



OREGON COAST  
COMMUNITY COLLEGE

**Four-Year Instructional Program Review Template  
September 2022**

**Program Name: Aquarium Science**

**Degrees and Certificates offered within Program: AAS  
in Aquarium Science, Certificate in Aquarium Science**

**Statement of Collaboration**

The program faculty listed below collaborated in an open and forthright dialogue to prepare this Program Review. Statements included herein accurately reflect the conclusions and opinions of the program faculty.

**Participants in the review:**

**Larry Boles, Aquarium Science Faculty and Director of Aquarium Science  
Program**

**Dan Lara, VP Academic Affairs**

**Authorization:**

After the document is complete, it must be signed by the Department Faculty and Chief Academic Officer prior to submission to the Instructional Leadership Team and the Assessment Task Force.

Signatures of Department Faculty

Signature of Chief Academic Officer

Date of Submission: September 5<sup>th</sup>, 2022

## **1.0 Mission and Goals**

*1.1 Briefly describe the relationship of your program to the college's Mission, Vision, and Core Themes.*

### **Program Description**

The Aquarium Science Program is a comprehensive two-year degree of both theory and practical experience designed to prepare students for a career in aquatic animal husbandry. Students that have already earned a four-year degree in a natural science may earn the Certificate in Aquarium Science through the program. Graduates of the Aquarium Science Program find work in public aquariums and zoos, the aquaculture industry, and aquatic research laboratories and other affiliated industries.

### **College Mission**

*At Oregon Coast Community College, we equip students for success by providing educational pathways and supports in response to the diverse needs of our community. Through accessible and engaging programs and a commitment to equitable outcomes, we enrich the economic and civic vitality of Lincoln County and beyond.*

Students are drawn to the Aquarium Science Program due to the unique nature of the curriculum. Because only a few community colleges around the country offer a similar course of study, the program receives applications from around the country. Students in the program are sought after by local facilities involved in public display of aquatic animals, aquatic animal research, and aquaculture. Although most graduates go on to careers outside Lincoln County, they are an important resource for local industry while enrolled at Oregon Coast Community College.

### **College Vision**

Oregon Coast Community college is *Shaping the Future Through Learning*.

The Aquarium Science Program is a national leader in the training of future aquatic animal care providers. Aquariums and zoos around the country recommend the program to students interested in a career in the field. With yearly input from our extensive alumni network and our visiting committee of aquarium professionals, the program stays in touch with industry trends and demands to guarantee our graduates become leaders in the field.

## **Core Themes**

### ***Student Success***

*At Oregon Coast Community College, we equip students for success in college and in life by providing exemplary teaching, student development programs and support services. Students receive customized and relevant advising and enriched supports to maximize completion and success. In response to the diverse needs and histories of our community we are institutionalizing a philosophy of student success and strengthening the College's policies, processes, and business practices to facilitate access and completion.*

The Aquarium Science Program creates student success through its staffing, curriculum, and industry partnerships. Faculty and staff have a combined 50+ years of experience in the public aquarium and aquaculture industries. Several part-time faculty and staff are currently working in the field. Yearly, through National Visiting Committee, students can meet 10-12 industry leaders and go through mock interviews. The experience provides unparalleled networking opportunities as well as insight into the hiring process. During their tenure at Oregon Coast Community College, aquarium science students all see the same academic advisor so they are guaranteed accurate and up to date information about their progress.

### ***Educational Pathways***

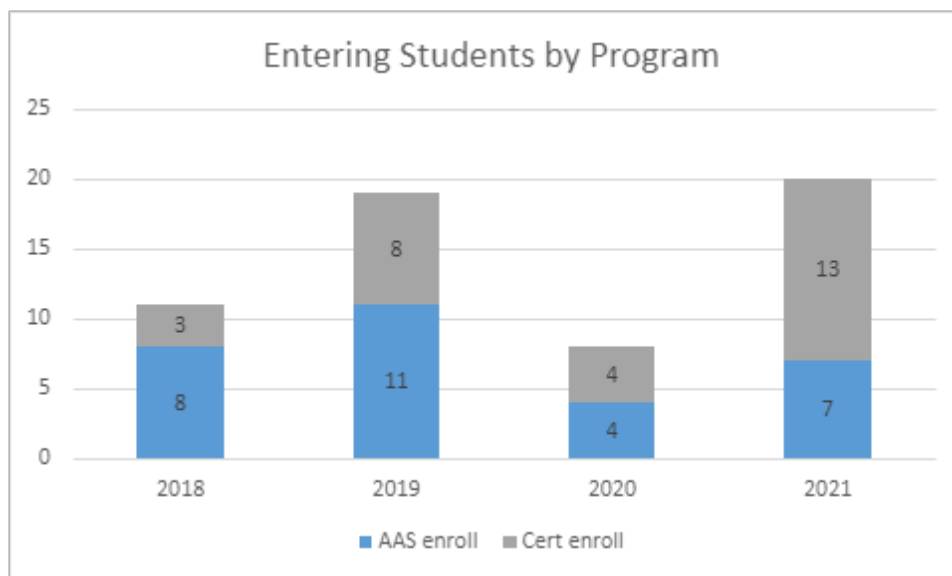
*At Oregon Coast Community College, we assess the needs of individuals and employers, and respond by designing pathways and partnerships that address community and regional priorities. We create bridges into our pathways from high school, adult education, non-credit, and other feeders. Educational Pathways are accessible through place and modality and facilitate transitions to transfer or employment. We strengthen the economy and workforce through our business development, career technical and transfer programs. By narrowing achievement gaps in post-secondary education and raising post-secondary educational attainment, we advance the economic and civic vitality of Lincoln County and beyond.*

The Aquarium Science program was created with input from both local and national industry partners. For nearly 20 years, Oregon Coast Community College has been a leader in preparing graduates to work with local employers like Oregon Coast Aquarium, Oregon State University's Hatfield Marine Science Center, and numerous federal and state agencies in the Newport area. Many of our graduates go on to work in leading aquariums and zoos around the country, giving OCCC a nationwide reputation for excellence in Aquarium Science training.

## **2.0 Program Data and Trends Analysis**

### ***2.1a Enrollment trends and 2.1b Number of Program Majors***

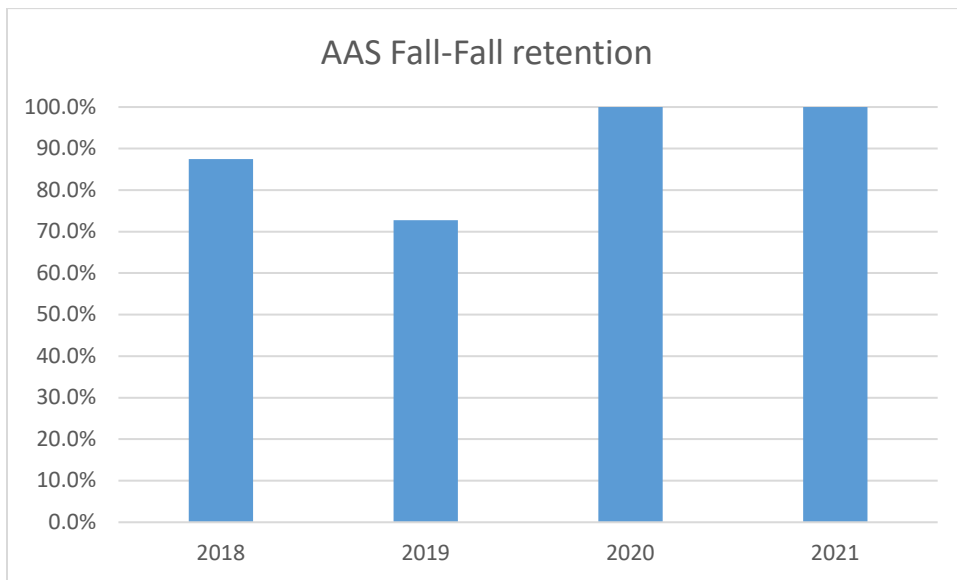
The Aquarium Science Program typically cannot accommodate more than 22 enrolled students due to a limited number of placements options with our experiential learning partners. Additionally, the Aquarium science teaching facility can only accommodate a similar number of students for instructional activities. The COVID pandemic impacted instruction during part of the review period and the 2020 class was purposely small to allow for physical spacing during instruction. It should be noted that total enrollment in a given academic year is not reflected by the new enrollment numbers each Fall term because some number of AAS students return after their first year to complete their studies.



### ***2.1h Fall to fall student retention***

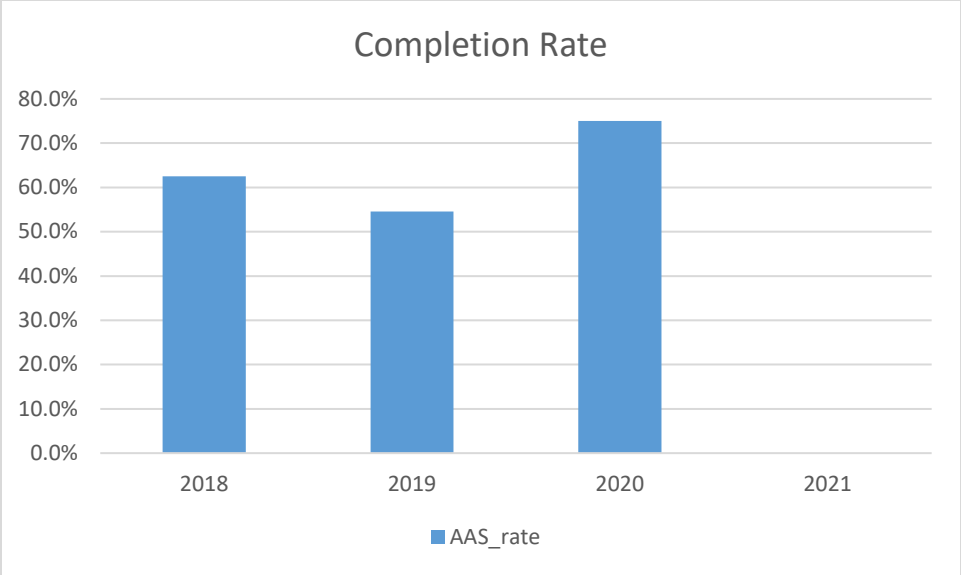
The fall-to-fall retention metric only applies to those students seeking the AAS degree, certificate students typically finish their coursework in the Spring and their internship in the Summer term following enrollment. Degree seeking students that return in the fall following their initial enrollment have typically completed all the pre-requisites for the upper level AQS classes. There has also been an increase in the number students completing the AAS degree in one year by transferring credits from other institutions., Those students are not counted in

the fall-to-fall retention data presented here. Retention rates of AAS students have increased markedly since the last review period.



### ***Successful completion rate 2.1i***

As is true through the history of the Aquarium Science Program, Certificate students have had high completion rates throughout the period of analysis. The preparatory completion of a four-year degree in a natural science provides these students with both knowledge and experience that contributes to success at Oregon Coast Community College. The historically low completion rate in the 2019 class is the result of 3 out of 8 students not completing. One of those is a student that left the program. The other two completed all courses except the final internship class. One of those two is employed at a public aquarium in Canada. The other just became CEO of a local sea food restaurant/retail vendor. Neither of these students fit the classic description of a non-completing student.



In contrast to Certificate students, degree seeking students had lower program completion rates. However, the performance of AAS students during the review period is significantly higher than during the I previous review period. AAS students had average Fall/fall retention rates of 87%, 20 percentage points higher than the national average for community colleges. During the period of analysis, the average completion rate for degree seeking students was 64%, up from 39% during the last review period. During the previous review period there were several students that took longer than 3 years to complete a degree. The most common reason for delayed graduation was failing a course in the Aquarium Science curriculum, classes that are only offered once per year. During the current review period, student performance has been higher leading to more retention. Some students have chosen to extend their time in the program by not enrolling as full-time students in some terms, especially during the COVID pandemic.

**Program Name: Aquarium Science Program**

Data Point	Table (see Appendix)	Trend	Highest Year
Enrollment	2.1.a	2010-18 average of 18.8 , 2019-21 average 16	2021 = 21 students
Number Program Majors	2.1.b	2010-18 average of 18.8 , 2019-21 average 16	2021 = 21 students

Total FTE	2.1.c	2020-21: 22.29 2021-22: 33.65	2021 = 33.65 FTE
Number Sections Offered	2.1.d	16 sections offered annually (Discounting Internships)	Same for all years = 16
FTEF	2.1.e	1.00, adjusted to 1.01 in 2021	2021 = 1.01
Fill Rate	2.1.f	2020-21: 61% 2021-22: 96%	2021 = 96%
WSCH/FTEF	2.1.g	2020-21: 239.2 2021-22: 383.7	2021 = 383.7
% Students Retained from Fall to Fall	2.1.h.	2018 – 2021: 86.73% 2021 – 2022: 100%	2020 and 2021 = 100%
Successful Completion Rate	2.1.i	2018 – 2020: AAS = 58%; Cert = 81.25% 2020 – 2021: AAS = 75%; Cert = 100% 2021 – 22022: Pending	2020 - 2021 AAS = 75% Cert = 100%

## **2.2 Program Peer Comparison**

***How does your program compare with peers? (Peers include similar programs at the college or programs at peer institutions as identified by the Office of Institutional Research)***

### **Analysis:**

Finding peer programs for comparison is a difficult challenge for the Aquarium Science Program. None that are similar can be found in Oregon or Washington. In California, Orange Coast College offers classes in Aquarium Science within their Marine Science Program and students have the opportunity to work in a small public aquarium about half the size of the Aquarium Science Building at Oregon Coast Community College.

Nationally, the program that is most similar to the Aquarium Science Program at Oregon Coast Community College is the Zoo and Aquarium Science Program at Davidson County Community College in North Carolina. The Aquarium Science track within that

program recently increased its class size to 20 students and the curriculum was modeled after OCCC's.

Neither of these programs publish or share student retention data currently.

### **2.3 Student Enrollment and Achievement by Gender and Race/Ethnicity**

**Analyze the achievement levels for each of the groups listed below. Are there differences in achievement levels across groups? Are there strategies you can implement to provide more support for these populations?**

**Program Name: Aquarium Science**

<b>Group</b>	<b>Number of Students Enrolled</b>	<b>% AAS Students Retained from Fall to Fall</b>	<b>Successful Completion Rate Cert. &amp; AAS</b>
<b>Males</b>	19	83%	68%
<b>Females</b>	35	82%	89%
<b>Other/Non-binary</b>	4	100%	100%
<b>Asian-American</b>	1		100%
<b>African-American</b>	0		
<b>Filipino</b>	0		
<b>Hispanic</b>	3	100%	66%
<b>Native American</b>	0		
<b>Other Non-White</b>	6	100%	100%
<b>Pacific Islander</b>	0		
<b>White</b>	48	74%	78%
<b>Prefer not to answer</b>	4	100%	100%

#### **Analysis:**

Applying the standard metrics of “Fall-Fall retention” and “Successful Completion” to the Aquarium Science Program is challenging due to the mixing of Certificate and AAS degree seeking students in the database provided by the State of Oregon. Students entering in a particular Fall term are lumped into a single “cohort” despite different expectations for Certificate (1-year) and Degree (2-year) students. The data presented above are the best estimates for those students entering in the Fall of 2018-20. These “cohorts” were chosen because they allowed the metric of “completion in 150% of expected duration” to be applied to all students.

Overall, students in the Aquarium Science program identify as majority white (83%) and majority female (60%), and these values are unchanged from the previous review period. In comparison, the latest numbers from the National Science Foundation (2018) indicate that slightly more than half of the Associate degrees awarded in science and



engineering were earned by students identifying as women and only 44% were earned by students who identified as white

Combined AAS and Certificate Program completion rates indicated non-male students complete the program at higher rates. However, there is a trend for male AAS students to return at a slightly higher rate after the first year. Carter (2018) indicated that women are less likely to ask questions in a seminar setting, which closely models the aquarium science classroom. To promote more opportunities to ask questions and learn outside of the classroom, the program requested additional funding to add aquarists (instructional and laboratory assistants for aquarium science) to work with students outside of class hours and has now nearly closed the Fall-to-Fall gender retention gap.

Data for minority groups are difficult to analyze due to very small numbers but the pattern during the time examined is for non-white students to have a higher rate of achievement than white students overall. However, while there may not be a race/ethnicity achievement gap, there is a lack of racial/ethnic diversity in the program. The program has undertaken a number of actions to increase student diversity within the program (see section 4.1 “Outreach and Recruitment”), and is proposing to offer an industry sponsored summer programs for historically underrepresented and underserved high school students (see section 5.2.1 “Long Term Plans.”)

It may be worth noting that the Aquarium industry has shifted from male dominated to female dominated over the last 15 years. The animal husbandry field in general has struggled to attract minorities and remains a majority white profession.

#### ***2.4 (CTE Programs Only) List the certifications students are able to earn through participation in your program.***

Aquarium Science students receive classroom training and may take exams for the following nationally recognized certifications:

- AALSO Life Support Level #1 – This certification is normally only offered through the yearly conference of the of the Aquatic Animal Life Support Operators. Only two other community colleges in the country currently offer this opportunity.
- AALSO Water Quality Analyst Level #1 – Beginning in Winter 2022, the Aquarium Science Program offers this certification which is normally only offered through the yearly conference of the of the Aquatic Animal Life Support Operators. Only one other community college in the country offers this opportunity.
- Weld-On Plastic Pipe Solvent Welding – The training materials are provided by the Weld-On corporation and allow students to demonstrate to future employers that their plumbing work meets industry standards. Students must submit a

demonstration project for stress testing to receive the certification. The exam is normally taken by journeymen and apprentices in the plumbing trade.

- PEI animal welfare course

## 2.5 Other Data

*Please include any other data (internal or external) that may be relevant to student achievement, learning, and trends within your Basic Skills, CTE, or Transfer Education program.*

Other Core Theme Indicators:

Student achievement on third-party technical skills assessments.

Indicator	AY 2018-19	AY 2019-20	AY 2020-21	AY 2021-22
<b>4.1 Assessment of technical skills.</b>	LS1: 94% Weld: 92% PEI: 100%	LS1: 88% Weld: 100% PEI: 100%	LS1: 86% Weld : 93% PEI : 100%	LS1: 88% WQ1 : 78% Weld: 100% PEI: 92%

Employment rates six months after graduation for Aquarium Science Certificate and AAS Degree students.

Indicator	2018-19 Cohort	2019-20 Cohort	2020-21 Cohort	2021-22 Cohort
<b>6.1 Employment rates of CTE graduates six months after program completion.</b>	100%	91%	100%	Pending

The majority of Certificate and Degree students in the Aquarium Science program secure employment prior to graduation, often with the industry partner through which the student completed their internship. In this regard, in addition to serving as a method of validating programmatic learning outcomes, the internship serves as an audition for future employment opportunities.

## 2.6 Strengths, Weaknesses, Opportunities, Challenges (SWOC)

*2.6.1 What are the strengths of your program as indicated in the supplied data?*

Program completion rates for Aquarium Science students are around 68% overall. Although minority representation is low, completion rates are generally higher than average. As in previous years, completion rates for Certificate students are much higher (85%) than for AAS students (58%). The non-completing Certificate students did not

enroll in the internship class but went on to employment in the field. The majority of non-completes in the AAS group were those that left school with some credit. Challenges posed by the Covid pandemic and transfer to other programs were the most common reasons cited for leaving the program.

AQS students in both degree and certificate tracks continue to score well above the national average on the AALSO Life support exam. Preliminary data for 2021 cohort shows above average scores on the AALSO Life support exam and the new Water Quality exam, offered for the first time in 2022.

For students completing the program, 93% were employed in the field 6 months after graduation.

### *2.6.2 What are the weaknesses of your program as indicated in the supplied data?*

The Aquarium Science Program, like the Aquarium industry it serves, needs to work harder to recruit candidates from underrepresented populations. Students seeking the AAS degree have lower completion rates than those seeking the Certificate. Given that Certificate students have completed a four-year degree before attending Oregon Coast Community College, they are more prepared for an intensive program.

### *2.6.3 What are the opportunities for your program as indicated in the supplied data?*

Oregon Coast Community College must continue to recruit quality applicants to the Aquarium Science Program. By leveraging connections with industry partners, we should focus on recruiting a high quality, diverse student population. Graduates from diverse backgrounds will be much in demand as the industry works to correct its own history of underrepresentation of minority groups.

A new partnership with Western Oregon University allows students to earn a bachelor's degree in Aquarium Science from WOU by completing three years on that campus and one year at OCCC. Promotion of the program by WOU will raise awareness of the AQS program among students throughout the west coast states.

### *2.6.4 What challenges exist for your program based on the supplied data?*

Despite drawing applicants nationally, the Aquarium Science Program receives the majority of its applicants from Oregon and Washington. Both states have lower ethnic diversity than the national average. Thus the largest pool of applicants presents challenges to increasing the representation of underrepresented groups. Creative strategies and messaging will be required to reach those populations.

The retention and completion levels of AAS degree seeking students are above national averages for community college students but still have room for improvement. Students in this group struggle the most with courses requiring applied math skills. Admissions for

the program must continue to balance providing opportunity to as many students as possible with assessment of a student's preparedness level for the intense nature of the coursework.

### **3.0 Student Learning Outcomes Assessment**

#### **3.1 How has assessment of course level SLOs led to improvements in student learning and achievement?**

Assessment of course level SLOs for Aquarium Science began during Spring 2019 term but the lack of continuity in instructional staff has limited the ability to apply learnings across academic years. Instructors using the process for more than one term have reported developing alternative teaching approaches for some subject matter.

Over the last few years the proportion of female students has risen steadily in the program. While doing well academically overall, assessment of course level SLOs indicated some female students struggled with some aspects of the curriculum that related to construction and fabrication techniques. The program director and the instructor for AQS 240 (the course with the largest engineering component) redesigned the lab schedules to introduce these concepts earlier in the term. We also recruited additional assistants for the tool training lab so more individual instruction time was available. Based on the positive feedback we received, we plan to expand that approach and incorporate some tool and safety training into orientation.

Additionally, this past year the program adjusted prerequisites, course content, course credits, learning outcomes, and course sequencing to accommodate a new course targeting weaknesses identified in CLOs (particularly AQS 100, Introduction to Aquarium Science). This also led to the incorporation of new industry certification (AALSO Water Quality Analyst Level 1 exam) that will be used to further assess program improvement in the identified area of weakness (Water Chemistry).

#### **3.2 How has assessment of program-level SLOs led to improvements in transfer or certificate/degree awards?**

Assessment of Program Learning Outcome #3 (Perform basic water quality analysis using standard testing equipment) identified curricular gaps that have led to extensive program redesign. Typically, these skills were introduced to students in AQS 100 and practiced in AQS 110 and 111. Practicum instructors and mentors from partner sites would evaluate student outcome achievement. Evaluation of student achievement and student feedback led to the development of a new course to further develop these skills. While student degree attainment for Certificate students with bachelor's degrees is nearly 100%, graduation rates for two-year students is considerably lower. The

Certificate students have generally completed a full year or two of chemistry and were better able to achieve this outcome than the two-year students. The addition of the water chemistry course is expected to help improve graduation rates of the two-year students. The new course was taught for the first time in the Fall of 2021.

Additionally, Program Learning Outcome #1 (Effectively communicate, verbally and in writing, scientific concepts, research findings and ideas to professionals and the general public) is assessed through individual and group research projects in a number of courses throughout the program and through feedback provided by the National Visiting Committee who conduct individual interviews with students and (often) observe student presentations. To improve student achievement of this Program Learning Outcome, the aquarium science program now requires students to complete the WR 227 Technical Writing course. This change was implemented for AAS Degree students in Winter 2022 and its impact will be assessed in AQS courses beginning in Fall 2022 when the AAS Degree students take their first AQS program courses (other than AQS 100, 110, and 111). The program expects this change to result in an increase in the number of AAS Degree students completing the program.

### **3.3 What challenges remain to make course and program level Student Learning Outcome Assessment more effective for your program?**

The reliance on part-time instructors in the AQS program after the departure of one full-time instructor in 2020 has led to challenges in continuity of instruction. Although course content is tied to learning outcomes, different instructors employ a range of instructional strategies. It is therefore challenging to pass the learnings of one instructor on to a new staff member.

Historically, the Aquarium Science Program has focused on student performance on national exams, job placement success, and feedback from industry partners to evaluate student learning outcomes. For career and technical programs, these external metrics have long been the standard of assessment of learning outcomes. However, even during a global pandemic some progress has been made and hopefully an increase in instructor continuity will aid in the utilization of SLO assessment tools.

## **4.0 Evaluation of Progress Toward Achievement of Previous Program Plans**

### ***4.1 Evaluate steps taken to achieve plans established in the last program review.***

Outreach and recruitment – One goal identified in the previous planning cycle was increasing the number, quality, and diversity of applicants to the Aquarium Science Program. Surveys of incoming students indicate that most find out about the program through referrals from zoo and aquarium professionals or by conducting internet searches. In the last two years, we have designed new promotional materials and will soon begin distributing those to industry partners. In the fall of 2022, the AQS program director will attend the national meeting of the Marine Aquarium Society of North America with the support of OCCC. The AQS program will have a high-profile booth on the trade show floor and the director will co-chair a session of aquarium education.

Because many prospective students find out about the AQS program via web searches, we have explored Search Engine Optimization (SEO) strategies with the assistance of one Local Advisory Committee member that has previous experience in internet marketing. Quarterly updates over the last year show that the Aquarium Science home page is rising in the ranks and is in the top three places for searches related to “aquarium jobs” and “aquarium school” searches.

Finally, an increased effort in recruiting students from more diverse backgrounds has been taken up by a sub-committee formed by the Local Advisory Committee and a group of alumni. The AQS program director along with some faculty and staff have become members of Minorities in Aquarium and Zoo Sciences organization (MIAZS). The board of directors for this group includes an alum of the AQS program.

Curriculum update – The National Visiting Committees during the last planning period had identified the need for a dedicated class in Water Chemistry techniques. The course was designed by the program director with input from NVC members and AQS faculty. The class was introduced into the curriculum during the 2021-22 academic year during the Winter term. In addition to allowing more focus on emerging issues and technology related to water chemistry, the course allows the AQS program to offer students a chance to take the AALSO Water Quality Analyst Level 1 exam. In the first year, 78% (14/18) students passed the exam. The national average was 70%.

New program pathways connections – The AQS program has formed a partnership with Western Oregon University to offer a new degree pathway. Students in this program will attend WOU for 3 years following a curriculum that is similar to a biology degree track. In their junior year they can apply to the AQS program and if selected will do one year in the AQS curriculum and graduate from WOU with a BS degree in Aquarium Science.

The framework for this cooperative program will hopefully allow the AQS program to partner with other colleges and universities.

***4.2 In cases where resources were allocated toward goals, evaluate the efficacy of that spending.***

OCCC has allocated funds for travel to conferences and the production of promotional materials for the Aquarium Science Program. The attendance at industry conferences allows the program director to network with leaders of public aquariums from around the country. Contacts made during these meetings have led to new members of our National Visiting Committee as well as helped make career connections for students in the AQS program. New promotional materials for the program are currently being produced that feature a more diverse workforce in the aquarium industry, which is a goal for both the industry at large and for the program.

The newly created full-time position of aquarist/science lab assistant has had positive impacts on staffing for the Aquarium Science program. The staff member has proven more accessible for students due to a 5-day work schedule, which has improved student training and animal care. The AQS program will continue to rely on additional part-time aquarium staff but having someone on campus more predictably has proven to be very helpful.

A funding arrangement was made for hiring a new AQS faculty member. Unfortunately, the search for a new member during the summer of 2022 failed due to low number of candidates and a rejection of job offer to the one qualified candidate. The position description is being modified with hopes of attracting more qualified candidates during the next search in Fall of 2022.

## **5.0 Program Plans**

### ***5.1 Short-term Plans (four year cycle)***

*5.1.1 Based on the above data and analyses, identify 2 or more concrete plans, measurable outcomes, and activities that you would anticipate resulting in improvements to the program in the next four year cycle.*

- Increase the number of applicants to the AQS program while maintaining the quality of students.
- Increase the number of applicants from underrepresented populations by working with national partners like Minorities in Aquarium and Zoo Sciences and the Association of Zoos and Aquariums.

- Evaluate the newly formed partnership with Western Oregon University with respect to levels of interest of students and the success of WOU students in OCCC classes.
- Hire a new faculty member to support aquarium science instruction.
- Resume in-person National Visiting Committee events in 2022-23 academic year but continue with virtual networking opportunities.

*5.1.2 What specific aspects of these plans can be accomplished without additional financial resources? (See 5.1.1 above)*

While some aspects of recruitment do require financial resources, many do not. We are employing low or no cost strategies like search engine optimization, social media activity, and virtual industry networking events to increase the visibility of the Aquarium Science program.

Evaluating the new partnership with WOU will be the joint effort of the two campuses and will mostly fit within existing capacities of the two campuses.

## **5.2 Long-term Plans (eight year cycle)**

*5.2.1 Based on the above data and analyses, identify 2 or more concrete plans, measurable outcomes, and activities that you would anticipate resulting in improvements to the program in the next eight years.*

**Development of an Aquaculture Program.** The Aquarium Science Program at Oregon Coast Community College already has many components essential for an aquaculture science program. Some faculty in the program have experience in aquaculture, particularly in hatchery and recirculating aquaculture operations. The Aquarium Science building has laboratory and food preparation facilities that would be essential to teach aquaculture science. One approach to expanding the program to include aquaculture science would be to create a core curriculum of classes dealing with nutrition, animal health, and systems engineering that would serve several potential career tracks. Then students would select from elective courses that would round out their training in more specific topics more relevant to aquaculture or aquarium operations. Additional faculty would be needed to teach specialized aquaculture topics and a new facility similar to the Aquarium Science Building would be needed to operate recirculating aquaculture systems. The courses and facilities would provide opportunities for collaborative education with Oregon State University and other organizations at the nearby Hatfield Marine Science Center. The expansion of the program and construction of facilities could likely be funded through the National Science Foundation (NSF) Advanced Technological Education (ATE) Program.



- Measurable Outcomes: Apply for the MentorLinks Program through American Association of Community Colleges to receive mentored support in developing a grant application for the NSF ATE program. Submit a NSF ATE grant to support the development of the Aquaculture Program.

**Summer programs for Industry and High School Students.** The Aquarium Science Building is highly underutilized during the Summer Term, with Certificate students being the only enrolled students during the summer, and these students being offsite for internships located throughout the country. This presents an opportunity for the program to run non-credit training for industry as well as summer programs for high school students. One major challenge is the lack of available lodging during the summer months when tourism is at its peak. The development of the proposed OSU Hatfield Dormitory is unlikely to ameliorate this problem, as OSU expects the dormitory to be at maximum occupancy during the summer months due to its expanded summer programming on the coast. However, organizing and advertising professional training programs as much as nine-months in advance, may allow for early booking of hotels. Summer programs for high school students will not encounter lodging challenges if students are local. However, as part of the program's goal is to increase the diversity of its students and future industry professionals, there is a need to promote summer discovery opportunities for high school students outside of Lincoln County.

- Measurable Outcomes: Develop series of summer non-credit training programs to support industry professionals in need of CEUs or advanced skill development. Possible trainings include: animal husbandry, water quality, tank/exhibit construction, and aquatic animal welfare and ethics. Develop week-long career exploration course for high school students in which they receive mentored supervision and instruction on site in the Aquarium Science Building. This course could be offered to local high school students and, with additional financial support from industry, potentially to historically underserved and underrepresented students from around the state or nation.

**Increase diversity of students in the program.** The Aquarium Science Program has a strong commitment to both increasing the diversity of the students in its program and increasing the diversity within the industry. The program has already taken several concrete steps toward this goal by expanding its recruiting efforts into geographic areas that are themselves more diverse, forming a Diversity and Recruitment Committee, which is a sub-committee of the Aquarium Science Local Advisory Committee, and joining the Minorities in Aquarium and Zoo Sciences.

- Measurable Outcomes: Diversity of AQS Program students increases over time.

*5.2.2 What specific aspects of these plans can be accomplished without additional financial resources?*

The summer Program for Local High School students could potentially be launched without additional resources, as Lincoln County School District has demonstrated a high level of commitment for supporting CTE pathways and opportunities for its students. The Summer program for historically underserved and underrepresented students may be supportable through contributions from industry.

## **6.0 Requests for Resources**

For any specific aspect of a plan listed in 5.0 that would require additional financial resources, complete the form below. If you are aware of a potential funding source other than college general funds, identify the potential source below.

Type of Resource	Requested Amount	Potential Funding Source
Personnel: 1.0 FTE AQS Faculty	\$81,898	College General Fund (allocated)
Facilities: Development of facilities to support expansion of aquaculture	\$500,000	National Science Foundation;
Equipment: Replacement	\$3,000	College General Fund
Supplies		
Computer Hardware		
Computer Software		
Training		
Other (promotion): Expand Recruitment	\$1,600	College General Fund
Total Requested Amount		

### **6.1 Describe the resource request.**

- Filling the empty full-time faculty position will aid stability of instruction over academic years and allow students to form more long-term relationships with

faculty. An experienced faculty member without competing interests from outside employment will create a more focused instructional environment.

- Expansion of the Aquarium Science Program to incorporate aspects of aquaculture could expand enrollment and provide more career pathways for graduates of the program. It would likely increase the number of graduates remaining on the central Oregon coast after graduation due to increasing job opportunities in the area.
- Replacing aging equipment – improves the student experience.
- More focus and effort on recruiting, including outreach to more diverse population centers in the Pacific Northwest, will hopefully produce a more diverse applicant pool for the Aquarium Science Program.

### **6.2 What measurable outcome(s) will result from filling this resource request?**

Outcomes:

- Hiring Full Time Faculty: Students will report a better experience on evaluations such as SENSE/CCSSE and end of term evaluations through the curricular stability and access to faculty provided by Full-Time Faculty. This will result in better student retention and programmatic completion.
- The expansion of the Aquarium Science program to include Aquaculture will meet regional economic workforce needs and provide a skilled labor force for the expansion of the food-based component of the Blue Economy and Maritime Sector. As recent efforts in Oregon have focused on the expansion of the Maritime Sector, the addition of Aquaculture at OCCC will result in new student FTE growth.
- Investing in year over year replacement of aging equipment and infrastructure keeps the program relevant and aids in recruitment and retention of students.
- Investing in recruitment allows the program to engage with students beyond Lincoln County to attract students from more diverse backgrounds. This increases both student diversity within the program and the diversity of the workforce within the industry.

### **6.3 How does this request further college fulfillment of the college mission and its Core Theme objectives?**

- FTE, Retention, and Completion through stability provided by Full-time Faculty
- Aquaculture addresses “economic vitality in Lincoln County and beyond” (Mission)
- Replacing aging lab supplies promotes engaging programs (Mission)
- Recruitment promotes college commitment to equitable outcomes (Mission)

## **7.0 Advisory Committee and Employer Input (CTE Programs Only):**

### *7.1 List Current Advisory Program Membership*

Local Advisory Committee (LAC) – A group that meets quarterly composed of representatives from the local aquarium, aquaculture, and research community. Most members have a professional interest in the Aquarium Science Program as part-time faculty or represent facilities that take students for practicum experiences. Many have been involved with aspects of the program for over a decade. Members serve for one year, but many have chosen to remain for more than one term.

Erdmann, Trevor	Oregon State University
Boles, Larry	Oregon Coast Community College
Miller-Morgan, Tim	Oregon State University
Moffett, Cinamon	Oregon State University
Jennifer A Krajcik	Oregon Hatchery Research Center ODFW
Cheung, Itchung	Oregon State University
Steingass, Sheanna	Oregon State University
Eric Rasmussen	World of Wet Pets, Portland OR
Lara, Daniel	Oregon Coast Community College

National Visiting Committee (NVC) – A committee composed of leaders from the public aquarium, aquaculture, and aquatic research communities that visits Oregon Coast Community College yearly to evaluate the program, students, and aquarium science facility. Membership in the committee includes some that have returned several times as well as new members each year. Members volunteer their time and service. During the visit the committee meets with college staff and program students. The NVC members conduct mock job interviews with students. After the visit, the committee produces a final report with recommendations for the coming year.

The most recent NVC event was in Fall of 2019. In subsequent years, due to the COVID pandemic, a smaller version of the NVC event was conducted online to give students some opportunity to network and practice interview skills.

Fall 2019 NVC members:

Committee Chair: Barrett L. Christie (Maritime Aquarium at Norwalk)

Committee Members: Roy Drinnen (Moody Gardens Aquarium), Mike Price (Sea World San Diego), Megan Olhasso (Monterey Bay Aquarium), Steve Vogel (Loveland Living Planet Aquarium), Evan Jamison (Loveland Living Planet Aquarium), Colby Podkin-Johnson (Piscine Energetics).

*7.2 Discuss the process your program followed to ensure advisory committee membership involvement in and contributions to this program review. Report on comments and concerns shared by members of the advisory committee.*

The last in-person NVC event that generated a full report was in the Fall of 2019. The executive summary from that final report is below:

*This committee finds the AQS program is as strong as it has ever been. Dramatic improvements are evident in the quality of the students, the appearance of the AQS building, the health and welfare of the animal collection, and the morale of both students and staff compared to some past years. It is evident that the influence Larry Boles has affected positive change in the program, and his dedication to the students and their success is obvious. Similarly, the instructors such as Sid Stetson, Trevor Erdmann, Dr. Hawkyard, Dr. Miller-Morgan are having an equally positive impact on the growth of the students academically, and as prospective aquarists. The NVC recognizes the unique value of this program in supplying qualified professionals to our industry.*

Summary of recommendations from final report:

- Address some minor but noticeable issues with infrastructure in the AQS building near animal exhibits as well as issues with control of lighting.
- Aquarium Science staff (all part-time) report challenges with meeting with students due to scheduling conflicts. The committee recommends (as in previous years) that OCCC explore a full time Aquarium Science staff position.
- Expand aquarium systems to include new technologies like zebrafish tanks and aquaponics that might be additional skills for job placement.
- A new course in water chemistry techniques is highly recommended given the changes in the technology in the field.

*7.3 Date final program review to be shared with advisory committee membership:*

The NVC last met in Fall 2019, the program review was shared with Local Advisory Committee members. No formal NVC event has occurred since 2019. Hopefully, conditions will allow an event in the 2022-23 academic year. The LAC has continued to meet during the time and several past NVC members have participated in virtual events for the benefit of students.

## **8.0 High School, Community, and Employer Outreach**

*8.1 (CTE Programs Only) List the largest employers within the service area for your program completers. How do these employers provide input to the program curriculum and information about industry trends?*

The largest potential employers for Aquarium Science graduates in the local area are the Oregon Coast Aquarium and The Hatfield Marine Science Center (OSU). Representatives of these institutions serve on advisory committees and act as part-time staff and faculty.

*8.2: (CTE Programs Only) Discuss local employer perceptions of your program and its graduates. What mechanism did you use to gather this input during the program review process?*

While no formal survey was conducted, the Aquarium Science program is well respected by local employers. Representatives of those institutions were instrumental in starting the program and many act as part-time instructors and staff for the program. Only a fraction of Aquarium Science students stay locally for employment. The program also receives feedback on employer perceptions from the National Visiting Committee (NVC), which is composed of employers from across the country. In non-pandemic years, the NVC provides a written account of their observations during a three-day annual visit. During the visit, the NVC also provides informal feedback on the skillsets, attitudes and abilities of recent program hires.

*8.3 (CTE Programs Only) What employment opportunities are available to your program completers (list specific positions)? To your certificate completers?*

Most graduates of the Aquarium Science Program are seeking employment as animal care providers in aquariums and zoos. A smaller number are interested in technician positions in research laboratories and aquaculture facilities.

*8.4 (CTE Programs Only) Provide labor market data regarding the projected number of job openings in the region (northwest Oregon and Portland metropolitan area). Cite the source of this data.*

Given the national focus of the Aquarium Science Program and the unique nature of the program, these data are hard to acquire and report. Graduates of the program most often work in jobs that fit the definition of “Nonfarm animal caretakers” used by the Bureau of Labor Statistics. This category is broad and includes a variety of skilled and non-skilled roles.

Area	2017 Employment	2027 Employment	Percent Change	Annual Change Openings	Annual Replacement Openings	Annual Total Openings
Oregon	3,335	3,900	16.9%	56	539	595
Portland Tri-County	1,799	2,129	18.3%	33	292	325
Mid-Valley	300	306	2.0%	1	45	46
Northwest Oregon	177	210	18.6%	3	29	32
Rogue Valley	160	203	26.9%	4	27	31
Eastern Oregon	73	80	9.6%	1	11	12

Source: State of Oregon Dept. of Employment. "Animal Caretakers" by Anna Johnson August 23, 2018

*8.5 (CTE and Transfer Programs) What dual credit offerings does your program support? In which area high schools are these dual credit courses offered? How will your program support the expansion of dual credit offerings at area high schools?*

As a limited entry specialized training program, it will be difficult for us to offer dual credit offerings to area high schools.

However, the program is exploring offering a course on Careers in Aquarium Science that would be primarily for high school students and their parents. This Guided Pathways inspired course would promote program completion by helping students better understand career opportunities and develop realistic expectations about the industry (it is not all about dolphins).

Also, the program has explored some additional partnerships with Career Tech Charter School. It is possible in the future that AQS 100, Introduction to Aquarium Science, could be taught for dual credit.

## **9.0 Executive Summary**

The Aquarium Science program is a unique program for the west coast of the United States, with few comparator programs nationally. Consequently, the program attracts students from around the United States who, upon program completion, find employment outside the state of Oregon.

Program completion rates for AAS Degree students continue to remain lower than that of Certificate students who possess a 4-year degree. A recent overhaul of program prerequisites, course content, and the addition of a new course is expected to increase program completion for AAS Degree students. The program has also begun working with less academically qualified applicants to complete program prerequisites as a local community college prior to admission to the AAS Degree program, creating what is in

essence a third degree path (while still a two-year degree, students would complete only one year at OCCC without the social and emotional challenges of relocating to Newport, Oregon). Additionally, having identified that female students struggle to achieve some course and program level outcomes the program has responded by increasing the instructional supports (through additional aquarist hours) during and outside of class.

There is a noted lack of ethnic/racial diversity in the student body. The program has focused recent recruitment efforts on geographic area with greater ethnic/racial diversity and is exploring opportunities to bring students from historically underrepresented and underserved communities to the College for summer workshops to provide greater exposure to the industry.

The lack of a full-time faculty member in Aquarium Science has impacted the student experience in the Aquarium Science program. While this position was vacated during the pandemic, the non-pandemic related impact of the vacancy cannot be overstated. Having a full-time faculty member in the program provides both curricular consistency and stability and provides a mentor to guide students in achieving their academic, professional, and life goals. When instructors change from term to term, the guidance element of the program that is essential to helping the student stay on their chosen path is minimized.

The program is in its twelfth year in its permanent facility. As equipment and systems age, it is imperative that the College continue to invest in equipment and infrastructure replacement. While the program consistently budgets for some equipment replacement, additional unexpected replacement needs are likely to occur in the coming years, and a budgetary increase should be planned.

Finally, the expansion of the program to include Aquaculture and the new 4-year degree track through a partnership with Western Oregon University (WOU) provide new opportunities for the College and the program. The need for trained technicians to serve an expanding demand for (recirculating) aquaculture to address regional and global food systems, provides a skill-adjacent programmatic opportunity for the College. In the near future, the College should assist the program with an application to the AACC MentorLinks program to develop the internal capacity to submit an application to the NSF ATE program for financial support to develop and launch an Aquaculture program. Additionally, the College should allocate staff to work with WOU to ensure students transitioning from the third year of the WOU program to OCCC receive early support and transfer guidance.

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## **Data Definitions:**

**Student headcount** – Student headcount is an unduplicated count of students. It is actual number of individual students enrolled. Students may enroll in one more courses in a term, but they are counted only once for the term.

**Full-Time Equivalent Student (FTE)** – FTE is a standard statewide measure of student enrollment at an academic department, or an institution. FTE is a key performance indicator, productivity measure, and funding rate. FTE represents neither student headcount nor student enrollment, but it is a conceptual measure of student enrollment. The formula to calculate FTE is expressed by the equation below:

$$\text{FTES} = (\text{Census enrollment} \times \text{Weekly student contact hours} \times \text{Term Length Multiplier}) / 510 \text{ where TLM} = 11$$

Example: FTE for a 4 credit class that meets 6 hours/week with 30 students enrolled at census  $\text{FTE} = (30 \times 6 \text{ hours/week} \times 11 \text{ weeks/semester}) / 510 = 3.88$

**Full-Time Equivalent Faculty (FTEF)** – In a FTEF, a faculty member's actual workload is standardized against the teaching load. Thus, FTEF does not represent an actual number of faculty members; it is a conceptual measure workload at an academic department, or an institution. The formula to calculate FTEF is expressed by the equation below:

$$\text{FTEF} = \text{WFCH} / \text{Contract teaching load of the discipline where WFCH} = \text{standard course hours} \text{ Example: } 3/15 = 0.20$$

**Weekly Student Contact Hours (WSCH)** – WSCH is acronym for weekly student contact hours. It presents a total number of hours faculty contacted students weekly in an academic department or an institution.  $\text{WSCH} = \text{census enrollment} \times \text{class hours per week}$

**Instructional Efficiency (WSCH/FTEF)** – WSCH is a proxy for revenue generated by the class. FTEF is a proxy for instructional cost. The ratio, WSCH per FTEF could be interpreted in terms of cost-efficiency or instructional quality.

**Fall to Fall Persistence Rate** – The percentage of students enrolled in the subsequent fall term out of students who first enrolled at the college in the preceding fall term.

$$\text{Fall to Fall Persistence rate} = (\text{number of students with at least one course in next term}) / (\text{number of students with at least one course in the first term})$$

**Graduation Rate** – The percentage of entering fall students who complete the requirements for a degree or certificate within 150% of time.