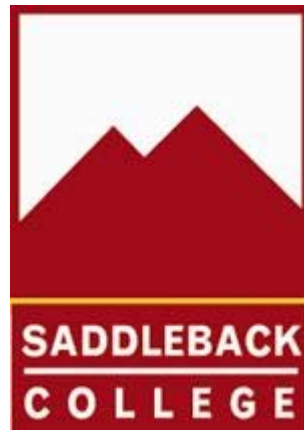


**Saddleback College
Program Review for
Aquarium and Aquaculture Science**



Submitted Fall 2006

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Program Review Team Members and Approvals

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Submitted in 2006

Program Review Checklist

Date Completed	Action
August 2006	Contact Program Review Chair for orientation
August 2006	Form Program Review Team
Fall 2006	Gather documents (Org Chart/Staffing Profile/SLO Assessment Forms/Data Sets)
Fall 2006	Solicit input from faculty and students
Fall 2006	Determine if additional research is needed
Fall 2006	Contact College Research Analyst if necessary
Fall 2006	Write Program Review report
December 2006	Submit report to Dean and Program Review Chair for approval
TBD	Report submitted to Academic Senate for approval
TBD	Report submitted to Office of Instruction for approval
TBD	Report submitted to College President and the Office of Institutional Effectiveness
TBD	Report posted to the IE web site
TBD	Open, formal presentation to the Program Review Committee and other interested parties

1.0 Program Overview

The mission of the South Orange County Community College District requires a systematic review of the Aquarium and Aquaculture Science Program to ensure quality and relevance, and the effective use of resources. This program review is used for making judgments about the effectiveness of the program and to improve student learning. It is a means of ensuring that the Aquarium and Aquaculture Science Program is effective and responsive to the local college community.

The results of the Aquarium and Aquaculture Science Program review will be incorporated into the strategic planning process. This program review will also support the WASC accreditation standards, interface with the college Enrollment Management Plan and most importantly, provide information for program planning and improvement

This document includes an overview of the Aquarium and Aquaculture Science Program and key recommendations. The overview starts with the mission and goals of Saddleback College, the Advanced Technology and Applied Science Division, and the Marine Science Technology Department. The main document describes and provides recommendations for: curriculum, instruction, student success, staffing and resources, staff development, community outreach, and articulation and accreditation.

1.1 College Mission and Goals

1.1.1 Mission Statement

To provide access to learning opportunities which promote student success; to foster intellectual growth, individual expression, and character development; and support a dynamic environment of innovation and collegiality.

1.1.2 Goals

The primary goal of Saddleback College is to provide a comprehensive post secondary education and a full range of student services. Emphasis is placed on open access to all students, including a changing and diverse student population. Academic success and student achievement are joint responsibilities of the students, the staff, and the college. To this end, the college will:

- 1.1.2.1 Provide educational programs leading to the Associate in Arts and Associates in Science Degrees.
- 1.1.2.2. Provide a comprehensive, broad range of high quality courses and programs to enable students to pursue their educational objectives and career goals.
- 1.1.2.3. Provide a meaningful general education program including baccalaureate-level transfer and occupational curricula.
- 1.1.2.4. Provide necessary developmental, remedial, and basic skills instruction so that students may be successful in their chosen course of study.
- 1.1.2.5. Provide access for the community to the educational, cultural, and recreational resources of the college.
- 1.1.2.6. Provide counseling and other support services that are responsive to the needs

of students.

- 1.1.2.7. Provide opportunities in continuing education and community services, including courses for skill upgrading, retraining for professionals, and life long learning for older adults.

1.2 Advanced Technology and Applied Science Division Goals

To provide quality technical instruction and career preparation to our students and participate in the vision and mission of Saddleback College

- 1.2.1 Facilitate the development of a prioritized equipment and technology plan for the ATAS division.
- 1.2.2 Facilitate the development of assessment and documentation of student learning outcomes for each department area in the division.
- 1.2.3 Facilitate the department's assessment and documentation for scheduled program review.
- 1.2.4 Define, identify and review what the departments believe to be best practices in instruction.

1.3 Aquarium and Aquaculture Science Program Goals

- 1.3.1 Provide the student with the skills and technical knowledge in specialized areas of study within the scope of Aquarium and Aquaculture Sciences.
- 1.3.2 Increase the employment opportunities and students potential in acquiring jobs relating to Aquarium and Aquaculture Sciences
- 1.3.3 Prepare the student, through coursework, hands-on application, training modules and career information, for vocational certificate, AA/AS degree or transfer patterns to a four-year university to major in aquarium/aquaculture sciences and/or related sciences and technological fields such as; aquatic biology, animal science, environmental sciences, fisheries, marine biology, oceanography and zoology
- 1.3.4 Provide existing employees of the various marine related specialties, with upgraded skills, technical knowledge and current guidelines established by local, state and federal governing regulations or accreditation standards, which may affect the industry or business.

Aquarium and Aquaculture Science Program goals are related to Saddleback College Goals: 1.1.2.1, 1.1.2.2, 1.1.2.3, 1.1.2.5 and 1.1.2.7: (1.2.1.2.) The Aquarium and Aquaculture Science Program offers a certificate and an Associate of Science Degree in Aquarium and Aquaculture Science. The degree program consists of nine core courses for a total of 21 units, in addition to the required, 60 units of general education courses. (1.2.1.2). The Aquarium and Aquaculture Program offers nine, high quality courses, providing the students with a broad range of general to specific areas. The student has the option of earning an occupational certificate, an Associate of Science Degree, or enrolling in one or more specific topics of specialty. The Program promotes; retraining for new career, skills upgrade or grooming for specific career pathways. (1.2.1.3). Three of the nine courses of the Aquarium and Aquaculture Science Program articulate with University of California Davis and California State University, Humboldt. (1.2.1.5). We host numerous visiting groups at our Aquarium Science Lab Facility and participate in a wide range of outreach activities and presentations to local and regional locations, young and old, male and female. (1.2.1.6). We provide general interest courses in aquarium and aquaculture science and offer several core classes that are can be taken by any student, since

they do not have prerequisite requirements. Generally, courses are taken specifically as certificate and associate degree requirements, technical knowledge and skills upgrading and/or general education and interest.

1.4 Historical Background and Unique Characteristics

The Aquarium and Aquaculture Science Program is the first and only approved and accredited program of its kind in the California community college system. The program, which offers an Occupational Certificate and Associate of Science degree was officially approved by both the California Postsecondary Education Commission (CPEC) and the State Chancellor's Office in October 2004. The vocational program is unique and was entered into the Inventory of Approved and Projected Programs under T.O.P code 1920.00 (6th edition TOP code) with a unique program identification number 15932. The program was submitted to (CPEC) for its concurrence because the program was the first of its' kind in California. The program is unusual, in that a case was made for looking at the job market from a national perspective, with considerable evidence provided at a national level and absence of training within the colleges' service area. It has tremendous potential of becoming a regional training center for the region, as there is not a single educational institution in the lower half of the state ¹. The Aquarium and Aquaculture Program is aimed for the future and is poised to become an academic leader in southern California in training a work force that will be necessary to fill the predicted job market for skilled technicians and marshal talented minds in combining advanced technology with environmentally friendly practices in sustaining our fisheries for the good of the environments and the nations' economy.

¹ *The United States government plans to grow the industry by 6-fold by 2024 and has set national goals for expanding domestic aquaculture production from the current \$900 million a year to \$6 billion a year by 2025, and this includes using aquaculture to enhance depleted wild stocks of fish and shellfish. In addition to this, aquaculture now plays a significant role in meeting human protein needs as wild caught fisheries reach their limits. Many Western states are involved in aquaculture, but the Pacific states of Alaska, Washington, Oregon, California and Idaho are in a particularly strong position to play an important role in this national development plan. Public and private hatcheries in the region release 2 billion fish each year, accounting for between 30 and 75% of Pacific salmon returns in some areas. Stock enhancement directly employs as many as 2000 people in the region, and generates 10,000 additional jobs in related industries and this number will have to grow to meet the national goals.*

The Program is similar to few other national 2-year vocational training centers (ours is one of 12 in the nation) and parallel university transfer patterns for some of the introductory courses. However, unlike the programs offered elsewhere, Saddleback's Aquarium and Aquaculture Science Program combines both, aquarium science with aquaculture. There are four core areas that are shared between the two related sciences; captive ecology, life support, health and disease and, water quality. The Program delivers the curriculum in a streamlined, need-to-know basis and is aimed at the application of the science targeting critical and necessary technical skills acquired through vigorous hands-on activities. The Program trains technicians for entry-level positions and supports upgrading of skills and continuing education for positions that are difficult to fill with advance degree personnel, or have high turn-over rates dues to rapid promotions in the venues.

The courses are lower division, three of these courses transfer to 4-year universities and the others are core classes that complete the technical training program. All classes are delivered by the same instructor teaching both lecture and lab during the same time block. The classes occur in two, studio-style, lab-equipped classrooms of the Biology Department and an adjacent

facility. The Aquarium and Aquaculture Science Program does not have a designated classroom and schedules the classes into unoccupied time/day slots after the Biology Department classes are scheduled. This is becoming very challenging as the Biology Program grows, and also restricts the course offerings to fit into available spaces. All Aquarium and Aquaculture courses share in the use of a unique, Aquarium Lab facility, located within minutes of the biology classrooms. This facility, the Science-Math Greenhouse, was adopted ten years ago because it was not utilized and basically in a state of disrepair. Through countless volunteer hours, three grant awards from the Saddleback College Foundation and several fund raising activities, this old SM Greenhouse, the Aquarium Lab facility, has emerged as the heart of the intense, vigorous hands-on training site and provides a strong simulation of a real work place. In addition to the facility, numerous local and regional facilities collaborate with our program and provide additional on-site workshops, specialized tours and sponsor internship opportunities; Aquarium of the Pacific, Birch Aquarium at Scripps Institute of Oceanography, Cabrillo Marine Aquarium of Los Angeles, Ocean Institute of Dana Point, Doheny State Park Aquarium Interpretive Center, Chula Vista Interpretive Center, Sea World San Diego, Hubbs-Sea World Research Institute, Carlsbad Sea Horse and Mussel Farms, etc. Many of our students praise the quality of training and education they received at Saddleback College and the employers actively seek our students for entry-level positions.

Generous donations from strong partnerships from the corporate business community continue to supply the bulk of the supplies. The college provides a meager supply budget that must be improved in order to sustain the program at a basic operating level. Currently, some of the basic science supplies are “borrowed” from the biology department, partly because of the lack of its own classroom and space to store the supplies in, but also because of the small operating budget. The college has provided for new equipment, and must continue to do so, as new lab curricula are introduced with additional technical skills training, for redundancy of existing equipment and as the program grows with. Since this is a new program, with no classroom and very limited storage and space, the program shares in the use of items that are available in the biology classroom. The need for additional equipment such as computer-based media services, laboratory appliances such as incubators, refrigerators, freezers, centrifuges, combination hot plate/magnetic stirrers, autoclave unit, deionized water system, chemical storage cabinets, spectrophotometers and variety of power tools will be necessary when the program obtains a lab classroom of its own.

The Aquarium and Aquaculture Science Program will continue to produce the skilled technicians and provide employers with a strong workforce equipped with recognizable and quantifiable training and knowledge to fill the expanding job market in this diverse and growing area. It will also promote skills upgrades for current employees and marshal skilled and talented minds to address the future challenges of conservation and sustainability of our ocean and earth resources.

1.5 Last Program Review

This is the first Program review for the Aquarium and Aquaculture Science Program.

1.6 Program Strengths, Opportunities, and Challenges

The Aquarium and Aquaculture Science Program is a new program and entering its third year as this report is being written, and therefore, has only two years to analyze.

Strengths: Strong partnerships and collaborations have been forged with aquarium and aquaculture related businesses, corporate and private, research facilities, interpretive centers, and four-year universities. We have a strong advisory committee, representing; private and corporate businesses, interpretive centers, public aquariums, research and 4-year universities who continue to provide expert guidance, host specialized work-site tours, and on-site workshops. Corporate businesses continue to donate supplies and equipment in support of the instructional program. We are located within an hours drive to numerous aquarium and aquaculture venues that provide academic support to our students and program. We attract students from across the nation and few internationally, and some are commuting from as far away as Chatsworth, San Bernardino and Chula Vista to enroll in the programs courses. We have a wonderful technical training facility within walking distance to the classroom. We are the only community college in all of California with an approved and accredited program that addresses the prediction for conservation and sustainability of our fisheries – which are in a state of urgent crisis.

Opportunities: Since we are the only community college in all of California with an approved and accredited Aquarium and Aquaculture Program and, the only academic institution in the entire lower half of this state, we have tremendous potential in establishing a regional training facility and could play a significant role in the national development plan (see inset ¹ on page 5) There is also a national need to enhance the K-12 grade students in this area of science and through this, the development of a two by two program to enhance High School student transfer patterns would be beneficial.

Challenges: There are many challenges that must be resolved in order for this premier program to be successful, and lead with twelve other national community colleges, a program of eminent importance to the future of our oceans. The program does not have a fulltime faculty member to anchor the program which is probably the biggest challenge. In the academic year 04-05, there was an opportunity to recruit a fulltime faculty member, but unfortunately, it proved to be a difficult task since the number one candidate turned down the job due to the high cost of living here in southern California, and the President of Saddleback College did not believe the second candidate was a good match with the College. The College President did suggest that efforts would be made to help find another qualified instructor for the Program, but unfortunately, the priority for the hiring was not continued into the current year or since. There is not adequate classified staff to support the instructional program; in particular, the life support systems for the variety of aquatic animal life. The classes are scheduled in left-over time slots in two Biology lab classrooms due to close proximity of the Aquarium Lab Facility, storage issues and necessity to borrow basic lab supplies. Storage and access to lab equipment and supplies are crammed into two cabinets and lab carts borrowed from the Biology Department. A variety of technical and basic lab equipment, apparatus and supplies are also borrowed from the Biology Department because of budgetary and storage problems. The current Aquarium Lab Facility has numerous problems, mostly due to age of the facility, since this site was adopted as an unused Greenhouse of the Science and Math building. Budget is another challenge. When the Aquarium and Aquaculture Science Program was developed, it was approved without a budget so it had to share funds in the Marine Science Technology budget. In the academic year 05-06, the Program did receive a meager \$5000.00 budget from the Vice President of Instruction. However, in the next academic year 06-07, that budget was reduced 36% for a total of \$3200.00. It is extremely difficult to run a program, especially one dealing with live organisms on \$3200.00. Unfortunately, it is believed this will again be the budget for next year (07-08).

2.0 Program Review

2.1 Curriculum

Saddleback College offers an Occupational Certificate and an Associate of Science Degree in Aquarium and Aquaculture Science. The contents of each course are evaluated every two years and on an as needed basis. The curriculum is revised and sent to the curriculum committee for approval at that time. Over the past two and one-half years, the AAS course outlines were updated five times to improve delivery, increase effectiveness of content coverage and improve student learning outcomes of the topics delivered.

Saddleback College has articulated three of the nine core courses in the program, MST 10: Introduction to Aquaculture; MST 100: Aquarium Systems; and MST 101: Aquarium Management. MST 10 articulates with the University of California and MST 100 and 101 articulate with the California State University. The remaining courses, while rigorous in their offerings and having intellectual merit, are not articulated because they correspond with upper division coursework in the University of California and California State University systems. The courses are individually transferable at the other universities throughout the country where aquarium and aquaculture programs are in place such as the Universities of Hawaii, Florida, Texas, Alabama and other states across our nation. Saddleback College's Articulation Officer does not have the resources to negotiate articulation agreements with out-of-state schools unless it is for a specific transfer agreement for an individual student. The Aquarium and Aquaculture program will continue to pursue articulation of its program with its partner schools.

The associate faculty members communicate regularly with the industry for advisory support on curriculum development, enhancement on technical skills and strategies needed to strengthen the program. They assist in the instructional delivery; assess the progress of the new curriculum and the overall impact of the training program through their observations of our students whom are interns or employees. Adjustments, revisions and adaptations of the coursework and development of additional courses use the expert guidance and evaluation process of our faculty, staff, advisory members and collaborators. We schedule and conduct advisory meetings for reviews and evaluations. Our advisory committee members hold current positions as directors, supervisors, curators and managers at nearby research facilities relating to aquarium and aquaculture venues; academic institutions, public aquariums, interpretive centers, corporate businesses and retail industries and are active in management, hiring and research responsibilities at their respective institutions. Additionally, we collaborate and share curriculum with Oregon Coast Community College's Aquarium Science Technology, Indian Hills & Hillsborough (Florida) Community College's Aquaculture Program, and Gadsden State (Alabama) Community College's Aquaculture Science Center, as well as, the chairs of various 4-year advanced degree related schools of University of California at Davis extension aquaculture/California Aquaculture, Cal State Humboldt, for guidance and articulation. Furthermore, the Department works closely with the Saddleback College counselors in order to coordinate student's schedules and articulation with other programs.

New Courses -Two new classes have been introduced Fall 2006 and Spring 2007. One is a distance education hybrid for the most popular course, MST 100, and the other course is a special topics, MST 289; Introduction to Aquaponics.

A distance education class was developed when AAS survey prepared by Denise Inciong was administered, Spring 05 and indicated 41% favored online hybrid course and 50% said yes, if

the schedule worked. Plus there were numerous phone and email requests. MST 100, the most popular and long-running class, was selected as the test course for this delivery format. MST 100DE was offered for the first time, Fall 2006 and was offered in a compressed, 10 week, hybridized course format. Weekly lab meetings were held on campus and two lectures were scheduled per week. Seven quizzes, two examinations, as well as pre-labs and other written reports were completed on-line. The class had a higher than average drop rate (47%). The feelings expressed by some of the students, is perhaps this topic was best delivered in the classroom. It was also suggested that perhaps running the course for the full 16.6 weeks would be better.

MST 289: Aquaponics will be offered in the Spring 2007 semester as a special topics course, to test interest in an area that is projected to revitalize in growth, as the nation looks toward environmentally friendly solutions of high tech, recirculating aquaculture.

Updating Existing Courses - We need to constantly update our courses to keep up with changes in technology and in new techniques and skills required to implement these changes. We need a fulltime faculty member with technical expertise to coordinate, articulate and otherwise deal with this. Most updating of courses were by small meetings which occurred between part-time faculty members consulting and collaborating in strategies and problems with other college programs, with advisory members and concurrence with the Department Chair and Division Dean.

In the first two years of the program, the most significant changes were the need to increase the number of units, lecture hours, for four of the classes in the program. MST 100, 203 and 206, were identified as needing more lecture time in order to cover the topics sufficiently and MST 101 needed more lab hours for mastering skills to achieve the learning outcomes necessary for students to perform well in their knowledge and critical thinking assessment evaluations.

Summary of Recommendations:

A fulltime faculty member is needed to strengthen the Program and continue to build on the momentum of a new program. The Program's success relies on a leader for the program and is an absolute must to build strength and develop cohesiveness within the instructional delivery. It is amazing that the program has come to fruition without a fulltime faculty member to take lead. A fulltime faculty member is needed to coordinate the efforts currently performed by informal meetings between part time faculty members and advisory board members in reviewing curriculum, improving existing courses, adding additional courses and developing learning outcomes.

2.2 Instruction

The Aquarium and Aquaculture Science Program consists of nine courses, for a total of 21 units. These courses are offered as vocational –occupation education program. Each of the nine courses fulfills the requirements. Three of the courses articulate and transfer as electives to the California State University or University of California (MST 10, MST 100 and MST 101). MST 100, Aquarium Systems, is our most highly enrolled course.

We are fortunate to be located within an hours drive to numerous aquarium venues that provide academic support to our students and programs. Some of these facilities are large venues and therefore, we solicit members for our Advisory Board Committee. The Advisory Board members are Chief Research Officers, Program directors, curators and managers of local corporate

aquarium industries, public aquariums, research institutes and four-year universities. In addition, public aquaria such as the Aquarium of the Pacific at Long Beach, Birch Aquarium of Scripps Institute of Oceanography in San Diego, the Cabrillo Aquarium in San Pedro, the Ocean Institute of Dana Point and Hubbs-Sea World Research Institute and Sea World of San Diego, offer internship and employment opportunities for our students. These venues also provide: specialized workshops, host “no-fee” behind the scenes tour for our classes, offer or hold internship opportunities, and relay important information to disseminate between our faculty and students.

Recommendations:

Continue to strengthen the existing collaborations and establish new ones. Schedule annual meetings to review program content and determine areas of weaknesses and strengths overall objectives.

Development of Skills and Competencies - Students are required to demonstrate logical reasoning and critical thinking skills. In particular, laboratory exercises emphasize the application of these skills to discrete problems that are solved either individually or through group learning. The exercises also emphasize practice and mastering specific techniques, which are highly desirable in a profession dealing with the husbandry of aquatic animal science. Writing skills are reinforced through short answer essay questions on written sections of the laboratory worksheets, quizzes and exams. All laboratory assignments begin with clearly stated learning objectives. Student progress and learning outcomes in this course are assessed in the following ways:

- Lecture
 - Students are assessed in the course with three multi-chapter exams that tests the students’ ability to recognize/recall, comprehend, apply and analyze material.
 - Exams typically consist of multiple choice and written short answer essay questions.
 - Periodic lecture quizzes are used to quickly determine student understanding of the current material prior to an exam.
 - Written assignments include research papers on a specific topic requiring a literature search utilizing the internet and library databases.
 - Article critiques through which the student demonstrates the ability to comprehend and explain written reports of scientific findings.
- Laboratory
 - Students are required to demonstrate competence and master of clinical skills
 - Measuring and calibration of test equipment
 - Handling, capturing and care of aquatic animals
 - Tools and apparatus, safety and biosecurity
 - Students are required to complete laboratory worksheets during the lab session
 - Students work in groups and sometimes independently;
 - acquire and analyze data;
 - graphing and mathematical manipulations (average, percentages);
 - written answers to questions that require deduction and logical reasoning;
 - Weekly lab quizzes or laboratory exams;
 - Oral and/or written presentation of student research project

Recommendations:

The program needs a permanent classroom for instruction and lab. The room should be able to store supplies, instrumentation and equipment that are used in the lab class. It should be equipped with sinks, and other basic lab accoutrements, as well as network access. These

items are vital and necessary to promote the variety of scientific methods and technical skills that are required to fulfill the learning objectives of the program and provide the student with marketable employment potential.

Innovation and Technology - Lectures: All of the associate faculty use MS PowerPoint technology as a means to enhance delivery of their lectures. Outside of the classroom, faculty members either have their own websites or use Blackboard where they post materials pertinent to the section(s) they teach. Students have unlimited access to course syllabi, course objectives, lecture outlines, study guides, special assignments, and laboratory data. Students are also encouraged to use the links provided by the instructor for additional augmentation of the course learning objectives.

Faculty members experiment and use a variety of new and innovative teaching methods. We periodically discuss and share innovative teaching methods obtained from various resources.

Aside from the MS PowerPoint technology used to deliver lectures, the laboratory portion of the course allows the student to become familiar with the use of scientific instruments, handling animals, working with chemicals, working through critical thinking in resolving situations.

The most abundant use of technology is in the laboratory section of the courses. At this time, the program does not have a classroom or lab room and use the biology laboratories (SM 202 and 246). These rooms are equipped with computers, overhead projectors, VCRs and DVD players. The computers are used to: 1) display MS PowerPoint presentations, 2) demonstrate various concepts by using animation software available from the publishers, 3) demonstrate the use of common data analysis software like Excel, and 4) access and display various interactive web sites available for the instructors. In addition, laboratory syllabi, outlines, write-ups and supplemental materials are posted on web pages for students to access. These web pages are either open-access, supported by the Saddleback College web server, or are restricted-access Blackboard web sites specific for each course

Summary of Recommendations

- Continue to strengthen the existing collaborations and establish new ones.
- Strengthen assessment strategies, identify Program's weaknesses and improve results.
- Provide a lab classroom equipped with network access, computer projection system and computer software..

2.3 Student Success

It is important to note that some of the statistics provided in the report were totals for all of Marine Science Technology and not exclusively the Aquarium and Aquaculture Science Program. There were statistics for each of the classes of the Aquarium and Aquaculture Science Program and these were combined when available to analyze. The statistics summarized in Tables 2.2-2.8 show years 2004/05 and 2005/6, the two years of the program. Detailed data is supplied in the attached Appendix (Section 3). The data is divided into enrollment and productivity, success and retention, and student characteristics.

Enrollment and Productivity - This is a new program and the enrollments reflect this. As shown in Table 2.1, prior to the programs approval, MST 100 and MST 101 were offered. Then, in the Spring 2004, in preparation for the new program, 2 new courses, MST 10 and MST 203, were approved and tested. The enrollments for MST 100 prior to this start up of this new

program were very high, and marked decrease was seen with the increase in tuition fee Fall 2005. The program suffers from low enrollment for a number of reasons which will be described in more detail in Section 3, Recommendations. *[Last year, 2005-2006 was a particularly bad year, with a dedicated associate faculty member on medical leave and limited abilities, and consequently little to no advertisement and presentations occurred.]* There is no ratio of fulltime faculty to students as *we have no full time faculty*. The maximum room enrollment of each class is 18-28 students, as the laboratory activities and situations can only safely accommodate a maximum of 28.

Table 2.1 Student Enrollments prior to program approval Aquarium and Aquaculture Science

CENSUS HEADCOUNT C1 Headcount by course/Term/Year

	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer
	2001	2002	2002	2002	2003	2003	2003	2004	2004
MST 100	23			26	26		29		
MST 101	12			0	15			14	6
MST 10								19	
MST 203								17	
Total	35			26	41		29	50	6

SOCCCD Management Information System (MIS) Data Warehouse November 2006

The start of the new program was hampered by a few things. Official word was delayed due to lost paper work and thus we were not allowed to advertise the program. It was also the year of the substantial hike in tuition fees, which was felt among many of the other vocational programs. The second year, 2005-06, was further reduced with no full time faculty member in place, no funding for support staff and little budget, which was borrowed from other programs. As a direct result, four classes were cancelled for the 2005-06 year: MST 205 in the Fall 2005, and 3 classes, MST 203 and MST 204 and MST 206 in the Spring 2006. As shown in Table 2.2, enrollment was stronger in the first year of the program, but dropped off the following year.

Table 2.2 Student Enrollments for the Aquarium and Aquaculture Science

COURSE NUMBER	Fall 2004	Spring 2005	Summer 2005	Fall 2005	Spring 2006	Summer 2006
MST 10	12			11		
MST 100	17			19		
MST 101		13			8	
MST 203					-	
MST 204		17			-	
MST 205	15			-		
MST 206		15			-	
MST 207			2			4
totals	44	45	2	30	8	4

SOCCCD Management Information System (MIS) Data Warehouse November 2006

At this time, we offer 1 section of 3 classes in the Fall semester and 1 section of 3 classes in the Spring semester and one class in the summer.

Success and Retention - Success and retention data show that there is an overall 69% success rate and 96% retention in courses offered in Aquarium and Aquaculture Science for the first two years of the new program (Table 2.3). Four students have graduated and received the Occupational Certificate and/or Associate of Science Degree.

Table 2.3. Success and Completion of Students enrolled

SUCCESS & SATISFACTION	Aver	Fall 2004	Spring 2005	Summer 2005	Fall 2005	Spring 2006	Summer 2006
Average Course/Term Retention Rate	96%	97%	84%	100%	95%	100%	100%
Average Successful Course Completion Rate	69%	76%	56%	100%	31%	100%	50%
Number of Degrees and Certificate Awards* (reported annually in MIS)	4						

SOCCCD Management Information System (MIS) Data Warehouse November 2006

A survey sent out to local area employers by the Program rated the students hired from the program with; 80% excellent and 20% good of programs effectiveness, with 100% excellent in basic husbandry science. The assessment results are included in the Student Learning Outcomes, dated September 2005 (see appendix).

Student Characteristics - It is important to point out that the data for Aquarium & Aquaculture Sciences was not separated and thus is mixed with the Marine Science Technology. Only the last two years, 2004-05 and 2005-06, of the data were analyzed, as this is how long the Aquarium and Aquaculture Science Program has been offered.

Over the 2-year period of this review, reflecting the Marine Science Technology (as representation of the Aquarium and Aquaculture Science Program,) students who take our courses primarily live within the district (86.6%), are ages 18-21 (51%), are male (56%), white (68.8%), and are transfer students (44.6%.) (Tables 2.4, 2.5, 2.6, and 2.7.)

Table 2.4. Age of Students Enrolled

AGE	Aver	Fall 2004	Spring 2005	Summer 2005	Fall 2005	Spring 2006	Summer 2006
Below 17	3%	4%	1.60%	5.90%	2.40%	0.50%	5.60%
18-21	51%	65.60%	58.60%	31.40%	65.90%	67%	16.70%
22-25	11%	9.50%	12.90%	3.90%	7.40%	13.50%	19.40%
26-35	15%	8.90%	10.20%	19.60%	8.60%	6.50%	36.10%
36-50	14%	8.90%	13.30%	29.40%	10.70%	8.80%	11.10%
51-65	5%	2.60%	3.50%	9.80%	4.70%	3.70%	8.30%
Over 65	1%	0.60%	0%	0%	0.30%	0%	2.80%

SOCCCD Management Information System (MIS) Data Warehouse November 2006

Table 2.5 Student Gender by Term/Year

Gender	Aver	Fall 2004	Spring 2005	Summer 2005	Fall 2005	Spring 2006	Summer 2006
Female	43%	47%	36.3%	49%	44.5%	47.9%	33.3%
Male	56.9%	53%	63.3%	51%	55.5%	52.1%	66.7%

SOCCCD Management Information System (MIS) Data Warehouse November 2006

Table 2.6 Location of Students Enrolled

ZIP CODES	Aver	Fall 2004	Spring 2005	Summer 2005	Fall 2005	Spring 2006	Summer 2006
Saddleback	86.60%	89.40%	86.70%	80.40%	86.90%	92.60%	83.30%
IVC	0.03	3.40%	1.60%	7.80%	1.50%	0.50%	0
Out of District	11%	7.20%	11.70%	11.80%	11.60%	7%	16.70%

SOCCCD Management Information System (MIS) Data Warehouse November 2006

Table 2.7 Ethnicity of Students Enrolled

ETHNICITY	Aver	Fall 2004	Spring 2005	Summer 2005	Fall 2005	Spring 2006	Summer 2006
Asian	8.20%	6%	5.50%	9.80%	7.10%	7%	13.90%
Afro-American	0.76%	1.10%	2%	0	1.50%	0	0
Hispanic	11.90%	8.60%	10.90%	9.80%	11.30%	11.60%	19.40%
Indian	0.90%	0.90%	0.40%	0	1.80%	0	2.80%
White	68.70%	71.30%	70.30%	70.60%	71.50%	72.60%	55.60%

SOCCCD Management Information System (MIS) Data Warehouse November 2006

Table 2.8 Educational goals

STUDENT CHARACTERISTICS							
		Fall	Spring	Summer	Fall	Spring	Summer
Educational Goals	average	2004	2005	2005	2005	2006	2006
AA/AS and transfer	35.1	37.8	35.5		31.8	35.3	
Transfer w/o AA/AS	44.6	8.9	9.8		11.9	14	
Voc.Cert. w/o transfer	14.4	15.5	16.4		13.1	12.6	
Acquire job skills	7.65	5.2	9.8		6.8	8.8	
Discover interest	5.4	6.9	5.1		6.2	3.3	
Ed development	22.88	6.9	9.8		9.2	65.6	

SOCCCD Management Information System (MIS) Data Warehouse November 2006

More of our students are males, the value cited above, (Table 2.5), reflects all of the combined data in the Marine Science Technology classes and not just the Aquarium and Aquaculture Science Program courses. It is obvious in the programs classes, that the value is indeed much

higher (77% - 80%). With respect to ethnicity, most students are classified as White (68.7 %) with a smaller component each of Hispanic (11.9 %) and Asian (8.2%). Many students take courses to earn an associate degree and transfer, (35.1%) and other notable educational goals were educational development (22.9%) and preparing for vocational certificate (14.4%) and acquiring job skills (7.65%).

Of significance is the fact that a fair number of students come from outside of the SOCCCD district (11%). This value may actually be even higher if the Aquarium and Aquaculture Science data had been extracted from the MST data. Since the program is small, the community of students is well known and commute from a regional radius of one to one-half hours drive, (Chatsworth, Chula Vista, Duarte, Hollywood, Long Beach, San Bernardino, and one from Osaka, Japan, an international student.)

Program Trends - The Student Survey results of 2004-05 (see Student Survey, appendix) demonstrate that students are satisfied with the courses offered in the Aquarium and Aquaculture Science Program. (There were no results captured for 2005-06 to use for this review.) Although this Program is entering its third year, students find our courses meet their educational and career goals, provide them with necessary skills in technology and clinical methods, and provide them with experience in developing writing and critical thinking skills. Students report overall satisfaction with faculty expertise and teaching strategies and methodologies. Of this same group, 27% already are employed in jobs related to Aquariums, 38% are seeking a certificate or degree, upgrading their knowledge, or plan to transfer for advanced degree, and 18.2% already have a bachelor's of science degree. Their future goals after receiving the certificate or degree are planning to work at a public aquarium or ocean-themed interpretive center, work in research, work in aquaculture, or planning to transfer to 4-year universities.

Program Initiatives and Strategies - The Aquarium and Aquaculture Science Program strives to improve student retention and course completion rates without sacrificing the reputation the Program must establish. One aspect of their education that influences student success in Aquarium and Aquaculture is their background in basic ecology, chemistry, animal science and mathematics. Students lacking this background have difficulty in successfully completing courses in Aquarium and Aquaculture Science. The part time faculty members use a variety of strategies and assessment tools to improve student success in the Aquarium and Aquaculture Science curriculum. Each course covers a unit or more of water chemistry and math and links this back to aquariums and animal science. Each faculty member also maintains a webpage or uses a blackboard account and provides links to additional web resources to improve student success. The faculty also counsel students to seek outside help when it is necessary. The faculty encourages students to seek additional help from students that have already completed the course.

Recommendations:

Create an FAQ, frequently asked questions on web site and continue to provide update links to other 4-year universities nation-wide.

Student Learning Outcomes - The goals and objectives for these courses are detailed in the course curriculum and are provided to students in the course syllabus during the first week of instruction. To successfully complete each of these courses, students are required to demonstrate mastery of the stated learning objectives, measured by appropriate tools and rubrics. These will generally include the ability to recognize, recall and comprehend information specific to the course content and to apply critical thinking skills. Student learning outcome

assessments are determined by each instructor and may include lecture and lab exams, weekly quizzes, laboratory worksheets, written assignments, oral presentations, and group or individual research projects.

In order to maintain consistency within each of these nine courses and to maintain cohesiveness of the program, all faculty are given clear statements of the required curriculum and a copy of such for each course, all textbooks are reviewed and approved as college level, course syllabi from earlier years are available for review and course materials from earlier years are made available to the faculty. This consistency is best met with a fulltime faculty member, for which there is none.

Many of our students are hired upon completion of the MST 100 and MST 101 courses and work as service technicians, aquatic pet store associates, aquarium technicians, and open up new stores or consulting/maintenance service businesses. They often do not come back to complete the program and are satisfied with their goal. Some of our students intend to complete the certificate and/or associate degree program and are not in a hurry because they work fulltime and are re-training for a new career. Some of our students transfer to 4-year universities and some enter the program with a bachelor's of science degree already.

Recommendations:

Develop a certificate of achievement for students completing both the MST 100 and MST 101 course sequence. Encourage continuing students to complete the program and place them into internships and jobs suitable for their education.

Meeting Student Needs - The Aquarium and Aquaculture Science Program attempts to meet the needs of full and part time students. We have had to be very creative, but still must limit the variety and technology of lab activities due to lack of classroom and space, limited resources, and no technical staff to support the preparation of lab needs. Students have access to part time faculty through phone and email only, because there is no full time faculty member available.

Support Services - Instructors regularly inform students of their progress in their courses by providing grade updates. They also maintain blackboard accounts for their classes. Instructors try to counsel students to seek outside help when it is necessary and encourage the students to seek additional help from other resources. Instructors encourage students to contact DSPS when there are indications of learning problems. They also encourage study groups and recruit the assistance of former students to help tutor. The instructors also make students aware of course recommendations, address frequently asked questions, announce internship and job opportunities.

Summary of Recommendations:

- Hire full time faculty member
- Hire full time lab technician
- Provide a budget for student help
- Increase local, regional and state advertisement since Saddleback College has the only approved and accredited program in all of California
- Develop a Frequently Asked Questions link on the website
- Continue with teaching and development of learning objectives for the program
- Continue to strengthen existing collaboration and develop new ones
- Provide the program with it's own lab classroom to increase scheduling, facilitate supplies and equipment storage

- Create classes that satisfy interest, but capture and inspire new students to career opportunities both Fall and Spring semesters
- Increase budget for advertisement and discuss other methods for increasing enrollments in existing course.
- Continue communication with local universities to assure proper articulation;
- Improve the articulation equivalency
- Insure all UC and CSU have current articulation agreements with our courses;
- Obtain articulation agreements with local private four year colleges and universities;
- Assess the need to offer courses which currently have no articulation agreements

2.4. Staffing and Resources

Faculty - We have no full time faculty member! In the academic year 04-05, there was an opportunity to recruit a fulltime faculty member, but unfortunately, it proved to be a difficult task since the number one candidate turned down the job due to the high cost of living here in southern California, and the President of Saddleback College did not believe the second candidate was a good match with the College. The College President did suggest that efforts would be made to help find another qualified instructor for the Program, but unfortunately, the priority for the hiring was not continued into the current year or since. The department typically offers 3-5 courses per semester, all are taught primarily by 2 associate faculty members. These part time faculty members are also responsible for preparing their own labs and rely on another dedicated part time faculty member for assistance. One new fulltime faculty member is desperately needed in order for this program to achieve success. This would also allow for the expected growth of the Program's course offerings, and to meet the needs of the growing student population that is occurring in South Orange County.

The Program will be in jeopardy without a full-time faculty to anchor the program. The curriculum and lab facility for the new program was initiated and orchestrated by a dedicated associate faculty/senior lab technician member of the College in collaboration with several key representatives of large public aquarium, research institutes, interpretive centers and large corporate industries. A full time faculty member is desperately needed to step in, continue to ramp up and build on what is quickly becoming known as a remarkable and successful pilot program. There is no possible way that the current associate faculty members can continue to maintain consistency within the Program and ramp the Program at the projected growth and intensity of what the Program projects in the near future. It is important to maintain consistency, increase reputation and strengthen collaboration with industry, academia, business and community. Saddleback College has the potential to be the cutting-edge training center to serve a regional area in a program that addresses the future predictions. There is not a single other educational facility in the lower half of this state that has an approved curriculum, a suitable location and an on-site facility. It is not uncommon for new programs to suffer slow growth in the initial launch, especially for a unique and on-of-a-kind program, but some of the low enrollment is directly correlated with insufficient staffing, funding, communication and maintaining consistency between course sequences. The new program can evolve quickly into a nationally recognized program, but only if the staffing, facility improvements and funding are resolved to increase enrollments by way of advertising.

Curriculum development, advisory committee meetings, articulation with four-year academic institutions, and a host of other major responsibilities are needed to ensure the continued integrity of the Program and its overall effectiveness in serving the goals of the program for student success. Growth of this new Program will be limited by the number of classes that can be offered to students seeking courses for employee incentives, certificates or associate

degrees. The increasing enrollment figures from previous 6 years of two successful pilot courses, the rate of successful employment, and the requests for employees from local vendors is a strong indication for student demand and employer need. Furthermore, the willingness of students to drive long distances (Chatsworth, Hollywood, Long Beach, San Bernardino, Chula Vista, Escondido, etc.) to attend our classes is another indicator of student demand. Lastly, the strong commitment, cooperation, and support received from industry partners and collaborating facilities provide additional evidence for continued need for their employees seeking skills upgrades in our programs.

Recommendation:

- Hire a full-time faculty member

Laboratory support staff – Currently, there is only one, 10 hour per week laboratory technician that was added this past summer 2006 and there is no funding for student help budget either. This level of support staffing is completely and absolutely inadequate for the nature and scope of the Program, the laboratory facility and the lab courses that are offered. Three to five lab courses are offered each semester and require supplies, instrumentation and equipment. The courses are intensive and use the Aquarium Science Lab facility. This facility is the heart of the Program's intensive training center, *and is not to be confused with the lab classroom*. It is here, that we house, living, breathing, aquatic animals which are cared for and maintained in a variety of aquarium, aquaculture and aquaponic systems. These organisms require daily care and, must meet the Use and Care of Animal Plan required by the Public Health and Safety Code for the State. Plus fish are "vertebrate" animals and the college receives government funding, we must comply. There is also complicated life support equipment, which maintains optimal and critical water quality for all the aquatic animals. We circulate over 2,500 gallons of seawater, and these systems must be maintained to keep the animals within scope of humane treatment of animals. These operations do not stop when campus is closed for holidays, and long semester breaks, and thus occur year-round. In addition to all of that described above, the investigative and experimental nature of the laboratory curriculum involves instrumentation, solutions, media, glassware, and supplies. This requires preparation, ordering, inventory management of various data bases, cleaning, repairing and so forth. Clearly, the program is in dire need of staffing to support this new program Our commitment to offering a high quality, hands-on technical-science curriculum, require at minimum, one fulltime senior laboratory technician and a budget to support 20 hours of student help or project clerk help.

Recommendation:

- Hire a fulltime senior laboratory technician
- Provide a budget to support 20 hours of student help and/or project clerk help.

Equipment and Supplies - The current equipment in the Aquarium and Aquaculture Science Program is improving for our current course offerings, but since we are a new Program, we have little to no space for housing equipment, we request equipment on a priority need basis and "borrow" the refrigerator and freezer space, and bring in our own specialized tools in order to accommodate the needs of the Program. The College and equipment budget, as well as grant and fund raising monies, and donations from private and corporate partnerships have allowed us to purchase various equipment items, materials and supply items to support our student laboratory investigations and instructional operations in the Aquarium Science Lab facility. We anticipate a strong need for continued funds to replace and repair heavily used equipment, provide redundancy for backup life support systems, purchase additional equipment items to allow for the increasing numbers of students, as well as equip courses and new

exercises that will be developed by faculty collaborating with the industry as new technologies emerge, especially if we move into a lab classroom equipped with auxiliary space to fully implement the Program to its potential.

When the Aquarium and Aquaculture Science Program was developed, it was approved without a budget so it had to share funds in the Marine Science Technology budget. In the academic year 05-06, the Program did receive a meager \$5000.00 budget from the Vice President of Instruction. However, in the next academic year 06-07, that budget was reduced 36% for a total of \$3200.00. Plain and simple, the budget for the AAS Program is inefficient for the nature of the program and is not even sufficient to run the full load of courses for the Spring of 2007. This Program has been strongly supported by corporate sponsors with donations of supply items; filters, water pumps, seawater mix, chemical test kits and lighting fixtures, bulbs and tanks. We continue to solicit donations for a variety of items, but we still require a basic operating budget to cover the cost of food, medication, tools, and supplies more intimately associated with investigative nature of lab activities. The increased need for materials, reagents, medications, to supply laboratory exercises and workshops and the increased number of course offerings has considerably strained the supply budget.

Recommendations:

- Immediate augmentation of this 36% cut to the supply budget, with yearly increases for inflation and student growth.

Summary of Recommendations

- Hire one new full time faculty member
- Hire one full time senior lab technician
- Provide budget to support 20 hours per week of student help or project clerk help
- Establish student tutoring through the LAP
- Restore and repair the Aquarium Science Lab facility
- Provide a classroom/lab room equipped with basic lab accoutrements
- Improve equipment funding each successive year
- Restore 36% of supply funding that was cut and increase funding each successive year

2.5 Staff Development

Faculty and staff enrichment through the participation and attendance of workshops, conferences and work-shadowing opportunities is a key element for increasing the quality and technical proficiency in science where advancements in technology are constantly changing. It is critical that they have sound disciplinary backgrounds, incorporate knowledge with cutting edge developments, be intellectually vigorous and excited about their disciplines and use advanced teaching methods. Since we have no fulltime faculty member and there were no funds available for the past three years, our part time faculty members paid for such activities on their own dime. In addition, they also, presented topics, poster displays and engaged in meetings that are arranged between collaborating members of a common goal. Some of these conferences are listed below:

- Regional Aquatics Workshop, Long Beach Aquarium of the Pacific, Long Beach, June 2005
- 6th International Aquarium Congress, Monterey Bay Aquarium, Monterey, CA, December 2004
- World Aquaculture 2004 and the Marine Ornamentals 2004, Honolulu, Hawaii, January 2004

Recommendations

- Improve college support of those faculty seeking grants, particularly the NIH and NSF grants.
- Provide funding to support professional development conferences for part time faculty, as well as fulltime faculty.

2.6 Marketing and Outreach

Marketing - Only one associate faculty member is able to participate in Senior Day, Transfer Day and Family Night in recruiting students to the program. Although all of the associate faculty members attend and present at regional, local, national and international conferences they are not funded for such activities. A website is also maintained by one dedicated associate faculty member. Distribution of brochures and advertisements are sporadic because of insufficient staffing to aid in this task. This could be improved tremendously with the hiring of a full time faculty member, a full time lab technician and budget to support student help. There is also, very limited funding available for advertising. However, the Marine Science Technology Department did receive a \$5000.00 donation, to be split among the three programs including Aquarium and Aquaculture Science, for marketing purposes.

Community Outreach - The part time faculty of the Aquarium and Aquaculture Science Program actively participate in community outreach programs to promote the department and Saddleback College. Members have participated in activities to increase the community's awareness of our program at Saddleback College.

- YMCA summer program each summer for past 3 years
- Presentations at Alternative Education programs regarding science careers
 - Silverado High School
 - Horizons High School
- Presentations for Clubs and Organizations
 - Sea Scouts, an NSF sponsored program offered by the Ocean Institute
 - Southern California Marine Aquarium Society
 - Elder Hostel of Dana Point
 - Regional Aquatics Workshop, Long Beach Aquarium
 - Koi Club of San Diego
 - Cub Scout groups
- Volunteer researcher

The Aquarium and Aquaculture Science faculty participate in a variety of on-campus events including: Senior Day, Career Day, Counselor's Day, and Family Night events to promote the Program and assist in recruiting new students.

The Aquarium and Aquaculture Science Program has its own web page, www.saddleback.edu/faculty/janderson/marineaquaprogram.htm, which has many links to other educational institutions, organizations and related information.

We also field many calls and emails regarding a wide range of topics from an even wider range of public, private and business persons. These are shuttled between the expert part time faculty members to provide resolutions to their inquiries. Development of a Frequently Asked Questions page may assist in decreasing the volume, as many calls cannot be returned because of insufficient time (staffing issues.)

Recommendations

- Encourage students to act as student liaisons for our program
- Continue the aforementioned community outreach projects
- Increase our community outreach programs
- Add a FAQ's (frequently asked questions) to our web site.
- Hire full time faculty member
- Hire full time lab technician
- Provide budget for student help

3.0 Needs Assessment

There are three major areas that are absolutely necessary and identified as crucial to the success of the program: Fulltime faculty member, senior laboratory technician, classroom, and deterioration of an adopted instructional facility.

RECOMMENDATIONS;

Fulltime Faculty - A fulltime faculty member is needed to strengthen the Program and continue to build on the momentum of a new program. The Program's success relies on a leader for the program and is an absolute must to build strength and develop cohesiveness within the instructional delivery. It is amazing that the program has come to fruition without a fulltime faculty member to take lead. A fulltime faculty member is needed to coordinate the efforts currently performed by informal meetings between part time faculty members and advisory board members in reviewing curriculum, improving existing courses, adding additional courses and developing learning outcomes.

Senior Lab Technician and budget to support 20 hours of student help – The level of support staffing is completely and absolutely inadequate for the nature and scope of the Program, the laboratory facility and the scientific lab courses that are offered. The courses are intensive and use the Aquarium Science Lab facility. This 43,000 square foot facility with 2,5000 gallons of recirculation water and numerous aquatic organisms, is the heart of the Program's intensive training center, *and is not to be confused with the lab classroom*. These organisms require daily care and, must meet the Use and Care of Animal Plan required by the Public Health and Safety Code for the State. In addition to all of that described above, the investigative and experimental nature of the laboratory curriculum involves instrumentation, solutions, media, glassware, and supplies. The 20 hours of student help are critical with the myriad of tasks that must be coordinated with the daily maintenance of the aquatic systems and of the lab supplies and equipment used in the various courses taught each day.

Suitable lab-style classroom: A classroom that can also serve as a lab class is needed. It should be equipped with tables designed for comfortable seating for lecture, but suitable to perform lab work, (i.e. low tables, chairs with backs, computer projection system, chalkboard and instructor table.) The standard science issues of sinks fume hood, gas, vacuum and water, including de-ionized water, hot/cold tap water, safety eyewash, fire extinguisher, storage for microscopes, instrumentation and other supplies and display cases for models, skeletons, specimens.

Three auxiliary rooms: These rooms will be needed to facilitate; dry storage of large items and bulk quantities of items and secure for storage tools, a room which will house special equipment and instrumentation and lastly a preparation room for preparing and dispensing of solutions, cleaning glassware and equipment, preparation of micro-media, an office-station for storage and retrieval of data management (inventory and animal use and care records), ordering supplies, vendor communications and related, and possibly an area that can be curtained-off to also serve as a quarantine area for new or ill aquatic animals that cannot be placed with the others for bio-secure reasons.

Aquarium Science Lab facility: If the current facility is to be used: Replace the plastic dome roof with other more suitable material to reduce the amount of sunlight and therefore "heat" into the facility. Remove the large fan, and replace/relocate the inefficient swamp coolers to an

H/VAC unit to reduce the moisture levels. Reseal and replace the corroded door and window frames. Add an additional door at the other end to improve safety accessibility. Add an additional deep sink and counter space with cabinets. Provide additional electrical outlets for counter area for instrumentation and in areas along the far side. These areas are also used as “work and tool areas” where mechanical tools and power tools are used to build things. Provide network line to upgrade current phone to that which occurred campus wide. Cover the open patio area with roofing material from one end to the other to provide and move existing gates to enclose and secure a larger area of the unused patio.

Equipment The current equipment in the Aquarium and Aquaculture Science Program is improving for our current course offerings, but since we are a new program, we have little to no space for housing equipment, we request equipment on a priority need basis, we “borrow” the refrigerator and freezer space, and we bring in our own specialized tools in order to accommodate the needs of the Program. The College and equipment budget, as well as grant and fund-raising monies, and donations from private and corporate partnerships have allowed us to purchase various equipment, materials and supply items to support our student laboratory investigations and instructional operations in the Aquarium Science Lab facility. We anticipate a strong need for continued funds to replace and repair heavily used equipment, provide redundancy for backup life support systems, purchase additional equipment items to allow for the increasing numbers of students, as well as equip courses and new exercises that will be developed by faculty collaborating with the industry as new technologies emerge, especially if we move into a lab classroom equipped with auxiliary space to fully implement the Program to its potential.

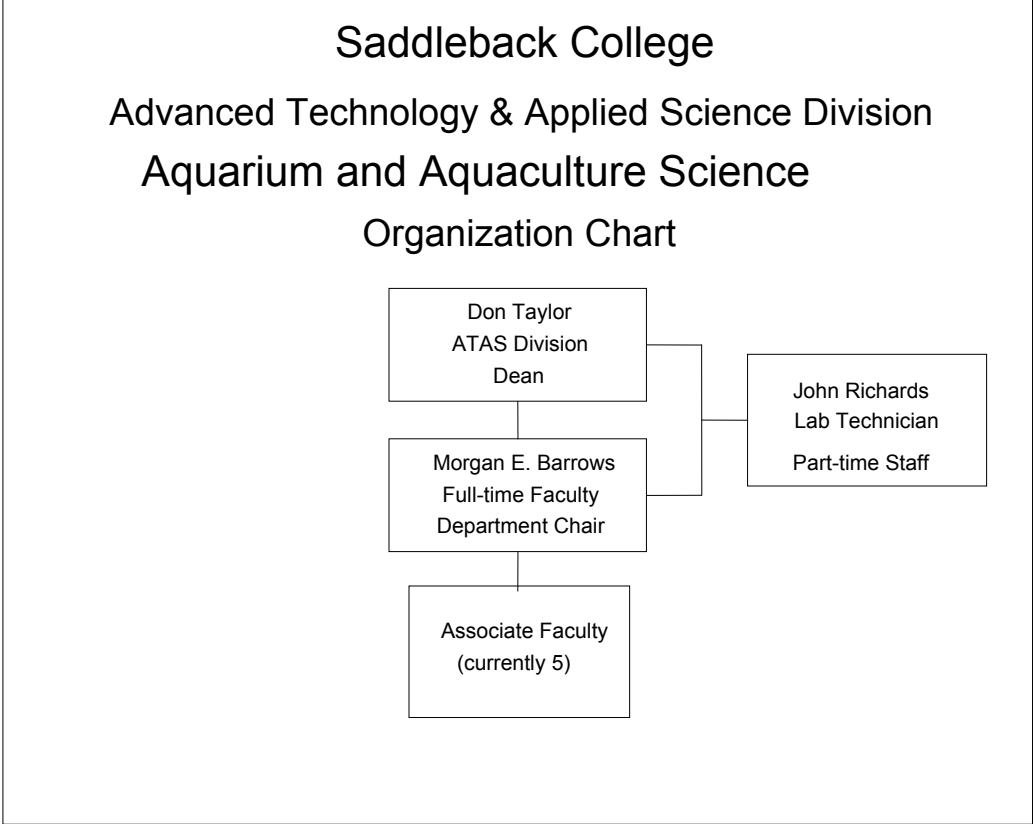
Supplies -The supply budget for the AAS Program is insufficient for the nature of the program. We are requesting an immediate augmentation of this 36% cut to the supply budget, with yearly increases for inflation and student growth. The current budget is not sufficient to run the full load of courses for the Spring of 2007. This program has been strongly supported by corporate sponsors with donations of supply items; filters, water pumps, seawater mix, chemical test kits and lighting fixtures, bulbs and tanks. We continue to solicit donations for a variety of items, but we still require a basic operating budget to cover the cost of food, medication, tools, and supplies more intimately associated with investigative nature of lab activities. The increased need for materials, reagents, medications, to supply laboratory exercises and workshops and the increased number of course offerings has considerably strained the supply budget.

Course Improvements – Difficult task without a fulltime faculty member! Continue to test and implement distance education for suitable courses. Investigate, design and implement special topics coursework in a condensed, three-four day period to serve the need for a regional training center

Faculty and Staff Development - Improve college support of those faculty seeking grants, particularly the NIH and NSF grants. Provide funding to support professional development conferences for part time faculty, as well as fulltime faculty.

Section IV: Appendices

A. Program Organizational Chart



B. Five-Year Program Staffing Profile

Environmental Studies Department						
Position	Staffing Levels in the Past 5 Years					% Change from Year 1 to Year 5
	2001-02	2002-03	2003-04	2004-05	2005-06	
Administration	1	1	1	1	1	0
Classified FT	0	0	0	0	0	0
Classified PT	0	0	0	0	1	100
Faculty FT	0	0	0	0	0	0
Faculty PT	0	0	0	5	5	0

STUDENT LEARNING OUTCOMES

Aquarium and Aquaculture Science

09/2005

I	II	III	IV	V
Expanded Statement of Institutional Purpose	Program Student Learning Outcomes	Assessment Method and Criteria for Success	Assessment Results	Use of Results
<p>Saddleback College Goals: Provide a comprehensive, broad range of high-quality courses and programs to enable students to pursue their educational objectives and career goals</p> <p>Aquarium & Aquaculture Science Goal: To prepare students to qualify for entry level positions relating to aquarium and aquaculture sciences and to provide opportunities in continuing education and community services, including courses for skills upgrading and retraining for professionals and life-long learning for adults.</p>	<p>1. Graduates of the Aquarium and Aquaculture Science Program will be successfully employed in the field.</p>	<p>1a. Students will be given a survey at time of program completion which should indicate an 85% success rate.</p> <p>1b. Employers will be given a survey every 2 years (<i>see 3 below</i>) and they will be pleased with the employees</p> <p>1c. We make every effort to keep in touch with as many of our students through email keep us informed of their successes.</p>	<p>1. 4 students have graduated (2=Sp 05 and 1=Summer 06 and 1=Fall 06.) Of these 4, 3 are successfully employed and 1 continues to volunteer and has increased responsibilities (<i>volunteer status is due to being an international student.</i>)</p> <p>Many of the students are hired after completing 1-2 core classes. Their interest lies in retail sales, wholesale business and service technicians rather than aquatic science technicians. They are non-completers, and from a survey response, "not in a hurry to complete the certificate or degree program."</p> <p>1c. In the past 2 years, 13 students were successfully employed or started a business and are still employed. There may be others which we have not been able to track.</p>	<p>Continue to "grow" the program. It is a new program and is not well known in the industry. Success of program appears strong with employment success of both completers and non-completers of the program.</p> <p>The results gave the department the idea to develop an Occupational Skills Award !</p>

I Expanded Statement of Institutional Purpose	II Program Student Learning Outcomes	III Assessment Method and Criteria for Success	IV Assessment Results	V Use of Results
<p>Saddleback College Goals: Provide a comprehensive, broad range of high-quality courses and programs to enable students to pursue their educational objectives and career goals</p> <p>Aquarium & Aquaculture Science Goal: To prepare students to qualify for entry level positions relating to aquarium and aquaculture sciences and to provide opportunities in continuing education and community services, including courses for skills upgrading and retraining for professionals and life-long learning for adults.</p>	<p>2. Graduates of the Aquarium and Aquaculture Science Program will be technically proficient, knowledgeable and able to think critically.</p>	<p>2a. Near completion of the program, 90% of potential graduates will be able to score 85% or more on written and oral assessments of their knowledge of the discipline</p> <p>2b. Near completion of the program, 90% of potential graduates will be able to score 85% or more on written and oral assessments of their critical thinking skills</p>	<p>100% of the graduates (4) scored above 90% on both written and oral for both and knowledge and technical skills and performed very well in critical thinking skills</p> <p>*Of the 13+ “non-completers” (completed at least 1-2 core classes/and whom are successfully employed) They scored above 90% in both assessment of their knowledge and technical skills and performed satisfactory to well on critical thinking skills, particularly with more general areas (fewer classes/less exposure than the graduate students)</p>	<p>2a. Continue to collaborate with Employers/industry to keep knowledge & technical skills up-to-date and improve strategies to further increase critical thinking in areas of concern</p> <p>Continue to collaborate with other educational institutes for improved assessment strategies of critical thinking</p>

I Expanded Statement of Institutional Purpose	II Program Student Learning Outcomes	III Assessment Method and Criteria for Success	IV Assessment Results	V Use of Results
<p>Saddleback College Goals: Provide a comprehensive, broad range of high-quality courses and programs to enable students to pursue their educational objectives and career goals</p> <p>Aquarium & Aquaculture Science Goal: To prepare students to qualify for entry level positions relating to aquarium and aquaculture sciences and to provide opportunities in continuing education and community services, including courses for skills upgrading and retraining for professionals and life-long learning for adults.</p>	<p>3. Employers of the Aquarium and Aquaculture Science Program graduates will be satisfied with the training.</p>	<p>3. Survey employers every 2 years. Surveys will be sent mid-Spring semester for results tabulated at the end of Spring semester. 85% should be pleased with the quality of the graduate and confirm that they would employ future graduates.</p>	<p><i>Survey was sent to 8 employers Feb. 06, 5 responded for a 63% response rate.</i></p> <p><i>Summary of responses:</i></p> <ul style="list-style-type: none"> • <i>Overall quality of program - 80% excellent, 20% good, with 100% excellent in basic animal husbandry science.</i> • <i>The remaining responses are split between excellent/good/average for target areas of knowledge/skills.</i> • <i>Comments:.</i> <i>2 responded with requests to increase internship/work experience</i> <i>1 responded with request a for distance learning courses</i> 	<p>Continue to improve areas identified as good and average results.</p> <p>Develop distance education delivery where appropriate</p> <p>Increase internship requirement of 1 unit to 2 unit</p>

Marine Science Technology

**Aquarium & Aquaculture Science Certificate and
Marine Science Technician Certificate
Program Review Data Set
November 2006**

Aquarium & Aquaculture Science Certificate and Marine Science Technician Certificate Program Review Data Set

The following pages include:

1. **Course Section Count**
2. **C1 & End of Term Headcount**
3. **Overview of Courses, Grades, Success/Retention**
4. **Course Grades, Success/Retention**
5. **Aquarium & Aquaculture Science Certificate and Marine Science Technician Certificate Programs Students' Duplicated Headcount**
 - a. **Gender**
 - b. **Zip Code**
 - c. **Age Groups**
 - d. **Ethnicity**
 - e. **Educational Goal**
6. **Awarded Certificates**

**Data Source: SOCCCD Management Information System (MIS) Data Warehouse November 2006
Prepared by Shouka Torabi, Research and Planning Specialist, Saddleback College**

Section Count

Marine Science and Aquarium & Aquaculture Science Courses Course and Section Count by Term and Year

	Fall					Summer						Spring					
	2001	2002	2003	2004	2005	2001	2002	2003	2004	2005	2006	2001	2002	2003	2004	2005	2006
	Section Count	Section Count	Section Count	Section Count	Section Count	Section Count	Section Count	Section Count	Section Count	Section Count	Section Count	Section Count	Section Count	Section Count	Section Count	Section Count	Section Count
ENV 18	2	1	1	1	2	0	0	0	0	0	0	1	1	0	0	1	2
ENV 19	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
MS 4	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0
MS 20	6	8	7	6	7	1	1	0	1	1	0	6	6	6	7	5	7
MST 10	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0
MST 100	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0
MST 101	1	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1
MST 201	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
MST 202	0	1	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0
MST 203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
MST 204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
MST 205	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
MST 206	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
MST 207	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0
MST 210	0	1	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0
MST 212	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
MST 214A	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
MST 214B	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	1	1
MST 215	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
MST 216	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	2	0
Total	13	15	12	15	15	2	2	1	4	3	2	12	13	11	14	15	12

Census Headcount

Marine Science and Aquarium & Aquaculture Science Courses C1 Headcount by Course/Term/Year

	Fall					Summer						Spring					
	2001	2002	2003	2004	2005	2001	2002	2003	2004	2005	2006	2001	2002	2003	2004	2005	2006
	C1 Headcount	C1 Headcount	C1 Headcount	C1 Headcount	C1 Headcount	C1 Headcount	C1 Headcount	C1 Headcount	C1 Headcount	C1 Headcount	C1 Headcount	C1 Headcount	C1 Headcount	C1 Headcount	C1 Headcount	C1 Headcount	C1 Headcount
ENV 18	24	18	26	24	46	.	.	.	.	.	.	19	20	.	.	24	45
ENV 19	8	4	.	.	.	.	.	.	.	.	.	.	.	.	8	4	.
MS 4	.	.	.	26	.	.	.	.	.	.	.	.	34	19	.	.	.
MS 20	165	189	178	188	197	22	30	.	19	17	.	142	104	175	195	127	138
MST 10	.	.	.	12	11	.	.	.	.	.	.	.	.	.	19	.	.
MST 100	23	25	29	17	19	.	.	.	.	.	.	.	.	26	.	.	.
MST 101	0	.	.	.	.	.	.	.	0	.	.	.	0	13	13	0	0
MST 201	17	13	15	14	.	.	.	.	.	.	.	.	.	.	.	.	.
MST 202	.	11	13	.	16	.	.	.	.	.	.	0	.	.	.	.	.
MST 203	.	.	.	.	.	.	.	.	.	.	.	.	.	.	19	17	.
MST 204	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	13	.
MST 205	.	.	.	15	.	.	.	.	.	.	.	.	.	.	.	.	.
MST 206	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	15	.
MST 207	.	.	.	.	.	.	.	.	10	2	4	.	.	.	.	.	.
MST 210	.	12	.	13	10	.	.	.	.	.	.	19	13	.	.	.	.
MST 212	0	0	36	0	0	0	0	0	0	32	0	.	.	.	.	.	.
MST 214A	.	.	.	.	11	.	.	.	.	.	.	.	.	.	.	.	.
MST 214B	.	.	.	16	.	.	.	.	.	.	.	0	22	19	0	0	0
MST 215	.	.	.	.	.	.	.	.	.	.	.	0	3	4	0	0	0
MST 216	.	.	.	.	.	.	.	.	.	.	.	18	10	.	18	15	.
Total	237	272	297	325	310	22	30	0	29	51	4	198	206	256	272	215	183

End of Term Count

Marine Science and Aquarium & Aquaculture Science Courses End of Term Enrollment by Course/Term/Year

	Fall					Summer						Spring					
	2001	2002	2003	2004	2005	2001	2002	2003	2004	2005	2006	2001	2002	2003	2004	2005	2006
	End of Term Enrollment	End of Term Enrollment	End of Term Enrollment	End of Term Enrollment	End of Term Enrollment	End of Term Enrollment	End of Term Enrollment	End of Term Enrollment	End of Term Enrollment	End of Term Enrollment	End of Term Enrollment	End of Term Enrollment	End of Term Enrollment	End of Term Enrollment	End of Term Enrollment	End of Term Enrollment	End of Term Enrollment
ENV 18	25	18	26	24	46	0	0	0	0	0	0	19	20	0	0	24	45
ENV 19	8	4	0	0	0	0	0	0	0	0	0	0	0	0	8	4	0
MS 4	0	0	0	26	0	0	0	0	0	0	0	0	34	19	0	0	0
MS 20	169	232	180	188	197	22	30	0	19	17	0	142	143	176	195	127	138
MST 10	0	0	0	12	11	0	0	0	0	0	0	0	0	0	19	0	0
MST 100	23	26	29	18	19	0	0	0	0	0	0	0	0	26	0	0	0
MST 101	12	0	0	0	0	0	0	0	6	0	0	0	11	15	14	14	8
MST 201	17	13	16	14	0	0	0	0	0	0	0	0	0	0	0	0	0
MST 202	0	11	13	0	16	0	0	0	0	0	0	1	0	0	0	0	0
MST 203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	17	0
MST 204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0
MST 205	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0
MST 206	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0
MST 207	0	0	0	0	0	0	0	0	10	2	6	0	0	0	0	0	0
MST 210	0	12	0	13	10	0	0	0	0	0	0	19	13	0	0	0	0
MST 212	19	21	36	23	27	36	30	22	30	32	30	0	0	0	0	0	0
MST 214A	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0
MST 214B	0	0	0	16	0	0	0	0	0	0	0	26	22	19	24	20	21
MST 215	0	0	0	0	0	0	0	0	0	0	0	4	3	4	3	6	3
MST 216	0	0	0	0	0	0	0	0	0	0	0	18	10	0	18	16	0
Total	273	337	300	349	337	58	60	22	65	51	36	229	256	259	300	256	215

Summary of All Courses by Grade/Success/Retention

Marine Science and Aquarium & Aquaculture Science Courses Summary of All Courses by Grade/Success/Retention

		Grades										success	retention	
		A	B	C	CR	D	F	I	NC	W	XX	Total		
		Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Percent	Percent
2001	Spring	31	57	61	2	11	29	2	1	27	8	229	65.9%	88.2%
	Summer	29	15	8	0	2	3	0	0	0	1	58	89.7%	100.0%
	Fall	75	74	48	5	15	18	0	1	23	14	273	74.0%	91.6%
2002	Spring	63	69	43	4	16	20	3	0	16	22	256	69.9%	93.8%
	Summer	25	12	12	0	0	5	0	0	1	5	60	81.7%	98.3%
	Fall	95	71	63	1	15	35	1	1	29	26	337	68.2%	91.4%
2003	Spring	71	68	34	7	17	31	1	2	23	5	259	69.5%	91.1%
	Summer	6	8	6	0	1	1	0	0	0	0	22	90.9%	100.0%
	Fall	83	80	57	2	20	22	2	5	15	14	300	74.0%	95.0%
2004	Spring	81	66	53	5	15	23	0	7	28	22	300	68.3%	90.7%
	Summer	26	14	12	4	1	5	0	1	2	0	65	86.2%	96.9%
	Fall	114	91	48	10	21	24	1	3	20	17	349	75.4%	94.3%
2005	Spring	46	42	45	5	31	41	1	5	29	11	256	53.9%	88.7%
	Summer	19	10	9	2	3	1	0	0	5	2	51	78.4%	90.2%
	Fall	74	53	77	5	28	37	0	15	35	13	337	62.0%	89.6%
2006	Spring	37	48	52	10	13	22	2	3	17	11	215	68.4%	92.1%
	Summer	12	11	2	5	1	3	0	0	0	2	36	83.3%	100.0%

Grade XX = None of the above/unknown.

Success Rate: Percent of students successful in courses out of total enrolled in courses (RP Group, 1996).

The success rate is calculated by dividing the numerator (number of students duplicated with A, B, C, CR) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX)

Retention Rate: Percent of students retained in courses out of total students enrolled in courses (RP Group, 1996).

The retention rate is calculated by dividing the numerator (number of students duplicated with A, B, C, D, F, CR, NC, I, XX) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX).

Summary of ENV 18 & ENV 19 by Grade/Success/Retention

Marine Science and Aquarium & Aquaculture Science Courses Courses by Grade/Success/Retention

			Grades								success	retention			
			A	B	C	CR	D	F	I	W	XX	Total			
			Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Percent	Percent	
ENV 18	2001	Spring	4	3	7	1	0	2	0	2	0	19	78.9%	89.5%	
		Fall	10	10	1	1	0	0	0	0	3	25	88.0%	100.0%	
	2002	Spring	11	2	1	0	0	0	0	0	0	6	20	70.0%	100.0%
		Fall	0	2	8	0	1	0	0	0	5	2	18	55.6%	72.2%
	2003	Fall	5	6	5	0	3	4	0	1	2	26	61.5%	96.2%	
	2004	Fall	4	7	5	0	4	0	0	3	1	24	66.7%	87.5%	
	2005	Spring	5	7	4	0	2	1	0	4	1	24	66.7%	83.3%	
		Fall	10	10	13	0	2	5	0	5	1	46	71.7%	89.1%	
2006	Spring	11	11	5	0	3	8	1	4	2	45	60.0%	91.1%		
ENV 19	2001	Fall	2	4	1	0	0	0	0	1	0	8	87.5%	87.5%	
	2002	Fall	0	1	0	0	1	2	0	0	0	4	25.0%	100.0%	
	2004	Spring	0	0	0	0	0	0	0	0	8	8	.0%	100.0%	
	2005	Spring	1	0	1	0	0	0	0	1	1	4	50.0%	75.0%	

Grade XX = None of the above/unknown.

Success Rate: Percent of students successful in courses out of total enrolled in courses (RP Group, 1996).

The success rate is calculated by dividing the numerator (number of students duplicated with A, B, C, CR) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX)

Retention Rate: Percent of students retained in courses out of total students enrolled in courses (RP Group, 1996).

The retention rate is calculated by dividing the numerator (number of students duplicated with A, B, C, D, F, CR, NC, I*, XX) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX).

Summary of MS 4 & MS 20 by Grade/Success/Retention

**Marine Science and Aquarium & Aquaculture Science Courses
Courses by Grade/Success/Retention**

			Grades										success	retention	
			A	B	C	CR	D	F	I	NC	W	XX	Total		
			Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Percent	Percent
MS 4	2002	Spring	5	11	5	0	4	5	0	0	1	3	34	61.8%	97.1%
	2003	Spring	2	5	3	0	2	5	0	0	1	1	19	52.6%	94.7%
	2004	Fall	5	10	4	0	4	2	0	0	0	1	26	73.1%	100.0%
MS 20	2001	Spring	13	25	41	1	11	19	2	0	23	7	142	56.3%	83.8%
		Summer	6	8	6	0	0	1	0	0	0	1	22	90.9%	100.0%
		Fall	32	46	37	3	11	14	0	0	17	9	169	69.8%	89.9%
	2002	Spring	22	40	30	2	12	12	1	0	11	13	143	65.7%	92.3%
		Summer	8	5	8	0	0	3	0	0	1	5	30	70.0%	96.7%
		Fall	59	55	46	0	11	21	1	0	16	23	232	69.0%	93.1%
	2003	Spring	50	51	24	0	13	15	1	0	18	4	176	71.0%	89.8%
		Fall	39	56	46	0	11	13	2	0	9	4	180	78.3%	95.0%
	2004	Spring	57	48	45	1	10	14	0	0	12	8	195	77.4%	93.8%
		Summer	5	10	2	1	0	1	0	0	0	0	19	94.7%	100.0%
		Fall	62	51	25	0	11	17	1	0	11	10	188	73.4%	94.1%
	2005	Spring	15	17	28	0	25	24	1	0	12	5	127	47.2%	90.6%
		Summer	4	2	8	0	1	0	0	0	0	2	17	82.4%	100.0%
		Fall	38	32	58	0	23	16	0	1	21	8	197	65.0%	89.3%
	2006	Spring	19	33	41	3	9	12	1	0	12	8	138	69.6%	91.3%

Grade XX = None of the above/unknown.

Success Rate: Percent of students successful in courses out of total enrolled in courses (RP Group, 1996).

The success rate is calculated by dividing the numerator (number of students duplicated with A, B, C, CR) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX)

Retention Rate: Percent of students retained in courses out of total students enrolled in courses (RP Group, 1996).

The retention rate is calculated by dividing the numerator (number of students duplicated with A, B, C, D, F, CR, NC, I*, XX) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX).

Summary of MST 10, MST 100, & MST 101 by Grade/Success/Retention

**Marine Science and Aquarium & Aquaculture Science Courses
Courses by Grade/Success/Retention**

			Grades										success	retention	
			A	B	C	CR	D	F	I	NC	W	XX	Total		
			Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Percent	Percent
MST 10	2004	Spring	1	5	1	0	2	2	0	2	3	3	19	36.8%	84.2%
		Fall	2	4	3	0	1	0	0	0	1	1	12	75.0%	91.7%
	2005	Fall	0	3	1	0	2	4	0	0	1	0	11	36.4%	90.9%
MST 100	2001	Fall	10	2	3	0	2	2	0	0	2	2	23	65.2%	91.3%
	2002	Fall	8	2	4	1	1	8	0	0	2	0	26	57.7%	92.3%
	2003	Spring	9	6	2	2	2	4	0	0	1	0	26	73.1%	96.2%
		Fall	6	5	4	0	1	4	0	1	2	6	29	51.7%	93.1%
	2004	Fall	5	5	2	1	0	2	0	0	0	3	18	72.2%	100.0%
	2005	Fall	5	0	0	0	0	7	0	3	0	4	19	26.3%	100.0%
MST 101	2001	Fall	5	1	1	0	2	2	0	1	0	0	12	58.3%	100.0%
	2002	Spring	7	0	1	0	0	1	2	0	0	0	11	72.7%	100.0%
	2003	Spring	6	0	2	0	0	4	0	0	3	0	15	53.3%	80.0%
	2004	Spring	7	4	0	0	2	1	0	0	0	0	14	78.6%	100.0%
		Summer	2	1	0	0	0	3	0	0	0	0	6	50.0%	100.0%
	2005	Spring	5	3	0	0	0	6	0	0	0	0	14	57.1%	100.0%
2006	Spring	3	3	2	0	0	0	0	0	0	0	8	100.0%	100.0%	

Grade XX = None of the above/unknown.

Success Rate: Percent of students successful in courses out of total enrolled in courses (RP Group, 1996).

The success rate is calculated by dividing the numerator (number of students duplicated with A, B, C, CR) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX)

Retention Rate: Percent of students retained in courses out of total students enrolled in courses (RP Group, 1996).

The retention rate is calculated by dividing the numerator (number of students duplicated with A, B, C, D, F, CR, NC, I*, XX) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX).

Summary of MST 201 & MST 202 by Grade/Success/Retention

Marine Science and Aquarium & Aquaculture Science Courses Courses by Grade/Success/Retention

			Grades									success	retention		
			A	B	C	CR	D	F	NC	W	XX	Total	Percent	Percent	
			Count	Count	Count	Count	Count	Count	Count	Count	Count	Count			
MST 201	2001	Fall	6	5	3	0	0	0	0	0	3	0	17	82.4%	82.4%
	2002	Fall	9	1	1	0	0	0	0	0	2	0	13	84.6%	84.6%
	2003	Fall	8	5	1	0	0	0	0	0	1	1	16	87.5%	93.8%
	2004	Fall	4	3	1	5	0	0	0	0	1	0	14	92.9%	92.9%
MST 202	2001	Spring	0	1	0	0	0	0	0	0	0	0	1	100.0%	100.0%
	2002	Fall	2	2	1	0	1	3	1	0	0	1	11	45.5%	100.0%
	2003	Fall	5	1	0	2	0	0	4	0	0	1	13	61.5%	100.0%
	2005	Fall	5	1	0	3	0	0	3	4	0	0	16	56.3%	75.0%

Grade XX = None of the above/unknown.

Success Rate: Percent of students successful in courses out of total enrolled in courses (RP Group, 1996).

The success rate is calculated by dividing the numerator (number of students duplicated with A, B, C, CR) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX)

Retention Rate: Percent of students retained in courses out of total students enrolled in courses (RP Group, 1996).

The retention rate is calculated by dividing the numerator (number of students duplicated with A, B, C, D, F, CR, NC, I*, XX) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX).

Summary of MST 203, MST 204, MST 205, MST 206, MST 207, & MST 210 by Grade/Success/Retention

Marine Science and Aquarium & Aquaculture Science Courses Courses by Grade/Success/Retention

			Grades										success	retention
			A	B	C	CR	D	F	NC	W	XX	Total		
			Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Percent	Percent
MST 203	2004	Spring	6	1	1	0	1	2	0	6	2	19	42.1%	68.4%
	2005	Spring	5	2	2	0	0	2	0	5	1	17	52.9%	70.6%
MST 204	2005	Spring	3	1	3	1	2	2	0	1	0	13	61.5%	92.3%
MST 205	2004	Fall	5	5	1	1	1	1	0	0	1	15	80.0%	100.0%
MST 206	2005	Spring	1	5	1	1	1	2	0	4	0	15	53.3%	73.3%
MST 207	2004	Summer	4	1	2	0	0	1	0	2	0	10	70.0%	80.0%
	2005	Summer	2	0	0	0	0	0	0	0	0	2	100.0%	100.0%
	2006	Summer	1	2	0	0	0	1	0	0	2	6	50.0%	100.0%
MST 210	2001	Spring	6	8	4	0	0	0	0	1	0	19	94.7%	94.7%
	2002	Spring	5	6	1	0	0	0	0	1	0	13	92.3%	92.3%
		Fall	4	4	0	0	0	0	0	4	0	12	66.7%	66.7%
	2004	Fall	7	1	2	2	0	0	1	0	0	13	92.3%	100.0%
	2005	Fall	4	2	2	0	0	0	1	1	0	10	80.0%	90.0%

Grade XX = None of the above/unknown.

Success Rate: Percent of students successful in courses out of total enrolled in courses (RP Group, 1996).

The success rate is calculated by dividing the numerator (number of students duplicated with A, B, C, CR) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX)

Retention Rate: Percent of students retained in courses out of total students enrolled in courses (RP Group, 1996).

The retention rate is calculated by dividing the numerator (number of students duplicated with A, B, C, D, F, CR, NC, I*, XX) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX).

Summary of MST 212 by Grade/Success/Retention

Marine Science and Aquarium & Aquaculture Science Courses Courses by Grade/Success/Retention

			Grades								success	retention	
			A	B	C	CR	D	F	NC	W	Total		
			Count	Count	Count	Count	Count	Count	Count	Count	Count	Percent	Percent
MST 212	2001	Summer	23	7	2	0	2	2	0	0	36	88.9%	100.0%
		Fall	10	6	2	1	0	0	0	0	19	100.0%	100.0%
	2002	Summer	17	7	4	0	0	2	0	0	30	93.3%	100.0%
		Fall	13	4	3	0	0	1	0	0	21	95.2%	100.0%
	2003	Summer	6	8	6	0	1	1	0	0	22	90.9%	100.0%
		Fall	20	7	1	0	5	1	0	2	36	77.8%	94.4%
	2004	Summer	15	2	8	3	1	0	1	0	30	93.3%	100.0%
		Fall	14	3	4	0	0	1	1	0	23	91.3%	100.0%
	2005	Summer	13	8	1	2	2	1	0	5	32	75.0%	84.4%
		Fall	10	4	3	2	1	3	4	0	27	70.4%	100.0%
	2006	Summer	11	9	2	5	1	2	0	0	30	90.0%	100.0%

Grade XX = None of the above/unknown.

Success Rate: Percent of students successful in courses out of total enrolled in courses (RP Group, 1996).

The success rate is calculated by dividing the numerator (number of students duplicated with A, B, C, CR) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX)

Retention Rate: Percent of students retained in courses out of total students enrolled in courses (RP Group, 1996).

The retention rate is calculated by dividing the numerator (number of students duplicated with A, B, C, D, F, CR, NC, I*, XX) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX).

Summary of MST 214A & MST 214B by Grade/Success/Retention

Marine Science and Aquarium & Aquaculture Science Courses Courses by Grade/Success/Retention

			Grades								success	retention	
			A	B	C	CR	F	NC	W	XX	Total	Percent	Percent
			Count	Count	Count	Count	Count	Count	Count	Count	Count		
MST 214A	2005	Fall	2	1	0	0	2	3	3	0	11	27.3%	72.7%
MST 214B	2001	Spring	2	11	2	0	8	1	1	1	26	57.7%	96.2%
	2002	Spring	9	4	3	2	2	0	2	0	22	81.8%	90.9%
	2003	Spring	2	6	2	5	3	1	0	0	19	78.9%	100.0%
	2004	Spring	4	3	1	2	4	4	6	0	24	41.7%	75.0%
		Fall	6	2	1	1	1	1	4	0	16	62.5%	75.0%
	2005	Spring	3	3	0	2	4	3	2	3	20	40.0%	90.0%
2006	Spring	3	1	4	6	2	3	1	1	21	66.7%	95.2%	

Grade XX = None of the above/unknown.

Success Rate: Percent of students successful in courses out of total enrolled in courses (RP Group, 1996).

The success rate is calculated by dividing the numerator (number of students duplicated with A, B, C, CR) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX)

Retention Rate: Percent of students retained in courses out of total students enrolled in courses (RP Group, 1996).

The retention rate is calculated by dividing the numerator (number of students duplicated with A, B, C, D, F, CR, NC, I*, XX) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX).

Summary of MA 215 & MST 216 by Grade/Success/Retention

Marine Science and Aquarium & Aquaculture Science Courses Courses by Grade/Success/Retention

			Grades								success	retention	
			A	B	C	CR	D	NC	W	XX	Total	Percent	Percent
			Count	Count	Count	Count	Count	Count	Count	Count	Count		
MST 215	2001	Spring	1	2	1	0	0	0	0	0	4	100.0%	100.0%
	2002	Spring	2	0	0	0	0	0	1	0	3	66.7%	66.7%
	2003	Spring	2	0	1	0	0	1	0	0	4	75.0%	100.0%
	2004	Spring	1	0	1	0	0	1	0	0	3	66.7%	100.0%
	2005	Spring	3	0	0	0	1	2	0	0	6	50.0%	100.0%
	2006	Spring	1	0	0	1	1	0	0	0	3	66.7%	100.0%
MST 216	2001	Spring	5	7	6	0	0	0	0	0	18	100.0%	100.0%
	2002	Spring	2	6	2	0	0	0	0	0	10	100.0%	100.0%
	2004	Spring	5	5	4	2	0	0	1	1	18	88.9%	94.4%
	2005	Spring	5	4	6	1	0	0	0	0	16	100.0%	100.0%

Grade XX = None of the above/unknown.

Success Rate: Percent of students successful in courses out of total enrolled in courses (RP Group, 1996).

The success rate is calculated by dividing the numerator (number of students duplicated with A, B, C, CR) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX)

Retention Rate: Percent of students retained in courses out of total students enrolled in courses (RP Group, 1996).

The retention rate is calculated by dividing the numerator (number of students duplicated with A, B, C, D, F, CR, NC, I*, XX) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX).

Gender by Year/Term

Marine Science and Aquarium & Aquaculture Science Courses Gender by Year/Term Duplicated Headcount

		F		M		X		Total	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %
2001	Spring	93	40.6%	135	59.0%	1	.4%	229	100.0%
	Summer	32	55.2%	26	44.8%	0	.0%	58	100.0%
	Fall	121	44.3%	151	55.3%	1	.4%	273	100.0%
2002	Spring	116	45.3%	140	54.7%	0	.0%	256	100.0%
	Summer	28	46.7%	32	53.3%	0	.0%	60	100.0%
	Fall	139	41.2%	198	58.8%	0	.0%	337	100.0%
2003	Spring	104	40.2%	154	59.5%	1	.4%	259	100.0%
	Summer	10	45.5%	12	54.5%	0	.0%	22	100.0%
	Fall	135	45.0%	165	55.0%	0	.0%	300	100.0%
2004	Spring	126	42.0%	174	58.0%	0	.0%	300	100.0%
	Summer	30	46.2%	35	53.8%	0	.0%	65	100.0%
	Fall	164	47.0%	185	53.0%	0	.0%	349	100.0%
2005	Spring	93	36.3%	162	63.3%	1	.4%	256	100.0%
	Summer	25	49.0%	26	51.0%	0	.0%	51	100.0%
	Fall	150	44.5%	187	55.5%	0	.0%	337	100.0%
2006	Spring	103	47.9%	112	52.1%	0	.0%	215	100.0%
	Summer	12	33.3%	24	66.7%	0	.0%	36	100.0%

Courses by Zip Code

**Marine Science and Aquarium & Aquaculture Science Courses by Zip Code
Duplicated Headcount**

		Saddleback		Irvine		Out of District		Total	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %
2001	Spring	203	88.6%	2	.9%	24	10.5%	229	100.0%
	Summer	55	94.8%	0	.0%	3	5.2%	58	100.0%
	Fall	235	86.1%	16	5.9%	22	8.1%	273	100.0%
2002	Spring	235	91.8%	5	2.0%	16	6.3%	256	100.0%
	Summer	52	86.7%	1	1.7%	7	11.7%	60	100.0%
	Fall	306	90.8%	7	2.1%	24	7.1%	337	100.0%
2003	Spring	226	87.3%	4	1.5%	29	11.2%	259	100.0%
	Summer	21	95.5%	0	.0%	1	4.5%	22	100.0%
	Fall	261	87.0%	8	2.7%	31	10.3%	300	100.0%
2004	Spring	271	90.3%	6	2.0%	23	7.7%	300	100.0%
	Summer	59	90.8%	1	1.5%	5	7.7%	65	100.0%
	Fall	312	89.4%	12	3.4%	25	7.2%	349	100.0%
2005	Spring	222	86.7%	4	1.6%	30	11.7%	256	100.0%
	Summer	41	80.4%	4	7.8%	6	11.8%	51	100.0%
	Fall	293	86.9%	5	1.5%	39	11.6%	337	100.0%
2006	Spring	199	92.6%	1	.5%	15	7.0%	215	100.0%
	Summer	30	83.3%	0	.0%	6	16.7%	36	100.0%

Age Group Distribution by Year/Term

**Marine Science and Aquarium & Aquaculture Science Courses
Age Group Distribution by Year/Term
Duplicated Headcount**

		Age Groups															
		Below 17		18-21		22-25		26-35		36-50		51-65		Over 65		Total	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
2001	Spring	6	2.6%	129	56.3%	26	11.4%	22	9.6%	31	13.5%	14	6.1%	1	.4%	229	100.0%
	Summer	1	1.7%	20	34.5%	7	12.1%	10	17.2%	16	27.6%	4	6.9%	0	.0%	58	100.0%
	Fall	5	1.8%	165	60.4%	34	12.5%	22	8.1%	26	9.5%	17	6.2%	4	1.5%	273	100.0%
2002	Spring	5	2.0%	153	59.8%	28	10.9%	18	7.0%	38	14.8%	14	5.5%	0	.0%	256	100.0%
	Summer	6	10.0%	19	31.7%	9	15.0%	9	15.0%	9	15.0%	7	11.7%	1	1.7%	60	100.0%
	Fall	7	2.1%	190	56.4%	49	14.5%	35	10.4%	35	10.4%	19	5.6%	2	.6%	337	100.0%
2003	Spring	3	1.2%	175	67.6%	32	12.4%	24	9.3%	17	6.6%	7	2.7%	1	.4%	259	100.0%
	Summer	1	4.5%	4	18.2%	1	4.5%	7	31.8%	7	31.8%	2	9.1%	0	.0%	22	100.0%
	Fall	10	3.3%	195	65.0%	37	12.3%	20	6.7%	25	8.3%	9	3.0%	4	1.3%	300	100.0%
2004	Spring	3	1.0%	190	63.3%	40	13.3%	26	8.7%	25	8.3%	16	5.3%	0	.0%	300	100.0%
	Summer	2	3.1%	17	26.2%	12	18.5%	13	20.0%	16	24.6%	5	7.7%	0	.0%	65	100.0%
	Fall	14	4.0%	229	65.6%	33	9.5%	31	8.9%	31	8.9%	9	2.6%	2	.6%	349	100.0%
2005	Spring	4	1.6%	150	58.6%	33	12.9%	26	10.2%	34	13.3%	9	3.5%	0	.0%	256	100.0%
	Summer	3	5.9%	16	31.4%	2	3.9%	10	19.6%	15	29.4%	5	9.8%	0	.0%	51	100.0%
	Fall	8	2.4%	222	65.9%	25	7.4%	29	8.6%	36	10.7%	16	4.7%	1	.3%	337	100.0%
2006	Spring	1	.5%	144	67.0%	29	13.5%	14	6.5%	19	8.8%	8	3.7%	0	.0%	215	100.0%
	Summer	2	5.6%	6	16.7%	7	19.4%	13	36.1%	4	11.1%	3	8.3%	1	2.8%	36	100.0%

Ethnicity by Year/Term

**Marine Science and Aquarium & Aquaculture Science Courses
Ethnicity by Year/Term
Duplicated Headcount**

		Ethnic Groups																	
		Asian		African American		Hispanic		American Indian/Alaskan Native		Other		Pacific Islander		White		Unknown		Total	
		Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
2001	Spring	14	6.1%	1	.4%	14	6.1%	2	.9%	5	2.2%	1	.4%	171	74.7%	21	9.2%	229	100.0%
	Summer	3	5.2%	2	3.4%	4	6.9%	0	.0%	1	1.7%	0	.0%	41	70.7%	7	12.1%	58	100.0%
	Fall	16	5.9%	6	2.2%	22	8.1%	1	.4%	2	.7%	2	.7%	205	75.1%	19	7.0%	273	100.0%
2002	Spring	15	5.9%	4	1.6%	16	6.3%	1	.4%	3	1.2%	1	.4%	195	76.2%	21	8.2%	256	100.0%
	Summer	2	3.3%	0	.0%	13	21.7%	2	3.3%	0	.0%	0	.0%	34	56.7%	9	15.0%	60	100.0%
	Fall	18	5.3%	2	.6%	30	8.9%	2	.6%	5	1.5%	4	1.2%	242	71.8%	34	10.1%	337	100.0%
2003	Spring	14	5.4%	2	.8%	23	8.9%	3	1.2%	4	1.5%	1	.4%	197	76.1%	15	5.8%	259	100.0%
	Summer	3	13.6%	0	.0%	4	18.2%	0	.0%	0	.0%	0	.0%	12	54.5%	3	13.6%	22	100.0%
	Fall	17	5.7%	2	.7%	29	9.7%	1	.3%	3	1.0%	3	1.0%	217	72.3%	28	9.3%	300	100.0%
2004	Spring	22	7.3%	4	1.3%	31	10.3%	4	1.3%	5	1.7%	4	1.3%	187	62.3%	43	14.3%	300	100.0%
	Summer	5	7.7%	2	3.1%	6	9.2%	0	.0%	0	.0%	0	.0%	40	61.5%	12	18.5%	65	100.0%
	Fall	21	6.0%	4	1.1%	30	8.6%	3	.9%	1	.3%	3	.9%	249	71.3%	38	10.9%	349	100.0%
2005	Spring	14	5.5%	5	2.0%	28	10.9%	1	.4%	4	1.6%	1	.4%	180	70.3%	23	9.0%	256	100.0%
	Summer	5	9.8%	0	.0%	5	9.8%	0	.0%	0	.0%	0	.0%	36	70.6%	5	9.8%	51	100.0%
	Fall	24	7.1%	5	1.5%	38	11.3%	6	1.8%	2	.6%	2	.6%	241	71.5%	19	5.6%	337	100.0%
2006	Spring	15	7.0%	0	.0%	25	11.6%	0	.0%	2	.9%	2	.9%	156	72.6%	15	7.0%	215	100.0%
	Summer	5	13.9%	0	.0%	7	19.4%	1	2.8%	0	.0%	0	.0%	20	55.6%	3	8.3%	36	100.0%

Educational Goals by Year/Term

Marine Science and Aquarium & Aquaculture Science Courses Educational Goals by Year/Term Duplicated Headcount

	2001				2002				2003				2004				2005				2006	
	Spring		Fall		Spring		Fall		Spring		Fall		Spring		Fall		Spring		Fall		Spring	
	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %	Count	Column %
AA/AS and transfer	69	30.1%	84	30.8%	72	28.1%	124	36.8%	84	32.4%	93	31.0%	93	31.0%	132	37.8%	91	35.5%	107	31.8%	76	35.3%
Transfer w/o AA/AS	22	9.6%	28	10.3%	18	7.0%	37	11.0%	30	11.6%	34	11.3%	36	12.0%	31	8.9%	25	9.8%	40	11.9%	30	14.0%
AA/AS w/o transfer	1	.4%	0	.0%	2	.8%	2	.6%	2	.8%	1	.3%	0	.0%	3	.9%	1	.4%	4	1.2%	0	.0%
2-yr Voc. w/o transfer	1	.4%	4	1.5%	4	1.6%	8	2.4%	2	.8%	4	1.3%	3	1.0%	2	.6%	1	.4%	8	2.4%	2	.9%
Voc. certif. w/o transfer	25	10.9%	25	9.2%	34	13.3%	29	8.6%	29	11.2%	37	12.3%	47	15.7%	54	15.5%	42	16.4%	44	13.1%	27	12.6%
Discover interests	18	7.9%	27	9.9%	21	8.2%	25	7.4%	16	6.2%	20	6.7%	15	5.0%	24	6.9%	13	5.1%	21	6.2%	7	3.3%
Acquire job skills	15	6.6%	28	10.3%	22	8.6%	18	5.3%	28	10.8%	22	7.3%	28	9.3%	18	5.2%	25	9.8%	23	6.8%	19	8.8%
Update job skills	5	2.2%	5	1.8%	3	1.2%	6	1.8%	6	2.3%	6	2.0%	6	2.0%	5	1.4%	3	1.2%	10	3.0%	6	2.8%
Maintain cert. or lisc.	1	.4%	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%	1	.3%	1	.3%	0	.0%	0	.0%	0	.0%
Ed. development	45	19.7%	33	12.1%	44	17.2%	42	12.5%	20	7.7%	29	9.7%	22	7.3%	24	6.9%	25	9.8%	31	9.2%	12	5.6%
Basic Skills	2	.9%	0	.0%	1	.4%	2	.6%	1	.4%	1	.3%	5	1.7%	1	.3%	3	1.2%	4	1.2%	3	1.4%
HS or GED	1	.4%	2	.7%	0	.0%	0	.0%	2	.8%	8	2.7%	3	1.0%	3	.9%	2	.8%	0	.0%	1	.5%
Undecided	24	10.5%	37	13.6%	35	13.7%	42	12.5%	39	15.1%	45	15.0%	41	13.7%	50	14.3%	25	9.8%	45	13.4%	32	14.9%
Unknown	0	.0%	0	.0%	0	.0%	2	.6%	0	.0%	0	.0%	0	.0%	1	.3%	0	.0%	0	.0%	0	.0%
Total	229	100.0%	273	100.0%	256	100.0%	337	100.0%	259	100.0%	300	100.0%	300	100.0%	349	100.0%	256	100.0%	337	100.0%	215	100.0%

Awarded Certificates by Academic Year

Marine Science Technology	2004-05	2005-06
Aquarium and Aquaculture Science	1	1
Marine Science Technician		1

Data Source: SOCCCD Awards Management System, November 6, 2006

