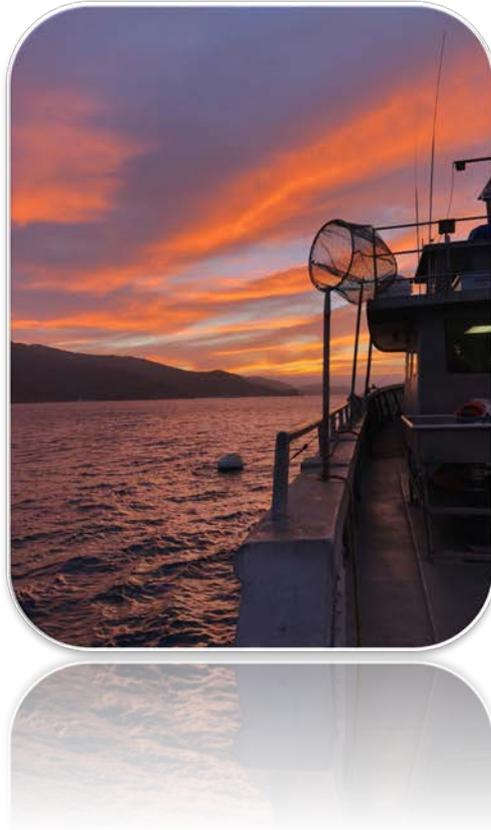


Southern California Marine Institute



Annual Report 2017-2018

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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.

Who We Are

SCMI is a consortium representing a strategic alliance of 23 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, The Bay Foundation, and NOAA National Marine Fisheries Service West Coast Region.

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 located 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

It is hard to believe another year has gone by and I am in my seventh year as director. Things could not be better at SCMI. As we continue to upgrade the facility and our resources, the use of SCMI grows daily. While we highlight in this report many of the new research projects we are assisting with, this is just a sliver of all of the work that we support. Remote sensing and robotics, climate change, endangered and protected species, fishery restoration and biofuels are just some of the cutting-edge projects we are supporting. As I write this message on this rainy day, the boat safety committee, including representatives from CSULB, CSUN and Occidental College, is meeting in our new classroom, the Bay Foundation is moving abalone into their new lab, the crew is maintaining the boat, giant sea bass are being fed, docks are being maintained and spring cruises are being scheduled. Just a typical day at the marine lab. Meanwhile, I would also like to report on AltaSea's incredible progress. AltaSea's new CEO Tim McOsker is making a huge impact. They have finalized the master lease with

the port and, as you would expect, are filling up Berths 58-60 with businesses. We are working with Tim to finalize our lease of Berth 57 for the new marine lab. AltaSea has built a sustainable business model and will be breaking ground on infrastructure projects in 2019. We anticipate big things to come, so stay tuned.

Introduction

The Southern California Marine Institute (SCMI) has seen many improvements and accomplishments this year. The year started off strong with our highest number of volunteer interns assisting SCMI staff with a wide range of projects from water quality to animal husbandry. SCMI's interns ranged from recent university graduates looking to gain valuable work experience to high school students researching degree options. This year again saw a successful CSU Marine Biology Semester on Catalina Island with 6 CSU faculty participating and 17 students attending. SCMI welcomed our new Facility and Seawater Coordinator Bill Fike, and he has already made improvements to our seawater systems and has worked hard with our Aquarists Mark Loos and Ben Grime to design and build a second abalone lab for The Bay Foundation. SCMI has also welcomed new CSUN Faculty Dr. Kerry Nickols and her brand-new Parker docked and maintained at SCMI. The R/V Yellowfin was repowered to Tier 4 engines this summer and is running the most fuel efficient and cleanest engines in the research fleet. SCMI assisted with some exciting research this year with a variety of new projects including CSUN's Dr. Larry Allen's Giant Sea Bass Study, The Bay Foundation's Abalone Project, and a collaboration with USC and Earth Observatory of Singapore on seafloor mapping.



What's New?

AltaSea SCMI Open House



AltaSea's Open House featuring SCMI was held on April 21, 2018 with great success. Over 16 of our 23 member institutions were present displaying research posters, scientific equipment, and projects to the public. SCMI Board President Dr. Chris Lowe gave an exciting and informative presentation on Robots and Sharks about his research at CSULB's Shark Lab. Over 200 public guests attended the event and met many of SCMI's faculty and students. Event highlights were CSUN's Dr. Larry Allen's saltwater tank showcasing local marine organisms, and the 20 student poster displays covering local marine research.



Service Goals

Facility Improvements

This year, SCMI has worked hard to meet the service goal to grow the facility for our member institutions to carry out their educational and research activities. The R/V Yellowfin was outfitted with new tier 4 engines and generators thanks to a grant from the South Coast Air Quality Management District Carl Moyer Program. The R/V Yellowfin now has the most fuel efficient and cleanest engines in the research fleet. The R/V Yellowfin will also be transitioning to a vegetable base hydraulic fluid.

Along with the \$312,000 upgrade of the R/V Yellowfin, SCMI also saw improvements in our building with a completely remodeled classroom. SCMI's classroom now has new tables and chairs that can combine to form a long conference table for board meetings and separate tables to accommodate AAUS Scientific Dive, MOTC courses, teaching and conferencing needs. The remodeled space also features new carpeting, white board and a projector to meet all of SCMI's member needs.



The Bay Foundation Abalone Lab

The Bay Foundation (TBF) joined SCMI as its first non-academic member in late 2015. Joining the SCMI team has given TBF convenient access to the local rocky reefs where they can manage and monitor their kelp forest restoration project. They have also continued their spawning of captive abalone within their aquaculture facility at SCMI.

In April 2018, SCMI and TBF began construction to more than double their current abalone rearing facility. This second lab space contains six 170-gallon tanks to hold broodstock abalone and four larval settling troughs for juvenile rearing. All red and green abalone currently held at SCMI will be relocated to the space this fall. TBF's Abalone Laboratory was added to the NMFS ESA permit held by the

Bodega Marine Lab in May 2018 as a holding and culturing facility for captive-bred white abalone. The current lab space will undergo life support system upgrades and additional larval settling tanks will be constructed to provide much needed space for white abalone captive propagation. This lab will serve as a staging hub for white abalone outplanting efforts off Palos Verdes Peninsula. Other facility upgrades will include the addition of red algae culturing for abalone feed.

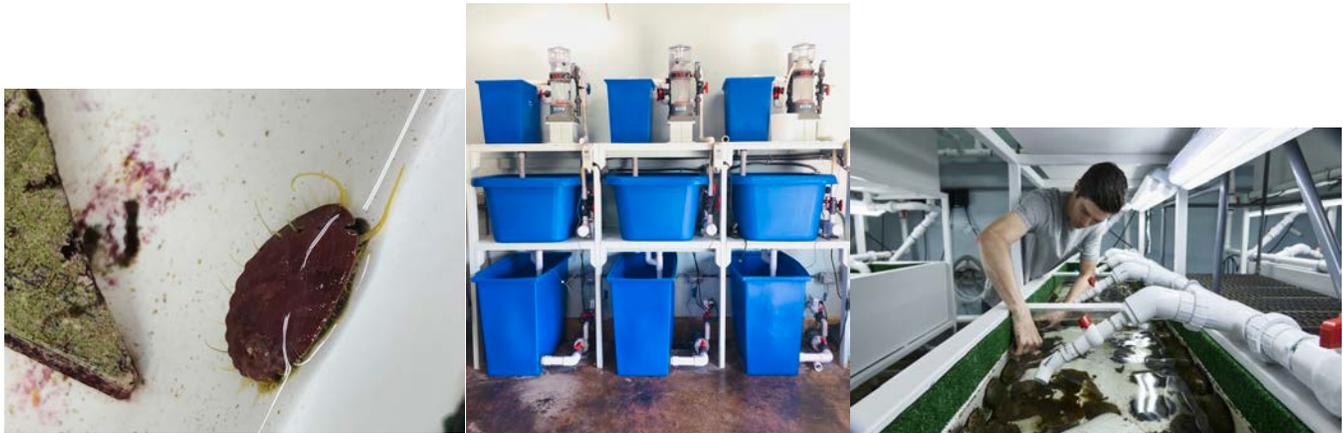


Figure 1. A one year old *Haliotis rufescens* (red abalone) from the spawn on 9/15/2017.

OSI AAUS Research Dive/Boating Program

Dive Operations: We currently have 105 Active Scientific Divers, with 2729 dives logged YTD – this number is expected to increase as divers continue catching up on logs from the Summer and Fall seasons. Three AAUS Scientific Diver courses were offered in 2018 – one during the Winter and two during the Summer. A total of twenty five new divers received training, and cohorts were comprised of candidates from CSUN, CSULB, CSUF, CPP, CSUCI and Occidental College. We anticipate offering three AAUS Scientific Diver courses in 2019, and are currently exploring the possibility of incorporating the third in coordination with the Catalina Semester. The Dive Locker was improved with renovations including additional overhead storage, workbenches and rinse bins. We began offering Nitrox training courses during 2018 and expect to incorporate that certification into the AAUS course. Nitrox fills from the new system are now approaching fifty percent of capacity. We’ve refurbished the banks from the old fill station and will be integrating them into the new system to help with the growing demand. In addition, an initial purchase of five sets of dive gear for the locker has been made, and we expect to purchase five more sets this fiscal period. We’re also building an inventory of DAN combination O₂ & First Aid kits available for checkout for dive operations.

Boat Operations: We conducted two five-day Motorboat Operator Training Courses (MOTC) for non-experienced boat operators during the 2018 Spring Break a total of twelve participants. In conjunction with our AAUS Scientific Diver courses, we offered one five-day MOTC during the month of July for six participants. An additional four-day course was conducted in July, for Cal Poly Pomona for six

participants. Cohorts were comprised of candidates from CSU/OSI, Occidental College, NOAA, and CDFW. During 2019, five-day courses will again be offered during Spring Break, and in conjunction with our Summer AAUS Scientific Diver courses. Over the past year we've continued to build our inventory of PFDs, exposure suits and safety gear required to teach the course.

New Dive and Boating Management System: The contract for the obsolete AAUS weblogger system is due to expire in less than one year and AAUS has been at a loss for a replacement system. Anticipating this need, we've been working for the past two years with a local web developer to produce a modern, fully integrated, system to service both dive and boating operations. This was a 'from scratch' build, to our specifications, which will allow for online filing of dive and float plans, includes an online document repository, and gives end-users more control over their individual accounts. It provides automated alerts for expirations of certifications and equipment, as well as compliance alerts to PIs and Lead Divers of divers and boat operators listed on submitted plans. Beta testing was completed earlier this year, and we're hoping to complete the migration from the old system by the end of this year. The system is very intuitive, and includes "quick-tip" training videos, but additional training will be available as needed.



Educational Goals

CSU Marine Biology Semester on Catalina Island

The CSU Marine Biology Semester on Catalina was hosted by CSU Long Beach this semester. The semester continues to be a unique opportunity for CSU students to experience hands-on marine biology and guide them to careers in marine science. There were a total of 17 students this semester from 6 different CSUs. The semester was taught by professors: Dr. Chris Lowe from CSULB, Dr. Jayson Smith from Cal Poly Pomona, and Dr. Erika Holland from CSULB.



CSU Marine Biology Semester on Catalina Fall 2017			
University	# Students	Professors	Courses
CSU Channel Islands	1	Dr. Jayson Smith	OSI 425/525 Marine Phycology
CSU Long Beach	11	Dr. Chris Lowe	OSI 419/519 Marine Ichthyology
CSU Los Angeles	1	Dr. Erika Holland	OSI 490/590 Special Topics- Aquatic Toxicology
Cal Poly Pomona	3		OSI 496/596 – Directed Research
Cal Poly San Luis Obispo	1		
Total # Students	17		
Total # Schools	6		

Demonstration Yellowfin Cruises

Our Yellowfin demonstration cruises have continued to be a valuable resource for students to experience hands on marine science. With the help of our engineer, Denis, the on board demonstration techs were able to give classes experience using real-world equipment and techniques such as VanVeen grabs, plankton tows, biological dredges and otter trawls.

SCMI has develop a new system aimed at facilitating data collection and entry from research cruises. This data collection will keep track of species collected in our otter trawls and can allows us to better pin point species faculty and students may be interested in.



Research Goals

SCMI has provided vessel support, equipment, and expertise to researchers from member and non-member campuses, and other organizations. This year SCMI has assisted researchers from University of Southern California, Occidental College, California State Universities Northridge and Long Beach, Claremont Colleges, NOAA, and the Ports of Los Angeles and Long Beach.

Giant Sea Bass Acoustic Study

Dr. Larry Allen Giant Sea Bass Acoustic study is still on going at SCMI. The three Giant Sea Bass are thriving in the tanks at SCMI and in June 2018, began to court and make sounds. Dr. Allen is very optimistic that he will soon be able to characterize the sounds made by the male Giant Sea Bass in the tank. The information gathered by this study will allow Dr. Allen to complete the description of the courtship and mating behaviors of this ecologically and economically important species.

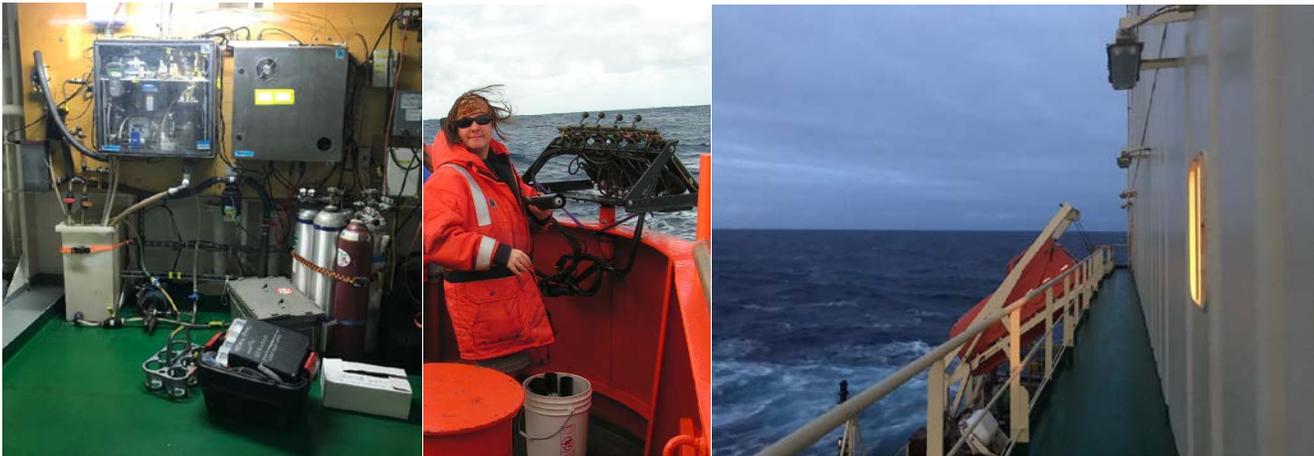


NOAA Pacific Marine Environmental Laboratory pCO₂ Study

In April and August of this year Carrie Wolfe sailed with the containership M/V Cap Blanche from Seattle WA to Oakland CA and on to Tauranga New Zealand. The trip takes almost 3 weeks, and during that time the system installed by NOAA in the engine room of the ship is operational 24 hours per day. The system uses a Licor unit to measure the CO₂ levels of the air and water while the ship is underway. Constant measurements of dissolved oxygen, pH, temperature and salinity are also taken, as are water samples every 8 hours. The job is to keep the system operating properly to extract the best data possible.

This route is especially important because it crosses the equator and captures the effects of the equatorial upwelling where the CO₂ levels of the seawater can rise over 500. Typically there are seven trips per year with a ship rider on board, usually southbound, but occasionally northbound from Auckland NZ to the US west coast. This program has been operational in the Pacific on ships of opportunity since 2004. You can read more about it at

<https://www.pmel.noaa.gov/co2/story/Volunteer+Observing+Ships+%28VOS%29>



Seafloor Mapping Study, USC and Earth Observatory of Singapore

USC's new faculty member Dr. Sylvain Barbot deployed a AUV glider unit that maps the seafloor at SCMI this year. Dr. Barbot was testing out the glider at SCMI with 2 engineers from Earth Observatory of Singapore. Dr. Barbot said "the surface of Mars is better mapped than the seafloor of our oceans." Coastal waters are very dynamic and often changing due to erosion, deposition, tectonic, and volcanic processes. To help monitor these effects we are developing an autonomous vehicle for automatic seafloor mapping". The surface platform is a Waveglider from Liquid Robotics and the multi-beam sonar is from Norbit. In collaboration with Seatronics in Singapore they are integrating a system that can capture, process, and store GPS and multibeam data on the fly during multi-months surveys. The group spent a couple weeks at SCMI to further develop and test the system in shallow water. They were able to acquire their first bathymetry data at SCMI.



Marine BioEnergy Kelp for Fuel Project

For the past year Marine BioEnergy has been building their test buoys at SCMI for their Kelp for Fuel Project. Marine BioEnergy is collaborating with a marine biology research team at USC, Wrigley Institute for Environmental Studies to test if kelp will thrive when depth-cycled at night to absorb nutrients and surfaced during the day to absorb sunlight. They plan to test the depth-cycle kelps from the test buoys currently being built at SCMI. The buoys measure resilience to pressure changes. The kelps will be attached to an anchored buoy system which will surface the kelps during the day and submerge them at night to nutrient rich waters. The goal for the project is grow giant kelp farms in the open ocean to utilize for fuel.

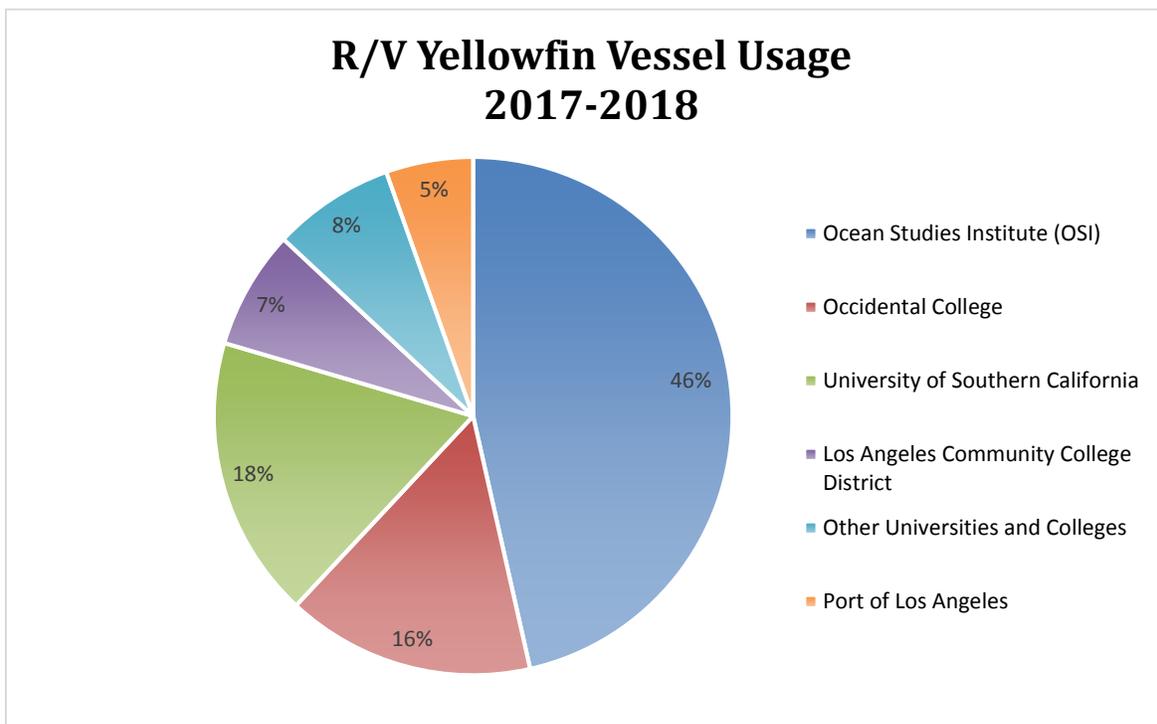


Vessel Use

R/V Yellowfin Usage by Institutions

This year, the R/V Yellowfin logged approximately 736 hours of vessel use. The vessel usage was down from last years by about 380 hours. This was due to the R/V Yellowfin dry docking and haul-out for engine repower during the summer. The trips consisted of a combination of class laboratories, graduate and university research, and contracted research. SCMI’s goal is to continue increasing vessel usage among SCMI member institutions and to broaden vessel usage to other institutions and disciplines.

Institute Name	Number of Students	Number of Faculty/Researchers	Hours of Vessel Use	Number of Cruises
Ocean Studies Institute (OSI)	1255	80	342	70
Occidental College	179	70	114	21
University of Southern California	73	108	129.5	17
Los Angeles Community College District	210	0	54.5	11
Other Universities and Colleges	334	3	56	15
Port of Los Angeles	0	10	40	5
Yearly Total	2051	271	736	139



Southern California Marine Institute Members

Southern California Marine Institute Staff 2017-2018

Dr. Daniel Pondella
Director

Adriana Stowell
Budget & Research Coordinator

Carrie Wolfe
Research & Education &
Operations Coordinator

Darrell Montague
OSI Dive/Boat Safety Officer

Dennis Dunn
Captian
R/V Yellowfin

Bill Fike
Facilities &
Seawater Coordinator

Jim Cvitanovich
OSI Dive Safety Officer

Denis Mahaffy
Vessel Engineer

Mark Loos
Aquarist & Instructional Support
Technician

Joel Ingram
Small Vessel Support Technician
& Relief Captain

Ben Grime
Instructional Support Technician

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