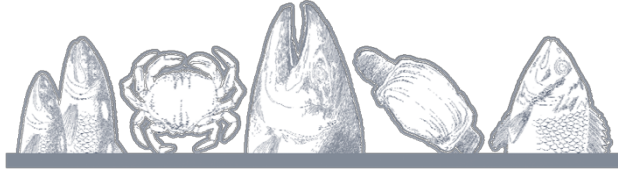


UNIVERSITY OF ALASKA SOUTHEAST SITKA



Fisheries Technology

Fisheries Technology Assessment Report

**Academic Year
2017 - 2018**

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University of Alaska Southeast (UAS) Fisheries Technology program (Fish Tech)
Assessment of Student Learning Outcomes (SLO) Report for Academic Year (AY) 2017-2018.

1. Program Overview

The Fisheries Technology Program (FT) Associates of Applied Sciences (AAS) is the only two-year, entry-level academic program in fisheries in the UA system. The mission of the FT program is to provide students with a broad educational and practical foundation in the field of fisheries technology. Students will be prepared for entry level employment in federal or state agencies, private-non-profit salmon enhancement facilities (PNPs), and various private fisheries sectors. Students will also be prepared to progress from the two-year degree to related four-year degrees should they choose to continue on academic pathways. The goal is for program graduates to fill high demand fisheries jobs in Alaska or pursue a Bachelor's degree in fisheries related fields.

This Assessment plan is for the Fisheries Technology AAS, the two Certificates (Alaska Salmon Enhancement, Fisheries Management) and the two Occupational Endorsements (Alaska Salmon Enhancement, Fisheries Management).

2. Program Student Learning Outcomes

Goal 1. Students will describe ecological attributes of fish and their habitats.

Outcome 1.1. Students will identify common commercial species of Alaska and understand their habitat needs.

Outcome 1.2. Students will describe water as an environment for life.

Outcome 1.3. Students will convey fishery information to faculty and classmates.

Goal 2. Students will demonstrate sound field sampling techniques.

Outcome 2.1. Students will collect, analyze, and present fisheries data utilizing standard methodologies.

Outcome 2.2. Students will describe the importance of following protocols and techniques; utilizing good field data collection techniques and data recording techniques.

Outcome 2.3. Students will describe methodologies and protocols; practice good data management skills; summarize and communicate findings.

Outcome 2.4. Students will discuss the importance of correct data collection and analysis.

Goal 3. Students will operate safely while participating in program activities and utilizing program equipment.

Outcome 3.1. Students will identify methods for reducing injury in the field and lab setting.

Outcome 3.2. Students will discuss safe operating procedures for equipment; assess field conditions to determine safety guidelines to follow.

Outcome 3.3. Students will discuss the importance of promoting safety for self and others and equipment.

Goal 4. Students will describe the basic principles of salmon enhancement techniques used in Alaskan hatcheries.

Outcome 4.1. Students will describe the basic process involved in fish rearing.

Outcome 4.2. Students will take part in “hands-on” procedures to ensure successful output of fish.

Outcome 4.3. Students will describe attributes of Salmon Culture facilities in Alaska.

Goal 5. Students will describe management and legal frameworks within which marine fisheries exist.

Outcome 5.1. Students will describe the legal and regulatory framework of marine fisheries in Alaska.

Outcome 5.2. Students will describe the current status of marine fisheries statewide.

Outcome 5.3. Students will describe the social and economic value of Alaska fisheries to the state and nation.

3. How data are collected on Student Learning Outcomes

The Fish Tech program has detailed Student Learning Outcomes (SLOs) that are hierarchically nested from the individual lesson, to the course, to the program level. In fall 2014, we established the SLOs for each of our core courses in accordance with a university-wide effort through the UAS Undergraduate Curriculum Committee. In fall 2016, we established SLOs for each lesson/module of each of our courses and began making those SLOs available to students via course syllabi (Appdx A). In fall 2016, we established the Fish Tech Annual Assessment document that outlines the results presented here. As part of this SLO assessment, we collect data on student learning via exam scores, summary reports of exam effectiveness (Appdx B), comparison of pre and post course exams (Appdx C), student evaluations (Appdx D), and survey of program graduates (Appdx E). New methods of evaluating student learning in 2017 and 2018 include the introduction of writing assignment and creative projects (Appdx F), as well as certification completion for semester intensive programs (Appdx G).

4. Data Collected on Student Learning Outcomes during the 2017-2018 academic year

Student exam scores – Though exam scores do show that students have a certain measure of knowledge at the time of taking each exam, it does not account for what students bring into the classroom.

Fall 2017 – Mean grade percentage 86 ± 2 SE % (n=133)

Spring 2018 – Mean grade percentage 88 ± 1 SE % (n=222)

Summary reports of exam effectiveness – For this academic year, most of our students took exams using a software package called ExamSoft. This application allows us to look at certain analytics that help us in determining assessment reliability. Each exam is scored based upon the likelihood of a student repeating the same performance. An example Summary Report can be found in Appdx B. We will continue to modify our exams to increase reliability for those with low scores.

Assessment Reliability AY17-18	Exam 1	Exam 2	Exam 3
FT 120	72	98	97
FT 122	65	83	83
FT 211	89	97	81
FT 222	81	73	84
FT 272	99	85	79
FT 274	87	84	75

Pre and Post exams scores – To determine what students learned during their course, we began implementing pre and post exams for all Fish Tech courses (n=198 students). Students were given a 30 question exam prior to receiving any content in each class, and at the end of the course, students were given the same exact exam. Course by course breakdown of pre and post exam scores can be found in Appdx C.

Mean scores for pre exams were 63.2 ± 2.4 SE %

Mean scores for post-exams were 88.0 ± 1.2 SE %

Mean improvement between pre and post exams was an increase of 40.9 ± 4.3 SE %

Student Evaluations – Though student evaluations do not explicitly relate to knowledge gained by students, they do allow us to evaluate successes and failures of how students learn so that we may improve our delivery and content for future courses. As part of our evaluations we ask students if they thought the courses were valuable, if they would take another course from us and if they would recommend our classes to another student. Example in Appdx D.

In fall 2017 (n=30 surveys)

100% of students said they would recommend this course to a friend

100% of students said they found their course valuable

88% of students said they would take another course

In spring 2018 (n=42 surveys)

90% of students said they would recommend this course to a friend

84% of students said they found their course valuable

75% of students said they would take another course

Survey of Graduates – Summer 2018

During Summer 2018, UAS Fish Tech students were asked to fill out a short Google Form with respect to their completion status, connection with fisheries industries, employment organizations, perception of Fish Tech curricula helping with current employment and further education (N=30 students; Appdx E)

Writing Assignments and Creative Projects

New in Spring 2018, Fish Tech faculty increased assessment of student learning via Writing Assignments and Creative Projects. As part of the OCN 101 – Introduction to Oceanography course, students were required watch 13 lectures, each of which had paired Reading and

Writing Assignments. Until Spring 2018, most of the Fish Tech faculty evaluated student learning based upon three exams and pre and post-exams. By introducing Writing Assignments to this course, Fish Tech faculty were able to assess student's ability to synthesize information from the lecture and Reading Assignment and develop informed answers. In addition, every four lectures, students were assigned a creative project (3 total for the semester), where students had to "re-teach" a segment from one of the lessons using technology or skills that students had or could readily learn. By introducing Creative Projects to this course, students created "artifacts of learning," and were in essence, teaching content, one the highest levels of learning according to Bloom's Taxonomy. The introduction of Writing Assignments and Creative Projects also allows student to have a diverse set of learning opportunities and reduces the pressure on student that do not score well on exams. Examples in Appdx F.

Certifications for semester intensives

As a result of end of year student surveys reviewed by Fish Tech faculty members, in Spring 2018 Fish Tech faculty created a sequence of courses designed as a semester intensive. This intensive was designed so that students could come to Sitka for "hands-on" courses in a unique sequence that could be completed in a single semester. In Spring 2018, the Fish Tech program piloted a program called the Alaska Dive Semester, where 13 students from 10 different universities from all over the country, came to Sitka, completed six courses and 12 credits of coursework in approximately 3.5 months. In addition to receiving college credit for the courses, the 13 students earned a total of 143 certifications. Different from most of the distance courses taught by the Fish Tech program, student learning was assessed via satisfactory demonstration of "skills practicals," which when complete, allowed for national and international certification.

5. Data Evaluation of Student Learning Outcomes from the previous academic year

In AY2017-2018, the Fish Tech program not only had the highest Student Head Count (n=398) and Student Credit Hours (n=1,013), it also was the most comprehensive in assessing student learning.

Exams scores for this academic year averaged in the B+ range and testing software assessed an average of 95% of our students would likely repeat the same performance on their exams.

Pre and post exams allow us to not only determine improvement in learning, but also the level where students are coming into classes. Mean pre-test scores were approximately 63% and post-test scores around 88%, which suggest students knowledge improved by approximately 40% by the end of their courses.

Almost all of the students that completed end of course surveys (approximately 1/3) said that they found the courses informative, would take another course and would recommend a Fish Tech course to a friend.

In Summer 2018, Fish Tech faculty surveyed recent graduates and asked them if they thought their courses have prepared them for the workplace. Of 30 student surveys, 77% said that

they were working in the fisheries industry, 100% said that they felt that their Fish Tech education helped prepare them for their current job and at least 24% said that they have continued on to a higher level of university education.

Introducing Writing Assignments and Creative Projects have allowed faculty other tools to assess student learning and allows students to enhance their education using different types of tools. These addition tools were widely popular with students because they felt like they really learned the materials and it allowed them to apply theoretical information to their personal life and experiences.

Finally, the development of a semester intensive course sequence has allowed students from all over the country to visit Alaska, take University of Alaska courses, and complete a number of credentials over a short period of time. This new direction in teaching has allowed Fish Tech faculty to assess student learning “face to face,” while offering students career skills that lead to jobs.

6. Future Plans to Improve Student Learning

In the future, Fish Tech faculty will continue to evolve the engagement and evaluation of distance programs while continuing to develop future semester intensives that prepare students for career opportunities over a short time period.

In the near future, the Fish Tech program will be doing the following:

- Development of “instructor presence,” in FT 122 – Alaska Salmon Culture I, FT 222 – Alaska Salmon Culture II, and FT 274 – Fisheries Biology, with hopes of increased student engagement and the potential to assess student learning via exams, pre and post exams, creative projects and writing assignments
- Continued offering of the spring intensive dive program
- Development of a fall Alaska Salmon Culture Semester intensive “face to face” program
- Working with Alaska High School teachers to enhance dual-enrollment opportunities

Appendix A. Example Detailed Course Outcomes Summary

Course title: FT 274 Fisheries Biology (3cr)

Course description: An introduction to the major groups of fishes with particular emphasis on fishes of the Pacific Northwest region of North America. Introduces students to finfish and shellfish. Identification and classification, anatomy and physiology, age and growth, reproduction and behavior will be studied. Emphasis will be placed on commercially important fish species of Alaska.

Course Learning Outcomes (Modules that address CLOs)

1. Describe how fish swim and regulate physiology with the environment (Module1, Module2, Module4, Module7)
2. Describe how we classify fish (Module3)
3. Describe how fish breathe (Module5)
4. Describe how fish grow and reproduce (Module8, Module9)
5. Describe how fish interact with the environment (Module10, Module11)
6. Describe the biology and fisheries ecology of invertebrates in Alaska (Module12)

Module and Student Learning Objectives (SLOs)

Module time: (hr:min)

Module 1: How to use iPads and elearning modules

Module time: (00:19)

Module 2: Class Introduction - Fisheries Biology

Module time: (01:12)

Student Learning Objective (SLO)

Time (min)

1. Describe the basic objectives and grading scheme of this course (07)
2. Describe your instructor . . . without using any bad words! (09)
3. Describe what makes saltwater unique for fish (15)
4. Describe where fish live (17)
5. Describe the general subjects covered in this course (22)

Module 3: Fish Systematics, Genetics, Speciation

Module time: (01:31)

Student Learning Objective

Time (min)

1. Define the general terms about systematics of fish. (04)
2. List the five methods of categorizing fish groups. (09)
3. Describe how species evolve via allopatric and sympatric speciation. (11)
4. Describe the early stages for fish evolution. (09)
5. Describe major characteristics of the "Jawless" fish - Agnathans (Lamprey and Hagfish). (13)
6. Define the major groups that make up the "Jawed" fish and give details about each group. (20)
7. Describe general characteristics and the two main groups of the Bony Fish. (03)
8. Describe major characteristics of the "Lobe-Finned" fish. (08)
9. Describe major characteristics of the "Ray-Finned" fish (09)
10. Describe major characteristics of the Teleosts. (04)

Module 4: Fish Structure (form) and Function

Module time: (01:19)

Student Learning Objective

Time (min)

1. Describe the eight basic categories of fish body shape. (18)
2. Describe the six basic body plans of fish swimming. (14)
3. Differentiate the four different types of scales and which belong to which fish. (07)
4. Describe the purpose of each fish fin and how fins play an important role in fish ecology. (17)
5. Describe the function of the skeleton, spines and head. (05)
6. Describe how the eyes, mouth and gills can explain fish ecological traits. (06)
7. Differentiate the function of white vs. red muscle. (06)
8. Describe three different types of swimming. (05)

<u>Module 5: Respiratory and Circulation</u>	<u>Module time:</u> (00:51)
<u>Student Learning Objective</u>	<u>Time (min)</u>
1. Describe the anatomy and function of the fish gill.	(07)
2. Describe the two types of gill ventilation and describe how fish extract oxygen from the water.	(05)
3. Describe the other ways that fish can breathe other than using gills.	(10)
4. Describe the bodily processes that depend on oxygen extraction.	(03)
5. Name four different things that can determine how much oxygen a fish will need.	(05)
6. Describe fish blood and cells and differentiate from our blood.	(11)
7. Define oxygen affinity, Bohr effect, Root effect, P50 and PCO ₂ .	(05)
8. Explain circulatory control in fish (heart structure and type of circulation).	(05)

Module 6: Exam 1

<u>Module 7: Buoyancy, Thermoregulation and Balance</u>	<u>Module time:</u> (01:15)
<u>Student Learning Objective</u>	<u>Time (min)</u>
1. Describe the four ways that a fish can achieve neutral buoyancy.	(14)
2. Differentiate physostomous and physoclistous gas exchange and describe how they work.	(11)
3. Describe the role of the rete mirabile and issues with dumping air quickly on ascents.	(04)
4. Describe the two ways fish can alter their internal temperature and be able to discuss what regional endothermy is.	(08)
5. Describe the challenges associated with fresh and saltwater fish in relation to osmosis and ion regulation.	(14)
6. Describe how each of the three main fish groups deal with osmotic issues.	(06)
7. Describe how each of the three main fish groups deal with ionic issues and detail the changes of diadromous and euryhaline Teleosts.	(06)
8. Describe what kind of stressors fish can face and how they deal with them.	(11)

<u>Module 8: Feeding and Growth</u>	<u>Module time:</u> (01:40)
<u>Student Learning Objective</u>	<u>Time (min)</u>
1. Define the basic terms associated with fish feeding habits and food selectivity.	(03)
2. Describe the relationship between gut length and fish diet and define the role of the pyloric caeca.	(09)
3. Describe the three basic types of fish feeding.	(14)
4. Describe the different mouth types and associate feeding.	(04)
5. Describe the differences in gill rakers for different types of feeding.	(06)
6. Describe three basic requirements of fish nutrition.	(05)
7. Describe three basic requirements of fish nutrition.	(19)
8. Describe the major factors that affect fish growth.	(23)
9. Describe the four ways we measure fish growth.	(16)

<u>Module 9: Reproduction</u>	<u>Module time:</u> (01:26)
<u>Student Learning Objective</u>	<u>Time (min)</u>
1. Define the basic terms associated with reproduction and differentiate male and female sex organs in each of the three major fish groups.	(11)
2. Define sexual dimorphism and dichromatism and give examples of each.	(07)
3. Describe the Non-Guarder reproductive class and give examples.	(09)
4. Describe the Guarder reproductive class and give examples.	(08)
5. Describe the Bearer reproductive class and give examples.	(06)
6. Differentiate the three main modes of reproduction in fish.	(08)
7. Differentiate the main four mating systems in fish.	(07)
8. Describe what r vs K selection means and how it relates to fish age, number of offspring, frequency of breeding, etc.	(06)
9. Describe the five major developmental stages for fish.	(05)

10. Differentiate direct and indirect development in fish and describe the role the environment may play. (05)
11. Describe the five factors that contribute to the variation in fish development. (06)
12. Differentiate the three alternative reproductive strategies and give examples of each. (05)

Module 10: Exam 2

Module 11: Sensory Perception, Behavior and Communication Module time: (01:49)

<u>Student Learning Objective</u>	<u>Time (min)</u>
1. Describe how water impacts vision, sound and smell for fish.	(13)
2. Define olfaction for fish and describe the organs responsible.	(07)
3. Define gustation for fish and describe the organs responsible.	(08)
4. Describe how a fish hears.	(14)
5. Describe how the lateral line in fish works.	(07)
6. Describe how fish see.	(11)
7. Describe the theory of optimal foraging and how it applies to fish.	(29)
8. Differentiate a fish school from a shoal and describe the purpose of each.	(20)
9. Describe the role of rheotaxis, electroreception, and magnetoreception.	(06)
10. Describe the 8 color patterns in fish.	(12)

Module 12: Introduction To Fish Ecology Module time: (00:56)

<u>Student Learning Objective</u>	<u>Time (min)</u>
1. Define each of the ecological filters and sequence by order.	(07)
2. Define fundamental and ecological niche and discuss impacts for species richness.	(06)
3. Define food webs and discuss their importance in the ecosystem.	(09)
4. Define and give examples of keystone species.	(08)
5. Define top-down and bottom-up interspecific and intraspecific interactions.	(09)
6. Define and give examples of character displacement, interference competition, exploitation competition, and habitat imprinting.	(05)
7. Define and give examples of symbioses, mutualisms, commensalisms, and parasitisms.	(12)

Module 13: Invertebrates Module time: (01:14)

<u>Student Learning Objective</u>	<u>Time (min)</u>
1. Describe the basic ecology of arthropods and describe each of the groups.	(23)
2. Describe the major arthropod fisheries in Alaska.	(11)
3. Describe the basic ecology of molluscs.	(13)
4. Describe each of the mollusc groups and the fisheries.	(08)
5. Describe the basic ecology of echinoderms and describe each of the groups.	(10)
6. Describe the echinoderm fisheries in Alaska.	(04)
7. Describe the diversity of nudibranchs.	(03)

Module 14: Exam 3

Appendix B. Example Assessment Reliability Report

SUMMARY REPORT



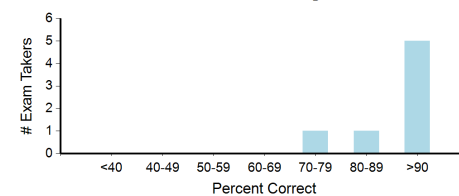
FT 120 - Exam2

Course: N/A • Instructor: N/A • Questions: 55 • Exam Takers: 7

ASSESSMENT PERFORMANCE

92% **71%** **100%**
Average Score (50.7/55) Low Score (39/55) High Score (55/55)

Total Student Performance Histogram



Assessment Score Reliability (KR-20)



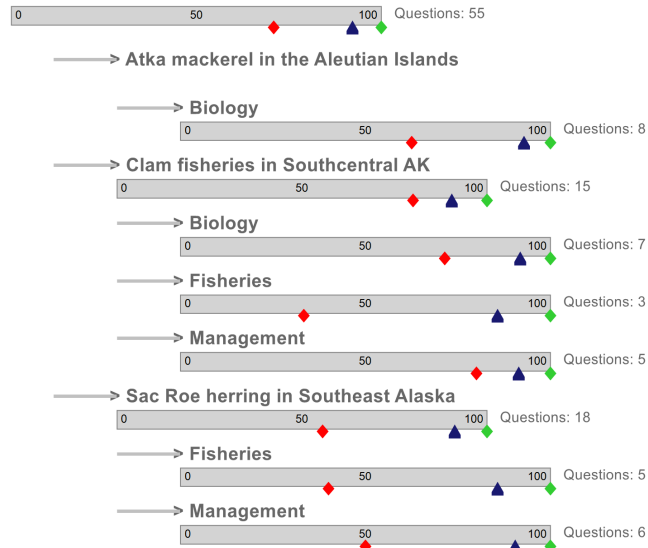
Likelihood of students repeating the same performance.

Assessment Analysis: There are too few exam takers (<20) to draw conclusions. Please interpret Reliability data with caution.

LEARNING OUTCOMES (Category Performance)

◆ Low ▲ Avg ◆ High

FT 120 - Exam 2



Appendix C. Pre and post exam scores for AY17-18

In Fall 2017, 104 students x 3 credit courses for a total of 312 credits

In Spring 2018, 94 students * 3 credit courses for a total of 285 credits

Students were asked to take a 30-question test (Pre-test) before watching any of the course lectures. At the completion of the course, students were given the exact same test (Post-test) to evaluate learning.

Fall 2017 - Pre and Post exam scores

	students	Pre-test %	Post-test %	% change
FT 120	15	56 $\pm$ 2 SE	84 $\pm$ 2 SE	40 $\pm$ 4 SE
FT 211	8	67 $\pm$ 5 SE	82 $\pm$ 6 SE	21 $\pm$ 9 SE
FT 272	9	63 $\pm$ 7 SE	92 $\pm$ 4 SE	26 $\pm$ 11 SE
FT 274	16	63 $\pm$ 4 SE	88 $\pm$ 2 SE	36 $\pm$ 7 SE
OCN 101	60	60 $\pm$ 1 SE	87 $\pm$ 1 SE	40 $\pm$ 2 SE

Spring 2018 - Pre and Post exam scores

	Students	Pre-test %	Post-test %	% change
FT 120	27	64 $\pm$ 4 SE	89 $\pm$ 3 SE	46 $\pm$ 9 SE
FT 122	15	68 $\pm$ 6 SE	91 $\pm$ 2 SE	46 $\pm$ 16 SE
FT 222	12	66 $\pm$ 5 SE	88 $\pm$ 3 SE	40 $\pm$ 12 SE
FT 274	21	75 $\pm$ 6 SE	92 $\pm$ 2 SE	65 $\pm$ 12 SE
OCN 101	23	50 $\pm$ 5 SE	87 $\pm$ 3 SE	49 $\pm$ 15 SE

Appendix D. Fall 2017 Student Evaluations

89 students took 104 classes * 3 for a total of 312 credits (n=55 surveys)

1. Was the semi-asynchronous format useful to you

Yes – 83.64%/

No – 1.82%

Maybe – 14.55%

2. If other courses were offered in this format would you be interested?

Yes – 74.55%

No – 1.82%

Maybe – 23.64%

3. Which course(s) did you take

FT120 – 15

FT211 - 8

FT272 – 9

FT274 – 16

OCN101 - 60

What are some areas of improvement?

- The accompanying paperwork describing the course and modules doesn't match the course content.
- some of the test questions seemed tricky or i read conflicting answers. for example, the kingdoms of life vary across locations, some sources say there are more sulfates than magnesium in saltwater or the opposite. I think the tests should be looked through a little more.
- on the self check quizzes within each module - some courses only said "correct or incorrect" - i found it more helpful when the quiz allowed you to either guess again or provide you with the actual answer.
- A more detailed syllabus would be helpful, that goes over deadlines and course structure. More assignments, so that the final grade is based off more than just exams.
- I became more confident in atmospheric, and meteorological science.
- i would like to see more specific regional examples emphasized for all topics. most topics were very vague and general.
- it seemed like the instructor was often reading without a strong knowledge of certain topics. he seemed more comfortable with some topics than others. some test questions were worded poorly.
- I enjoyed this class and how it was setup. I enjoyed the self-paced aspect. Rough pregnancy created some challenges for me and i was able to finish.
- one of the slides glitched and would repeat like a record player. also i miss having the time next to the lecture to see how long it is
- I really liked this course, it was very interesting. The Ipad was so much easier than books and I really love the self pace.
- I enjoyed this course. There were some technical difficulties but I believe the course was great overall.

- Several of the FT 120 recorded lectures had poor audio and were hard to listen to.
- The Fisheries of Norton Sound module is difficult to hear. The instructor sounds like he's speaking through a radio and his voice is distorted.
- i had trouble veiwing one module about waves and beaches, also i had a test question asking me what the image showed but i couldnt see the picture.
- I like the Ipad delivery format, it is very informative and descriptive in a way that makes it easy to take in all the material.
- I found this semester extremely helpful and useful. I can not think of anything that needs improvement
- Areas of improvement for me would be to focus more on the modules because I would zone out while watching the modules. I think that if the modules we shorter I would have focused more.
- More organization with exams. I saw some misspelled words on the exams and give the students a heads up on now many questions are on the exams.
- I believe there have been improvements made already. Written instructions for exams could be helpful for lazy, incompetant students who seem to always have technical difficulty.
- Making matching questions more easier to understand. Use both numbers and letters to match answers. It was very difficult to tell which was suppose to ber matched to which when using numbers for both the photos and words to be matched.
- at times the presenter will refer to a slide/picture that dont actually appear in the online lectures.
- i would have liked to have used a book that would be optional to follow along.
- Sometimes topics were explained a bit too fast but other than that everything was fine.
- Perhaps ensuring glitches do not happen in the tests, but everything was fine in general.
- I really liked everything about this course.
- Personally, I need to work on my marine mammals and time management.
- Some areas that need improvement is editing: spelling, words missing in text especially in quiz and test questions. At the end on a numbers of sections, instructor isn't finished speaking before it cuts out. In a number of screen shots that are full of writing, the bottom line or two are not visible on the screen. All minor things.
- wording
- when you answer the post questions and get it wrong you can send them back to go over it so they can retain it.
- Audio quality
- This may be a personal thing that shouldnt be applied to the great popukation of students however I find the True False questions to be tricky. I know the information but get tripped up on what its asking for.
- Some of the slides are not centered on the screen and you cannot see all of the material.
- I think that the information was good and easy to understand but when I was going over my tests there were a lot of misplaced questions and incomplete questions. I think that everything you say in the presentations should be written down somewhere on the slides so it is easier to understand. Also it is very hard to succeed in this class when your grade is based only on 3 tests
- Can't think of anything. I LOVE these iPad classes!
- i enjoyed the classes it was everthing i expected coming out of an ipad class.
- I don't think any improvements are needed for this course. There were a couple of minor tech issues -- a practice question w/ no right answer, think it was on Odontoceti echolocation, a question on Exam 3 w/ no diagram, and question 7 on this survey :) I took OCN101 -- but none with the actual content.
- there is some spelling errors as well as some articulation problems with the articulate application. all and all the study was interestingand brodened my understanding of marine ecology and geography.

- Well I think that everything was pretty good overall. It was a lot to cover in 9-15 chapters per lesson. But I thought you were good at getting your point across.
- my knowledge
- The slides need to be cleaned up a bit. In most slides, there were sections that were out of view or blocked by the instructor's camera feed. There were also lessons where the instructor misspoke during the slide and corrected at the end instead of redoing the video.
- When taking any course you always get to keep the text book. I think having access to the slides or presentations would be an extra bonus similar to having a text book to reference for later situations.
- I would also recommend breaking the grading up into post section quizzes. I did not like that my final grade for oceanography was based off of 3 exams alone. I think quizzes would help to ensure that people actually learned the material or paid attention during the material and would change the grading rubrics a bit.
- Also, I answered falsely on Question 7. Oceanography was not included in the answers.
- On the exams, I find the matching questions difficult to follow. For example, the question will state match the following: a,b,c,d with 1,2,3,4 and then where I write the answers its listed 1-4. I found the 1-4 misleading when answering some of the questions as it did not say which part of the match (abcd or 1234) I needed to write. I hope this makes sense. Other than that I have no suggestions or concerns! It was great!
- Some of the questions and answers did not seem to be the right answers, or the answers seem like they could have multiple answers.
- This course improved my skills on a lot of things like fisheries in general, biology, and general knowledge
- On my iPad some of the lecture numbers didn't match with readings for each class in iBooks. Also for the invert lecture reading in iBooks the actual document wasn't about invertebrates, it was actually "economic value of seafood in AK"
- I think it would be beneficial to review all modules. There were a few where you would have the definitions written out but then accidentally switch the term when discussing it. I also think a pre-test for each exam would be helpful. Nothing scored but just to see areas you are lacking in. The tests are easy after the modules because you just watched them, but maybe going back after a week or so you might not.
- Personally for me it was the exams. there were questions that focused more on historical figures over terminology in oceanography such as the one in exam 2 about ben franklin naming a gyre. Also I noticed a question in exam 3 there was a question asking to name the diagram above when there was no diagram. Also, while I understand the challenges of setting up this course especially long distance I think a stronger sense of communication between professors, peers, and staff would help greatly. I spent several class periods simply waiting for an email and the staff here weren't much help. in fact one of my peers practically had to lead the whole class in setting up the exams while the guy getting paid 35 an hour right next to me has no idea what to do
- How it is recorded: When I am watching the lessons, most of the time the entire image moves towards the bottom right and cuts off a good portion of the screen.
- Spelling/Grammar: Many questions in the exams had either spelling and/or grammar mistakes in the questions
- The test itself: Many of the questions made no sense. One question was supposed to have a diagram, it did not. One was a question about if tides were called one thing or another and my answers were True and False, which made no sense. And many others, like previously mentioned had errors in spelling and grammar.

- No offense Reid but you need to have a bit more excitement and interest in the subject at hand. For most of the lessons, you were quite monotone and seemed to show very little interest in the topic at hand. You did say a joke here and there which was nice.
- once i figured out to write the notes first and then listen, i took better notes, so i feel it is a good setup and nothing needs to change. except on the exams i couldn't see the diagrams and so i had to guess.
- I found the reading to not be very helpful for me, they just seemed to repeat stuff.
- The sound quality in some segment.
- the testing app wouldn't let me take the 3rd test because the app crashed.
- Some areas of improvement are that there were some glitches in the videos, a diagram in the last exam didn't appear for me, some of the correct answers of the self-check quizzes aren't correct (some of these questions were on the exams but the "correct answer" was wrong on the exam), and either more exams over fewer materials, or better review things before tests (maybe full section review self checks).
- One area of improvement for me would definitely be focusing a lot more on the modules. They were quite extensive so I would sometimes zone out. I could've also taken notes about each lesson and reviewed over them before taking the exams. There were also some typos in the exams that kind of confused me, but the class was fun overall.
- I didn't have important many areas of improvements. I saw a couple typos. And for some of the videos, they would play just a frozen screen for a few minutes after the lecture was over.

5. What did you like best about the courses?

- There was a lot of variety of information and student can proceed at own pace
- Getting more informed about my backyard! also, the iPad method was great!
- real life examples and stories
- How everything was loaded onto the iPad.
- I loved the iPad format.
- time flow, easy to fit my schedule. can rewatch lecture for more detail and better understanding.
- Self paced and the freedom.
- that i learned alot and i was able to do it at my own pace
- The self pace.
- I enjoyed that the course was at my own pace and if I fell behind it was only my fault.
- I appreciated the diversity of fish groups covered in FT 274, as well as the invertebrates.
- I liked the variety of guest lecturers in FT 120. Listening to the experiences of researchers and observers provided some insight into what those careers might be like.
- Self paced and no time limit on quizzes and test.
- My instructor was motivating too. He displayed passion and enthusiasm for the subject which, in turn, gave me energy towards learning. Also, my e-mails were responded to immediately, so our communication was strong.
- In my syllabus there was web link of: <http://tss.learningspaces.alaska.edu/tutorials/>. This really helped me and may assist others on campus.
- you could complete it at your own speed
- I liked the whole experience, but in particular impressed by the course organization and structure.

- I like the entire concept. I like being able to study attend class and take tests without being required to be online. As a working adult and father I appreciated not having to attend weekly phone calls as well
- I liked how the modules had visual representations of what the topic was about and how you explained the topic.
- I liked the lessons. They were really organized and laid out right .
- Short bursts of interesting information, and the ability to start, stop, resume a lecture
- Class can be taken at my own pace and classes/lectures aren't scheduled for a certain time. Makes it easier for people than have busier schedules because of work, etc
- Self paced
- The freedom to complete it when it worked best for my busy adult life schedule.
- learning things i did not know and being with cousins to learn with me
- Short lectures, I feel like I paid more attention since it was only for a short period of time.
- I liked how I could go at my own pace and take time on the lectures as I needed.
- I like having the spoken lectures, clear descriptions of things to learn and the visual guides / points.
- I liked learning more about the ocean, as well as how I could do it at my own pace.
- The subject matter is interesting. I enjoy anything that deals with marine especially if it pertains to field work.
- going at my own pace
- i can work on my speed
- that i could go back and look at documented lessons
- I found the whole course interesting but especially the alaskan drive to statehood.
- I love the ipad courses, please don't add any additional work, I am getting so much more out of these classes by not having extra writing assignments to stress about.
- That I could watch the video lectures anywhere and the information was very interesting
- The 5 - 15 -ish minute segments.
- this is what i want to to ass a career and this course has helped me to better understand the ecology and biology of fish and invertebrates.
- I enjoyed how thoroughly you explained the reasoning behind things (why/how), rather than primarily just detailing what we need to memorize. I'm not sure if that's typical with an oceanography course, but it is with prior science courses that I've taken. It helped me greatly with learning the content.
- the exams
- The Topic. I feel like it really opened up my eyes about ocean life.
- learning
- The final section covering climate change, the impact it has on the ocean, and the problems caused by humans concerning the ocean. The beginning sections were also great! I just wish I had learned these things sooner.
- I really like the format of the courses and how all of the information covered is useful and on topic.
- I liked when the class got into learning about plankton and different ocean mammals.
- No Homework was by far the Best Part!!! no assignments and such either
- Everything was very detailed. It was easy to take notes with the pause button and being to rewind each slide if a detail was missed that wasn't written on the slide. The different speakers for Fisheries of Alaska were really good and gave me a much better understanding of how everything works for each one. The first hand accounts are much better than just text from a book. Reids personal work and experiences give the program an added boost for the students as well.

- I enjoyed having it all on the iPad. Extremely convenient. I liked that everything was on the same device, modules, readings, tests!
- I really enjoyed the section about current affairs and how humans are effecting our planet in a negative way. also the section on marine ecology and how different animals are connected and the amount of one can drastically effect another
- Mainly just learning about the ocean and the waters in the Alaska area. Since I live in maryland, all we learn about is the Chesapeake Bay most of the time, not so often the ocean as a whole. We still do learn about the ocean, but it was nice learning about another states waters vereses how polluted mine are.
- I liked how they described everything well enough to understand.
- the marine mammals and your pictures about all the jobs you have had.
- Easy to understand and easy tests that took things from the lesson.
- That I could do it at my own pace and that most of the examples where local.
- avaiability
- The things I best liked about this course were how easy it was to reach out for help and how the instructor did a good job with not making the modules boring.
- The thing I liked most about the course was just the different information that I learned. It's really going to benefit me because I'm a tsuanmi bowl member. I could use it during quiz bowl and when writing the papers.
- I really appreciated how you used diagrams and other pictures to help me visualize and understand the lesson a little better.

6. Would you recommend the iPad format for Fish Tech courses to a friend? Why or why not?

- yes
- yes, very informative, but not difficult to comprehend so it is not stressful.
- yes - flexibility cant be beat!
- Yes, especially for people who travel or need a flexible course.
- Yes. Very user friendly.
- yes, but with the caviate that thye are very introductory... at least this class.
- Yes hands down.
- already have. i enjoy it and i know my friends would too.
- Yes. Easy format.
- I will be recommending this course because it was a great starter for the ocean sciences.
- Yes. This format is great for students who travel often or have difficult work schedules.
- Yes. This class made learning fun and stress free.
- yes i enjoyed it, i thought the lessons were very informative and covered topic that were useful
- Yes I would because in a way its different than most probably expect. The ipad format allowed me to take more detailed notes at a self-pace, making the whole experience a great one. I thought it would be much more difficult with the ipad format but it really wasn't as hard as previously expected.
- yes!
- No I would not recomend this iPad format for Fish Tech courses to a friend because the modules are very long and take many hours of our day to finish them.
- Yes. Just remind them to stay on top of the course

- I would, because it allows a very flexible schedule for lectures, while having access to the instructor.
- Yes, course was easy to take and understand. Good for anyone that doesn't have time to go to a distance class at a set time.
- yes, because it is self paced
- yes, the flexibility and the ease of the course made it great for learning.
- i really don't know why it could help and could not depends on the person
- Yes! It is a fun course and I learned lots of new things, I have already recommended it to a few of my friends.
- I would because most people I know who want to continue their education are adults with working jobs and want to be able to do things at their pace especially when work calls.
- Yes, I really liked the set up of this distance course.
- I would recommend it to my friends who have an interesting in oceanography, as well as those who can manage their time.
- I recommend it only if, like me, you live where you can not attend a classroom course and if you work irregular shift work, when it is not possible to attend a live class the same time every week.
- yes, its convenient for those trying to work.
- Yes, I always do.
- No if they are not working in or have worked in, it would be hard to understand.
- Yes/no. because its on an ipad it seems easier but don't let yourself demean how much time to dedicate to it.
- I absolutely would and regularly do. I find because I do lecture on my own time I am present and attentive.
- Absolutely, they are great for people with little time to go to school.
- Yes and No, I am not the kind of learner to just hear things once and understand it, I am a total mix of all I learn from hands on, listening and reading so if my friend was a listening learner then yes I would but if not then no.
- Yes! Due to being self-paced and really quality material.
- yes, i would its nice to have it on your own terms but also a burden.
- Yes! Most especially those with hectic schedules
- I don't have many friends but I would recommend to anyone interested on the bus or bus stop
- Yes. I feel like the chapters could have been played anywhere anytime.
- yes, its a good experience
- Maybe. The level of information retention is less than when you read these out of a text book. That could be specific to me because of the way I learn.
- Yes I would. I enjoy being able to do my school work at home. The presentations are done very well, are educating and also interesting. The pros do a really good job presenting the info and it is done very clear, and is extremely easy to follow.
- Definitely for someone who can teach themselves. Having just got out of the military, I had a real hard time doing this course. The same with any online class, without face to face I just plain suck at it.
- Yes because it is easy portable and not too hard to navigate
- I would recommend this format, and actually have. I was also recommended the format while I was working at Kitoi Bay last year. Unfortunately I wasn't able to return for this season because of some family issues that needed me to stay on the East Coast. But being able to work full time (nights) and pursue my certificates has been wonderful. This will get me to where I want to be in the near future. You can work at your own pace. I was able to work, come home and complete a lecture or two easily. It would be extremely difficult for me to have to sign into an online meeting time class.

- Yes I would. I found it to be informative and interesting.
- I would because its a fairly straight foward course as long as you put the work into it and you get your credits. However I would mention the amount of last minute solutions and lack of help from local staff
- Porbably not because of previously mentioned errors that really did bug me. If those were to be fixed however, I would definitely recommend it to friends who are interested in the field of oceanography.
- Yes, you can go at your own unlike in an acutal class you have to go at the same pace.
- Yes! it was a fun course and though i did not make an A, i enjoyed it and learned a lot
- Yes it lets you do it at your own pace.
- Yes because it is self paced, you still get the insrtuctor talking, there is a lot of great information.
- yes, because it is very helpful as a study tool for tsunomi bowl and stuff
- I definitely would reccomend the iPad format for Fish Tech courses to a friend because it's just so convenient being able to do the classes on your own time, and the helpfulness of the instructor is a plus.
- I would probably recommend it to a person who is really interested in science, but most people would probably get bored with the long modules. So, probably not.
- I would reccomend it to a friend, but only if they have regular free time in their schedule because this class takes a lot of time especially if you want to take notes and try to remember everything since this is an extra class that they would be taking.

7. Could you have taken live classes (ie. meet once a week, require strong internet)? Why or Why not?

- Probably not as I have a full time job and family, church and community responsibilities
- yes
- no - seasonal work and research currently make that timing impossible
- Yes, but i prefer classes without meeting times.
- no, busy unpredictable schedule with school and kids
- No, this tough pregnancy kept me from being able to do anything in person. But not being pregnant i would have enjoyed an in person portion.
- no becuse i work a really stupid hours.
- No. I work two jobs.
- I could have but I already had 5 other classes that met so I wouldnt have prefered it.
- No. I was tagging fish and didn't always have wifi.
- No. My internet rection is weak, so live classes would have been frusterating.
- yes it would have depended on the time of the live class though
- I could have and am willing, its just i kind of rushed into the program at the last minute and although It was an option I overlooked it.
- no. none offered where i live
- No I could have not taken live classes because in Unalaska there is very weak internet therefore it would not have worked.
- Depends what time. Due to work schedule
- Right now I could not, because I am remote, with no internet access.
- No, some classes meet on certain days/times that I am very busy. For example one class was scheduled for Wednesday evenings which is one of my busier timeframes.

- no, because I worked full time, thru september. October I was traveling.
- possibly- maybe not this semester, and only if the the class did not conflict with work.
- i liked the meet once a week because i could ask questions when i need help or to see what it was
- Yes I could've although my internet isn't very good.
- I could, but it would have been very hard to keep up with for someone who works.
- It would depend on the class time, I work 40 hours a week and am taking 3 other classes so it would potentially be very difficult.
- I could have, Petersburg has the infratructure to support that, as well as the school is very supportive in encouraging student to take time out of the school day to learn more.
- As I stated in the previous question, it is not poosible for me to go to class as I live in Maine and I work irregular shift work, different week to week.
- no, due to the time differance and work
- Yes I could if I had too.
- NO be cause i like that i can do it at my own pace
- no, i was already working and having to miss class to work.
- I would but perfer the I pad because I work full time and maybe more
- Not with my work schedule, I will have problems when I have to take the Freshwater Ecology course that is not offered on the ipad.
- I could depending on the time, and I would MUCH rather have it in person rather than online
- Yes, but much prefer self-paced so I can binge when I have time!
- i would have preferred a live class honestly at least once a week to keep my head in the game
- No. I work full time with varying hours and travel frequently. All of my courses this semester were sans meeting times.
- no it has more problems with tech and would not translate well
- No, Because I no internet access ar home and I feel like your class was great.
- no,im really busy with school
- Yes. Mostly live classes while still in Sitka then webinars of something similar once traveling.
- Yes, I could have. My personal schedule would allow for it. Although I liked the flexibility of not having a meeting time as it allowed me to work as well as do the courses.
- No I wish I could have. I live in the Matsu Valley.
- I don't think so because it might not have fit in with the high school schedual
- I do not think I would be able to due to my current work schedule and the large time differenece from AK to NJ. Also the meeting times seem to be during my work hours, I work night shift starting at midnight EST.
- Yes, I live in Sitka. The reason I could not is because I am busy with salmon season till end of September.
- I could however I personally like this set up more because it allows students to study on their own time on top of the three hour sessions twice a week
- I couldn't have, I live in Maryland. A little far away ;). (The last question of the survey does not conatain OCN 101 so I did not answer it)
- no. i am still in high school
- Yes but I think I would of preferred this at my own pace.
- I don't know.
- no, i had too much going on at the beggining of the class
- I would have taken live classes as I think it would help for myself not to get so behind, but being in Unalaska makes this near impossible as internet is expensive and slow.
- I don't think I could've taken live classes because the wifi here in Unalaska is pretty bad.
- No, the wifi isn't very strong here in Unalaska and its also really expensive.

Appendix E. Summer 2018 Graduate Student Survey

When did you graduate?

2014-2015	1
2015-2016	2
2016-2017	5
2017-2018	6
I was just taking classes	7
I am still working on it	9

Are you working in the fisheries industry?

Yes	23 (77%)
No	7 (23%)

What organization do you work for and what is your job title?

AAE Tech Services. Fisheries Technician
ADF&G, Fishery Biologist I
Downeast Institute-Hatchery Tech
USGS research wildlife biologist
Chilkat Indian Association / Fish tech
US Coast Guard
Simon Fraser University, Research Assistant
Fish Tech II at the Hernandez Sport Fish Hatchery
Kodiak Regional Aquaculture Association, Fish Culturist
Fish and game, title- fish technician II
Valdez Fisheries Development Association (Solomon Gulch Hatchery)
Icicle Seafoods-Quality Assurance Manager
National Park Service, Regional Chief of Contracting
Coastal Villages Region Fund, Corporate Counsel
Anchorage Museum
Allen Marine whale tours: guest services
Prince of Whales Eagle Lodge - Charter Captain
SSRAA lead fish culturist
Kansas State University - Graduate Research Assistant
ODFW/Fish Tech
SSRAA - Lead Research Technician
NSRAA, Administration
Hotel. Desk receptionist
Saltwater INC - observer
US Fish and Wildlife Service
Kodiak Regional Aquaculture Association as a Logistics Tech
Port Armstrong hatchery-fish culturist

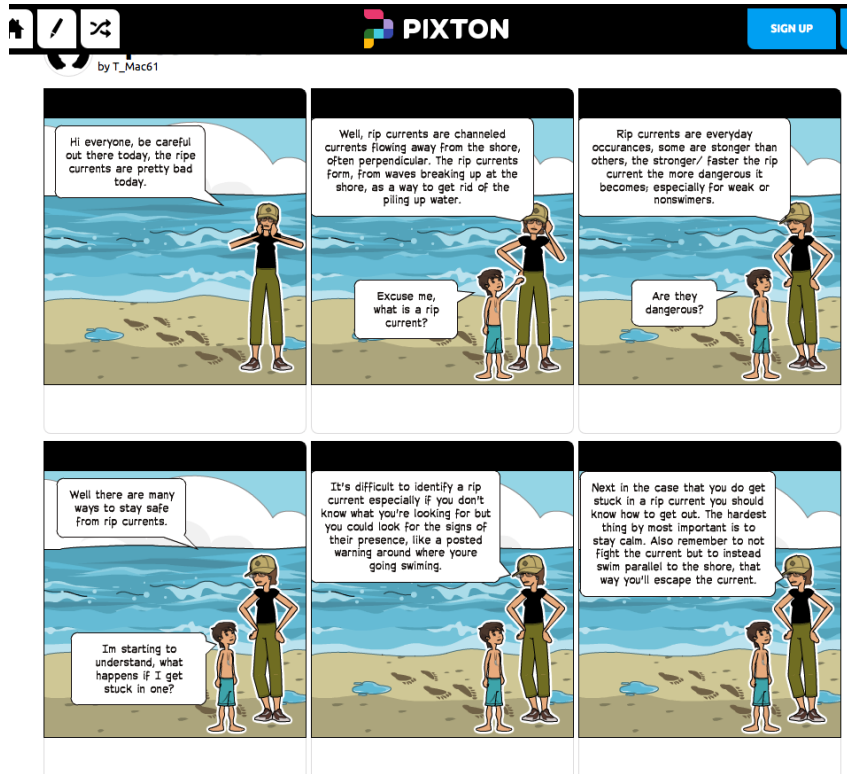
Do you feel like your Fish Tech education helped you prepare for your current career?

Yes	30 (100%)
No	0 (0%)

Have you taken any further education in fisheries/ marine sciences?

Yes	7 (24%)
No	10 (33%)
Not answered	13 (43%)

Appendix F. Example Creative Project and student comment on Writing Assignments



Assignmen... - Add: " _____ "Well done Marcy... Inbox x

cy Herman (Google Docs) <d+MTAzMjE4NzQzNDIzNTE3Njg3! 2:34 PM (18 hours ago) ★

Marcy Herman replied to a suggestion in [Writing Assignment 7 MH](#)



Reid Brewer

Add: " _____ "Well done Marcy! 20/20 points. One thing to keep in mind is any time that you introd..."



Marcy Herman

Thank you for your comments Dr. Brewer. I am finding that there are not enough assigned words for me to share all that I am learning from these readings. I find much of this content fascinating. It has been a long time since I have had a science course, mostly business types, and I am loving the change of topic!



Marcy Herman

Accepted suggestion

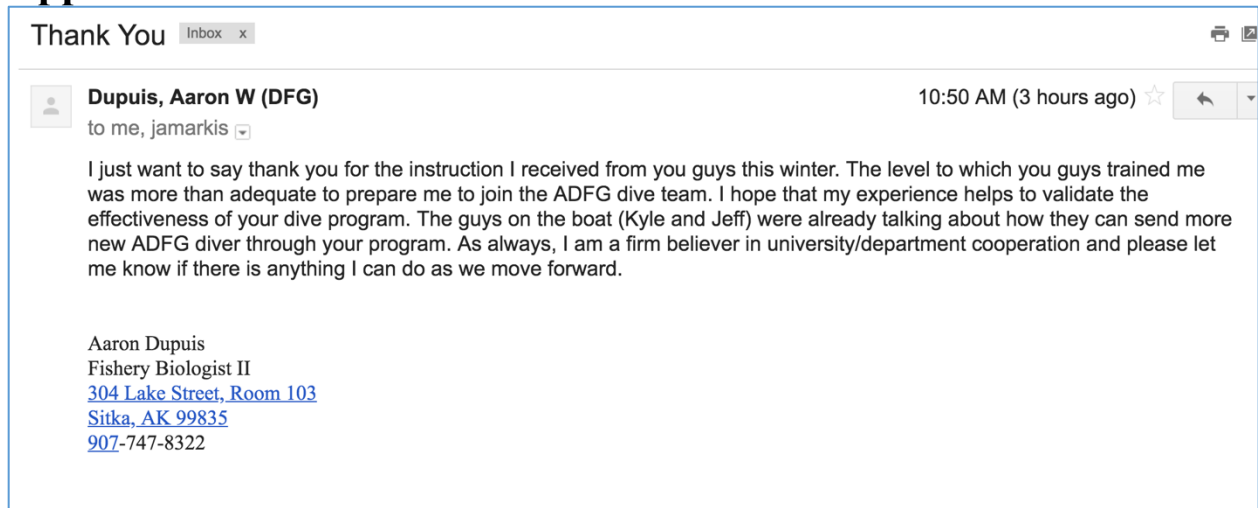
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Appendix G. Letters from semester intensive students



Dear Reid Brewer and Joel Markis,

I would like to take a moment to thank you for all the hard work and countless hours of time you both put into making the Alaska Dive Semester such a success. There is no other program like this one. With the amount of hands on training, certifications, class time, and diving time we were given, you had students who had never dove before the program out personally navigating on the water, confidently diving, and seamlessly collecting and working with large amounts of quantitative and qualitative data. Each student felt self-assured learning under you two because of the passion behind your words and actions in making sure we were learning and practicing the correct techniques. You two beautifully translated the many needs for scientific diving by providing intensive projects and bringing in professional guests representing the different areas of marine science, diversifying and expanding our perception of ocean research. Being able to work on the many projects together as a group, and then the final internship project, presented each individual student the opportunity to shine and bring their talents to the table. This program not only created strong scientific divers, it formed a family. Our class became such a close-knit family that we shared many laughs and tears, and experienced life changing memories together to last a lifetime. We will forever view Sitka as home. To say that we are all forever grateful for this once in a lifetime experience is a strong understatement. This is a program that has set us all up for success in our lives and in our research that we will continue to see the results of for many years to come. And it is all because of you two, Reid and Joel.

I am very excited and humbled to share that because of the Alaska Dive Semester, I have been given the opportunity to accept the position of Data Management Specialist with the Joint Institute of Marine and Atmospheric Research and the Pacific Islands Fisheries

Science Center in Honolulu, Hawaii. JIMAR is a branch of our National Oceanic and Atmospheric Administration and to work for NOAA has been a top career goal of mine. This is my dream position and to be accepting this role directly after my studies feels surreal. Following my passion for data science, geospatial analytics, and ocean research has been a mission that involves a path I have had to create for myself. The Alaska Dive Semester provided me the opportunity to build upon my mission and bring my skillsets with ArcGIS to our projects, something you allowed me to do to help build my own experience as well as bring a unique perspective and presentation of data to our projects. This opportunity is the reason that I received this position, because I was presented with an inimitable occasion to work on such an exclusive project that no one else applying to the position had comparable experience.

The beautiful part about this is that you two not only let me build upon my skills, but you took one-on-one time with every individual student to learn their strengths and passions, to create projects that enhanced their personal skillsets, and help students find employment and start their careers after the program. We all share immense gratitude and are endlessly inspired by how you two ran this program. Thank you for giving us a dive family for the rest of our lives, making Sitka a home, giving us all the opportunity of a lifetime that changed our lives for the better, and for showing us what it means to put your heart and soul into the sciences and in translating your teachings to your students. You two are a wonderful team and truly one-of-a-kind. I am grateful to have been a student to the both of you. I am so excited to see what the future holds because of the Alaska Dive Semester.

Sincerely,

Brooke Olenski