SOUTHERN CALIFORNIA MARINE INSTITUTE

ANNUAL REPORT

2024-2025

820 S. SEASIDE AVE. TERMINAL ISLAND, CA 90731 | SCMI.NET | 562-985-3172

DIRECTOR'S MESSAGE

I believe this may have been the busiest SCMI year ever. We had another fantastic Catalina Semester led by Drs. Steele, Edmunds and terHorst at CSUN. 20 wonderful students had another incredible semester. The R/V Yellowfin was booked solid throughout the school year led by our OSI campuses. We had a total of 1885 students participating with 394 faculty and researchers on 124 cruises. Because of its unique size and capabilities, the R/V Yellowfin is an affordable research and teaching vessel that provides an unrivaled opportunity for accessing the Southern California Bight. Our mission is to make sure that this unique opportunity is available and affordable to all students in the greater Los Angeles area. Thus, in addition to its regular coastguard inspection, we had the vessel surveyed this year and it passed with flying colors. We can thank Captain Dennis Dunn and Engineer Denis Mahaffy for this excellence. The dive program was audited as part of a CSU statewide accreditation of their diving program. Thanks to the hard work of Darrell Montague, we're fully accredited. We also had an EH&S audit of the entire facility by our home campus, CSULB. And, I'm happy to report that there are no significant OSHA or safety concerns with our lab. We need a big shout out to Julianne Steers for working with campus and the OSHA consultants ensuring that we have the safest possible campus. And, finally the entire OSI program was audited by the Chancellor's Office with no significant findings! You can thank our staff for their excellent work ensuring that the marine lab and the R/V are ready for you. Book your cruises today!

Daniel J. Pondella II, MA, Ph.D.
Director, Ocean Studies Institute & Southern California Marine Institute

MISSION

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

SCMI 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, and 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, state-of-the-art dive locker 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.

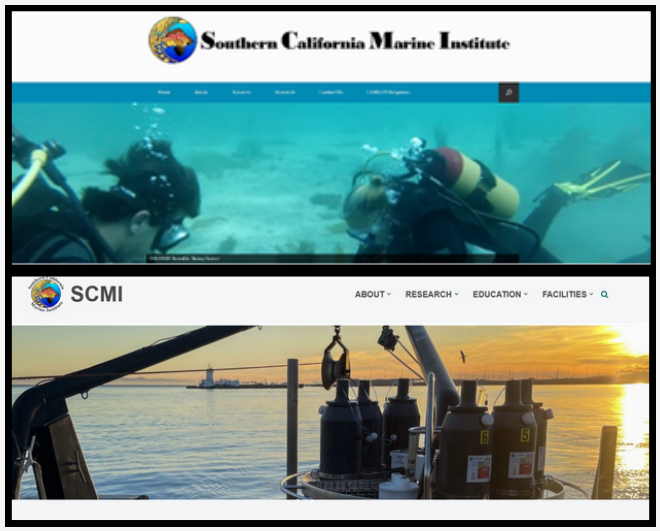
SCMI'S 30TH ANNIVERSARY

SCMI celebrated its 30th anniversary in 2024! We had the opportunity to spend the past year reflecting on all of the great work and accomplishments SCMI has had over the past thirty years while fostering marine research and education. From operating some marvelous vessels including the R/V Vantuna, R/V Sea Watch, the Golden West, the Valero, the Nautilus and R/V Yellowfin to participating in innovative projects including the Palos Verdes Reef Restoration Project and various Water Quality Projects, we have had an incredible 30 years and are looking forward to many more!

WHAT'S NEW?

R/V Yellowfin Haulout

It was haul-out season for the R/V Yellowfin! In July 2024, the Yellowfin was hauled out for routine maintenance. This is the time of year where we are able to give our boat some TLC and bring her into top shape for the upcoming educational and research cruises. While the boat remained completely out of the water during this time, crew were able to properly clean the bottom of the boat and give her a fresh coat of paint. Other areas that needed attention were more easily identifiable at this time as well. Everything has since been running excellent as we continue to conduct science!



Website Redesign

The SCMI website received a facelift this past year! The goal of the redesign was to create a website with simplified information and an easy-to-use interface. We still have our main menu categories of "About", "Research", and "Education" alongside a recently added "Facilities" Tab. These sections easily bring you to your favorite pages including R/V Yellowfin Information, Research Projects happening at SCMI, Facility Information and many more! You can view the updates at scmi.net.

INFRASTRUCTURE IMPROVEMENTS

At SCMI, our unwavering commitment to advancing our mission is demonstrated through the strategic maintenance and optimization of our physical infrastructure and environments. Our primary objective is to establish and sustain a clean, safe, and conducive environment that promotes learning and engagement among member institutions, researchers, staff, and students.

Throughout this fiscal year, we have persistently enhanced our facilities by integrating best practices to ensure the delivery of high-quality services within a cost-effective framework. Key improvements include HVAC systems; Carry deck crane acquisition; faucet upgrades; aquatic systems chiller and housekeeping.

HVAC System Upgrade for Enhanced Climate Control on Second Floor

As part of our ongoing commitment to maintaining optimal environmental conditions for research and administrative operations we successfully upgraded two HVAC (Heating, Ventilation, and Air Conditioning) units servicing the second floor of our facility.

Scope of Work: The project involved the decommissioning and replacement of two aging HVAC units with high-efficiency systems to provide precise climate control. These units are now fully operational and calibrated to support the unique environmental requirements of our second-floor laboratories and office spaces.

Key Improvements:

· **Enhanced Climate Stability:** The new systems offer improved temperature and humidity regulation, critical for maintaining the integrity of sensitive laboratory experiments and equipment.

· **Improved Air Quality:** Enhanced filtration and ventilation capabilities ensure a cleaner and healthier indoor environment for staff and researchers.

· **System Reliability:** The new installation ensures continuous operation.

These upgrades significantly enhance the working conditions for personnel and the operational stability of our research infrastructure.

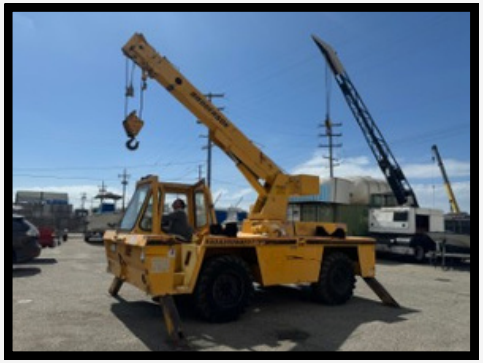
INFRASTRUCTURE IMPROVEMENTS

Crane Upgrade for Enhanced Security and Operational Reliability

In our ongoing commitment to maintaining a robust and secure operational environment, we have undertaken a comprehensive upgrade of our lifting and material handling infrastructure. The essential replacement of our legacy crane, circa 1946, with a new-to-us 1990s Broderson RTR-80 carry-deck crane. The modernization initiative aligns with current OSHA standards, thereby ensuring compliance with all relevant safety regulations.

The new Broderson RTR-80 carry-deck crane delivers a more reliable tool for our lifting needs. The compact design and improved maneuverability of the carry-deck crane facilitate seamless integration into existing workflows.

This upgrade not only reinforces security by minimizing the potential for equipment failure but also promotes operational efficiency through improved safety protocols. The implementation exemplifies our dedication to uphold the highest standards of safety, reliability, and productivity within our infrastructure.



INFRASTRUCTURE IMPROVEMENTS

Installation of New 7.5 HP Chiller and FRP Platform for SCMI Aquatic System

As part of our strategic infrastructure improvements to support the Southern California Marine Institute (SCMI) aquatic systems, we have completed the removal of the legacy chiller unit and the installation of a new 7.5 horsepower (HP) chiller. This upgrade is critical to ensuring the long-term reliability and performance of our aquatic research operations.

Scope of Work: The outdated chiller unit was decommissioned and replaced with a high-efficiency 7.5 HP chiller. The new unit is engineered to deliver consistent thermal regulation for the SCMI aquatic system, supporting optimal water temperatures for marine life. A custom-fabricated FRP platform was installed to elevate and secure the chiller. This platform is designed to mitigate the risk of flood damage, particularly from seasonal and storm-related flooding along Seaside Avenue.

A few key benefits:

- **Flood Resilience:** The FRP platform provides robust protection against water intrusion, safeguarding the chiller and associated infrastructure from potential flood events.
- **Operational Efficiency:** The new chiller offers improved energy efficiency, reduced maintenance requirements, and comparable cooling capacity to meet the demands of the aquatic system.
- **System Reliability:** With upgraded components and reinforced installation base, the system is now better equipped to deliver uninterrupted service in a coastal environment.
- **Impact:** This infrastructure enhancement ensures the continued stability and performance of the SCMI aquatic system, protecting valuable research assets and supporting our mission of marine science operations. The proactive flood mitigation measures also reflect our commitment to sustainable and resilient facility management.

INFRASTRUCTURE IMPROVEMENTS

Warehouse and Laboratory Spaces

This year, we prioritized the maintenance and organization of our warehouse and laboratory facilities. A thorough housekeeping effort was undertaken, including the purging of outdated, unused equipment and materials. This initiative has successfully optimized storage capacity, enhanced safety, and improved overall operational efficiency across our campus.

Laboratory Sink Faucet Upgrade

Select laboratories underwent a systematic replacement of outdated sink faucets to enhance operational efficiency and compliance with safety standards. The replacement process involved the installation of high-quality, corrosion-resistant fixtures to support optimal laboratory hygiene. This upgrade aims to improve water flow control, eliminate water loss, and reduce maintenance needs.

OSI AAUS & MOTC OPERATIONS

OSI AAUS Dive Operations

The AAUS accreditation report was delivered in April 2024. A number of recommendations were made, four deemed “high priority”, one of which was the addition of a full-time assistant for CSU/OSI. As of this writing, our DCB has yet to review/discuss the report.

We currently have 83 (61 active) Scientific Divers on our roster, logging 1693 dives for the period 7/1/2024 – 6/30/2025 . Two AAUS Scientific Diver courses were conducted – one in August 2024, and one in June 2025. A total of seventeen new divers received training, and the cohorts were comprised of candidates from CSUN, CSULB, CSUCI, CSUDH, USC, CMA, CDFW and Occidental College.

OSI MOTC Boat Operations

We conducted one MOTC in July 2024 for 9 participants comprised of candidates from CSUN and CSULB. We are currently in the process of moving the management of small boating operations onto the bloop system. This will allow us to centralized record-keeping, track expirations, log on-water time, and simplify the reporting of statistics to the Scientific Boating Safety Association (SBSA).

OSI AAUS REPORT

AAUS Report 2024

Created
04/21/25 09:18
by Darrell Montague

Updated
04/21/25 09:18
by Darrell Montague

Period
01/01/24 - 12/31/24

Total time
57169 min (39days 16h 49min)
From last year ▼ 32%

Total dives
1623
From last year ▼ 37%

Total divers
52
From last year ▼ 19%

Incidents
0
From last year ▲/▼ 0%

AAUS
04/21/25 09:34
by Darrell Montague

Dives by Breathing gas

	Dive time (min)	Dives logged	Number of divers	Number of incidents
Air	54954	1520	51	0
Nitrox	2215	103	1	0
Mixed Gas	0	0	0	0

Dives by Specialized Diving Environment

	Dive time (min)	Dives logged	Number of divers	Number of incidents
Required Decompression	0	0	0	0
Overhead Environment	0	0	0	0
Blue Water	21	1	1	0
Ice/Polar	0	0	0	0
Saturation Diving	0	0	0	0
Aquarium Diving	0	0	0	0

Dives by AAUS depth range

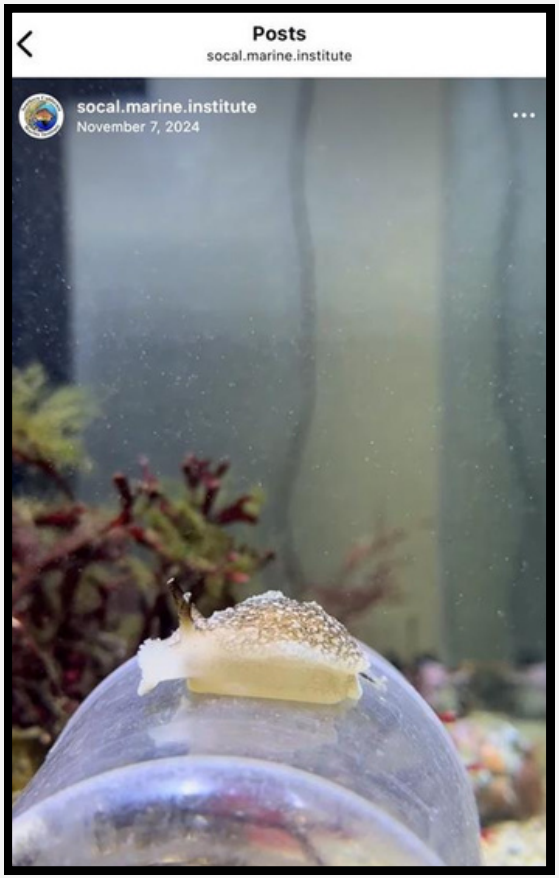
	Dive time (min)	Dives logged	Number of divers	Number of incidents
0 - 30 feet	40087	1114	49	0
31 - 60 feet	15633	455	49	0
61 - 100 feet	1434	53	11	0
131 - 150 feet	0	0	0	0
151 - 190 feet	0	0	0	0
> 190 feet	0	0	0	0

Dives by Diving Purpose

	Dive time (min)	Dives logged	Number of divers	Number of incidents
Scientific	51886	1376	45	0
Training and Proficiency	5283	247	16	0

SCMI SOCIAL MEDIA

SCMI's Instagram account @socal.marine.institute had another excellent year. We use our social media platform to educate viewers and followers about marine life as well as the exciting projects we have around the SCMI lab and on the R/V Yellowfin. Educational posts, reels and stories are posted often as a scheduled series, which continues to engaging amongst our viewers. We continue to include "What is it Wednesday?!" on a weekly basis where participants guess the animal based on a zoomed in image.



2024-2025 PERFORMANCE REVIEW

1.6 K Followers

1.2 K Profile Activity

1.6 K Interactions

13.7 K Accounts Reached

R/V YELLOWFIN EDUCATIONAL CRUISES

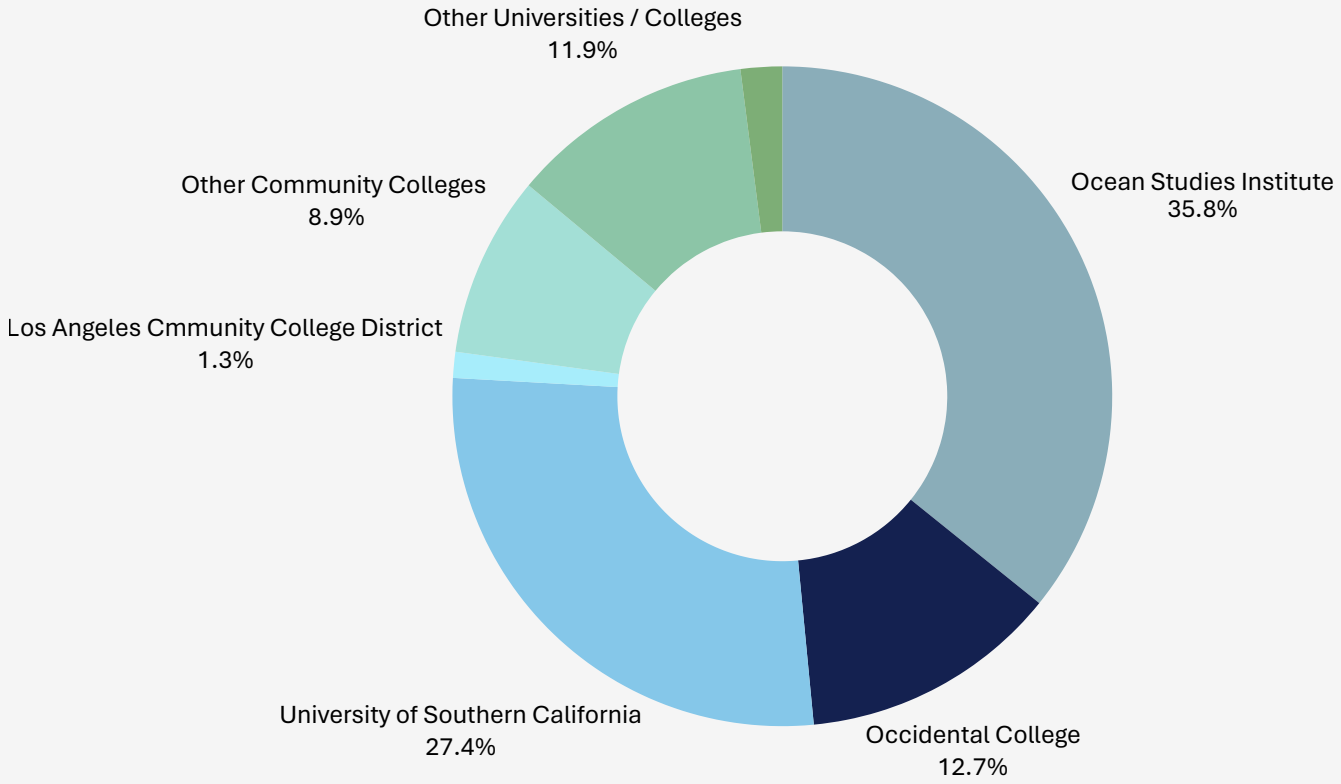
The R/V Yellowfin had another fantastic year conducting educational cruises with our local colleges and universities. Throughout the year, we have the pleasure of bringing university and college laboratory classes onboard to experience the process of conducting marine science on a moving vessel. This year, we held 86 educational cruises on the R/V Yellowfin where we operated scientific equipment including but not limited to otter trawls, biological dredges, gravity corers, CTDs, and plankton nets alongside the expertise of our captain, engineer and technicians.

R/V YELLOWFIN VESSEL USAGE

Another successful year was spent at sea for the R/V Yellowfin. The R/V Yellowfin is an incredible research vessel that is utilized year-round for educational and research endeavors. This past year, the R/V Yellowfin embarked on 124 cruises total, with 675.5 hours at sea. We continue to see large student attendance onboard which has been excellent returning from the COVID-19 pandemic. We additionally continue to work with universities and institutions to conduct research projects along the coast.

NAME	NUMBER OF CRUISES	NUMBER OF STUDENTS	NUMBER OF FACULTY & RESEARCHERS	HOURS OF VESSEL USE
Ocean Studies Institute	53	904	141	298
Occidental College	13	165	50	51
University of Southern California	22	122	108	166.5
Los Angeles Community College District	2	54	5	8
Other Community Colleges	22	525	35	59.5
Other Universities / Colleges	10	115	47	80
Other Institutions	2	0	8	12.5
TOTAL	**124**	**1885**	**394**	**675.5**

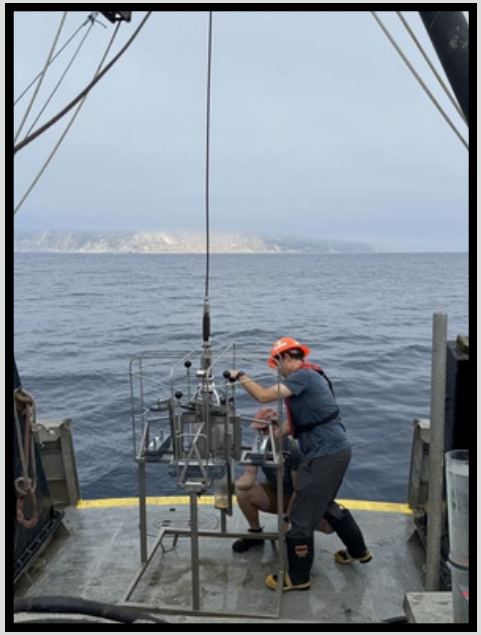
R/V YELLOWFIN VESSEL USAGE



CSU MARINE BIOLOGY SEMESTER ON CATALINA ISLAND

The CSU Marine Biology Semester on Catalina Island had an excellent year in Fall 2024 hosted by the California State University, Northridge. Courses offered this year included Ecology of Marine fishes taught by Dr. Mark Steele, Marine Invertebrate Zoology taught by Dr. Peter Edmunds, Marine Ecology taught by Dr. Casey terHorst and Undergraduate Directed Research. A full roster of 20 students attended the semester with several students placed on a waitlist to attend. The program has been gaining consistent momentum and popularity over the past few years as well as this upcoming year! This immersive program is an excellent opportunity for marine science and biology students to immerse themselves in hands on field learning and training. This sets them up for a promising and successful career after graduation.

SCMI SUPPORTED RESEARCH PROJECTS



PALOS VERDES REEF RESTORATION PROJECT

The Southern California Marine Institute completed construction of the offshore rocky reef off of the Palos Verdes Peninsula in the spring and summer of 2020 in partnership with the Vantuna Research Group (VRG) at Occidental College. SCMI remained the proud lease holder of this project as it was the first of its kind in the state of California. The peninsula prior to the rebuild had undergone environmental stressors that caused depletion and loss of the local rocky reefs and kelp beds. It has been several years since the rebuild of the reef, and we are excited to report that the reefs are thriving! Monitoring the success of the Palos Verdes Reef Restoration Project has been a multi-institutional collaboration by reviewing kelp growth, kelp forest community spatial dynamics, fish habitat patterns, eDNA studies and more! We have been seeing excellent signs of Giant kelp growth, as well a substantial increase in fish biomass density since the construction!

ENVIRONMENTAL STATUS OF ARTIFICIAL STRUCTURES OFFSHORE SOUTHERN CALIFORNIA | BOEM GRANT

The Bureau of Ocean Energy Management (BOEM) granted the Southern California Marine Institute (SCMI) funding to conduct research on the environmental status of the artificial structures off the Southern California Coast. In collaboration with researchers from Occidental College's Vantuna Research Group (VRG) and Cal Poly Pomona, this study has been looking into ecological indicators that reflect on the relationship between local factors and artificial reef structures in Southern California through habitat and biodiversity assessments. Further analyses aim to develop environmental criteria that evaluates potential artificial reef structures in the future.

ARTIFICIAL REEF MONITORING | COAST

With the support of CSU Council on Ocean Affairs, Science & Technology (COAST), Dr. Jeremy Claisse from Cal Poly Pomona and Dr. Daniel Pondella from Occidental College have been conducting research on the artificial reefs all along the Southern California Coast. The research aims to dive into a deeper understanding of the physical status and habitat features of artificial reefs along the coast of Southern California. They have been studying the status of the artificial reefs using methods including bathymetry and acoustic backscatter sonar and biological SCUBA surveys, allowing for in depth analysis on the biological and habitat assessments of these reefs.

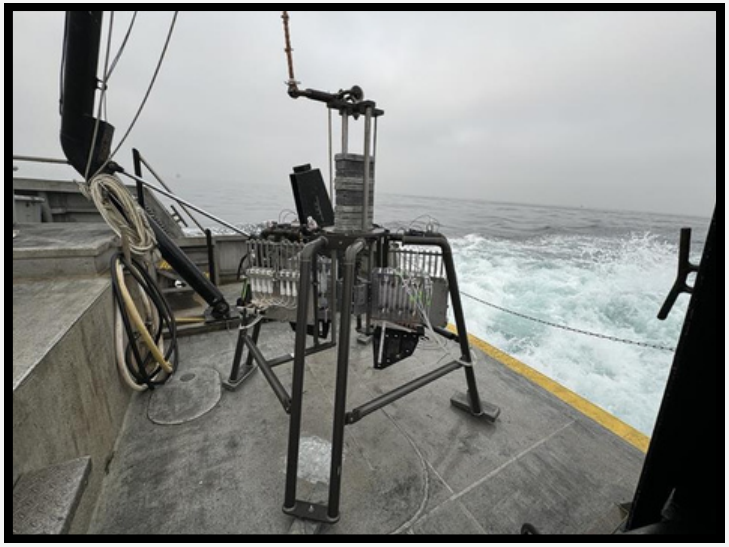
This research project has been an excellent opportunity for OSI researchers, graduate students and undergraduate students to be involved in important and necessary research off our coastline.

CALIFORNIA STATE UNIVERSITY, NORTHRIDGE
YELLOWFIN CROAKER RESEARCH

Graduate student Vanessa Benoit (CSUN) is using SCMI's facilities to study the acoustic behavior of yellowfin croaker *(Umbrina roncador)*, a native Southern California species. Fish housed in SCMI's outdoor tanks are monitored with hydrophones and GoPro cameras to document sounds and link them to behavior. With the help of SCMI staff, Vanessa designed a specialized egg net to detect spawning and worked alongside a veterinarian to ultrasound fish for sex identification. The ongoing guidance and support from SCMI staff have been essential in advancing this project, which aims to reveal how yellowfin croaker produce sound and whether sound production differs between males and females.

UNIVERSITY OF SOUTHERN CALIFORNIA
DDT PORE WATER STUDY

Provided by Researchers at University of Southern California:



We conducted research funded by Sea Grant/California Water Board that focused on the DDT that exists over much of the sea floor between Los Angeles and Catalina Island. We visited sites near the Whites Point outfall pipe, in water 650 m deep and sites in water 850 m deep. At all sites we collected sediment pore water and measured DDT degradation compounds.

We found many degradation compounds present in pore waters at all three sites, also many compounds present in the sediment from all sites. But most importantly, we found high concentrations of several soluble DDT-degradation products (DDA and CPA) in the pore waters at all three sites. The concentration of these soluble forms in the pore waters is much higher than in the overlying water, this means they will diffuse out of the sediment into the overlying water. An estimate of this flux of DDA from the sediments back into the ocean yields a value of 8 tons per year. This much DDA is re-entering the ocean ecosystem from the sediments.

Again, we acknowledge that this work is a collaboration, mainly between USC and Caltech but also involving students at CSU Fullerton and Santa Monica College.

UNIVERSITY OF SANTA BARBARA | DDT MAPPING

Provided by Researchers at University of Santa Barbara:

We would like to extend sincere thanks to Southern California Marine Institute and the crew of the R/V Yellowfin for third very successful field work season in the Southern California Bight. Over three field seasons, the captain and crew have helped us collect sediment cores from 91 deployments into the deep coastal basins along Southern California. This year, we expanded our sampling efforts to include San Pedro, Santa Monica, and Santa Catalina Basins 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 provided a first look at elevated DDT and related compound concentrations in San Pedro Basin. This work was published in 2024 in Environmental Science & Technology (see https://doi.org/10.1021/acs.est.3c08575), and was a focus of a February 2024 Los Angeles Times article (see https://www.latimes.com/environment/story/2024-02-21/radioactive-waste-ocean-dumping-los-angeles-coast). Sampling efforts in 2022 and 2023 have now been included in another recently submitted publication we anticipate will come out later this calendar year. In addition, our work on R/V Yellowfin has been highlighted in the award-winning Los Angeles Times' documentary Out of Plain Sight (see https://www.outofplainsight.com). Finally, we continue to aggressively work towards reporting the findings from our more recent 2024 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.

CONSORTIUM MEMBER & COLLABORATOR UPDATES

THE BAY FOUNDATION

The Bay Foundation (TBF) has gladly been an SCMI consortium member for over 10 years. SCMI's facilities and location have allowed TBF to continue culturing and propagating juvenile red and endangered white abalone, while simultaneously providing accessibility for kelp forest and eelgrass restoration efforts. TBF values the resources and support that SCMI has provided over the years.

Figure 1. TBF Ocean Resilience Program Divers this spring 2025 after outplanting endangered *Haliotis sorenseni* (white abalone) to the reefs off Palos Verdes, Los Angeles.

TBF Abalone Project Updates

TBF's abalone restoration projects aim to implement a multifaceted approach to restoring and developing abalone populations, and ultimately rocky reef habitats, throughout southern California and the Channel Islands. TBF maintains two abalone aquaculture facilities at SCMI where they advance research on captive-bred juvenile abalone husbandry 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 captive-bred juvenile red abalone (*Haliotis rufescens*) and over 18,000 captive-bred federally endangered white abalone (*Haliotis sorenseni*) to rocky reefs off Palos Verdes, Los Angeles and Point Loma, San Diego. This May 2025, TBF and project partners outplanted an additional 1,569 white abalone to the reefs off Palos Verdes and Point Loma. The Fall 2025 abalone outplant events are tentatively scheduled to occur in September 2025, in support of the Pacific Coast Ocean Restoration (PCOR) Initiative awarded through NOAA. TBF and project partners will develop four new abalone outplanting sites located in Palos Verdes, Point Loma, and Santa Catalina Island. The mainland sites, in Palos Verdes and Point Loma, will receive 5,000 captive-bred juvenile red abalone, produced by partners at The Cultured Abalone Farm; and additional captive-bred juvenile white abalone, produced by the White Abalone Captive Breeding Program, will be released at the new Santa Catalina Island sites this Fall 2025. Furthermore, TBF and partners will continue with Phase II project events for the Gaviota Coast Abalone Restoration Project, in which partners are undertaking abalone restoration in subtidal habitats affected by the Refugio Beach Oil Spill in May 2015. This spring and summer 2025, continued habitat surveys occurred along the Gaviota Coast for the goal to develop an additional abalone outplant site by August 2025, with two of these sites scheduled to receive 5,000 juvenile red abalone, produced by The Cultured Abalone Farm, this August 2025.

THE BAY FOUNDATION

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Figure 2. Tagged *Haliotis sorenseni* (white abalone) on a blade of kelp during abalone outplant module stocking.

THE BAY FOUNDATION

TBF Abalone Project Updates

Moving forward, TBF is excited to continue their partnership at SCMI with the development of a new abalone aquaculture system that is expected to be onsite by winter 2025. This new system will allow TBF to continue as a core abalone project partner, and will allow TBF at SCMI to serve as a vital abalone growout and holding facility in the Los Angeles area prior to future abalone outplants throughout the Santa Monica Bay and southern California! Further, 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 always eager to develop new partnerships to further abalone restoration throughout southern California, with continued and new projects coming soon!

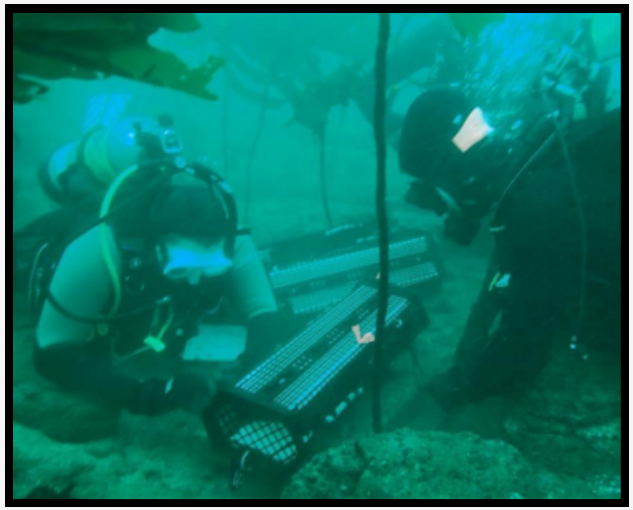


Figure 3. TBF Divers working to deploy PODs (Protective Outplanting Devices) stocked with captive-bred juvenile white abalone (*Haliotis sorenseni*) to concrete bases throughout the abalone restoration site located off Palos Verdes.

THE BAY FOUNDATION

TBF Kelp Forest Restoration Update

TBF's Palos Verdes Kelp Forest Restoration project aims to enhance the subtidal habitat of Palos Verdes by the management 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 80 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 all three 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.

The Bay Foundation continued to expand our volunteer diving program this year, onboarding over 30 new scientific divers to aid in the kelp forest restoration project. Volunteer divers have been incredibly influential on the progress of this project, helping clear two acres of urchin barrens over the course from July 2024, to June 2025.

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

TBF 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, 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 m2 project area (Figure 5). In 2025 this eelgrass bed has grown to over 2,000 m2 showing incredible success of the transplant to date (Figure 6). 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. TBF and partners have received funding to establish additional transplant sites and are in the process of determining the best locations for this project.

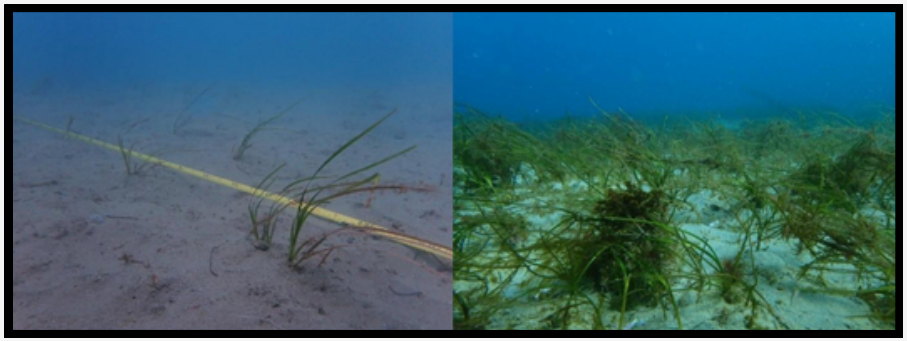


Figure 5. Photo of transplanted Z. marina at Catalina Island experimental site one month post-restoration (left) and seven months post-restoration (right).

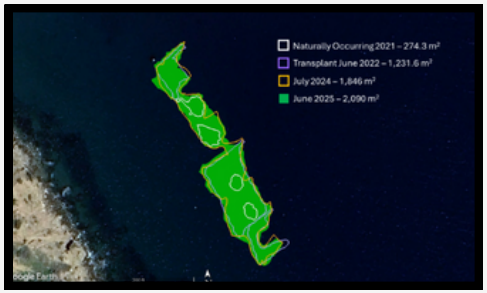


Figure 6. Map of Button Shell Beach Cove Zostera marina (eelgrass species) restoration site since 2021 to June 2025. Figure depicts eelgrass bed area pre- and post-transplant. Credit: Adam Obaza, PMRG.

Figure 7. Timelapse camera (TLC) image of a green sea turtle at Button Shell Beach Cove eelgrass restoration site on 03/22/2023.

HOURGLASS CLIMATE

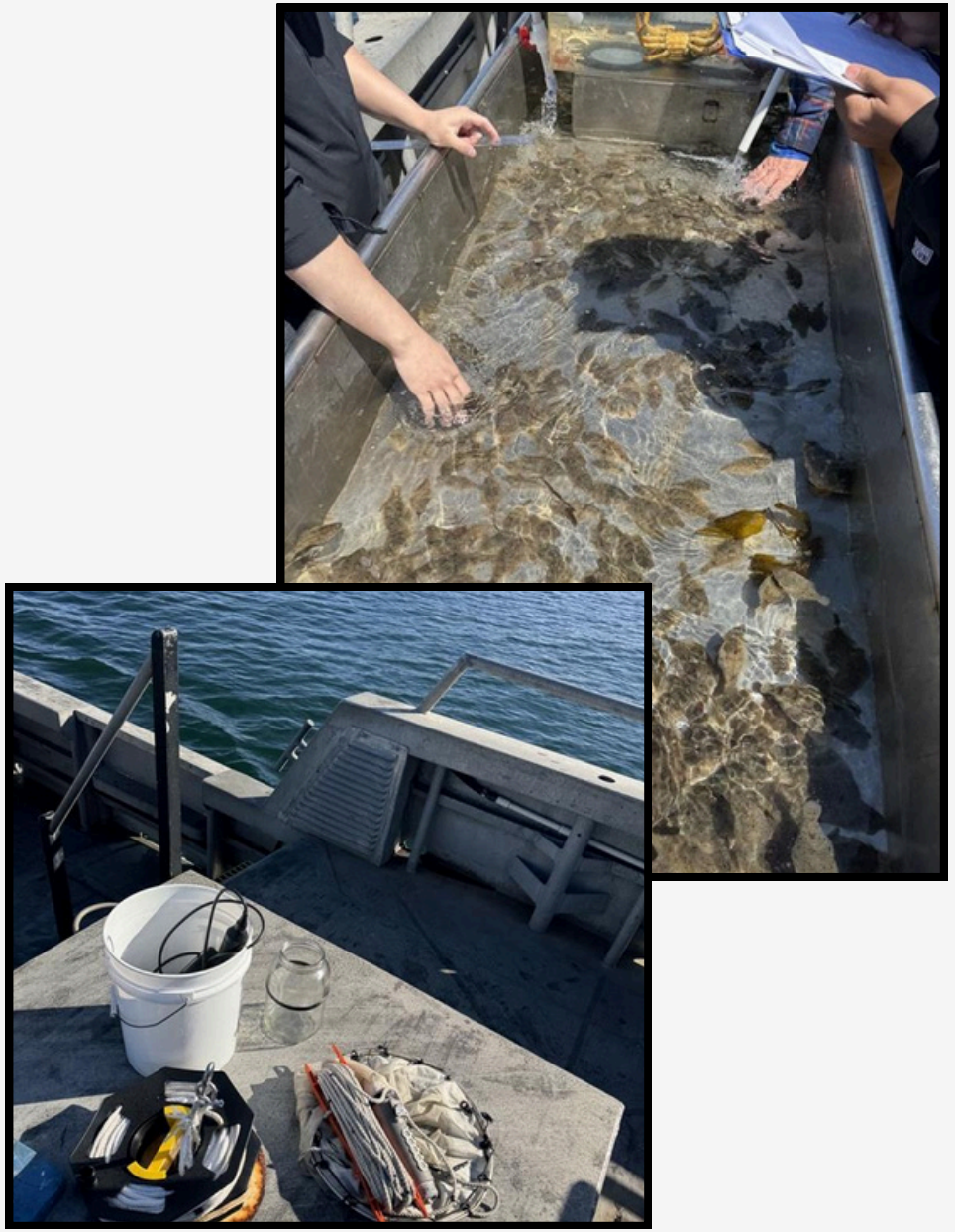
Hourglass Climate is a nonprofit research organization with the mission to strategically research the safety and efficacy of marine Carbon Dioxide Removal (mCDR) techniques for responsible carbon removal and climate impact at scale, and disseminate our work for the public benefit.

A critical industry gap, Hourglass identified that many mCDR companies build in-house labs to measure seawater carbonate system parameters (e.g. alkalinity), the key measurements used to calculate carbon removal from their projects, due to a lack of high-precision commercial options. For a rigorous and trusted mCDR industry to develop, a centralized, independent, high-precision carbonate chemistry analytical facility is required. Hourglass is currently filling this gap from our laboratory at the Southern California Marine Institute. Hourglass has also just built a series of bench-top reactors to simulate seafloor mineral dissolution to further parameterize RADIO, a sediment reaction transport model to mechanistically predict alkalinity fluxes resulting from mineral feedstock dissolution on the seafloor, a key process in marine Enhanced Rock Weathering which is a form of mCDR.

PASADENA CITY COLLEGE

NSF FUNDING GRANTED

We are elated to announce that Pasadena City College has been granted NSF funding to work with the Southern California Marine Institute and the R/V Yellowfin Crew! Pasadena City College is our newest consortium member and recently submitted a proposal for funding to bring students together at SCMI and learn about the different areas of research in the marine biology, geology and oceanographic field. During this time they will learn about the different marine sampling methods onshore as well as onboard the R/V Yellowfin. With the help of the SCMI crew at the lab and onboard, students will learn how to develop a mini research project, collect the data and draw conclusions. Congratulations to Pasadena City College, we are very excited to be part of this program!



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