – it was the beginning of the end.

Meanwhile, the rise of agriculture in the Imperial Valley had ramped up the use of water from the Colorado River. The lake started an inexorable process of drying up. Vacation homes and resorts would soon lose much of their value. Docks and marinas started crumbling. Of the diverse community of fishes, only a few could withstand the ever increasing salinity: more than 90% of the fish disappeared. The Salton Sea, many argued, was dying.

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Grebes are seen swimming on the Salton Sea from the shore at Salton Sea Beach, on the eastern side of the Sea. (Photo: Andrea Bonisoli Alquati)

President's Corner



Karin Wisenbaker

I hope everyone is having a great start to their summer and doing their best to stay cool! After two years of Zoom dinner and annual meetings we were finally able to have our first in-person meetings. In March we held our dinner meeting at Pizza Port in Carlsbad, CA. I think we were all ready to see each other in person again. I had so much fun catching up with everyone over pizza and beer. After dinner, Dr Ochan Otim, from the City of Los Angeles, discussed evidence suggesting a potential DDT/PCB-associated decline in the robustness of white croaker population endemic to the Los Angeles outer harbor. I would

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- ✓ **SoCal SETAC Calendars**

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With a maximum depth of only 50 ft, in a dry climate plagued by droughts and chronic overuse of scarce water, the Sea never had the best prospects to begin with. The drainage from two rivers, the Alamo and the New River, had been preventing the lake's drying. But the lifeline that the two rivers were extending to the Sea had been coming at a cost for it all along. Snaking around the agricultural fields, the rivers were collecting runoff from the half a million acres of intensive farmland of the Imperial Valley, comprising two thirds of California's production of winter vegetables. Such agricultural prodigy could happen only with massive amounts of water. The Imperial Valley could afford that water by being the most senior of all players in the complex landscape of Southern California water rights, governed by the Doctrine of Prior Appropriation. Meanwhile, the rivers' loads of selenium, nitrates, and pesticides were contaminating the Sea's waters, raising its already high salinity, and collecting into its sediments. The nutrients would also cause algal blooms, resulting in mass mortality of fish and birds. Tens of thousands of birds using the site as a stopover on their migration or as a nest site have died of starvation or poisoning over the years.

During the 1990s, the shrinking of the lake reduced the Sea's overall volume. Combined with agricultural runoffs, this conspired to increase the salinity of the Sea, and the concentrations of several environmental contaminants. A study from the group of Daniel Schlenk at University of California, Riverside showed that selenium, legacy contaminants like PCBs and DDTs,

and current-use pesticides like pyrethroids, all consistently exceeded the risk thresholds for adverse effects (Xu et al., 2016). Several other pollutants were above sediment and/or tissue criteria at least in some of the years. In several cases, the screened environmental contaminants exceeded criteria even at the outlets of the two tributaries, the Alamo River and the New River. The Salton Sea cannot catch a break.

With the water level dropping, several consequences are happening. Salinity is approaching or possibly already surpassing the critical point of 60 parts per thousand, a level incompatible with fish reproduction. The disappearance of fish, in turn, would greatly reduce the Sea's ability to support a diverse biological community. Many of the fish-eating birds, including the cormorants and pelicans that used to feed on the abundant fishes have all but disappeared. White Pelicans (*Pelecanus erythrorhynchos*) have declined more than 95 percent. Still, a variety of birds nest there. Their mere presence can be deceptive. Eared Grebes (*Podiceps nigricollis*) that now number in the thousands around the Sea used to number in the millions. It's the classic issue of a shifting baseline – we forget how abundant and common wildlife used to be until the geological yesterday. The lake is also an important stopover site for many of the one billion birds that annually migrate along the Pacific Flyway. Sandpipers (*Calidris* spp.) stop here during their thousands-miles-long migratory journey from Central and South



A sculpture using materials and debris from decayed buildings, on the eastern side of the Salton Sea. (Photo: Andrea Bonisoli Alquati)

America to the Canadian and Alaskan Arctic. Thousands of ducks such as Northern Shovelers (*Spatula clypeata*) overwinter here before returning north to breed. Others, like Ruddy Ducks (*Oxyura jamaicensis*), stay year-round. The relevance of the Sea as bird habitat cannot be exaggerated. A total of 400 species have been spotted there, making it a hotspot of avian diversity in North America. It is why the Sea was designated as a globally significant Important Bird Area (IBA), and why the Audubon Society insists on its preservation. The good news is that birds, although fewer, are still seen by the thousands, particularly in areas where freshwater from agricultural drains enters the Sea. Some species, particularly the saline lake specialists, like the Black-necked Stilt (*Himantopus mexicanus*), American Avocet (*Recurvirostra americana*), and phalaropes (*Phalaropus* spp.) may even have already increased, or likely will in the future (Bradley and Yanega, 2018). Birdwatchers who

FEATURE ARTICLE (continued)

come to witness the spectacles of bird migration and breeding also contribute to the local economy. The Audubon Society's stance is that a rescue plan for the Sea and its birds is still possible. The plan would also contribute to the economy and health of the more than 650,000 people who live in the region, in the Coachella and Imperial Valleys. Such a plan, however, has long escaped any binding definition.

(The Lack of) A Plan for the Sea

A 2003 landmark agreement between the Imperial Valley Irrigation District and the State Water Resources Control Board drew a plan that would resolve the provision of water to the urban districts while also sustaining the Salton Sea. The Imperial Valley Irrigation District would cede 20 percent of its water to the Coachella Valley Water District and the water districts of San Diego and Los Angeles. Money from the settlement would then be used for improving efficiency of water use in the Imperial Valley's fields, benefiting the Sea. The Imperial Valley would also continue to provide runoff water to the Sea, however tainted by nutrients and pesticides. The agreement, labeled 'Quantification Settlement Agreement', was the largest ceding of water rights ever signed. The California State Legislature approved it, committing to the development and funding of a plan for the preservation of the Salton Sea, in light of its importance for public health and as wildlife habitat. In 2007 the California Natural Resources Agency drew a restoration project for the Sea. The remaining water inflow into the Sea would be diverted to create wetlands, generating habitat for



A dead fish is seen on an exposed plays of the Salton Sea, near Bombay Beach, on the eastern side of the Salton Sea. (Photo: Andrea Bonisoli Alquati)

birds, and locking in the toxicants. Unfortunately, its steep tagline of \$8.9 billion effectively stalled everything. Yet, inaction will ultimately lead to pricier costs. The Pacific Institute, a think-tank focused on water policy headquartered in Oakland, estimated the costs of the environmental crisis may balloon to up to \$70 billion, as a result of a public health crisis, reduction in agricultural productivity, and losses in property market values. Other plans for the future of the Sea have surfaced, from environmental groups and 'techno-fixers' alike. A recurring one would pump saline water from the Sea of Cortez or the Pacific Ocean, run water through desalination, and add it to the Sea. Needless to say, these other plans are also not

cheap. The stalling of any action by the legislature has also already prompted lawsuits. Environmental groups filed lawsuits against the water districts. Foreseeing damages to the Salton Sea, the Imperial County itself also sued the district. Then in January 2018 the Imperial Valley was no longer legally bound to provide 'mitigation water', spelling doom for the local fish populations – the water is going to thirsty San Diego instead. Negotiations continue, but the clock is ticking for the Sea. Three quarters of the lake's volume might be lost by 2030, exposing hundreds of additional square miles of playa, the dry lake bed, to erosion. And with erosion comes dust that the high winds of the region kick around. Erosion of the playa already contributes to air concentrations of particulate matter smaller than 10 µm in diameter (PM10) in the region (Johnston et al., 2019). Plus, in the airborne dust are the toxicants the Sea collected from agricultural runoff, including pesticides, selenium, and arsenic. Their transport worsens already poor air quality around the Sea, with intensive agriculture and the desert itself as contributing factors. Imperial County has the highest asthma hospitalization rates in California. The number of asthma-related ER visits by children in Imperial County is twice as high as in the rest of California. It's

WELCOME to NEW SoCal SETAC BOARD MEMBERS!

Andrew Gray, University of California, Riverside

Caroline Moore, San Diego Zoo Wildlife Alliance

Meagan Morgan, Physis Environmental Laboratories

Ochan Otim, City of Los Angeles

Maggie Stack, San Diego State University Research Foundation

Nancy Torres, University of San Diego

FEATURE ARTICLE (continued)

a public health crisis enmeshed within an environmental one, a stark reminder of the interconnectedness of humans and nature.

The Salton Sea and the Energy Future

At a virtual event earlier this year, President Biden spoke about the Sea. His administration has been concerned about the US being dependent on imports for most of its lithium. Ubiquitous in batteries of technological devices and electric vehicles, lithium is crucial to the transition to renewable energy and away from fossil fuels. In circles of energy experts the metal is already called ‘white gold’, a reference to its silver white color and rising value on the global market. Yet, most of the lithium used in the US is imported, including from China. The Salton Sea is an opportunity for the US to approach independence. At the same event in February of this year, Governor Newsom called the Imperial Valley the “Saudi Arabia of Lithium”. This is not an exaggeration. The exact amounts of lithium that could be extracted are unknown, but the California Energy Commission estimates the Salton Sea could produce more than 600,000 tons of lithium carbonate per year, or more than the 2021 annual global demand. The area is also already home to several geothermal plants, enabling extraction with a low carbon footprint. Elsewhere, the extraction of lithium ends up being entangled in issues of environmental justice and the right to self-determination of indigenous people, including at Thacker Pass, in Nevada, where the largest known deposit of lithium in the US lies under a sacred site for Shoshone and Paiute tribes, the site

of a massacre of indigenous families by white settlers. In Chile, second only to Australia for lithium extraction, and part of the so-called ‘lithium triangle’ with Argentina and Bolivia, mining is disrupting the pastoral and agricultural way of life of the Atacameños, who have been living in the Puna de Atacama (the Atacama plateau), for thousands of years. Indigenous people, scientists and social and environmental justice groups have been advocating for an energy transition to renewables without a pollution legacy. So far, the urgency of the transition seems to have motivated a discounting of its environmental and inequality costs. The risk of this attitude is the repetition of unjust, colonizing dynamics. The dichotomy between clean renewable energy development and environmental protection is a false one. Mining does not need to be ‘dirty’. The Salton Sea, and specifically its Geothermal Field, may be the opportunity to do things right. The opportunity may have come via a \$500-million extraction complex that Australia’s Controlled Thermal Resources is building to drill for lithium by tapping into a reservoir of superheated briny water. Powered by geothermal energy from a power plant next door, the project is truly carbon neutral, unlike most net-zero pledges. Geothermal plants are expensive to build, so the revenue stream from lithium extraction could attract new investment and spur development for geothermal power, which had stalled in recent years. Controlled Thermal Resources’ lithium project has been lagging behind for some years, the money nowhere to be found. But then in mid-November of last year, the drilling began with financial backing by investors that included General Motors. This June came

other developments. The car-manufacturing giant Stellantis signed a 10-year agreement with Controlled Thermal Resources for the supply of 28,000 tons of lithium hydroxide each year from its Salton Sea operations.

There is good news for the birds too. A habitat restoration project by the California Department of Water Resources called the “Species Conservation Habitat Project” is generating wetlands by building levees, and containing the expansion of playas. The Project will not suffice to achieve the State’s goal of 25,000 acres between dust containment projects and natural habitat for birds and other wildlife by 2025. But birds are already seen there. It’s a shimmer of hope for a fragile place.

References

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PRESIDENT'S CORNER (continued)

like to thank Dr. Ochan for presenting his research to a full house of SoCal SETAC members!

On April 25th and 26th we held our Annual Meeting at the Crowne Plaza in Ventura, CA and it was a huge success! The venue, on the promenade right next to the Ventura pier, had spectacular views of the ocean and coastal mountains. It was a great space for our sessions and poster social. I would like to give a big thank you to Nick Hayman for organizing this successful event with the support of the Officers and Board Members. In addition, this event wouldn't be possible without the support of our sponsors, and those of you who attended and presented at the meeting (especially the students).

The excellent work of SoCal SETAC officers and board members are a big reason this Chapter is so successful. I would like to say a heartfelt farewell to our Co-secretaries Misty Mercier and Alvina Mehinto and our Webmaster Violet Renick. They did a wonderful job and kept our chapter running smoothly for many years. I would also like to thank our outgoing Past President, Nick Hayman for his leadership. In addition to leading the effort to organize our Annual Meeting, he was our Zoom guru when we couldn't meet in-person and worked behind the scenes to make sure our virtual meetings ran smoothly. Varenka Lorenzi, Leslie Nanninga, Barbara Orelo, and Kara Wiggin will be rotating off the board this summer and I would like to thank them all for their contributions to SoCal SETAC. We will miss you all!

I want to welcome our incoming Webmaster, Leslie Nanninga, and Co-secretaries Amanda Russel and Barbara Orelo. In addition, Maggie Stack has agreed to be our new Vice President! Caroline Moore, Andy Gray, Megan Morgan, Ochan Otim, Maggie Stack, and Nancy Torres will continue serving on the board for one more year. We have an amazing group of Board Members and Officers and I am looking forward to working with you all over the next year!

Our annual student grant was awarded this fall to Evan Tjeerdema, from Scripps, for his project "Generation of a metal-responsive fluorescent reporter line for examining the genetic response of sea urchins to metal exposure during development". He also presented his work at our Annual Meeting this year. Congratulations Evan! You can find out more about Evan and his research in this issues Student's Corner. The student grants would not be possible without funding from the Chapter's sponsors, and SoCal SETAC is grateful for your support.

Finally, I am approaching the end of my time as Chapter President. I have always enjoyed being a part of SoCal SETAC and I am grateful that I had an opportunity to get more involved by becoming a Board Member and then an Officer. I encourage anyone who wants to be more involved with our Chapter to nominate yourself to become a Board Member. Board Member nominations close on July 15th, please feel free to reach out to me or Barbara Orelo if you did not receive the email with the nomination form.



Dr. Ochan Otim presenting at the winter dinner meeting.

MEET THE BOARD

Barbara Orelo

Enthalpy Analytical, LLC

*Barbara with her dogs Charlie and Bruno*

Hello SoCal SETAC! My name is Barbara and I am a SoCal SETAC board member, representing the private sector. I have been a member of SETAC since 2017, when I joined Enthalpy Analytical (previously known as Nautilus Environmental). Currently, I am a project manager and aquatic toxicologist at Enthalpy.

I spent the first half of my childhood in Buenos Aires, Argentina until my family moved to Los Angeles in pursuit of better opportunities for my sisters and me. Growing up, I was always fascinated with the natural world, and in high school I became interested in science after taking an environmental science course. This led me to the University of California, San Diego, where I received a degree in Biology with an emphasis in Ecology, Behavior, and Evolution and a minor in Environmental Science.

One of the most influential parts of my degree was getting to participate in the University of California Education Abroad Program (UCEAP). Through UCEAP, I spent a quarter in Costa Rica, where I took tropical diversity and field ecology courses. When I got back from Costa Rica, I was eager to continue my exposure to science (and to be outdoors), so I decided to pursue an internship at the Levin Lab, where I helped a postdoc with his research on rain gardens (small gardens designed to filter pollutants from stormwater). We looked at the role that soil invertebrates have on nutrient storage, removal, and processing – which play an important role in the function of rain gardens.

After finishing my internship and receiving my degree I worked in a chemical physiology lab at The Scripps Research Institute; however, my interest in environmental biology eventually led me to Enthalpy Analytical. At Enthalpy, I started as a laboratory technician and became a project manager after two years in the lab. As a tech, I worked on a variety of projects, ranging from toxicity testing for permit compliance to sediment testing and toxicity identification evaluations (TIEs). Starting out in the lab allowed me to learn how to perform all of the testing and understand how the data is produced - which was crucial for my professional development and success as a PM and toxicologist. Now I manage these projects and work closely with client from different sectors to develop projects, answer scientific questions, and meet compliance requirements.

Outside of work, I spend most of my time hanging out with my dogs, trying to keep my house plants alive, or out on a trail. I love to hike, backpack, and camp and I'm always looking to explore new beautiful places.

I am very thankful to be working with such brilliant and dedicated people who share the same values as me. It has been a pleasure to represent the private sector as a SoCal SETAC board member for the last year and I am so excited to continue until 2022. Cheers, Barbara

*Barbara paddling on the Colorado River*

MEET THE BOARD

Kara Wiggin

Scripps Institution of Oceanography

*Kara smiling near the ocean*

Hello everyone! I am in the final year of my time as a student representative for the SoCal SETAC Board. I've been involved in SETAC since the start of my graduate studies, and it has been an honor to be involved in the board these past two years!

I grew in up in Massachusetts, a bit southwest of Boston, and grew up visiting beaches on Cape Cod where my love for the ocean began through moon jelly and horseshoe crab sightings and picking up every single hermit crab I could find (my love for hermit crabs remains strong). I received my environmental science B.S. from Northeastern University where I worked in a couple different research labs that sparked my love for marine science research and encouraged me to go to graduate school.

I started my graduate school experience in a master's program at Cal State Long Beach in Dr. Erika Holland's lab where I realized my love for toxicology research and started getting involved in SoCal SETAC. My research there focused on the detection and toxicity of microplastic pollution in southern California, and because I loved this research so much, I decided to continue onto a PhD program at Scripps Institution of Oceanography. I am in my third year in Dr. Jack Gilbert's lab studying the impacts of microplastic pollution on oyster microbiomes, and the potential for microplastics to harbor and transmit pathogenic bacteria. I love this research because it is very interdisciplinary, encompassing toxicology, microbiology, and disease ecology. I hope to continue this type of research beyond my PhD, to continue to work towards protecting the health of the ocean.

I plan to remain an active member of SoCal SETAC after my term as student rep is up – this community is so welcoming and encouraging and I just hope I've given a little bit back what I have gained from being a part of this group!

When I'm not in the lab, you can find me in the tide pools picking up all the hermit crabs (never gets old) and searching for sea slugs, attempting to surf, or skiing where I can find some snow!

*Hunting for hermit crabs in the tide pools near the Scripps institution of Oceanography*

STUDENT CORNER

Graduate Student Grant Award Recipient: Evan Tjeerdema

Interview by Kara Wiggin



Evan Tjeerdema, Graduate Student Research Awardee

Evan Tjeerdema is the winner of our 2021 Graduate Student Research Grant! We interviewed him to learn more about him and his work.

Evan is from the Bay Area and did his undergraduate degree in Marine and Coastal Science at UC Davis, with a minor in toxicology. He worked in multiple labs during his time at UC Davis on both the main campus and at Bodega Marine Lab. He worked on a project focused the impacts of UV light on creosote toxicity in crab larvae, another project looking at the effects of ocean acidification on abalone defensive behaviors, a project measuring the sorption of azithromycin in salmon eggs, and a project using mammalian cell lines to screen for AhR activity. After undergrad, he worked for two years as a laboratory technician at Bodega Marine Lab on the white abalone captive breeding program. Evan is now a 1st year PhD student at Scripps Institution of Oceanography in Dr. Amro Hamdoun's lab.

Evan's current project is focused on characterizing the developmental metal response pathways in sea urchin larvae. In early developmental stages, embryos are known to express genes that protect against metal exposure in the surrounding environment, but in early life stages, the expression of these genes is not well characterized. This is important because it can help identify gaps in the defensive response of the sea urchin larvae that could leave certain tissues or structures vulnerable to sublethal effects.

Evan's research focuses on metals, a ubiquitous pollutant in urbanized waterways, especially in San Diego's south county. Metals are one of the major constituents of the Tijuana River outflow that affects south county's beaches, leading to frequent beach closures and hospitalization of swimmers. One of Evan's goals for his PhD research is to design a metal responsive fluorescent reporter for these defensive genes to be used for toxicity testing, using fluorescence as a biomarker for toxic exposure to metals. He is currently working with sea urchins, which have a long history of being used in aquatic toxicity testing. However, the endpoints that are used in standardized EPA protocols are all lethal endpoints, and there is a data gap in understanding sublethal effects, which is more relevant to human health.

Evan loves toxicology research because of its relevance to human and environmental health questions, but also because he loves learning about how pollutants can manipulate and interact with biological systems and the complex defense mechanisms that organisms have to counteract pollution exposure.

In his free time, Evan is a big surfer! And often takes advantage of his building's proximity to some of the best surfing in San Diego. He also loves to ride his bike and go hiking. To answer our most important question, the song Evan picked to describe his research experience so far is "Monday at the Beach" by Jeff Rosenstock. Give it a listen!

2021 SETAC North America - SciCon4 41st Annual Meeting List of SoCal SETAC Presentations

Presentations by SoCal SETAC Members

At the 2021 virtual SETAC North America meeting last November, known as SciCon4, members of our chapter showed up in full force. For everyone's record, here is a list of their contributions.

November 16th

Session: Whole Effluent Toxicity (WET): Applications of and Developments in WET and Ambient Testing

Session ID: 2.08.01

Title: Aquatic Toxicity Methods Collaboration: Historical Perspective & the Future Role of the Aquatic Toxicity Testing Interest Group

Presenter: Stephen Clark

Session ID: 2.08.14

Title: Progress Towards the Development and Validation of a Proposed Modified WET Test Procedure to Assess Episodic Exposures and Gaining Regulatory Acceptance

Presenter: Chris Stransky

Session ID: 2.08.15

Title: Validation of Pulsed Exposure Toxicity Methods at San Diego Regional Naval Bases

Presenter: Molly Colvin

Session ID: 2.08.16

Title: Pulse Exposure Monitoring Method for Assessing Toxicity of Stormwater Contaminants: Case Studies With Copper and Zinc Exposures to *Ceriodaphnia dubia* and *Hyaella azteca*

Presenter: Hanna Karic

Session ID: 2.08.17

Title: Evaluation of Sodium Bisulfite for Contribution to Chronic Toxicity of the Water Flea, *Ceriodaphnia dubia*

Presenter: Peter Arth

November 17th

Session: Exposure: Processes and Approaches for Estimating Environmental Exposures

Session ID: 4.03.18

Title: The Status of Pesticide Risk in California's Surface Waters

Presenter: Nicol Parker

November 18th

Session: Deriving and Implementing Ecologically Relevant Water Quality Criteria and Guidelines**Session ID: 5.07.11****Title:** Data and Taxonomy in the Development of Marine Water Quality Criteria**Presenter:** Alice Coleman**November 19th**

Session: Per- and Polyfluoroalkyl Substances (PFAS): Analytical and Site Assessment Tools to Understand the Fate and Transport of PFAS at Contaminated Sites**Session ID: 1.12.24****Title:** Evaluation of Several Adsorbents for Possible In Situ Remediation of PFAS -Contaminated Groundwater**Presenter:** Nicholas Hayman**Session ID: 1.13.09****Title:** Systematic Mapping and Meta-Analysis of Perfluorooctane Sulfonate (PFOS) Concentrations in Birds Around the World**Presenter:** Raul Flamenco**Session: Remediation and Restoration: Connecting them- Integrating Cleanup and Ecosystem Recovery****Session ID: 6.04.04****Title:** What Comes First Sediment Cleanup or Ecosystem Recovery? (Hint: They Should Go Hand in Hand)**Presenter:** Robert Johnston (Katie Payne)**Session: Multiple Stressors: Assessing Contaminant Effects in Ecosystems with Multiple Stressors****Session ID: 5.09.17****Title:** Comparing Contaminant-Induced Gene Expression in Native and Non-Native Oysters in Southern California Estuaries**Presenter:** Aaron Sugimoto**Session: Deepwater Horizon Oil Spill - Ten Years Later: What Have We Learned About Wildlife Impacts and How Do We Proceed?****Session ID: 1.02.04****Title:** A Marine Oil Spill on Land: Exposure to Deepwater Horizon Oil and Its Effects on Louisiana Seaside Sparrows**Presenter:** Andrea Bonisoli Alquati**Session ID: 1.02.05****Title:** Oxidative Stress in the Seaside Sparrow (*Ammospiza maritima*) Following the Deepwater Horizon Oil Spill**Presenter:** Aaron Angel**Session ID: 1.02.10**

Title: Investigating Patterns in Transcriptome Data: Lipid and Cholesterol Dysregulation in Phenanthrene Exposed Zebrafish Embryos

Presenter: Victoria McGruer

On Demand Presentations (No Live Discussions)

Session: Harmful Algal Blooms: Across the Freshwater to Marine Continuum - Toxins, Detection, Effects, Monitoring and Management

Session ID: 2.04.26

Title: Southern California Wildfire, Harmful Algal Bloom, and Fish Kill in Lake Elsinore, California

Presenter: John Rudolph

Session: Sediment: Confounding Factors and Best Testing Practices in Sediment Toxicity Testing

Session ID: 1.16.02

Title: An Investigation of the Viability and Comparability of the Manila Clam (*Venerupis philippinarum*) to the Bent-Nosed Clam (*Macoma nasuta*) for 28-Day Bioaccumulation Exposures

Presenter: Peter Arth

Session: Harmful Algal Blooms: Across the Freshwater to Marine Continuum - Toxins, Detection, Effects, Monitoring and Management

Session ID: 2.04.12

Title: An Assessment of "Red-Tide" Harmful Algal Bloom (HAB) Effects on Marine Organisms Used for Permit Compliance in San Diego, CA

Presenter: Kate Buckley

Session: General Aquatic Toxicology, Ecology and Stress Response

Session ID: 2.09.59

Title: Sediment Quality Changes in the Southern California Bight: 1998-2018

Presenter: Ashley Parks

Session: Passive Sampling: Innovations in Passive Sampling Across Environmental Compartments

Session ID: 4.10.02

Title: Evaluation of a Rapid Biosensor Tool for Measuring PAH Availability in Sediment

Presenter: Jason Conder

Session: Stakeholder Collaboration: Collaborative Efforts Between Research and Indigenous Peoples and Citizen Scientists

Session ID: 7.01.01

Title: Two Canoes in Parallel: Tribal/EPA Collaboration to Advance the Cooperation of Western and Indigenous Science Approaches in the U.S

Presenter: Jose Zambrana

CALENDAR OF EVENTS

June 2022

June 12 - 15

American Water Works Association (AWWA) Annual Meeting

<https://www.awwa.org/ace> | *San Antonio, TX*

June 27 - July 2

American Ornithological Society (AOS) Annual Meeting (140th Stated Meeting)

<https://americanornithology.org/meetings/annual-meeting/> | *San Juan, Puerto Rico*

August 2022

August 14 - 19

Ecological Society of America (ESA) & Canadian Society for Ecology and Evolution (CSEE)
Annual Meeting

<https://www.esa.org/montreal2022> | *Montreal, Quebec, Canada*

September 2022

September 4 - 8

SETAC 8th World Congress/12th SETAC Asia-Pacific Biennial Conference
Global Visions for Sustainable Environmental Quality

<https://singapore.setac.org/> | *Singapore*

September 26 - 28

SETAC Europe 25th LCA Symposium

The Role of LCA in Raw Material Sustainability, Circularity and Criticality

<https://lca2020.setac.org/> | *Darmstadt, Germany*

Have you checked out the Student Resources Page on the SoCal SETAC Website?

During these unprecedented times, we have built this page to help students find resource to continue to learn and engage with community and prepare for the next step.

Check it out and please email Leslie Nanninga, lnanninga@sandiego.gov if you have any additional resources or tips to share!

<https://www.socal-setac.org/student-resources>

HAVE YOU CONSIDERED JOINING THE SoCal SETAC BOARD?

SoCal SETAC is currently accepting **nominations for positions on the Board of Directors**. Regional Chapter Board members are elected to a 2-year term, during which they contribute to all activities of the Chapter.

You may self-nominate, and all nominees must be current Chapter members. Nominees must provide a brief bio to be included in the election.

Nominations are due **July 15** to Barbara Orelo, SoCal SETAC Co-Secretary, barbara.orelo@enthalpy.com. Send in the form you received via email, or let us know you need one.

We look forward to receiving your nominations!

SOCAL SETAC OFFICERS AND BOARD MEMBERS

SoCal SETAC 2021–2022 Officers

Past President	Nicholas Hayman , Public Sector nthayman@gmail.com
President	Karin Wisenbaker , Aquatic Bioassay and Consulting Laboratories Inc. karin@aquaticbioassay.com
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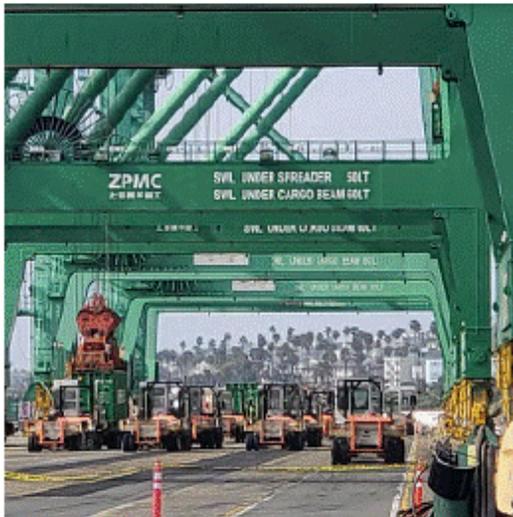
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