



Ocean Studies Institute



Annual Report 2018-2019

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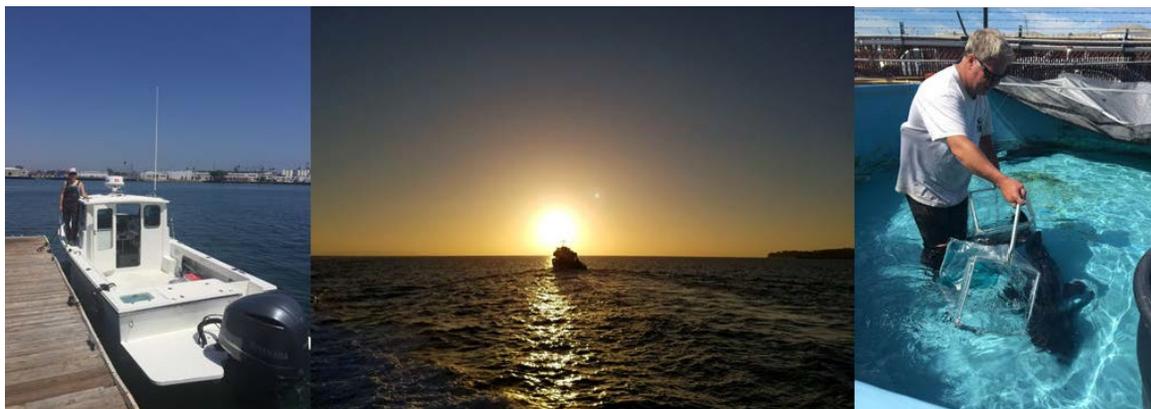
Mission

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 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.

Introduction

The Southern California Marine Institute (SCMI) has had an exciting and successful year. The year started off strong with a busy research season over the summer. SCMI assisted in research collaborations with University of California Los Angeles and the Los Angeles Natural History Museum on an eDNA study. SCMI had another great batch 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 for high school students researching degree options. This year again saw a successful CSU Marine Biology Semester on Catalina Island with 5 CSU participating and 17 students attending. Ocean Studies Institute had successful annual symposium that showcased exciting research from the 9 CSU campuses in our consortium. The Bay Foundation's Abalone lab build was completed and now housing white, green, and red abalone. The R/V Yellowfin was booked solid with educational cruises supporting over 1800 students and researchers. SCMI assisted with some exciting research this year including CSUN's Dr. Larry Allen's Giant Sea Bass Study which saw seven successful spawning producing 700 babies. SCMI finished permitting the Palos Verdes Restoration Reef with funding from the California State Coastal Conservancy and NOAA.



What's New?

OSI Research Symposium

The Ocean Studies Institute held its first annual Research Symposium at Cabrillo Marine Aquarium on April 19, 2019. The Symposium was a great success with 10 OSI faculty members presenting their ongoing research and 12 OSI graduate and undergraduates students presenting posters of their research from over 6 of OSI member campuses. The full day event brought together over 50 distinguished marine science researchers from many disciplines, students and the public. Simulating presentations covered topic such as; white sharks off California, deep learning based on data augmentation, biofilm detection, rocky intertidal habitats, Giant Sea Bass songs, and fish assemblages around oil platforms. Next year's OSI Symposium will be integrated into the Annual Meetings of the Southern California Academy of Sciences at California State University, Fullerton on **May 8, 2020**.



Symposium Schedule

FRIDAY, April 19, 2019 9:00 am to 6:00 pm Cabrillo Marine Aquarium - Olguin Auditorium

MODERATOR	Allen	Speaker	Institution	Title
9:00 AM	Intro			
9:15 AM	1	Chris Lowe	CSULB	Recovery of white sharks off California and what this means for beach communities
9:45 AM	2	Erik Arriaga	CSULB	Deep Learning based on Data Augmentation
10:15 AM	3	Tainā Coleman	CSULB	Deep Learning based shark identification method
10:45 AM		Break		
11:00 AM	4	Alani Diamond	CSUSM	Detection of <i>Mycobacterium marinum</i> biofilm and it's implications in the marine ecosystem and beyond
11:30 AM	5	Jayson Smith	CSUPP	Rocky intertidal habitats in urbanized southern California: long-term change, impacts of human visitation, and management
12:00 AM	6	Bengt Allen	CSULB	Environmental Controls Of Black Abalone Body Temperature Determine Risks Of Thermal Stress And Disease
12:30 AM		Lunch		
MODERATOR	Pondella			
2:00 PM	7	Britt Leatham	CSUSB	The shallow siliciclastic San Pedro Shelf-- anthropogenic modification of its ancient substrate
2:30 PM	8	Sean Anderson	CSUCI	Purple Rain, Fire Pain, & Increasing Strain: Novel & chronic stressors reshaping the coast and our relationship to it
3:00 PM	9	Larry Allen	CSUN	The Song of <i>Stereolepis</i>
3:30 PM	10	Darren Johnson	CSULB	Natural selection and local adaptation in populations of coastal fishes
4:00 PM	11	Jeremy Claisse	CSUPP	Fish assemblages around 23 Oil and Gas Platforms off the coast of California
5- 6 pm	Posters & Social	Bryce Perog	CSUF	Effects of Baycrete Rugosity and Shell Composition on Native Species Recruitment in Southern California
		Anthony Nguyen	CSUF	Microbiomes of native and non-native oysters in Southern California
		Kimberly Garcia Mendez	CSUPP	Speciation in the genus <i>Dondice</i> (Mollusca: Nudibranchia) from the Western Atlantic
		Meaghan Swintek	CSUF	Ten polymorphic microsatellite markers for use in the Greenland Shark (<i>Somniosus microcephalus</i>)
		Jennifer Fields	CSUN	The effect of foundation species loss on ecosystem function in the rocky intertidal
		Lindsay Stockton	CSUN	Evaluating the <i>Labrisomus xanti</i> populations on Santa Catalina Island by determining densities, size ranges and habitat preference
		Benjamin Chubak	CSUN	Evaluating the Importance of Reef-Based Resources for Reproduction in a Temperate Reef Fish
		Karina Moreno	CSUPP	Phylogenetic systematics of the genus, <i>Cyerce</i> Bergh 1871 using molecular and morphological data
		Nathalie Carrillo-Munoz Sandra Muro	CSUF CSUPP	Complete mitochondrial genome of the California grunion (<i>Leuresthes tenuis</i>): A population-level approach investigating sea slug species in the genus <i>Julia</i>
		Austin L. Ka'ala Estores-Pache	CSUPP	Pseudocryptic speciation in two <i>Hermisenda</i> sea slug species

Service Goals

Facility Improvements

This Year OSI/SCMI has worked hard to meet the service goal to provide and grow the facility for our member institutions to carry out their educational and research activities. SCMI purchased a new CTD for research and educational cruises. The YSI DSSpro CTD is handheld with 20 meters of cable, a handheld readout and measures pH, dissolved oxygen, conductivity, turbidity, temperature, depth and barometric pressure. It also has a GPS and is capable of logging data as well. The unit has already been on several classes and contracts and has proved to be a fine little workhorse when something smaller and shallower than the SeaBird CTD is needed.

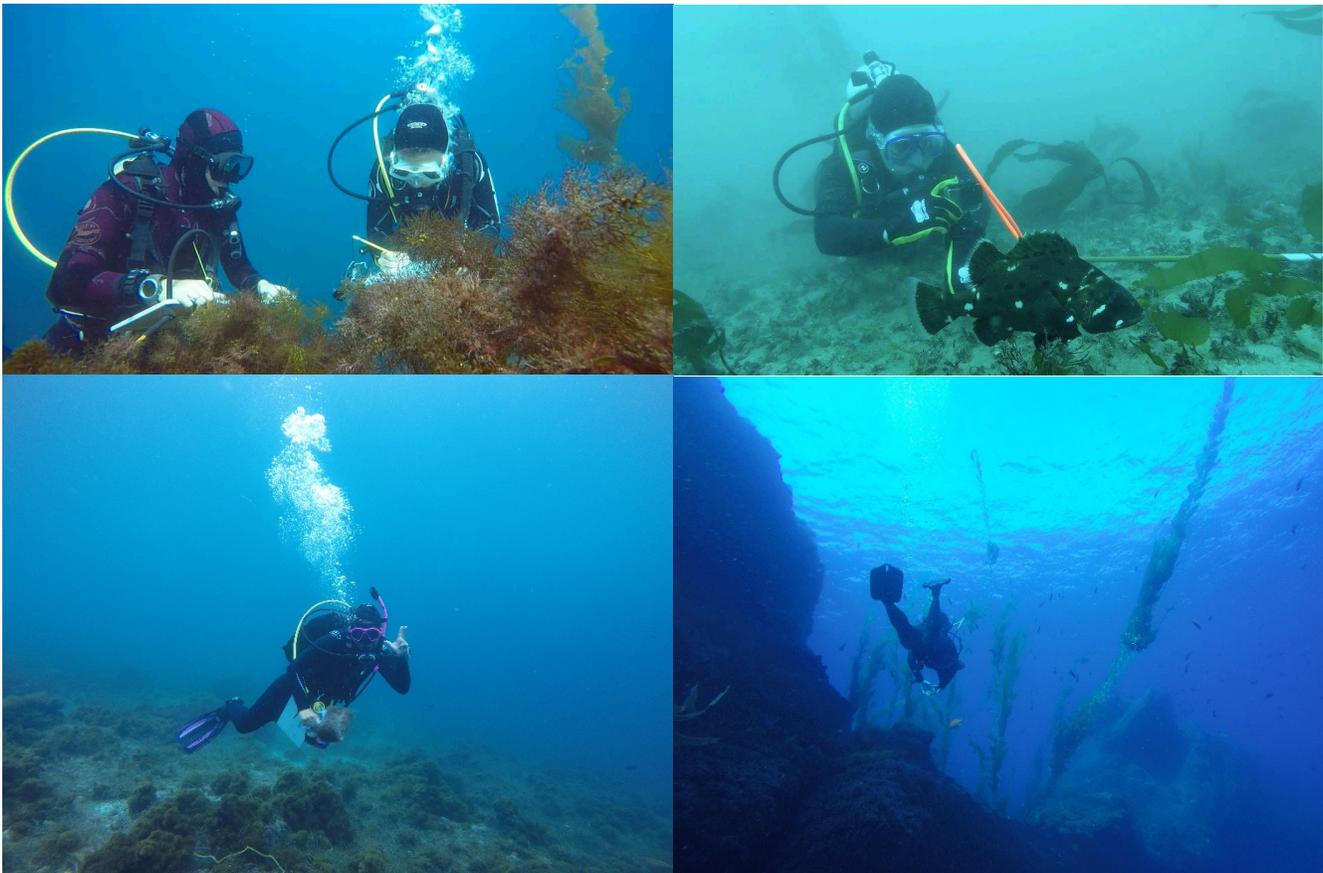
SCMI also refurbished our supply of Niskin bottles that were used in research contracts with the Los Angeles Natural History Museum and UCLA eDNA surveys.

SCMI also saw improvements in our building with repairs to the parking lot and hallway floors. Asbestos tile flooring in the hallways was removed and the floors were refinished.



OSI AAUS Research Dive/Boating Program

Dive Operations: We currently have 111 Scientific Divers on our roster. 76 logged dives totaling 2729 dives for fiscal 2018/19. We offered three AAUS Scientific Diver courses– one during the winter and two during the summer. Twenty new divers received training, and cohorts were comprised of candidates from CSUN, CSULB, CSUF, NOAA, and Occidental College. We anticipate offering three AAUS Scientific Diver courses in 2020. We have purchased an inventory of six DAN hard cases with combination O₂ & First Aid kits available for checkout for dive and vessel operations. CSU has placed new, system-wide Risk Management and EH&S staff, tasked with reviewing and implementing consistency in policies and procedures for all campuses. To that end, they reached out to all of the DSOs to form an affinity group, which will meet on an ongoing basis to help consolidate policies and procedures. Related to this, a number of questions have arisen regarding the recent fatality of a UCSC research diver, and the Conception incident. Both incidents are under investigation and pending publication of the final reports, we will review relevant training and safety policies and procedures.





Boat Operations: We conducted three, five-day, Motorboat Operator Training Courses (MOTC) for non-experienced boat operators during the 2019 Spring Break with twelve participants. In conjunction with our AAUS Scientific Diver courses, we offered one five-day MOTC during the month of July for six participants – the second course, scheduled for August, was canceled due to lack of applicants. Cohorts were comprised of candidates from CSU/OSI, CPP, and Occidental College. During 2020, 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.



Educational Goals

CSU Marine Biology Semester on Catalina Island

The CSU Marine Biology Semester on Catalina was hosted by CSU Northridge 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 was a total of 17 students this semester from 5 different CSUs. The semester was taught by CSUN professors: Dr. Larry Allen, Dr. Robert Carpenter, Dr. Peter Edmunds, and Dr. Mark Steele.



CSU Marine Biology Semester on Catalina Fall 2018			
University	# Students	Professors	Courses
CSU Fullerton	1	Dr. Larry Allen	Marine Phycology
CSU Long Beach	10	Dr. Robert Carpenter	Invertebrate Zoology
CSU Northridge	4	Dr. Peter Edmunds	Ecology of Marine Fishes
Cal Poly Pomona	1	Dr. Mark Steele	Directed Research
CSU San Francisco	1		
Total # Students	17		
Total # Schools	5		

Demonstration Yellowfin Cruises

The CSU *R/V Yellowfin* demonstration cruises have continued to be a valuable resource for students to experience hands on marine science. With the help of our Captain, Vessel Engineer, and the on-board Demonstration Techs we can give classes experience using real-world equipment and techniques such as VanVeen grabs, plankton tows, biological dredges, otter trawls, and our new handheld CTD. Demonstration cruises on the R/V *Yellowfin* supported over 1800 students from Southern California colleges and universities.



Research Goals

OSI/SCMI has provided vessel support, equipment, and expertise to researchers from member and non- member institutions. This year SCMI has assisted researchers from University of Southern California, Occidental College, University California Los Angeles, California State University, Northridge, Long Beach, and Los Angeles, NOAA, Ports of Los Angeles, Woods Environmental & Infrastructure Solutions, and Los Angeles Natural History Museum.



Giant Sea Bass Acoustic Study

Dr. Larry Allen's 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. Initially, Dr. Allen and his students completed the acoustic monitoring of the captive Giant Sea Bass through two breeding seasons (partial summer of 2017 and all of 2018). After hundreds of recording sessions with both the handheld TASCAM hydrophone and Soundtrap underwater hydrophones, only "booms" recorded, presumably from the male Giant Sea Bass SOK-3 (aka "Maxie"). In short, these "booms" and concert bass drums have very similar acoustic profiles ranging from 30 to 90 Hz in max frequencies.

However, on May 28, 2019, the captive giants began spawning in the tank at SCMI. We have since had seven successful spawns with the fertilized eggs collected and distributed to rearing facilities at both the **Long Beach Aquarium of the Pacific** and the **Cabrillo Marine Aquarium**. The staffs at both aquaria have, to date, successfully reared about 700 juvenile Giant Sea Bass through the settlement stage. Rearing baby Giants to this size has never been accomplished before, by anyone. We are now in the process of signing a Letter of Agreement with the California Department of Fish and Wildlife to release these YOY into the known nursery areas (e.g. head of Redondo Canyon).



Lots of baby giants!



More baby Giants

More important to the acoustic study, the fish began producing a new type of sound during spawning events. The male GSB (SOK-3) produced an abrupt “snare drum” sound during the evenings of each spawn (Fig.1). The acoustic frequency characteristics were similar to the known “booms” (Fig. 2), but at very high repetitive rate.

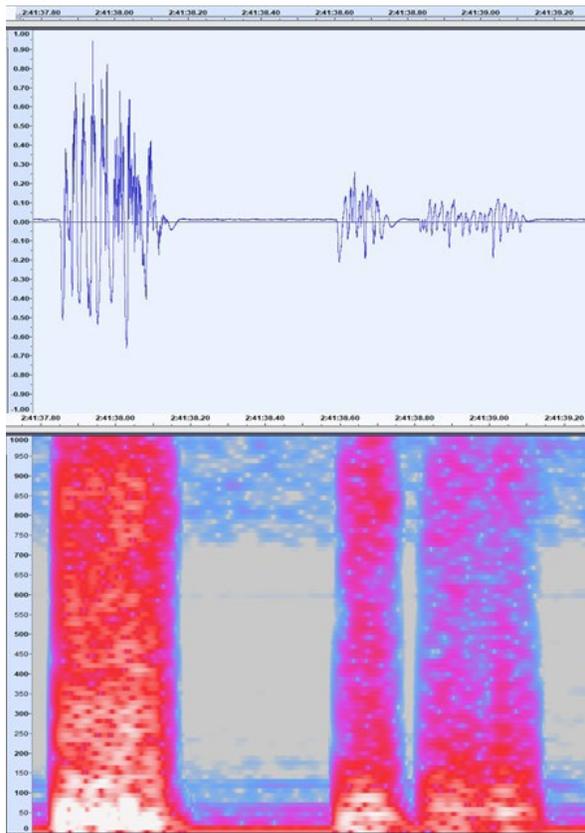


Fig. 1 – “Snare drum” spectrograms

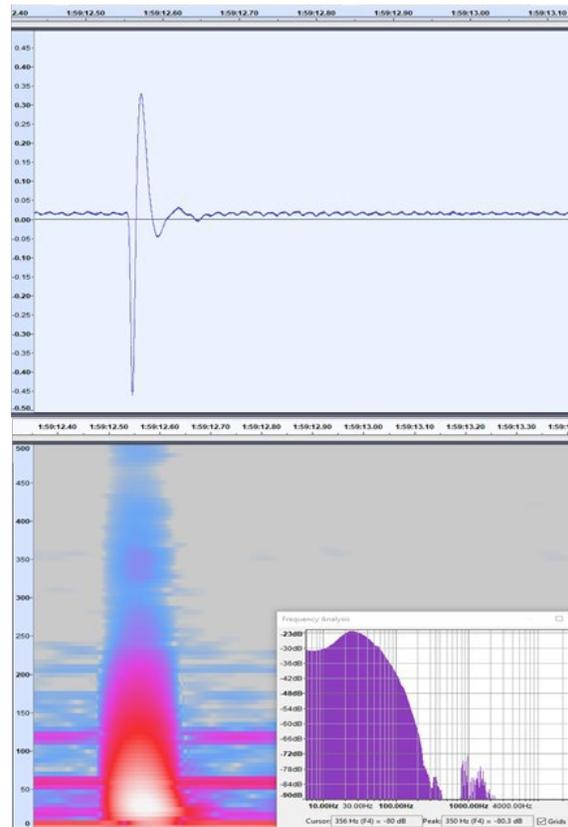


Fig. 2 – “Boom” spectrograms

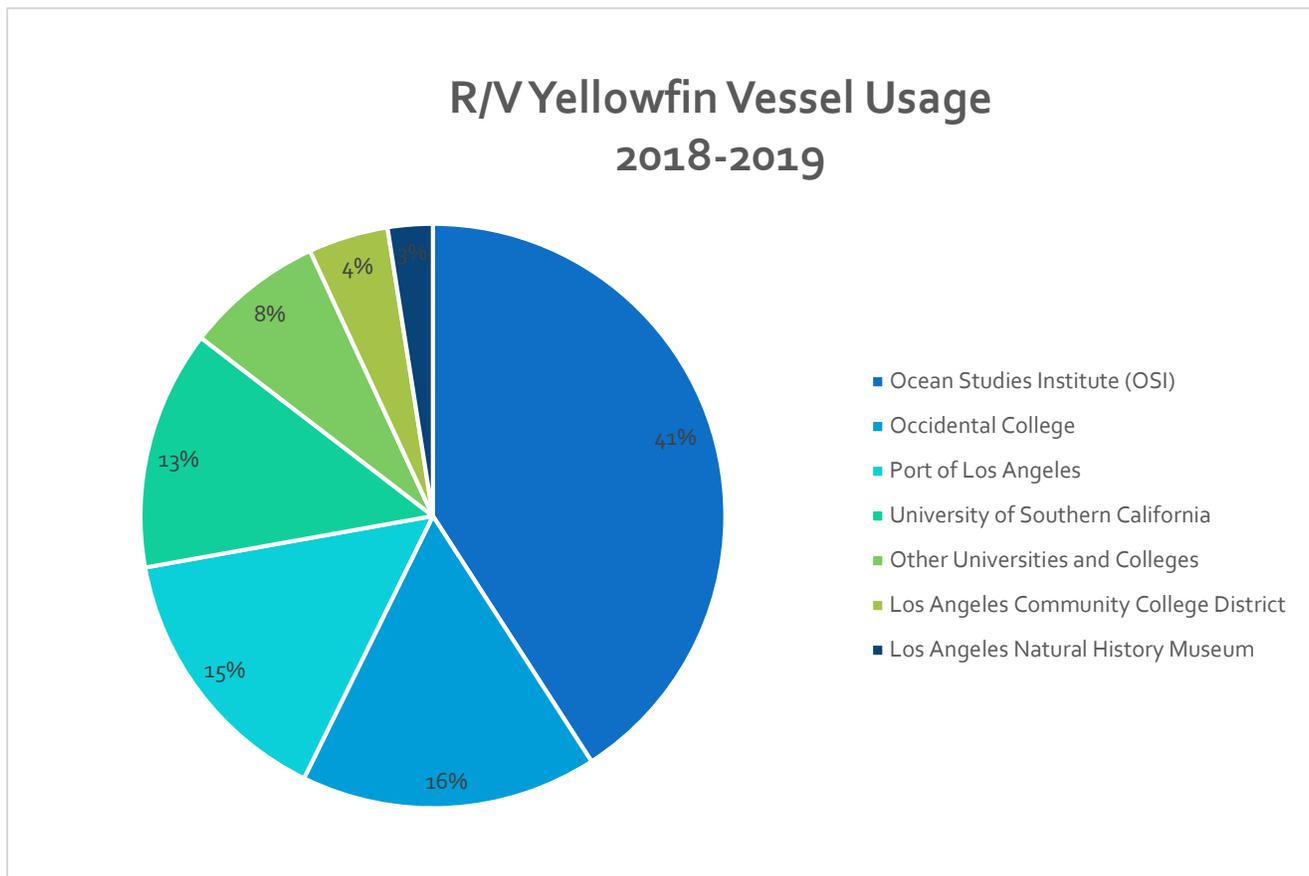
The information gathered by this study will allow Dr. Allen to complete the description of the courtship and mating behaviors of this ecologically and economically important species. Finally, both the “boom” (Fig. 2) and “snare drum” (Fig. 1) sounds will aid greatly in the identification of spawning areas for Giant Sea Bass throughout their current range.

Vessel Use

R/V Yellowfin Usage by Institutions

This year, the R/V Yellowfin logged approximately 724 hours of vessel use. The vessel usage was consistent with last year's hours. 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	Total # of Students	Total # of Faculty/Researchers	Total Hours of Vessel Use	Total # of Cruises
Ocean Studies Institute (OSI)	1103	57	296	64
Occidental College	194	29	119	17
Port of Los Angeles	2	29	108	12
University of Southern California	47	32	96	12
Other Universities and Colleges	378	16	56	16
Los Angeles Community College District	136	6	32	6
Los Angeles Natural History Museum	0	15	18	2
Yearly Total	1860	184	724	129





Ocean Studies Institute FY Budgets 2013-2014 through 2018-2019

Ocean Studies Institute FY Budgets 2013/2014 through 2018/2019

Fund Description	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19
Revenue						
Salaries and Wages ⁽¹⁾	\$371,145	\$397,139	\$481,698	\$492,443	\$557,411	\$528,809
Benefits	\$163,813	\$186,408	\$214,827	\$250,093	\$321,836	\$317,532
OSI Member Contributions ⁽²⁾	\$75,000	\$76,500	\$76,500	\$76,500	\$76,500	\$76,500
OE&E ⁽¹⁾	\$31,774	\$17,357	\$63,964	\$88,324	\$116,702	\$48,233
Misc Revenue and User Fees ⁽⁴⁾	\$46,928	\$47,197	\$66,390	\$82,265	\$48,756	\$77,436
Total	\$688,661	\$724,601	\$903,379	\$989,625	\$1,121,205	\$1,048,510
Expenditures						
Salaries and Wages	\$413,445	\$412,271	\$448,147	\$490,658	\$614,598	\$552,822
Benefits	\$168,254	\$189,592	\$214,827	\$256,605	\$321,905	\$317,532
Operating Expenses ⁽³⁾	\$90,356	\$80,129	\$199,344	\$194,857	\$165,549	\$121,621
Accounting Charges	\$1,761	\$2,694	\$2,863	\$2,106	\$1,799	\$3,609
Total	\$673,816	\$684,687	\$865,181	\$944,226	\$1,103,850	\$995,583
End-of-Year Balance	\$14,845	\$39,914	\$38,198	\$45,399	\$17,355	\$52,926

⁽¹⁾ In FY 2015-16, Revenue includes CO augmentation for Dive and Boating Safety Officer at \$115,000 (\$75,000 for Salary and \$40,000 for Other Expenses)

⁽²⁾ OSI Members contributions are received annually and vary among the nine OSI institutions based on historic patterns of facilities and service use

⁽³⁾ Operating Expenses include contractual services, supplies, minor boat repairs, and diving related expenses

⁽⁴⁾ Miscellaneous OSI Revenue comes from indirect cost returns from external grants; user fees are associated with use of the R/V Yellowfin. This revenue source varies from year to year



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