OCEAN STUDIES INSTITUTE

ANNUAL REPORT 2023-2024

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MISSION

The Ocean Studies Institute is a consortium of nine California State Universities who decided to pool their resources to explore the ocean and coastal regions more effectively. OSI currently consists of California State University Dominguez Hills, Fullerton, Long Beach, Los Angeles, Northridge, Pomona, San Bernardino, San Marcos, and Channel Islands. OSI became a founding member of larger consortium of the Southern California Marine Institute (SCMI) in 1994.

The mission of the Southern California Marine Institute (SCMI) is to foster marine research and education, focusing on urban impacts of the greater Los Angeles region on the coastal ocean. We seek to improve scientific understanding and the development of solutions that will enable coastal waters and watersheds to thrive, adapt and become resilient to ongoing environmental stressors.

ABOUT US

The Ocean Studies Institute is a founding member of the Southern California Marine Institute (SCMI) which is a consortium representing a strategic alliance of 25 major universities, colleges, and foundations in Southern California. This includes nine universities from the California State University system representing the Ocean Studies Institute: Channel Islands, Dominguez Hills, Fullerton, Long Beach, Los Angeles, Northridge, Pomona, San Bernardino, and San Marcos. SCMI also comprises the combined marine resources of the University of Southern California, Wrigley Institute for Environmental Studies, University of California Los Angeles, Occidental College, Los Angeles Community College District, Pasadena City College, The Bay Foundation, NOAA National Marine Fisheries Service West Coast Region, the California Science Center Foundation.

The consortium structure of SCMI allows us to engage in specialized marine research that would not otherwise be possible through independent organizations, and to maximize the use of resources as well as collaborate on projects. SCMI is in the heart of the Port of Los Angeles on Terminal Island. Our facility is a full functioning marine research institute equipped with offices, laboratories, classrooms, a seawater filtration system, machine and wood shops, and a warehouse. There is ample docking space for small boats from various universities and organizations, as well as the research vessel R/V Yellowfin.

DIRECTOR'S MESSAGE

Another year at SCMI has zipped by! It seems like they are going faster and that's because we are busier than ever. The R/V Yellowfin is still the best research vessel of its size in the region providing unparalleled support for our students, faculty and researchers. Because of its unique size and capabilities, the R/V Yellowfin is an affordable research and teaching vessel for accessing the Southern California Bight. It provides our students with a unique opportunity to study the marine environment and we are committed to providing this cost-effective experience to the schools in our region. Because of its capabilities and our crew, you can accomplish any research or teaching goal you have in Southern California. The boat is busier than ever so contact Carrie Wolfe and book your cruises. As we have for many years now, we continue to upgrade our facilities and as you'll see this has resulted in an increase in facility use and new partners. You'll see that the number of research projects we're supporting is continually increasing. We're also very excited to welcome our longtime partner Pasadena City College to the consortium! We're looking forward to another great year, hope to see you down here soon!

INTRODUCTION

The Southern California Marine Institute (SCMI) had another extraordinary year where we stayed committed to fostering marine research and education. We are excited to welcome Pasadena City College to the SCMI consortium as our 25th member. We additionally had the pleasure of collaborating with several other marine organizations to conduct groundbreaking research and educate the young minds of future scientists. SCMI continues to monitor the kelp growth of the Palos Verdes Reef Restoration Project through aerial drone footage. We also received a second round of grant funding from the Port of Los Angeles Community Investment Grant Program which has allowed us to continue to monitor the data collected by our Port Observing Shore Station Element. The Fall 2023 CSU Marine Biology Semester on Catalina Island had a full class with exceptional courses being offered by professors from California State University, Long Beach.

At the SCMI laboratory, we continue to advance with major upgrades around the facility including upgrading our docks and gangways. Hourglass (previously known as Vesta) continues to be supported by SCMI's staff as they focus on their Ocean Alkalinity Enhancement (OAE) for carbon removal and climate impact. The Bay Foundation continues to excel as they continue their process of repopulating red and white abalone throughout Southern California. They additionally continue making strides in their kelp forest and eelgrass restoration. We enthusiastically welcomed the Ocean Animal Response and Research Alliance into our laboratory at the end of this year and are excited to collaborate with their team in the future.

The R/V Yellowfin has been fully booked with an increase in the number of cruises conducted between running educational cruises and contract work. We had the pleasure of working with Aquatic Bioassay Consulting Laboratories on the 2023 Southern California Bight Survey on the R/V Yellowfin for a few weeks in Ventura and Santa Barbara. We also proceeded to partner with several other remarkable organizations such as La City, WSP, University of Southern California and University of California Santa Barbara. With a strong year behind us, we strive to continue our mission to foster our marine research and education in the year to come and are excited to continue our collaborations with partners and members.

WHAT'S NEW?

Pasadena City College Joins the SCMI Consortium

We are excited to welcome Pasadena City College (PCC) as the newest member of the Southern California Marine Institute, bringing our membership to 25 members. Pasadena City College is a public community college located in Pasadena, California where they are focusing on upgrading their ocean science courses through their membership with the LA-23 SMC Blue Economy and Climate Action Pathways LARC Region Project led by Santa Monica College. They are excited to use SCMI and the R/V Yellowfin to prepare students firsthand for a career in the marine sciences.

Adriana Stowell, Budget & Research Coordinator off to New Adventures

After 12 years of working for SCMI, Adriana Stowell, SCMI's Budget and Research Coordinator, moved onto a new role with another agency. Adriana has been with SCMI since 2012, beginning her career with SCMI as a Demonstration Technician on the R/V Yellowfin where she gained extensive experience conducting biological and water sampling collections. Over the years, she was promoted to SCMI's Budget and Research Coordinator where she played a highly essential role in SCMI's daily functions and assisting researchers on their projects. We look forward to continuing working with her and her new team in the near future!

Newest Employee, Beverly Lynch

SCMI welcomed Beverly Lynch as the newest employee of SCMI as the Administrative Support Coordinator. Beverly Lynch brings over 15 years of administrative and fiscal experience from her time spent in the transportation and entertainment industries as well as higher education. She earned her bachelor's degrees from CSULB double majoring in American Studies and Communication Studies and has been employed at CSULB for over 8 years. She specializes in administrative and fiscal technology applications. Beverly is inspired by books, films, technology, nature, helping others, building relationships, and loves animals, especially cats. She is excited to learn more about Marine Science and to help facilitate the incredible work that is being done at SCMI/OSI.

New Merchandise

As part of our ongoing commitment to enhancing both our presence and safety protocols, we are pleased to announce the successful redesign of our laboratory merchandise. This initiative encompasses a new line of branded apparel and accessories, including a trio of vibrant stickers, t-shirts, and hats. Softshell jackets, sweatshirts, and long-sleeve triblend shirts were also implemented for our staff.

The primary focus of this redesign is to bolster our team's visibility and identification, particularly in critical situations. By ensuring that our personnel are easily recognizable, we not only promote team cohesion but also enhance our safety measures during field operations. This is especially crucial in scenarios where collaboration with the Coast Guard may be necessary.

Each item in the new merchandise line features our updated logo and color scheme. The jackets and sweatshirts are designed to provide warmth, comfort and protection, while the long-sleeve triblend shirts offer a lightweight, sun-protection option for warmer conditions, all contributing to our team's preparedness.

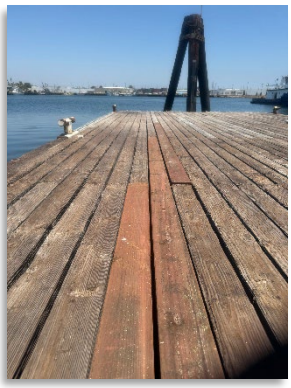
We believe that these enhancements will not only elevate our brand image but also significantly improve safety and operational efficiency.

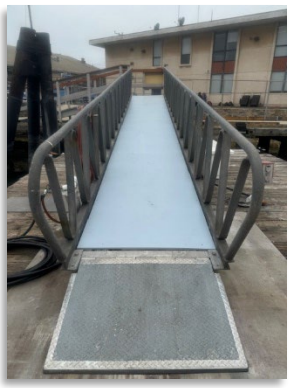
SERVICE GOALS

Infrastructure Improvements

At SCMI, our commitment to advancing our mission is underscored by our dedication to maintaining and optimizing our physical resources and environments. Our foremost priority is to create and sustain a clean and safe environment that fosters learning and engagement for member institutions, researchers, staff, and students.

This year, we have continually enhanced our facilities by implementing best practices in the industry to ensure we deliver optimal services while adhering to an effective cost model. Notable improvements include the reinforcement of our wooden gangways, which have been fitted with custom ramps at each end for improved accessibility. Furthermore, each of our three docks has undergone significant upgrades to enhance safety and stability, including the installation of new planking, fascia boards, and rubber bumpers. Additionally, the Yellowfin dock has been equipped with numerous safe seal deterrents to protect our floating assets from curious pinnipeds.





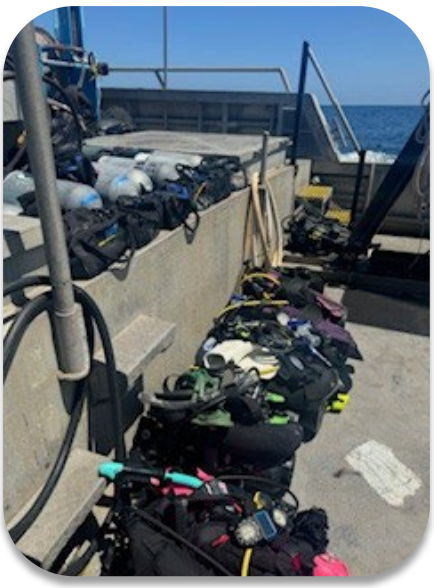
In our primary laboratory facility, a series of enhancements have been made to improve functionality and efficiency. These improvements include the installation of a new sink faucet in the men's restroom and upgraded ceiling tiles throughout the building. Additionally, a universal electric vehicle charging station has been added in the 820 parking lot to better support the growing number of alternative-fuel vehicles. We have also upgraded several pumps to our seawater system, which has increased flow, reduced microbubbles and aided in backwashing efficiency.

In keeping with the protocols established in previous years, our annual report outlines a systematic effort to decommission and reorganize supplies left behind by former principal investigators across multiple laboratories. This initiative entailed a thorough process of sorting, discarding, and relocating materials, with potentially valuable resources being transferred to deep storage and meticulously labeled to facilitate easy access for upcoming projects. As a result of this strategic organizational effort, we have successfully created additional usable space within our facilities. This newly liberated workspace has been rapidly occupied by

new researchers and collaborators, effectively converting previously underutilized areas into productive research environments.

Furthermore, upgrades continue to be implemented in several laboratories and offices. Five distinct spaces—Offices #101, #205, #206, and #208, along with Laboratory #211—have been fitted with new water- and corrosion-resistant window shades. The implementation of these shades is an ongoing effort, and we are at completion.

OSI AAUS Dive Operations



The AAUS accreditation committee audited our program during this period and we are fully accredited!. The only mandated change was that we remove several inactive members from our Diving Control Board. A number of recommendations were made which included the addition of one full-time assistant. Most of the recommendations are "system-wide" intended to be addressed by the CSU DSO group, facilitated by system-wide EHS/RM and the DCBs. As of this writing, our DCB hasn't met to review/discuss the report.

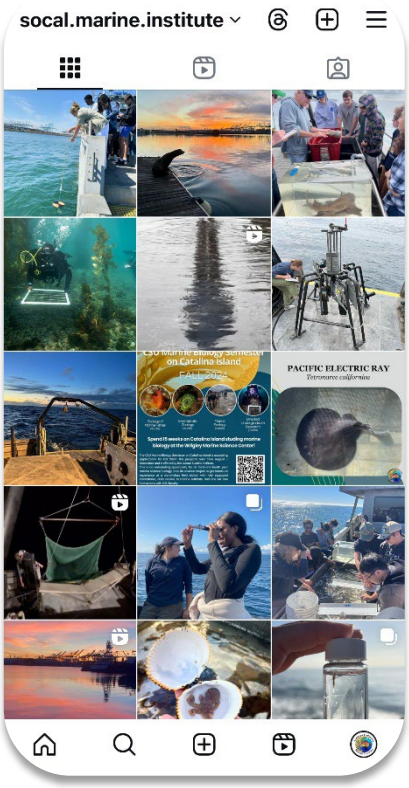
We currently have 93 (65 active) Scientific Divers on our roster, logging 2357 dives for the period 6/30/2023 – 6/30/2024. Two AAUS Scientific Diver courses were conducted – one in June, one in August. The Winter AAUS course, held in January, has been discontinued due to ongoing logistical problems (transport, weather, health and safety). A total of fifteen new divers received training, the cohorts were comprised of candidates from CSUN, CSULB, CPP and Occidental College.

OSI MOTC Boat Operations

The California Department of Fish and Wildlife, renewed their contract for training of their personnel. We conducted four MOTCs for them for a total of 24 participants. The Spring MOTCs for OSI have been discontinued due to lack of enrollment. We scheduled two MOTCs for OSI during the summer of 2023, but canceled one due to lack of enrollment - we had a total of 6 participants. Cohorts were comprised of candidates from CSUN and CSULB. Of interest, enrollment in the Summer 2024 MOTCs bounced back – we trained a total of eighteen new boat operators, with candidates from CSUCI, CSUF, CSUN and CSULB.

SCMI Social Media | Engagement

SCMI's Instagram account @socal.marine.institute continued to thrive over this past year. We continue to use our platform to engage with our followers and educate them on various projects and interactions we have working at the SCMI laboratory and on the R/V Yellowfin. We have successfully increased our following to an additional 14% this past year through maintaining our regular reels, posts and stories.



The R/V Yellowfin had an exciting year using innovative technology with various research partners. Our social media platform has given us the opportunity to share these advanced research tools and methods, captivating them into the world-class research happening off our Southern California Coast.

In addition to highlighting our research projects through social media, we also use it as an opportunity to educate our followers about marine biodiversity off our coast as well as different sampling methods used onboard vessels. The weekly Instagram story "What is it Wednesday" maintains as an exciting quiz for followers to participate in, which educates them on how to identify different marine fishes and invertebrates found throughout Southern California.

We aim to continue educating and sharing our work highlighted at SCMI through our Instagram throughout the next year. We hope that our content provides educational sources to viewers, as well as promotes the specialized work SCMI conducts to current and future partners.

EDUCATIONAL GOALS

CSU Marine Biology Semester on Catalina Island

The CSU Marine Biology Semester had a very successful Fall 2023 Semester. This 15-week semester long program was hosted by California State University, Long Beach at USC Wrigley Marine Science Center on Catalina Island. We had a full program with 20 students and 3 professors including Dr. Darren Johnson teaching Marine

Image by Sean DuFrene

Ichthyology, Dr. Bengt Allen teaching Marine Ecological Practices and Dr. Christopher Janousek teaching Marine Phycology. This unique opportunity for Biology and Marine Biology students allows them to conduct undergraduate directed research in the last few weeks of the semester based on information they learned from their courses throughout the semester. The captivating and immersive experience was exciting for students as they have come out of the COVID-19 pandemic. We are looking forward to another successful semester this upcoming Fall 2024 hosted by California State University, Northridge.

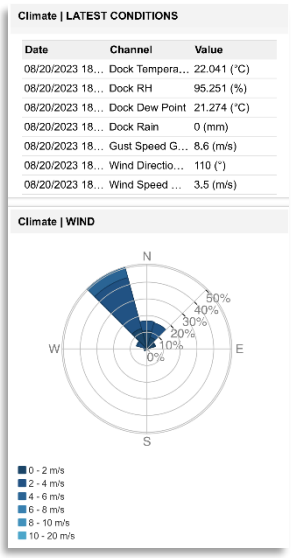
Demonstration R/V Yellowfin Cruises

The R/V Yellowfin had another successful year driving our educational initiatives with demonstration cruises. We had several college and university laboratory classes attending R/V Yellowfin cruises throughout the year. The unique opportunity to attend a laboratory class on the Yellowfin allows for students to have firsthand experience to see what it is like conducting marine science on a moving vessel. Students have the unique opportunity to learn about cutting edge technology used in marine science research such as Otter Trawls, Plankton Tows, Van Veen Mud Grabs, Sediment Sorters, CTDs, etc. through the guidance of our Demonstration Technicians, Vessel Engineer and Captain.

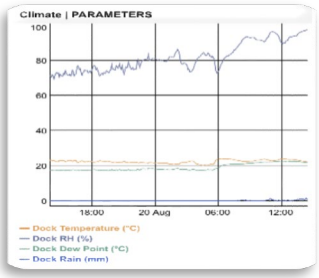
A Databank for the Future | SCMI Shore Station

The POSSE (Port Observing Shore Station Element) has received a second round of funding from the Port of Los Angeles Community Investment Grant Program. This initiative offers significant benefits to the Harbor Department and the Tidelands Public Trust by supplying real-time water quality and climate data, which supports marine-related scientific research across all educational levels within the Port of Los Angeles.

By integrating multiple data sets and implementing outreach efforts, the POSSE aims to sustain and enhance a comprehensive, regional coastal ocean observing system. This system is designed to illuminate the environmental conditions within the Port of Los Angeles, providing critical data capabilities that will serve as a vital resource for the preservation and prediction of changing environmental conditions. This supports the Port's preparedness and resilience to these changes.



With this renewed funding, the program will also be able to carry out annual maintenance, which includes the procurement of consumable parts. Additionally, this funding will facilitate an expansion of the system's capabilities through the introduction of conductivity and ORP sensors. Furthermore, interpretive elements have been installed onshore to extend the project's outreach through a visual display.



On August 20, 2023, our Eastern Pacific coastline experienced an unusual hurricane event. With the implementation of remote monitoring capabilities, SCMI was able to closely track the weather conditions impacting our laboratory, vessels, and living collection. The POSSE recorded wind gusts reaching speeds of 8.6 m/s, accompanied by erratic changes in wind direction.

RESEARCH GOALS

Palos Verdes Reef Restoration Project | Aerial Drone Surveys

Since the completion of the Palos Verdes Reef Restoration Project in 2020, the Southern California Marine Institute has made significant advancements in our aerial drone survey program. Regular drone flights continue to monitor kelp growth, with missions scheduled monthly during low tide. This systematic aerial monitoring allows us to visualize the progress of the restoration blocks and effectively assess the success of our conservation efforts.

The outcomes of our drone surveys have been promising. We have observed substantial growth since the inception of the program, and each subsequent flight continues to reveal enhanced block definition, indicating the positive impact of our restoration initiatives. Additionally, the image and footage library has been provided with other researchers studying the reef to correlate subsurface data with surface view.

The Palos Verdes Reef Restoration Project has evolved into a robust multi-institutional collaboration, further strengthening our commitment to marine habitat preservation and restoration.

The Bay Foundation

The Bay Foundation (TBF) has gladly been an SCMI consortium member for over 9 years. SCMI's facilities and location have allowed TBF to continue culturing and propagating abalone, while simultaneously providing accessibility for kelp forest and eelgrass restoration efforts. TBF are grateful for the resources and support that SCMI has provided over the years.

The Bay Foundation | Abalone Restoration Update

TBF's abalone restoration project aims to implement a multifaceted approach to restoring and developing abalone populations, and ultimately rocky reef habitats, throughout the Santa Monica Bay and greater coastal waters. TBF maintains two abalone aquaculture facilities at SCMI where they advance research on captive and wild abalone husbandry, spawning, and larval cultivation techniques. Since 2019, TBF and project partners (CDFW, NOAA Fisheries, Paua Marine Research Group, UC Davis Bodega Bay Marine Lab, Aquarium of the Pacific, and others) have outplanted over 5,000 red abalone (*Haliotis rufescens*) and 14,000 federally endangered white abalone (*Haliotis sorenseni*) to rocky reefs off Palos Verdes, Los Angeles and Point Loma, San Diego. This Spring 2024, TBF and project partners have outplanted an additional 2,000 white abalone to the reefs off Palos Verdes and Point Loma. The Fall 2024 white abalone outplant is tentatively scheduled to occur in October 2024.

Starting in 2024, TBF's abalone restoration work has expanded beyond the mainland coast of Los Angeles and San Diego. Following a pipeline burst in May 2015, over 100,000 gallons of crude oil spilled into the nearshore environment along the Gaviota Coast and Refugio State Beach, Santa Barbara County. TBF and its partners, the NOAA Restoration Center, Paua Marine Research Group, Rincon Consultants Inc., and The Cultured Abalone Farm, are undertaking abalone restoration efforts in the subtidal habitats affected by the spill. In April and May 2024, TBF and partner divers conducted subtidal habitat surveys at 15 reef sites along the Santa Barbara mainland coast. From these surveys, two sites were selected for the first abalone outplanting event, where 5,000 juvenile red abalone were released on August 12th and 13th, 2024. This event marks the beginning of Phase

I of the project, with the overall goal of releasing 40,000 red abalone in future years. Additionally, starting in 2024 TBF and project partners have initiated white abalone habitat suitability and site selection surveys off Catalina Island, with the goals of developing a new Catalina Island white abalone outplant site in 2025.

Moving forward, TBF and project partners will continue to perform scheduled biannual outplanting and monitoring events at the existing abalone sites, ultimately helping to inform the success of the project and the recovery of the species. TBF is looking forward to establishing many new partnerships to further abalone restoration throughout Southern California, with new projects coming soon!

Figure 1. TBF Divers working to deploy PODs (Protective Outplanting Devices) stocked with captive-bred juvenile white abalone (*Haliotis sorenseni*) to concrete bases throughout the abalone restoration site located off Palos Verdes.

Figure 2. The Cultured Abalone Farm (TCAF) captive-bred juvenile red abalone (*H. rufescens*) produced for Gaviota Coast abalone enhancement project. Abalone have a colored dot to differentiate from native abalone, and are transported in mesh bags inside coolers with seawater-soaked foam pads and icepacks the morning of outplanting to the reef sites.

Figure 3. On August 12th and 13th 2024, TBF and partner divers working to deploy 5,000 captive-bred juvenile red abalone (*H. rufescens*), produced at The Cultured Abalone Farm, to enhance reef sites off the Gaviota Coast impacted by the Refugio Beach Oil Spill in 2015.

The Bay Foundation | Kelp Restoration Update

TBF's Palos Verdes Kelp Forest Restoration project aims to enhance the subtidal habitat of Palos Verdes by mitigation of purple sea urchins (*Strongylocentrotus purpuratus)* to historically natural population densities. The project targets rocky reef habitat once abundant with giant kelp (*Macrocystis pyrifera*) that has shifted or begun shifting to a barren state by unstable urchin populations. The project is implemented with support from Vantuna Research Group (VRG), commercial sea urchin fishermen, and support from volunteer scientific divers. Restoration and monitoring activities have been conducted in kelp reference, restoration, and barren sites since July 2013. These restoration and monitoring activities include pre-restoration UPC and urchin density surveys, urchin culling, post-restoration urchin density surveys, and CRANE habitat monitoring. To date over 70 acres of reef has been restored, with an observed increase in red urchin gonad biomass, an increase in community diversity, and a significant increase in kelp canopy within restored sites.

Current efforts are focused on the restoration of Underwater Arch Cove, Point Fermin, and White Point where purple urchin barrens currently persist. TBF divers have begun setting up 30m by 30m restoration blocks within both sites by conducting pre-restoration UPC and urchin density surveys to establish baselines values for restoration efforts. After this data is collected commercial urchin fishermen, volunteer scientific divers, and TBF's own program biologists work to systematically cull purple urchins within the blocks. Urchins are removed until a target density of 2 per square meter, the historically healthy population density, is reached. Subsequent post-restoration urchin density surveys are conducted after the culling process, to confirm that the goal urchin densities have been achieved.

Figure 4. Point Fermin TBF kelp site pre-restoration with purple urchin barren (*Strongylocentrotus purpuratus*) pictured on the left, and post-restoration 2-months after urchin culling and giant kelp (*Macrocystis pyrifera*) regrowth pictured on right.

The Bay Foundation | Eelgrass Transplant Update

Eelgrass (*Zostera* spp.) is a marine flowering plant that is an economically and ecologically valuable marine habitat found in temperate regions throughout the world. It provides rearing habitat for juvenile fishes, filters nutrients, and reduces erosion, among myriad other functions. Eelgrass beds are highly productive systems, and the complex structure of seagrasses compared to unvegetated sediments greatly enhances biodiversity. Unfortunately, eelgrass beds are typically found near the coastline, and such, are more vulnerable to harmful impacts by human activities and climate change as well as natural disturbances, including wave action and light limitation. It is within this context that TBF, and partnered with Paua Marine Research Group (PMRG), transplanted *Zostera marina* to Button Shell Beach Cove on the leeward side of Catalina Island. Using applied methods from previously successful eelgrass transplants, TBF and PMRG transplanted 8,400 turions to a 1,400 m^2 project area. This Catalina Island Eelgrass Restoration Project hopes to produce strategic partnerships, address key data gaps pertaining to offshore eelgrass beds, create ecologically significant habitat, and inform the efficacy of scalable eelgrass restoration efforts.

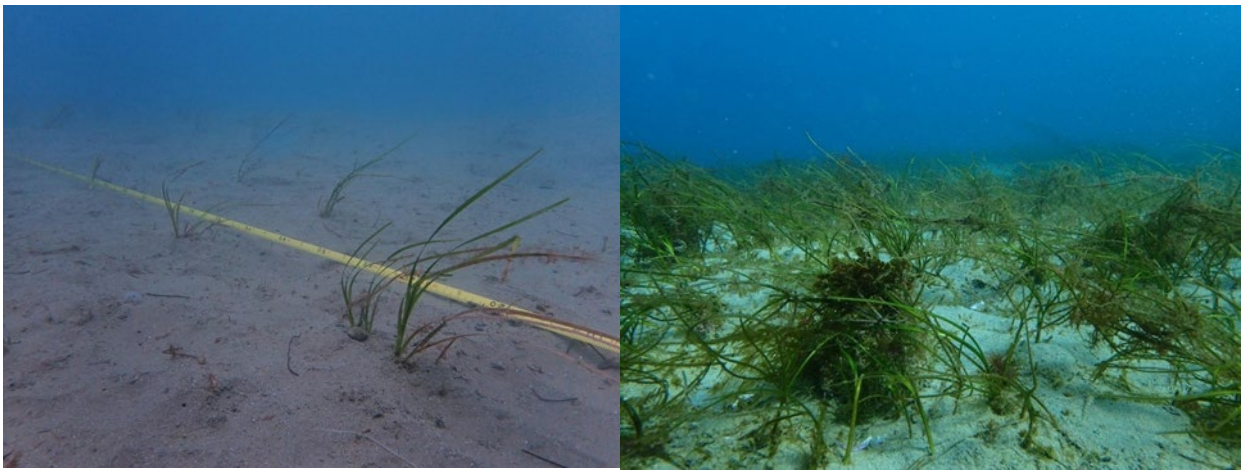


Figure 5. Photo of transplanted *Z. marina* at Catalina Island experimental site one month post-restoration (left) and seven months post-restoration (right).

Figure 6. Timelapse camera (TLC) image of a green sea turtle at Button Shell Beach Cove eelgrass restoration site on 03/22/2023.

Hourglass | Ocean Alkalinity Enhancement (OAE)

Ocean Alkalinity Enhancement (OAE) via alkaline mineral dissolution has the potential for permanent, gigatonne-scale carbon removal at competitive costs. Hourglass is a non-profit research organization formed in early 2024 that brings together interdisciplinary scientists to conduct targeted, integrated, and independent model, laboratory, and field research that rapidly de-risks the key uncertainties on how to safely and effectively scale mineral-based OAE techniques. Our mission is to strategically research the safety and efficacy of mineral based OAE techniques to accelerate responsible carbon removal and climate impact at scale.

This summer, we began the execution of a comprehensive 3-year monitoring plan of the world's first field trial of a carbon-removing nearshore berm to assess its safety and efficacy as a climate solution. We have also begun publishing our analyses from a monitoring program of the first ever coastal enhanced weathering field trial carried out by Vesta, PBC from July 2022-November 2023.

This year we also took over operations of a carbonate chemistry laboratory housed at SCMI and previously staffed by Vesta, PBC. We have since expanded our laboratory operations here to provide analytical services to other OAE industry partners and to generate vital geochemical data for our environmental monitoring programs. We're grateful for the incredible staff and support at SCMI that have been so crucial to our success thus far, and we look forward to continuing working together in the future.

University of Southern California | Geological Pore Water Study

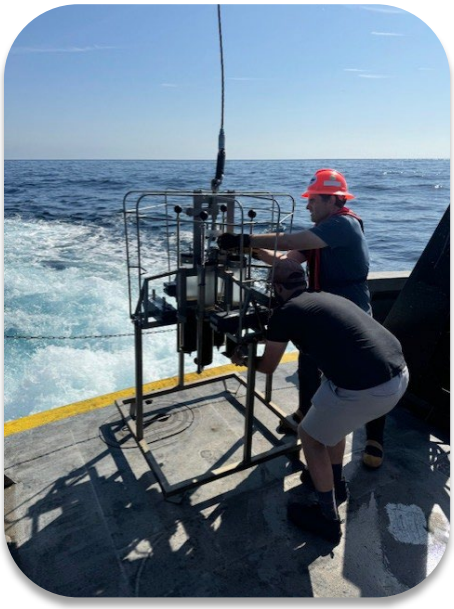
We are participating in a Sea Grant/California Water Board research project focused on the DDT that exists over much of the sea floor between Los Angeles and Catalina Island.

Our focus is on compounds that form during DDT degradation, compounds that may be soluble in sea water. If these compounds form and are present in the sediment in soluble forms, they may move out of the sediment, into the overlying water. If that happens, DDT degradation products may spread far and wide. Thus, we are collecting sediments and particularly pore waters (interstitial water) to see if these degradation products are present and if so, in what concentrations.

The R/V Yellowfin is a well-suited vessel on which to conduct this research. We use the A-Frame and winch to deploy a coring device which also contains an in situ pore water sampling device. We are working at depths >850 m and at locations mid-way between Palos Verdes and Catalina.

This is a collaboration, mainly between USC and Caltech but also involving students at CSU Fullerton and Santa Monica College.

University of California Santa Barbara | DDT Mapping



We would like to extend sincere thanks to Southern California Marine Institute and the crew of the *R/V Yellowfin* for a second very successful field work season in the Southern California Bight. Over two field seasons, the captain and crew have helped us collect sediment cores from more than 90 deployments into the deep coastal basins along Southern California. This year, we expanded our sampling efforts outward geographically with the goal of observing the extent of pesticide DDT and related compound concentrations in the deep ocean sediments. Our field work continues our core goals of mapping DDT and related compound concentrations across Southern California and identifying concentration hotspots in the region where extensive DDT manufacturing waste dumping is reported.

DDT was utilized globally as a highly effective pesticide during the mid-1900s. Its largest manufacturer in the United States operated out of Torrance, California, and had reportedly disposed of acidic manufacturing wastes into the deep ocean between Los Angeles and Catalina Island. Our sampling efforts aboard *R/V Yellowfin* in late 2022 showed high DDT and related compound concentrations across San Pedro Basin with a hotspot north of a known disposal site. Interested readers can view this year's publication describing this work at https://doi.org/10.1021/acs.est.3c08575 and a Los Angeles Times article referencing the work at https://www.latimes.com/environment/story/2024-02-21/radioactive-waste-ocean-dumping-los-angeles-coast. We are aggressively working to report findings from our more recent *R/V Yellowfin* voyages.

We continue to assess DDT and related compound concentrations in sediments across Southern California deep oceanic basins to provide much needed data for researchers interested in other aspects of DDT pollution in Southern California. We remain concerned about lasting and ongoing effects that DDT pollution has had on local marine mammals and birds feeding in the marine food web. We hope that our efforts will help us both understand current and future local ecological impacts and assess remediation potential for the affected region.

LA City | National Pollutant Discharge Elimination System Sampling

Our own vessel, La Mer, was under repair and we utilized RV Yellowfin as a fill-in to complete our National Pollutant Discharge Elimination System (NPDES) mandated sampling in Santa Monica Bay. Our permit requires us to trawl at 10 routine stations in the Bay twice a year. On the RV Yellowfin, we completed 8 of those trawls ranging from 60m depth to 220m. All fish and invertebrates collected were weighed, counted, measured, and released. Diversity, abundance, biomass, and community composition are examined spatially and temporally. Communities around the Hyperion Wastewater Reclamation Plant's outfall, which lies near the center of the Bay at 60m depth, are compared with communities throughout the Bay.

WSP | Marine Monitoring Projects

WSP staff were grateful to have SCMI as a subcontractor on marine monitoring projects throughout the Port of Los Angeles and Port of Long Beach this past year. SCMI's local presence offered critical vessel and personnel support to WSP scientists during water quality monitoring utilizing SCMI's CTD throughout the Los Angeles Harbor. SCMI staff also conducted otolith analysis for several studies including support for Regional Water Quality Control Board Investigative Order projects in San Diego Bay examining ecological and human health risk assessments. WSP and SCMI have a longstanding relationship and plan to continue to support one another on these projects and many more in the future.

Aquatic Bioassay Consulting Laboratories | Southern California Bight Survey

Aquatic Bioassay and Consulting Laboratories Inc. (Aquatic Bioassay) is an environmental field and toxicology laboratory located in Ventura, CA. Aquatic Bioassay contracted the R/V Yellowfin in the summer of 2023 to conduct sampling for the Southern California Bight Regional Monitoring Program (Bight Program). The Bight Program is a collaborative marine monitoring effort that extends from Point Conception to the Mexican border, and Aquatic Bioassay has participated in this program since 1997. The primary goal of the Bight Program is to examine sediment contamination and how it affects ecological health throughout the region. This is accomplished through the collection and identification of benthic fish and invertebrates and the

collection of sediment for benthic infauna, chemistry, and toxicity analysis. Aquatic Bioassay was assigned sediment and trawl stations in the northern Bight from Port Hueneme to Goleta and successfully conducted 19 trawls and collected sediment at 9 stations aboard the R/V Yellowfin. Bight sampling protocols, reports and data are publicly available and can be found at https://www.sccwrp.org/about/research-areas/regional-monitoring/southern-california-bight-regional-monitoring-program/

Ocean Animal Response and Research Alliance

The Ocean Animal Response and Research Alliance (OARRA) is excited to be a new SCMI tenant this year. We have had an exciting year of growth and development. As the designated West Coast Stranding Region organization for marine animal mortality response in Los Angeles County (LAC), this year we have successfully logged eighty-eight pinniped, cetacean, and sea turtle mortality response cases as of September, including but not limited to two dead stranded endangered fin whales in the Port of LA and Torrance. These cases continue our work of biosurveillance for emerging and proliferating pathogens, documentation of baseline population data and anthropogenic threats, and the extension of immersive fieldwork opportunities to students and early-career researchers. Many of these cases have been necropsied as teaching workshops at our SCMI laboratory as we ramp up the onboarding of many new mortality response volunteers and student interns from Southern California colleges. We have also enjoyed collaborating with area colleges and laboratories to support ongoing research on heavy metal and DDT concentrations in cetaceans with samples sourced from our programs. OARRA continues conducting weekly live animal population abundance surveys of the LA and OC coastline, Ports of LA and Long Beach, and offshore oil platforms in order to monitor population dynamics, site fidelity, health, flipper tag and bird band resightings, entanglement incidence, and more. These sightings are published live on our website's WatchSpotter data map. We are grateful to consider SCMI our base camp and look forward to ongoing collaborations on and off campus.

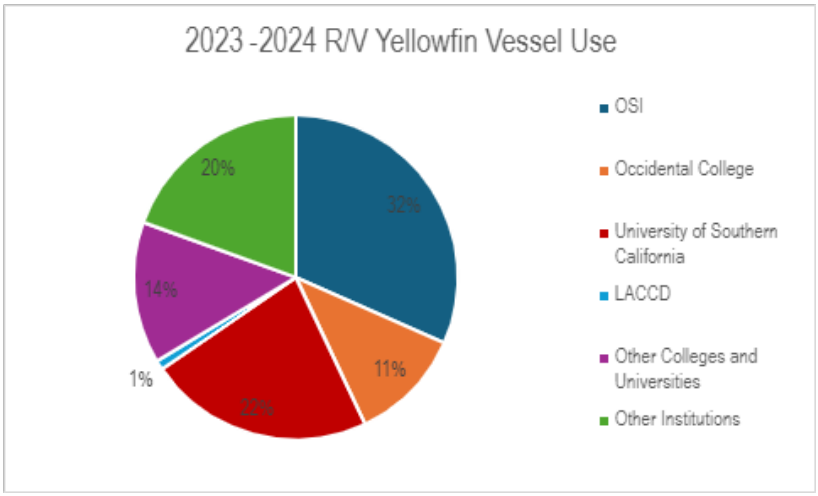
OARRA staff strategize with other Los Angeles County and Orange County collaborators on the case of a dead stranded fin whale in Torrance, CA.

VESSEL USAGE

R/V Yellowfin Usage

The R/V Yellowfin logged 146 cruises this past year, bringing the boat to about 862 hours at sea. There was an increase in contract work this year while maintaining our consistent class laboratory trips for colleges and universities, and university research. SCMI continues to increase vessel usage amongst SCMI member institutions and to broaden vessel usage to other institutions. Compared to last year, we had an 18% increase in the total number of cruises, 62% increase in faculty and researchers, 4% increase in student attendance and 36% increase in the number of vessels hours used to conduct research and field trips aboard the R/V Yellowfin.

Institute Name	Total Number of Cruises	Total Number of Faculty & Researchers	Total Number of Students	Total Hours of Vessel Use
OSI	56	57	1040	272.5
Occidental College	23	29	295	98
University of Southern California	24	65	117	193.5
LACCD	2	2	48	8
Other Colleges and Universities	27	36	478	121.75
Other Institutions	14	54	0	168
Total	**146**	**243**	**1978**	**861.75**



OCEAN STUDIES INSTITUTE BUDGET

Ocean Studies Institute FY Budgets 2018/2019 through 2023/2024

Fund Description	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24
Revenue						
Salaries and Wages	$ 528,809	$ 554,099	$ 544,799	$ 544,799	$ 603,297	$ 605,473
Benefits	$ 317,532	$ 320,305	$ 284,865	$ 286,313	$ 309,865	$ 351,832
OSI Member Contributions [1]	$ 76,500	$ 76,500	$ 76,500	$ 76,500	$ 76,500	$ 76,500
OE&E	$ 48,233	$ 63,481	$ 84,524	$ 109,761	$ 128,752	$ 99,798
Misc. Revenue and User Fees [2]	$ 77,436	$ 50,891	$ 26,268	$ 33,090	$ 48,758	$ 59,691
Total	$ 1,048,510	$ 1,065,275	$ 1,016,955	$ 1,050,463	$ 1,167,172	$ 1,193,295
Expenditures						
Salaries and Wages	$ 552,822	$ 565,225	$ 509,263	$ 521,423	$ 587,059	$ 638,626
Benefits	$ 317,532	$ 320,305	$ 284,865	$ 286,313	$ 309,865	$ 351,832
Operating Expenses [3]	$ 121,621	$ 93,957	$ 144,505	$ 139,391	$ 195,780	$ 158,959
Accounting Charges	$ 3,609	$ 1,044	$ 53	$ 1,293	$ 2,125	$ 2,031
Total	$ 995,583	$ 980,532	$ 938,685	$ 948,419	$ 1,094,829	$ 1,151,448
End-of-Year Balance	$ 52,926	$ 84,744	$ 78,270	$ 102,044	$ 72,343	$ 41,847

[1] OSI Members contributions are received annually and vary among the nine OSI institutions based on historic patterns of facilities and service use

[2] Miscellaneous OSI Revenue comes from indirect cost returns from external grants; user fees are associated with use of the R/V Yellowfin. This

[3] Operating Expenses include contractual services, supplies, minor boat repairs, and diving related expenses

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Julianne E. Steers – Marine Science Technician

Mark Loos – Aquarist & Instructional Support Technician

Nicole Christian – Instructional & Research Support Technician

Dennis Dunn – Captain R/V Yellowfin

Denis Mahaffy – Vessel Engineer

Joel Ingram – Small Vessel Support Technician & Relief Captain

Georgios Tsounis – Assistant Dive Safety Officer

Michael Abernathy – Assistant Boat Safety Officer

Thomas Arklie – Assistant Dive Safety Officer

Jim Cvitanovich – Captain