



Moss Landing Marine Laboratories

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1 Executive summary

CSU CO Instructions: In the summary include information about (a) affinity group contribution to the fundamental mission of the CSU system, (b) ability of the affinity group to attract external funds and grow in a financially sustainable manner, (c) return on investment that includes funding, student success, publications, engagement with community, service etc., (d) other points that you may have including constructive suggestions for improvement.

MLML contributes to the mission of the CSU by providing a world-class M.S. degree program in marine science, which includes curriculum, student mentoring, access to research and educational tools, and administrative and facilities support. MLML also contributes to the mission of the CSU by encouraging and supporting innovation, learning, and student and faculty fulfillment. In the past year, MLML has secured 82 grants totalling \$8.8 million in extramural funding from Federal, State, and private sources, \$640,000 in donations, and awarded 12 graduate students with \$22,000 in scholarships.

Twelve students finished their M.S. degree this past year, and students continue to receive many regional and national awards (e.g., Central California Diving Aquatics Studies Scholarship, Academy of Underwater Arts and Sciences Zale Parry Scholarship, and International Women in Fishing Association's scholarship). Personnel at MLML published 35 peer-reviewed articles and six books. MLML continues to engage with the community and public via the annual MLML Open House that attracted 2,000 people in Spring 2017; via social media; and via community lecture series, tours, and sponsored many community events. We are reorganizing various aspects of the curriculum and advising to reduce the time it takes students to graduate.

MLML's plans include the final stages of the proposed Center for Aquaculture, adding two new tenure-track faculty members, and a new Sea Grant Extension Specialist in aquaculture. Our faculty, researchers, and students have research projects throughout the world including Antarctica, Arctic, Indian Ocean, Indonesia, Chile, Mexico, Philippines, and throughout the tropical and temperate Pacific. These studies are making a difference in the future of science and the oceans.

2 Achievements against strategic plan milestones

Enter as many objectives as needed to summarize achievements

Objective 1: Education - Student Success

No.	Activity	Outputs/ milestones	Completion date	Comments
1.1	Increased Accountability	Thesis Committee	October 2017	Committee formed to provide guidance to students who have not received thesis topic approval and to set yearly milestones for students and advisors. Faculty Chair scheduled a Thesis Symposium for students without an approved thesis proposal where students will be expected to present their ideas and preliminary thesis topics to the MLML community.
1.4	Creation of an Aquaculture Program	Partner with CA SeaGrant to host an Aquaculture Specialist.	Fall 2016	Earmarked funding to pay 25% of the salary for the CA SeaGrant Specialist who will begin in March 2018.

Objective 2: Research

No.	Activity	Outputs/ milestones	Completion date	Comments
2.2	Integration of Research Faculty Into Academic Program	Promote greater use of MLML Research Affiliates	July 2017	3 new Research Affiliates appointed from NOAA and the Naval Postgraduate School held a summer computer programming workshop for MatLab and Python and have research cruise opportunities for MLML students in 2018 and 2019.
2.4	Faculty Recruitments	Recruit new faculty and researchers specializing in new marine science subject areas	August 2018	With the retirement and pre-retirement of 2 TT Faculty at MLML, recruitments began for two new TT Faculty in Oceanography and marine Invertebrate Zoology. The new CA SeaGrant Specialist will develop a course in Aquaculture for AY18-19

Objective 3: Societal Benefits

No.	Activity	Outputs/ milestones	Completion date	Comments
3.2	Enhanced Online Presence	Launched new, re-designed website and enhanced social media sites	Fall 2016 and July 2017	In the Fall of 2016, MLML synchronized multiple social media pages, brought uniformity and consistency to MLML branding and introduced more modern posting themes. New website was launched in July 2017

3.4	New & Strengthened Partnerships	Started two new collaborations at the Aquaculture Facility with local researchers.	July 2016	MLML will begin collaborating with CSUMB on an ocean acidification project and an Olympia Oyster Restoration project with the Elkhorn Slough at the Proposed Aquaculture Center.
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Objective 4: Infrastructure & Funding

No.	Activity	Outputs/ Milestones	Completion date	Comments
4.1	Continued Development of MLML Properties	Received Coastal Commission approval to erect structure for an ocean acidification project at the Aquaculture Facility	August 2017	All development in Monterey County must obtain design approval from Monterey County Planning and then apply to the Coastal Commission for a permit to build or alter property. We are going through a design phase currently before attempting to raise funds for permitting and development.
4.5	Philanthropic Development	Dedicated staff	Spring 2017	SJSU College of Science Advancement director began working at MLML 1 day per week.

3 Impact

3.1 Scientific impact

CSU CO Instructions: Include scientific advances and journal publications. Include impact on faculty career development.

MLML faculty, labs, and research facilities have made significant advances within marine science disciplines while also influencing faculty career development, research, and scholarship positively. Our scientific impact is demonstrated in research awards won by faculty members, grants awarded to MLML research projects, and through recognition in journal publications. In fact, MLML Faculty and Research Affiliates authored and co-authored a total of 35 articles and papers and published six scientific books.

Dr. Colleen Durkin, Research Faculty member in Biological Oceanography, won the 2016 Luigi Provosoli Award from the Phycology Society of America, received the 2016 NSF EAGER Award, the 2017 CA SeaGrant New Faculty Award and was selected to join the NASA EXPORTS field program and Sea to Space Particle Investigation cruise aboard the R/V Falkor in March 2017.

With funding from the CSU COAST Grant Development Program, another tenure-track faculty member who studies the ecological impacts of the coastal zones, Dr. Tom Connolly, is starting a new project investigating remote forcing of seasonal currents in the California Current System. Additionally, the CSU COAST awarded Professor Ivano Aiello from the Geological Oceanography Lab, who specializes in Marine Geology and cross-disciplinary fields within marine sciences, a Rapid Response grant to study the changes in beach morphology and sand budgets in Monterey Bay that are associated with the storm activity during the 2015 El Nino.

Professor Michael Graham of the Phycology Lab continued serving as the Managing Editor and Co-editor of the Journal of Phycology. Also, several MLML faculty members received assigned-time support from the College of Science in recognition of, and to further, their research activities.

MLML Faculty and Research Affiliates authored, co-authored and published 35 peer-reviewed articles and papers, and 6 scientific books.

3.2 Financial impact for CSU

CSU CO Instructions: Indicate whether affinity group projects generated revenue beyond grant funding.

Total Revenue generated: \$640,000

- \$2,600 generated from the rental of the Seminar Room and other classrooms to outside groups.
- \$630,715 in donations received.
- \$8,000 revenue generated by the MLML Student Body from Open House 2017.
- \$3,400 revenue from MLML Merchandise Store, operated via the SJSU Bursar's Office.
- \$24,417 in revenue from Sandholdt property house rentals
- \$96,000 in revenue earned from rental of our dock to Del Mar Seafoods, Inc.

3.3 Student success impact

As an institution within the CSU, MLML aims to impact student success and encourage state, national, and international student enrolment. MLML students demonstrate such success through scholarships earned, grant awards, and professional recognition within the field of marine sciences.

The California Sea Grant State Fellowships, an esteemed program that matches qualified graduate students with "hosts" in municipal, state and federal agencies in California for a 12-month paid fellowship, awarded the highly sought-after experience to two MLML students.

The Dr. Earl H. Myers and Ethel M. Myers Oceanographic and Marine Biology Trust of Pebble Beach Grant, which supports the work of outstanding student researchers in the Monterey Bay Area, awarded a total of \$10,200 to six MLML students.

June Shrestha, an Ichthyology lab student, was awarded the prestigious Central California Diving Aquatics Studies Scholarship. Other Ichthyology lab students, Bonnie Brown and June Shrestha, won the International Women in Fishing Association's scholarship and Wil Fennie made headlines when he studied the effects of ocean acidification on juvenile rockfish

Angela Zepp, a Phycology lab student, was awarded the Academy of Underwater Arts and Sciences Zale Parry Scholarship, one recent graduate was hired by the Monterey Bay Aquarium's cephalopod research group and a second recent graduate was hired as the Diving Safety and Logistics Specialists at the University of Hawaii Manoa. Chemical Oceanography lab student, Maureen Wise, spoke at the 2017 Girls in Ocean Science Conference conducted by the Ocean Institute in Orange County.

Discovery Channel's popular programming during Shark Week 2016, "Alien Sharks: Stranger Fins," featured Paul Clerkin and Vicky Vasquez, two MLML students, from MLML's Pacific Shark Research Center. The Pacific Shark Research Center earned additional prestige when one of its graduate students, Kristin Walovich, discovered a new species of shark, the *Bucktoothed Ghost Shark*.

The CSU COAST Graduate Student Research and Travel program awarded a total of \$9000 to three MLML students and The David and Lucile Packard Foundation awarded ten students Research and Travel Grants that totalled \$10,000. MLML invested in its students as well and awarded a total of \$22,000 over 12 student scholarships.

With the help of individual achievements made by our students, MLML has grown in recognition as an esteemed academic and research institution. In Fall 2016, a remarkable 17 new students started at MLML, this past year 12 Students graduated with an MS in Marine Science, and the recent Open House 2017 welcomed almost 2000 visitors and generated \$8,000 in donations to support students.

Additionally, MLML encourages student engagement within and outside of our institution to advance knowledge and research findings further. MLML graduate students served as mentors to 12 undergraduates from the University Research Opportunities Center (UROC) at CSU Monterey Bay and MLML Students and Faculty mentored six students from the NSF Research Experience for Undergraduates (REU) program at CSU Monterey Bay. MLML faculty member Dr. Tom Connolly and 2 Research Affiliates from MOBY and NOAA provided free statistical programming tutorial workshops on using MatLab and Python to over a dozen students.

3.4 Community impact

A major vision of MLML lies within its ability to strengthen the local Moss Landing community, along with the larger state, national, and international communities. As a

member of the CSU, all of MLML's research is done in this spirit of advancing knowledge of the marine sciences and to promote sustainable ocean systems.

MLML is a member of the Moss Landing Chamber of Commerce and participates in all public meetings conducted by the County of Monterey regarding Planning and Development of Moss Landing, California and its harbor. Additionally, MLML continues its positive relationship with neighboring oceanographic institute, the Monterey Bay Aquarium Research Institute (MBARI) by working with them to replace the sea water pump system, maintain properties, coordinate security, share scientific subject matter expertise and sharing use of boats and dock space.

MLML strives to promote community integration, communication, and environmental recognition as both an academic and research facility and through the professional accomplishments of its faculty. MLML gave 40 free tours to K-12 classes, including a high school Aquaculture class who spent the weekend at MLML and an undergraduate Biology class from CSU Stanislaus that stayed for three days.

Additionally, MLML's Vertebrate Ecology Lab manages BeachCOMBERs, a regional team of 75 trained public volunteers that monitors beaches from central California to Mexico, counting and surveying dead and stranded marine mammals, birds and turtles.

The MLML Annual Open House is a well-known event in the Monterey Bay area and draws visitors of all ages from across the state, consortium campuses and family and friends. It is put on by MLML students and supported by staff, faculty and researchers, and welcomed 2000 visitors over two days and generated \$8000 for the MLML Student Body.

MLML welcomed 40 different groups in the Seminar Room and classrooms. These groups provided MLML with \$2600 in rental revenue for the use of the rooms, an amount directly used towards student support:

- *Central Coast Fire and Red Cross used our seminar room as HQ during the major Big Sur fires in 2016*
- *CA Assemblyman Mark Stone*
- *Congressman Panetta*
- *Habitat for Humanity*
- *Cal State University Emergency Planner's Meeting*
- *CSUMB conducted four workshops and meetings*
- *CSU Fresno*
- *Humboldt State*
- *SJSU*
- *NOAA*
- *MLML and collaborators conducted a Wildlife Disturbance workshop and Whale Disentanglement training sessions.*

MLML understands the importance of raising awareness of oceanic life through public education and takes advantage of community-based platform opportunities to do so. MLML was considered the most popular booth when it participated in Monterey's Whale Festival 2017 by displaying specimens from our Biological Collection ranging from shark jaws to jarred fish and marine mammal skeletons and hides. MLML's Pacific Shark Research Center participated in the California Academy of Sciences *Sharktoberfest* in October 2016, where it displayed specimens and gave presentations about shark research. MLML also invites outside researchers from The Elkhorn Slough Foundation to use the Biological Oceanography lab every week for continued collaboration on wetland restoration and aquaculture.

MLML community impact relies on the outreach of students, faculty, and staff. Kathleen Donahue, Assistant to the Director, connected MLML to the Monterey Bird Festival in Summer 2016. At the festival, MLML hosted a site for lectures, showed a film, displayed our sea bird collection with student volunteers answering any questions from the public and offering support at the table, and led birding walks along the slough, shoreline and dunes.

The research of our faculty also plays a distinct role in MLML's community impact strategy. Alum Gary McDonald from the Invertebrate Zoology Lab, who spent decades studying and documenting California nudibranchs, had the prestigious honor of having a new nudibranch species named after him, "McDonald's Dorid" (*Limacia mcdonaldi*).

Professor Emeritus Mike Foster and former MLML Post Doc Dave Schiel received the Gerald W. Prescott Award in June 2017 from the Phycological Society of America for their book, "*The Biology and Ecology of Giant Kelp Forests*." Professor Emeritus Greg Cailliet was elected President of the Cannery Row Foundation Board of Directors whose mission is to preserve historical sites along Cannery Row in Monterey.

Professor MacDonald of the Vertebrate Ecology lab served as a judge for CSU Monterey Bay's Marine Science Department undergraduate poster session and MLML's Environmental Health and Safety Officer, Jocelyn Douglas served her 5th year on SJSU's IACUC Board.

3.4.1 Economic impact

As an internationally recognized institute of marine sciences, MLML requires a broad economic strategy to maintain its academics, research lab and expeditions, and the maintenance of six properties. During AY16-17, MLML submitted 66 proposals totalling \$15.6 million. For its 8th year, MLML operated on a \$3.5M budget from the State, \$50K of which was allocated to hire more student assistants to support our IT department and to fund 25% of the salary for a California SeaGrant Aquaculture Specialist. When, and if, necessary, SJSU can provide additional IT support.

To qualify and remain competitive for grant revenue, MLML must remain on the cutting edge of innovation because the scientific discoveries and investigations generated by MLML link powerfully to local, regional, state, national and international economics. For example, understanding the effects of climate change and overfishing informs diverse populations about regulating local fisheries and assessing shoreline communities and assets. MLML was awarded 82 grants totaling \$8.8 million. This generated \$1.9 million in F&A revenue, of which MLML was returned \$128k, and \$190k in administrative support for facilities and administration.

3.4.2 Social impact

MLML advocates on behalf of the marine sciences and oceanic life, and how the health of our oceans, coastlines, and sea life directly impacts society and the quality of individual lives. As such, it is vital MLML continue efforts to highlight our exemplary research efforts through volunteer opportunities, traditional and social media, and through increased brand-marketing.

MLML's research activities throughout AY16-17 served to raise awareness and influence such societal issues as fisheries management, impacts of climate change, pollution from anthropogenic sources like agricultural runoff and ballast water release from ships, and developing sustainable aquaculture methods. Also, MLML staff, faculty, researchers, and students volunteered with the Marine Mammal Center, Monterey Bay Aquarium Research Institute's Open House, and as divers for the Monterey Bay Aquarium. Additionally, representatives from MLML visited local K-12 schools, Rotary Clubs, and the SPCA.

In efforts to increase donations for student support and lab operations and expand our reputation within and outside of the scientific community, we've renewed emphasis of

MLML, SJSU, and CSU-branding on posters, papers, and during presentations. Additionally, we've increased our media presence so that it both highlights and reinforces the dedicated work of MLML faculty, students and researchers.

Additionally, Kathleen Donahue, Assistant to the Director, began an aggressive campaign to increase MLML's online presence by synchronizing all MLML social media sites and launching more modern and consistent posts such as *#LiveEveryWeekLike*, features on students and researchers, and video blogs called "*What is Up With Your Science MLML?*" These new posts have generated a 50% increase in views, shares, and followers. The MLML Graduate Student blog, "The Drop In," communicating individual student research and achievement, continues to gain popularity and success.

3.4.3 Environmental impact

MLML seeks to advance marine sciences, strengthen environmental policy, and engage individuals and communities in building a sustainable world. Positively contributing to the environmental health of California and the planet is the driving force behind faculty research and scholarship as well as a major component of MLML's mission. A reduced environmental impact and increased environmental awareness is the result of a collective strategy among staff and faculty, MLML research labs and classrooms, MLML sponsored, approved, and partnered studies, as well institutional action taken onsite. As such, to better sustain natural resources and to minimize the institution's environmental impact, MLML Facilities, SJSU FD&O, and PG&E conducted an energy assessment on all of the MLML buildings.

Environmental awareness efforts are reflected in our local research studies taking place at MLML and in the Monterey Bay, nearby in San Francisco and the surrounding Bay Area, and in our expeditions expanding up and down the California coastline and in other parts of the country and world.

The Marine Pollution Studies Lab (MPSL) began a long-term monitoring program for mercury and nutrients in the San Francisco Bay Delta and collected samples from the Yolo River during the 2017 flood event. Other local initiatives include The Central Coast Wetland Group (CCWG) building a 12-chamber bio-reactor to treat agricultural run-off and an 18-acre wetland treatment site to filter pollutants entering wetlands near Moss Landing. Incidentally, the CCWG also conducted fieldwork for the Environmental Protection Agency at 51 sites within the state of California. With renewed funding from NOAA, the Central and Northern California Ocean Observing System will continue to support MLML shore stations. These stations will be maintained by MLML principal investigators Drs. Connolly, Smith, Harvey, and Coale along with technical manager Jason Adelaars.

MLML faculty and research affiliates, with studies occurring onsite at one of MLML's laboratories or locally, nationally, and internationally, are furthering understanding on how human innovation effects the climate and the environment as well as the interconnectedness of ecosystems around the planet. Below are examples of such vital work happening within the expansive MLML community.

Professor McDonald from the Vertebrate Ecology Lab and other researchers measured the impact of sound on marine mammals and fish using Bioacoustics. Dr. McDonald measured the negative effects vessels had on the behaviors of marine mammals.

Dr. Qing Wang and Dr. Denny Alappattu, research affiliates from the Naval Postgraduate School's Meteorology and Oceanography Departments, worked on air-sea interactions. Dr. Wang supported the MLML Chemical Oceanography Lab in identifying the role of fog in transporting contaminants from sea to land and to improve maritime communication while Dr. Alappattu's remote sensing observations looked at air-sea interaction in the marine atmospheric surface.

In further studies to identify the transmission quality of fog, Dr. Kenneth Coale, Chemical Oceanography Professor, continued his collaboration with UC Santa Cruz on a NSF-

funded project. Dr. Coale measured levels of mercury contained in coastal fog, between Ventura, CA and Newport, OR, up to 100 miles offshore, that is carried to land and deposited into the ecosystem. His work is particularly relevant as traces of mercury have been found in the coastal redwoods, biota, and mountain lions.

Dr. Tim Stanton from the Naval Postgraduate School and Research Affiliate deployed an Autonomous Ocean Flux Buoy at the North Pole in April 2017. Every two hours, the buoy reports vertical fluxes of heat, salt, and momentum just below the ice as it drifts toward Fram Strait, between Greenland and Spitzbergen.

Dr. Valerie Loeb, Research Faculty in Biological Oceanography, submitted final documentation summarizing results from a major NSF project conducted between 2014 and 2015 in Antarctica. Dr. Loeb used net sampling and Acoustic Doppler Current Profiling to study the biomass of zooplankton and physical structuring imposed by strong frontal jets of the Antarctic Circumpolar current. Dr. Loeb has also conducted a post-cruise analysis of zooplankton taxa collected during a pilot study inside the Drake Passage.

Dr. Ivano Aiello, Geological Oceanography Professor, began a long-term study using Terrestrial Laser Scanning and Unmanned Aerial Vehicles (drones). Dr. Aiello tracked the positions of California coastlines through time, in order to show trends in coastal erosion dating back to the beginning of the 20th century. Dr. Aiello also participated in the IODP Expedition 363 aboard the R/V *Joides Resolution* in the Western Equatorial Pacific where samples, or cores, of deep-sea sediment from key locations, were taken to identify different species of plankton contained in the sediment. This work will lead to an enhanced understanding how global warming might change the climate in this area and how this may influence climate elsewhere.

Dr. Nick Welschmeyer, Professor of the Biological Oceanography Lab, continued his research collaboration with the Cal State Maritime Academy analyzing ballast water deposited into the ocean from ships and how it is contributing to the spread of invasive species.

Dr. Mike Graham, Phycology Lab Professor, continued development of MLML's Aquaculture facility. The primary goal of MLML's Aquaculture facility is to develop novel technologies for enhancing the sustainability and productivity of current aquaculture practices. During AY16-17, Dr. Graham focused on studying more sustainable ways to cultivate seaweeds and algae to serve as potential food sources and to preserve kelp habitats essential to rockfish survival.

Philip Heller, a former Post-Doctoral Research Assistant, joined the faculty in the Computer Science department at SJSU where he will be teaching Programming and Bioinformatics in marine environments with a focus on Antarctica and the Baltic Sea, especially in the context of climate change.

The Ichthyology Lab, led by Professor Scott Hamilton, with funding from NSF, CA Sea Grant, NOAA, and SJSU investigates the effects of climate change (ocean acidification and hypoxia) on various aspects of the ecology and physiology of rockfish and other groundfish. Dr. Hamilton collaborated with students and faculty from MLML, CSU Monterey Bay, UC Santa Cruz, and NOAA Fisheries. They spent six weeks conducting the first ever quantitative surveys of kelp forests around Tristan da Cunha Islands (Tristan, Nightingale, Inaccessible, and Gough) in the South Atlantic on a project lead by the National Geographic Pristine Seas Program. Tristan da Cunha is the most remote inhabited archipelago on the planet. Additionally, in June 2017 Dr. Hamilton participated on a 3-week expedition to the remote southwest islands of Palau (Fana & Sonsorol, Pulo Ana, Tobi, Merir, and Helen Reef) to conduct SCUBA surveys of coral reef fish communities with colleagues from the Scripps Institution of Oceanography as part of the 100 Islands Challenge initiative.

The Benthic Lab, led by Research Faculty Dr. John Oliver, collaborated with architects from California College of the Arts to help their students design and build a floating “houseboat of the future” for deployment in the Maldives in 2018.

The Fisheries and Conservation Biology Lab, led by Dr. Rick Starr, Research Faculty member, completed its 10th year monitoring central coast marine reserves as the leader of the California Collaborative Fisheries Research Program (CCFRP). In recognition of the value of this work, the California Ocean Protection Council provided new funds to expand the program to other parts of the state. This expansion entailed Dr. Starr spending much of 2017 developing relationships with UC San Diego, UC Santa Barbara, Cal Poly San Luis Obispo, UC Davis Bodega Marine Lab, and Humboldt State University to create a statewide MPA monitoring program for marine reserves. Dr. Starr also worked with the Nature Conservancy, National Marine Fisheries Service, MBARI, and UC Santa Barbara to develop new tools and techniques for surveying high-relief rock habitats. His team also collaborated with UCSB researchers to use stereo video camera systems to evaluate species distributions in mid-depth areas around Anacapa Island.

Additionally, he received funding from the Ocean Protection Council to organize a series of workshops for scientists using camera systems to discuss the best ways to monitor the deeper portions of MPAs in California. In the last academic year, on behalf of the Fisheries and Conservation Biology Lab, Dr. Starr received funding from NOAA/NMFS to continue biological sampling of species being considered for stock assessments.

As demonstrated above, MLML’s strategic focus to lessen environmental impact lies in the dedication, expertise, and research of our faculty and affiliates, but also in our ability as an institution to share their findings with the scientific community and, when appropriate, the world. The results of Professor of Invertebrate Zoology, Dr. Jon Geller’s, study measuring and assessing debris found along the California coast from the 2011 Japanese Tsunami will be published in the journal *Science* this year. G. Jason Smith, Research Faculty from the Environmental Biotechnology Lab, received worldwide review for his published papers on the 2015 harmful toxic algal bloom events in the Monterey Bay.

3.5 Communication and dissemination activities

MLML is dedicated to increasing positive impacts on the climate and local, national, and international ecosystems. Communication, via journal articles, lectures, research, and online are all vital pieces to achieving this type of positive global influence. MLML’s dissemination strategy includes publishing research, enhancing online presence and accessibility, participating in lectures and seminars, and faculty involvement in committees or other events within the scientific community.

As a result, MLML was involved with numerous positive communication activities. A total of 35 articles and papers and 6 scientific books were authored and co-authored by MLML Faculty and Research Affiliates. The MLML faculty and research community were members of several organizations and committees: Monterey Area Research Information Network for Education (MARINE) and the Monterey Bay National Marine Sanctuary Advisory Committee. Additionally, MLML distributed packets containing an academic report, budgets and Director’s update in Fall 2016 and Spring 2017. (The MLML Governing Board met in the Fall of 2016 but were unable to meet Spring of 2017.)

Faculty and students led many efforts to both increase and enhance MLML’s outward facing communication. Between 2016 and 2017, Professor McDonald from the Vertebrate Ecology Lab presented at the Western Society of Naturalists, the WAVE Foundation Seminar Series, the Scientific Committee on Antarctic Research Conference, the Acoustical Society of America, the Pacific Sea Bird International Symposium and the 9th Annual Penguin Congress in South Africa.

The Pacific Shark Research Center presented at the American Elasmobranch Society meeting in July 2016 and the IUCN Shark Specialist Group in 2017.

Oceanographic Research Affiliate, Dr. Larry Breaker, was invited to present at SCRIPPS 100th Anniversary of the Shore Station Program

Professor Tom Connolly of the Physical Oceanography Lab co-chaired a scientific session on the California Undercurrent at the 2016 Eastern Pacific Ocean Conference (EPOC) and was selected to be co-organizer of the next EPOC in September 2017. Professor Connolly, along with his graduate students Ryan Manzer and Drew Burrier and summer 2016 REU student Miranda Baker, presented work at EPOC, the National Diversity in STEM Conference, the American Society of Limnology and Oceanography Meeting, the Gordon Research Conference on Coastal Ocean Dynamics, and the American Geophysical Union Fall 2016 Meeting.

To enhance accessibility for potential students or outside entities interested in MLML's research, scholarship, and academics, a Web Committee composed of faculty, staff and IT technicians redesigned the MLML website to make it more user-friendly and functional. Katie Lage, the MLML Librarian, launched OneSearch, the new library online catalog and discovery system. OneSearch is a consortial catalog with the 23 campuses of the CSU System and provides streamlined access to print and electronic resources provided by the MLML/MBARI Research Library. OneSearch facilitates enhanced collaboration among libraries and more efficient sharing of library resources.

4 Training and workforce development activities

- a. **CSU CO Instructions:** If relevant, indicate internal CSU and extra-CSU training activities.

Environmental Health and Safety Officer

DOT Hazmat Employee with Packaging online course

Campus Safety Webinar Preparing for an Active Killer

HAZWOPER Refresher

CSU: Bullying in the Workplace

CSU Emergency Manager's Meeting at CSUMB

Campus Safety Conference Long Beach

Marine Operations

Deckhand/Technician: Motor Boat Operator Training Course for Scientific Boating
Safety Association

All: OSHA-Approved Forklift Training

- b. **CSU CO Instructions:** If relevant, indicate internal CSU and extra-CSU workforce development activities

Assistant to the Director

SJSU Media Training for Faculty Affairs

MLML Small Boat Operating Certification

Marine Operations

Manager: USCG Master License (500tons/Oceans) Renewed

Captain and Small Boats Coordinator: USGS Captain's License (100tons/Near Coastal) Renewed

5 Intellectual property (IP) and technology transfer

- a. **CSU CO Instructions:** If relevant, indicate opportunities for intellectual property and technology transfer, including status and next steps

None

- b. **CSU CO Instructions:** Indicate IP training events for participants on how to protect

None

6 New activities planned for coming year

To continue the same level of institutional achievement identified in this document, MLML has an expansive strategy for positive environmental, community, and social impact in the year, and years, ahead. This plan includes property enhancements and renovations, investments in student achievement and faculty development, and sending the Assistant to the Director to CSU's IP/TT training in 2018.

MLML hired a team of current and former Industrial Design students from SJSU to develop a concept for an Academic Village to be built at the Sandholdt property. The current plan for the Academic Village is scheduled to be made available in print and 3D video by December 2017 for use in fundraising. The plan includes student housing, a conference center, a small restaurant, museum, classrooms, labs and an outdoor wetland classroom targeted for K-12 students.

MLML's Del Mar property is undergoing engineering studies to examine options available for removing the dock and building. The next steps involve obtaining approval from the Monterey County Planning Department and California Coastal Commission. Additionally, MLML's Marine Operation Facilities team and Diving Safety Officer will look at options for rebuilding and enlarging the Scientific Diving Area.

Progress continues on MLML's concept of an ORTU through SJSU for a Center for Aquaculture. Although some steps remain before its completion, the proposal has been reviewed and recommended for approval, and a significant amount of new activity is underway as three new research grants start and new infrastructure and researchers come to the facility.

In Spring 2017, The CSU COAST met with MLML students to discuss funding opportunities and as a result many MLML students will be funded during AY17-18 by CSU COAST graduate student awards for travel to field work and conferences.

In efforts to align with the CSU Strategic Plan to shorten the time towards graduation, all MLML students enrolled in an MS program without an approved thesis will be required to present their preliminary ideas and drafts at a Thesis Symposium in October 2017.

In the year ahead, MLML looks towards enhancing our online presence and platform to inspire student enrolment and community support. The new MLML website will continue development and refinement and MLML anticipates sending out regular E-Newsletters to alumni, donors and the community.

Finally, MLML believes student achievement is not possible without the intellect, merit, and guidance of skilled professors and researchers viewed as experts in the field of marine sciences. As such, recruitment efforts will soon be underway to hire two new tenure-track faculty members, a Chemical Oceanographer and a Marine Invertebrate Zoologist by August 2018.

7 Problems and opportunities

Since 1966, MLML has provided quality academic and research opportunities to students, researchers, and faculty members. MLML is unique in its ability to provide both onsite classroom and experiential learning. Each year, MLML is met with the obstacles and problems inherent to any internationally recognized academic and research institution. Such obstacles ahead exist in the areas of economic capacity, CSU institutional leadership, and developmental impact.

- a. **CSU CO Instructions:** Problems: Nature of problems; resources needed to resolve the; status on resolving them

MLML continues to seek additional funding to support its largely graduate student population. Graduate students require more support beyond the typical educational needs including travel, supplies, and research funding. In conjunction with this additional cost associated with graduate students, the State budget remains the same. In fact, the O&E portion of MLML has made only incremental increases since the large cuts starting in 2009, even as the cost for operating MLML increases each year.

MLML's research enterprise is supported by the return of F&A. Typically the variability in this return generated by MLML causes a constant budgetary battle which has been exaggerated recently by the decrease in external support for scientific research, especially from the State. In response to this, The SJSU Research Foundation budgeted an additional \$125,000 allocation to bridge MLML's lower F&A revenue and is committed to be responsive to any of MLML's further research needs. All of this is exacerbated by the fact that MLML has endured an extensive period of time with a small and overextended fundraising and outreach staff. The potential increased support of a development officer from SJSU will greatly increase the capacity for MLML to seek outside funding.

These funding concerns exist in conjunction with uncertainty about which CSU will be the future Operating Institution for MLML. This uncertainty has resulted in a number of decisions or activities being curtailed or altered because the future of the MLML consortium is somewhat dependent on the decision regarding the Operating Institution and the funding model with the CO and consortium campuses.

Capital enhancements rely on meeting standards and regulations in Monterey County which is notoriously strict on development regulations. This has been compounded by recent problems Monterey County has had in staffing the Building Department, thus impacting development plans for MLML (i.e. the Academic Village).

- b. **CSU CO Instructions:** Opportunities: Examples include enterprise-level projects (multi-campus; multi-sector), interdisciplinary projects; high-impact; new technology or tools

MLML leadership interprets the aforementioned problems as opportunities to improve MLML's standing within the scientific and research communities. In addition to these opportunities for success, MLML's future vision includes exciting partnerships, new funding streams, and enhanced technology.

MLML is currently in discussions about jointly operating a new research vessel for California with Scripps Institution of Oceanography (UCSD). This vessel would serve the CSU and UC systems, and operate out of ports in San Diego and Moss Landing.

Funding for MLML's proposed Center for Aquaculture is uniquely poised to support a burgeoning industry and educational opportunity, as funding for aquaculture via NOAA and other funders is likely going to increase.

We are developing a number of new tools that will allow us to study, monitor, and explore the world's oceans. These tools include new sensor technology, video landers, and environmental sensors.

Most favorably, all strides above will provide increased opportunities for CSU campus collaborations and support in MLML's plan to develop additional CSU partners in future marine science endeavors.

8 Budget

CSU CO Instructions: Indicate funds received from (a) the Chancellor’s Office, (b) Campus contributions, (c) External funds to support operation of affinity group, (d) External grants of faculty associated with the affinity group

(A) Chancellor’s Office

- **COAST Graduate Student Research and Travel Awards given to 3 MLML students totaling \$9000.**

(B) SJSU Contribution

MLML Operating Budget AY16-17: SJSU General Fund		
	<i>AY 16-17 Actuals</i>	<i>AY 17-18 Budgeted</i>
Salary	1,813,522	1,813,522
Benefits	770,000	770,000
OE&E	407,648	407,648
Utilities	306,844	306,845
Salary Recovery / Reimbursement	0	13,000
Consortium Funding-Visiting Scientist	21,425	21,425
Other Reimbursement/Support	13,130	5,000
CSUMB Contribution	50,000	50,000
Prior Year Balance Forward	166,917	110,642
Roll-Forward Encumbrances	29,932	TBD
TOTALS:	3,579,418	3,498,082
<i>Operating Budget For:</i>		
<i>Administration, Instructional Supplies, Dive Program, Facilities, IT</i>		

(C) External funds to support operation of affinity group.

MLML: SJSU Research Foundation F&A Return/Support for Operations

REVENUE	FY16-17 Actuals	FY17-18 Budgeted
Other Income	610	600
Rental Income (Del Mar, Sandholdt Center)	120,417	119,000
F&A Return (Less 30% to PI's, Reserve, Deficit Refinance)	177,068	44,917
Foundation Admin and Facility Support	190,000	315,000
Balance Forward From Previous FY	157,000	58,816
Balance of Revenue To Fund Operations:	645,095	538,333
OPERATIONS DETAIL		
Total Salaries, Wages and Benefits	421,388	429,369
<i>SJSURF Facility and Admin Staff - not from Grant Direct Costs</i>		
Total Administrative Costs	19,844	25,000
Total Diving Costs	1,592	5,000
Total Information Technology	14,551	53,400
Total Maintenance and Repairs to SJSURF Properties:	51,037	53,000
<i>Del Mar, Norte, Aquaculture Center, Firehouse, Sandholdt</i>		
Total Services & Facility Costs	72,849	36,000
Total Supplies & Equipment	5,018	11,500
Small Boat Support	-	15,000
Total Operating Costs:	586,279	628,269
	58,816	(89,936)
RESERVE		
Reserve Account Balance EOY	584,282	600,000
REFINANCING ACCOUNT		
Refinancing Account Balance EOY	(3,004,943)	(2,994,943)
MLML MARINE OPERATIONS BUDGET AND REVENUE FY16-17		
R/V JOHN H. MARTIN	8,310	
R/V SHEILA B.	(7,134)	
ORANGE RHIB	3,986	
WHALERS	(8,838)	
Total Revenue FY16-17:	(3,676)	
OPERATING COSTS FY16-17	(47,477)	
MARINE OPERATION BALANCE FY17-18:	(51,153)	

MLML: SJSU Tower Foundation Financial Report	
TOTAL DONATIONS AY16-17	630,715
<i>Major Donations and Fundraising</i>	
21 Scholarships Awarded	22,000
MLML Merchandise Store Revenue	3,400
Anthropocene Institute Donation	16,500
Monterey Bay Aquarium Research Institute	33,500
The Nature Conservancy	24,000

(D) External grants of faculty associated with the affinity group

- **82 Grants awarded totaling \$8.8 Million.**
- **66 Proposals submitted during AY16-17 totaling \$15.6 Million.**

9 Affinity group's self-certification checklist

CSU CO Instructions: Requirements to grandfather in as a System-Wide Center or Institute under EO 1103.

Check list for:

PURPOSE:

- Organized around a scholarly, creative, research, education, and/or public service activity that combines interests/expertise of individuals, departments or administrative units, and may draw on expertise of others external to the campus or the academy
- May offer services to constituents beyond the CSU community (e.g., individuals as well as private and public entities)
- As specified otherwise

FUNCTION

- Provide opportunities for professional development of faculty and staff through teaching, research, scholarly and creative activities, and public service
- Foster and facilitate interdisciplinary efforts among disciplines, departments, colleges, and universities
- Provide a clearinghouse for information of interest to professionals and conducting workshops and conferences for continuing education
- Improve student success by facilitating/supplementing student academic experience
- Provide opportunities for faculty and staff to collaborate on multi-campus or system-wide proposals for external funding to support the above activities
- Cite other functions as stated in proposal or strategic plan and approved following processes described below

STRUCTURE

- Strategic plan, including purpose and mission
- Campus or auxiliary responsible for administration of funds
- Financial support
- Participating CSU campuses and non-CSU entities, and their roles and responsibilities
- Organizational and governance structures
- Suspension or dissolution guidelines
- Hiring procedures, staff, and location
- Protocol for changes in participants—identified under participating CSU campuses...

ADMINISTRATION

- Identify lead president or other executive as responsible for the oversight of each system-wide multi-campus center, institute, or affinity group
- CSU personnel shall be subject to a letter of appointment from the campus; the letter sets forth the terms and conditions of his/her employment including, but not limited to, whether he/she serves at will in either capacity and whether his/her employment with the campus will continue after the employee's service to the unit terminates or is otherwise suspended and/or if the unit dissolves