



# UNIVERSITY of ALASKA SOUTHEAST

Bachelor of Arts Biology  
Bachelor of Science Biology  
Bachelor of Science Marine Biology  
Bachelor of Science Fisheries and Ocean Sciences with a Concentration in Fisheries Science  
Annual Assessment Report for AY2020  
March 2, 2021

## **Program Overview**

The cluster of biology programs includes a BS degree in Biology, a BA degree in Biology, a BS degree in Marine Biology, a BS degree in Fisheries and Ocean Sciences with a Concentration in Fisheries Science that is jointly offered with UAF, pre-major programs for all of the above, a minor in Biology, and a concentration in Fisheries Science available to the first three of the aforementioned bachelor programs. The location of the University provides students with a “natural laboratory” that includes extensive marine habitat, rainforest, streams, lakes, wetlands, and ice fields all within walking or short driving distance of the classrooms. A small student-to-professor ratio ensures a more personal approach to learning than is possible at larger universities. Information about our degrees is found at <http://www.uas.alaska.edu/artssciences/naturalsciences/biology/index.html>.

The B.S. in Marine Biology was instituted in AY05 in support of the university’s goal of being the premier in-state campus for marine science undergraduate programs. The B.A. in Biology was added in AY08 to provide a greater opportunity for students interested in a biology degree with a liberal arts focus. The B.A. degree is ideal for students with goals towards teaching in middle-school and secondary-schools and require a content degree in addition to broad training in liberal arts and sciences. The B.A. in Biology was derived from the B.S. in Biology program and no new courses were required to implement the program. The concentration in Fisheries Science commenced in AY18.

***BS Degree – Biology:*** The Bachelor of Science degree in Biology provides students the opportunity to learn biological principles and skills in lecture, laboratory, and field courses. Student research is emphasized throughout the program. Program faculty are actively involved in a wide range of disciplines, including biological and fisheries oceanography, marine ecology, behavioral ecology, evolution, marine mammalogy, invertebrate physiology, and pollution biology. The Bachelor of Science program in biology comprises a core curriculum generally found nationwide in Bachelor of Science biology programs.

***BS Degree – Marine Biology:*** The B.S. degree in Marine Biology provides students with the opportunity to learn biological principles and skills in lecture, laboratory and field courses with a core curriculum in marine biology. Student research is emphasized throughout the program. The program has faculty actively involved in a wide range of disciplines described above. The Marine Biology B.S is enhanced by the onsite flow-through seawater system located on the main campus, and intertidal

field sites for students directly behind the teaching lab. There are few campuses that can boast of the connection between a marine laboratory and the main campus!

*BS Degree – Fisheries and Ocean Science with a Concentration in Fisheries:*

The UAS-UAF Joint B.S. degree in Fisheries and Ocean Sciences with a concentration in Fisheries Sciences (Fisheries B.S.) provides students with the opportunity to learn fisheries and ocean sciences and skills in lecture, laboratory and field courses with a core curriculum in fisheries science across the two campuses. Student internships in fisheries industries and fisheries science research is emphasized throughout the program. Students enjoy designing their upper-division elective coursework from many options offered through UAS Natural Sciences and UAF College of Fisheries and Ocean Sciences. The program has faculty actively involved in a wide range of disciplines described above. The Fisheries B.S is enhanced by the onsite flow-through seawater system located on the main campus, and intertidal and subtidal field sites for students directly behind the teaching lab. There are few campuses that can boast of the connection between a marine laboratory and the main campus!

*BA Degree – Biology:* The B.A. degree in Biology provides students with the opportunity to learn biological principles and skills in lecture, laboratory and field courses with a breadth in liberal arts and sciences.

*Biology Minor:* This minor is designed to provide students with a broad introduction to the discipline of biology as well as the opportunity for advanced study in three focus areas.

*Fisheries Science Concentration:* This concentration is designed for students in one of the cluster of biology programs to gain a broad introduction to the biology, assessment, and management of fish populations harvested for human consumption, in preparation for a career in the fisheries of Alaska and elsewhere.

**Program Student Learning Outcomes**

The following program student learning outcomes are based on our Program Assessment Plan that was finalized in fall 2017. The student learning outcomes are common to all four degree programs.

Program Student Learning Outcomes (SLOs)

- 1) Students will gain a broad background in biological sciences.
- 2) Students will develop critical thinking skills.
- 3) Students will improve oral and written scientific communication skills.
- 4) Students will gain practical experiences in basic biological research.

**Method of Data Collection on Program SLOs**

SLO 1: Broad Background in Biological Sciences: Students will demonstrate a broad knowledge of biology including chemical principles, cellular metabolisms, organismal diversity, principles of genetics and evolution

- 1A) We report on the number of students out of the total number of students who passed (earned a C or better) the second semester of the Fundamentals of Biology two course series (BIOL S106).

1B) We examine the distribution of grades in required course(s) (BIOL S271, 310, and/or 362) to determine the percentage of students who pass with a C or better.

SLO 2: Develop Critical Thinking Skills. Students will demonstrate that they can use an empirical approach to evaluate a biological phenomenon using the primary literature.

2A) We assess the percentage of students in a lower division course (BIOL S271) who receive a C, B, or A on their written research report. We compare these data to those obtained from an upper division course (BIOL S482).

2B) We assess the proportion of students earning a C or better for the portion of the grade based on the primary literature (e.g., discussion grade, written research paper) in one upper-division course (BIOL S380).

2C) We assess the percentage of students in a lower division course (BIOL S271) who earn a C, B, or A on their written report that requires them to use the scientific method to solve scientific problems in the field and lab. We compare these data to those obtained from an upper division course (BIOL S384).

SLO 3: Oral & Written Scientific Communication Skills. Students will demonstrate that they are able to represent and communicate biological information.

3A) We assess the percentage of students in a lower division course (BIOLS215) who receive a C, B, or A on their oral presentation. We compare these data to that obtained from an upper division course (BIOL S482).

3B) We assess the percentage of students in a lower division course (BIOL S271) who earn a C, B, or A on their written research paper. We compare these data to that obtained from an upper division course (BIOL S482).

3C) We assess the percentage of students in a lower division course (CHEM S105) who earn a C, B, or A on their written lab notebook. We compare these data to that obtained from an upper division course (CHEM S341).

SLO 4: Students will gain practical experiences in basic biological research. Students will demonstrate their knowledge of techniques and skills gained in the biological sciences.

4A) We assess the percentage of students who receive a C, B, or A on the laboratory practical in a lower division course (BIOL 106) and an upper-division course (CHEM 341).

**Data Collected on Program SLOs for AY20** The following program student learning outcomes data summary is based on our Program Assessment Plan that was finalized in Fall 2017, and includes data for AY20.

SLO	Course	Metric	%
1A	BIOL S106	% students earning an A, B, or C	100
1B	BIOL S271	% students earning an A, B, or C	92
1B	BIOL S362	% of students earning A, B, or C	91
2A, 3B	BIOL S271	% students earning an A, B, or C on their written research report	96

<b>2A</b>	BIOL S482	% students earning an A, B, or C on their written research report	92
<b>2B</b>	BIOL S380	% of students earning a C or better for the portion of the grade based on the primary literature (e.g., discussion grade)	Course not offered
<b>2C</b>	BIOL S271	% of students earning A, B, or C on their written report that requires them to use the scientific method to solve scientific problems in the field and lab.	96
<b>2C</b>	BIOL S384	% of students earning A, B, or C on their written report that requires them to use the scientific method to solve scientific problems in the field and lab.	n/a
<b>3A</b>	BIOL S215	% of students earning an A, B, or C on their oral presentation	100
<b>3A</b>	BIOL S482	% of students earning an A, B, or C on their oral presentation	92
<b>3B</b>	BIOL S482	% students earning an A, B, or C on their written research report	92
<b>3C</b>	CHEM S105	% of students earning A, B, or C on their written lab notebook	n/a
<b>3C</b>	CHEM S341	% of students earning A, B, or C on their written lab notebook	87
<b>4A</b>	BIOL S106	% of students earning A, B, or C on the laboratory practical	95
<b>4A</b>	CHEM S341	% of students earning A, B, or C on the laboratory practical	93

### **Evaluation of the Data Collected on Program SLOs for AY19**

On average, 94% of students achieved the SLOs for the Biology, Marine Biology, and Fisheries programs (AY19 = 85%). This indicates that our program is largely effective at meeting the SLO's outlined in this plan. Students performed well (>90%) on nearly all SLOs assessed but were somewhat weaker on SLO 3 related to scientific laboratory writing skills. These SLOs do not include BIOL 492/498, where senior students gain most of their practical skills through internships and independent research.

### **Student Exit Interviews**

We distribute exit interviews to our graduating seniors each spring. In Spring 2020, we only received two responses, likely due to the pandemic which necessitated email delivery of the interviews instead of in-person, paper delivery as we usually do. Nevertheless, we did receive useful feedback from these two students.

Both students "agreed" with the statement that they were satisfied with their education in Biology/Marine Biology at UAS. One student earned a BS in Biology and Marine Biology and aims for a career in restoration ecology while the other earned a BA in Biology and aims for a career in the health sciences. The lowest ratings for both students were reported for preparation in written communication and quantitative reasoning. This suggests room for improvement in these areas. As

more students complete the Communicating Science course (BIOL 311), we aim for students to be better prepared in written communication. However, based on achievement of the SLOs, students overall are succeeding in this area.

### **Future Plans to Improve Student Learning**

Faculty have discussed ways in which SLOs can be improved. One of the more successful strategies for this has been the receipt of curriculum development and academic innovation funds to increase the proportion of active learning and locally based lab activities in our courses. We will continue to apply for such funds.

We know from exit interviews and student discussions that students who engage in research (independent or directed) are more engaged in biology. In response to this, David Tallmon proposed, developed and organized a freshman course (Biology 108: Ecology of SE Alaska: Experiential Learning) in which students gain skills in time management, note taking, reading primary literature, and will be introduced to all Biology faculty and their research projects. This was delivered for the second time to students in Fall 2019 and we received positive feedback from the students. We are eager to see if this has positive impacts on success and retention in the biology programs over the next few years. All biology faculty participated in this and found it overall to be a positive experience in the field and laboratory with freshmen students. This experience helped to ‘break the ice’ for students meeting and working with faculty, and our hope is that they become more engaged in faculty research projects as a result.

David Tallmon has also recently been awarded a prestigious, multi-year grant from the National Science Foundation entitled “SSTEM”. One of the goals of this grant is to increase enrollment and retention of Alaska Native and rural students at UAS. To this end, David has been actively recruiting students across the state and has created 2-year and 4-year scholarships for Alaska Native and rural students to pursue degrees in the biological, environmental, and fisheries sciences and mathematics at UAS. We are optimistic that this will increase our overall enrollments and particularly those from underserved populations.

We have determined that many of our students do not form study groups in their classes and we are testing ways to encourage participation in study groups. The co-location of biology students in Anderson with Biology faculty provides positive student and student/faculty interactions. Students study in the “Fish Bowl”, adjacent to faculty offices, and foster positive study habits. Faculty frequently discuss study skills with students, both in class and during advising sessions, and study groups are encouraged. This level of face-to-face engagement has been halted during the pandemic but we are looking forward to this resuming when it is safe.

With respect to improving practical skills in biology, we emphasize how particular skills can be applied to research/science projects and to future careers. We already provide the time for the students to understand and practice laboratory skills. Students bear some responsibility for understanding practical skills prior to their laboratory practicals. Students gain significant experience in laboratory and field techniques while conducting independent or directed research with faculty mentors, which is not captured in our SLOs, so perhaps we should modify our assessment tool to include this metric.

We are particularly proud of our Marine Biology BS Program being ranked #8 in the country by College Magazine in 2018, and glad to hear that our efforts in delivering a quality program are being recognized. We are also pleased with the recent statewide focus by President Pitney, the Board of Regents, and others on enhancing fisheries, marine, and ocean sciences in Juneau. We are excited to

showcase and strengthen our unique programs that are built upon our one-of-a-kind location near the sea in Southeast Alaska.