

Project Title: Increasing Experiential Learning Opportunities for Undergraduate Students in Fisheries at the University of Alaska Fairbanks

Final Report to the PCCRC

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Co-Principal Investigators (on previous reports and the initial project): Amanda Rosenberger and Nicola Hillgruber (same institution)

Abstract

The goal of the project is to enhance and expand the Experiential Learning Program (ELP) in Fisheries Division of the School of Fisheries and Ocean Sciences (SFOS) at the University of Alaska Fairbanks (UAF). Within Alaska's unique environment, the ELP has given Fisheries undergraduate students opportunities to participate in fisheries and marine biology research and management in occupational and research settings, expanded student's professional development through mentorship, encouraged pursuit of graduate studies, and has better prepared them for a future career in fisheries. Our accomplishments since this project was initiated include the following: (1) a total of 117 undergraduate Fisheries student enrolled in ELP courses; (2) 19 of these undergraduate students were employed in SFOS fisheries and marine science laboratories through PCCRC-sponsored internships; (3) one to two symposia have been hosted each academic year that highlighted the Fisheries ELP in which undergraduate participants gave presentations on their ELP experiences; and (4) the NSF-sponsored Nunivak Island Science Camp took place in summer 2009 which provided Alaska Native students opportunities for experiential learning in fisheries in a unique field atmosphere.

Background

Practical research and field experiences in academic or professional settings in their chosen field offers students inspiration, lasting lessons, and a foundation for future learning through graduate research. Further, students benefit greatly from the attention, examples, and lessons that mentorship from a professional can provide. The funding provided by the Pollock Conservation Cooperative Research Center (PCCRC) since 2008 has greatly enhanced the Experiential Learning Program (ELP) in the Fisheries Division of the School of Fisheries and Ocean Sciences (SFOS) at the University of Alaska Fairbanks (UAF), which involves students from pre-college to upper-class undergraduates in hands-on learning and provides continuing mentorship and guidance that can lead to a successful professional career in the seafood industry, government natural resource agencies, non-governmental organizations, or academia. In addition, funding from PCCRC has encouraged interaction between faculty within UAF SFOS, including graduate faculty that have otherwise been uninvolved in undergraduate education, and has expanded the opportunities for undergraduate research programs within SFOS and student interactions with marine sciences faculty.

A critical commitment of the UAF SFOS is the training of future professionals in the field of fisheries. Public agencies and marine industries throughout Alaska and beyond our state borders

need knowledgeable and experienced scientists, technicians, economists, social scientists, and managers focused on the larger field of fisheries. Consequently, the UAF SFOS began a major initiative six years ago to expand and enhance their undergraduate fisheries program to elevate it to one of national prominence (<http://www.sfos.uaf.edu/fisheries/>). In January 2007, the Rasmuson Foundation provided a \$ 5.0 million grant matched by UAF and the Alaska State Legislature to support this initiative for undergraduate students in fisheries in Alaska. Although these have been significant contributions, much of the funding was dedicated for hiring new faculty and improving infrastructure (e.g., classrooms, distance learning equipment, etc.). As a result, we cannot rely solely on these funds to support all of our initiatives, including the ELP. Funding from the PCCRC supplemented and enriched the ELP in Fisheries at UAF SFOS towards achieving our goal of providing life-changing experiences for our students that will foster an appetite for life-long learning. Further, this funding has helped accelerated the growth of the undergraduate fisheries program (increase from 22 to 72 students between fall 2007 and fall 2012) and is consistent with the new UAF mission to enhance undergraduate research opportunities through the URSA (Undergraduate Research and Scholarly Activity; <http://www.uaf.edu/ursa/>) program. Hands-on learning deepens the educational experience for fisheries students and accelerates student development into young professionals. In addition, experience with the fisheries-in-practice, such as field work, fisheries management, fisheries research, and seafood marketing, is often what is most exciting and engaging for young students. The opportunities that Alaska affords to burgeoning fisheries scientists are unrivaled elsewhere, and these types of experiences have drawn students from within and outside Alaska to pursue undergraduate study in fisheries in Alaska.

OBJECTIVES

In this project, funds were sought to supplement four aspects of experiential learning for the Fisheries program at UAF. These objectives were to: (1) develop an internship program that will provide students learning opportunities in the workplace and field as a crucial and required component of their undergraduate education; (2) provide support for students to work with SFOS faculty conducting marine and freshwater research; (3) organize an annual student symposium highlighting undergraduate occupational experiences; and (4) create a college-level curriculum for high school students from the Yukon-Kuskokwim-Delta as part of an NSF-funded science camp on Nunivak Island in the eastern Bering Sea. The 2012 calendar year marked a transition in the ELP as Dr. Amanda Rosenberger, the Principal Investigator for this grant from PCCRC, departed in May for a new position at the University of Missouri. In addition, SFOS Internship Coordinator Ms. Katie Straub departed in October 2012. As a result, Dr. Trent Sutton, Chair of the Undergraduate Fisheries Program, assumed responsibilities associated with directing the ELP and administering the associated PCCRC funding as the Head of the SFOS Retention and Student Success Program. In the following report, I (Trent) will summarize the overall accomplishments for each of these four objectives.

Accomplishments for Objective 1: Develop an Experiential Learning Program (ELP) that will provide students learning opportunities in the workplace and the fisheries and marine sciences field as an essential element of their undergraduate education.

Experiential learning is a critical component of the revised Bachelor of Science (BS) in Fisheries Science and Bachelor of Arts (BA) in Fisheries degree programs in UAF SFOS. To complete these degree programs, undergraduate Fisheries students must complete at least one credit of FISH 490 Fisheries Internship. However, this course is repeatable (i.e., a student can enroll for it more than once) and students can also couple FISH 497 Independent Study and/or FISH 498/499 Senior Thesis as a component of their ELP requirement. To date, the ELP has matched 117 undergraduate Fisheries students with fisheries and marine sciences positions since the initiation of this program (see previously submitted annual progress reports for details regarding individual students). While most students that have completed the ELP requirement in the BS and BA degree programs have taken FISH 490 (N = 70 students), students have also completed FISH 290 Fisheries Internship (internship for freshman- and sophomore-level students; N = 15 students), FISH 497 (N = 32 students), and FISH 498/499 (N = 6 students). Overall, enrollment in these courses has increased since the initiation of the ELP in the Fisheries degree programs (Figure 1). Forty-four of the FISH 290 and 490 internships (52%) have been completed by students in UAF laboratories, while an additional 21 internships (25%) were completed by students with the Alaska Department of Fish and Game (ADFG; Table 1). The remaining 20 internships (23%) were completed by undergraduate students with a variety of state, federal, Alaska Native, nongovernmental, and private agencies and organizations in Alaska and Montana. The high proportion of undergraduate student internships completed at UAF reflects a focus of the ELP to provide research and mentoring opportunities for undergraduate students within UAF SFOS Fisheries, Marine Biology, and Oceanography research programs, as well as the funding provided by PCCRC. The relatively high proportion of students that completed internships with ADFG reflects the high availability of internship opportunities with this agency, active recruitment of student interns by ADFG biologists and managers, and the identification of a clear pathway for students from a B.S. degree to a fisheries biologist/manager career opportunity. Specific accomplishments of the ELP include the following:

1. Development and subsequent revision of the UAF SFOS website advertising the ELP (see <http://www.sfos.uaf.edu/prospective/undergraduate/experiential-learning.php>).
2. Development of the ELP Curriculum and guidelines for senior thesis and independent study in the program. The structure and guidelines for the ELP courses in these curricula include: (1) FISH 290 Fisheries Internship; (2) FISH 490 Fisheries Internship; (3) FISH 497 Independent Study; and (4) FISH 498 Senior Thesis Proposal and 499 Senior Thesis. For copies of these course syllabi, please see the following links:
 - a. *FISH 290 Fisheries Internship*
(<http://www.sfos.uaf.edu/prospective/undergraduate/forms/Syllabus%20FISH290.pdf>)
 - b. *FISH 490 Fisheries Internship*
(<http://www.sfos.uaf.edu/prospective/undergraduate/forms/Syllabus%20FISH490.pdf>)

- c. *FISH 497 Independent Study – One-Credit Option*
(http://www.sfos.uaf.edu/prospective/undergraduate/forms/Syllabus%20FISH497_1C%20redit.pdf)
 - d. *FISH 497 Independent Study – Two-Credit Option*
(http://www.sfos.uaf.edu/prospective/undergraduate/forms/Syllabus%20FISH497_2C%20redits.pdf)
 - e. *FISH 497 Independent Study – Three-Credit Option*
(http://www.sfos.uaf.edu/prospective/undergraduate/forms/Syllabus%20FISH497_3C%20redits.pdf)
 - f. *FISH 498 Senior Thesis Proposal*
(http://www.sfos.uaf.edu/prospective/undergraduate/forms/Syllabus_FISH498_Senior%20Thesis%20Proposal.pdf)
 - g. *FISH 499 Senior Thesis*
(http://www.sfos.uaf.edu/prospective/undergraduate/forms/Syllabus_FISH499_Senior%20Thesis.pdf)
3. Creation of the SFOS undergraduate student jobs board, which advertises seasonal fisheries opportunities for students in the UAF SFOS Fisheries program (<http://www.sfos.uaf.edu/jobs/>). In addition, weblinks to other Fisheries-related jobs boards, including the Alaska Department of Fish and Game and the American Fisheries Society internship/jobs webpages are listed on the ELP website.
 4. Creation of a series accessible profiles of potential Alaskan fisheries and seafood industry employers for undergraduate Fisheries students, which is available on the ELP website (http://www.sfos.uaf.edu/prospective/undergraduate/industry_profiles/A_Fisheries_Students_Guide_to_Alaska_Employers.pdf).
 5. For the spring semesters 2008-2013, the ELP hosted workshops on developing and writing resumes, curriculum vitae, and cover letters, proper interview skills, and on-the-job professional conduct. These workshops were all well received by undergraduate Fisheries students.

Accomplishments for Objective 2: Provide experiential learning opportunities for undergraduate students within UAF SFOS Fisheries and Marine Sciences programs.

The support from PCCRC allowed students to gain research experience in a laboratory environment during the academic year in Fisheries and Marine Sciences within SFOS. With support from the PCCRC, we offered stipends to 19 undergraduate Fisheries students who participated in research in laboratories under the supervision of SFOS faculty. These students participated in a variety of projects including least cisco tag retention, growth, and survival

(Patricia McCall), effects of ocean acidification of larval crab development (Douglas Duncan), evaluation of the benthic infaunal community in the Beaufort Sea (Colby Johnson), and food-web structure of Arctic lakes (Deven Lisac and Ben Overacker). Students were uniformly positive in their final reports to the Experiential Learning Coordinator regarding their experiences. The PCCRC-funded internship summaries for the five aforementioned students from the Fall 2012 and Spring 2013 semesters can be found in Appendix I.

Accomplishments for Objective 3: Organize and host an annual undergraduate symposium that will highlight student research and hands-on learning experiences and provide opportunities for students to present their ELP results.

Each spring semester since 2008 (plus the fall 2012 semester), UAF SFOS has organized a PCCRC-funded undergraduate ELP symposium. During the symposium, students that have participated in the ELP over the past year are provided an opportunity to present their internship or research experience. The number of student presenters has ranged from a low of two to a high of 10 individuals. Presentations last in duration from 10 to 15 minutes and highlight the particular lessons that students have learned from during their hands-on learning experience. The list of student presenters and their presentation topics from the fall 2012 and spring 2013 undergraduate ELP symposia is provided in Appendix II. For all symposia, catered food and refreshments were provided by PCCRC to insure good attendance by SFOS administrators faculty, staff, and students as well as invited guest from UAF URSA (Undergraduate Research and Scholarly Activity) Committee, Alaska Department of Fish and Game, NOAA National Marine Fisheries Service, and U.S. Fish and Wildlife Service. Student presentations were also video conferenced among UAF SFOS Fisheries Divisions locations (Fairbanks, Juneau, Kodiak), and the symposia were moderated by either Amada Rosenberger (Spring 2008 [N = 3 student presenters], 2009 [N = 3 student presenters], and 2010 [N = 3 student presenters]), Katie Straub (Spring 2011 [N = 2 student presenters]), or Trent Sutton (Fall 2012 [N = 7 student presenters] and Spring 2013 [N = 10 student presenters]).

From 2008 through 2012, two to three students were selected to travel with Amanda Rosenberger to the annual meeting of the American Fisheries Society (AFS). At this meeting, students participated in a variety of activities that enhanced their professional development, such as an undergraduate and graduate student colloquium, a student-mentor luncheon, AFS section meetings, and various social events. For these students, attendance at the AFS meeting was a life changing experience that provided them new focus and purpose in their careers through opportunities to network with professionals, attend scientific presentations, and understand how AFS operates as their professional society. For student feedback on attendance at the 2011 annual AFS meeting in Seattle, Washington, see Appendix III.

Accomplishments for Objective 4: Facilitate involvement and recruitment of rural Alaskan high school students in the Yukon-Kuskokwim Delta through participation in an NSF-sponsored field course.

In June 2008 and 2009, UAF SFOS faculty members Nicola Hillgruber (2008) and Amanda Rosenberger (2009) each taught a two-week intensive, NSF-funded summer science camp on Nunivak Island, Alaska, supported by the Nunivak Island Mekoryuk Alaska (NIMA) Corporation and the Nunivak Island Cultural Education and Adventures (NICEA). The goal of the science camp was to encourage high school students from the Yukon-Kuskokwim Delta (YKD) to consider a career in Science and Technology and to provide a pathway toward an academic education. This course exposed seven YKD students to fisheries field methods; all of the students were fantastic participants in the class (all passed) and very much enjoyed the experience. The class included both laboratory and field exercises, and lectures covered a variety of topics, including basic descriptions of the fisheries field, fish anatomy, field methods, and fish ecology. For a copy of the course syllabus for June 2009, see Appendix IV.

CONCLUSIONS

The Experiential Learning Program (ELP) curriculum at UAF SFOS involves students from pre-college to upper-class undergraduates in hands-on learning, providing continuing mentorship and guidance that can lead to a successful professional career in the fisheries industry, government agencies, non-governmental organizations, or academia. Support from the PCCRC has been instrumental for this component of our BS in Fisheries Science and BA in Fisheries degree programs, adding additional ELP opportunities for UAF undergraduate students interested in careers in fisheries. Practical research and field experience in academic or professional settings offers students a combination of inspiration, lasting lessons, and the foundation for future careers. Further, students also benefit greatly from additional attention and mentorship from working with SFOS faculty, some of which would otherwise have minimal contact with these students.

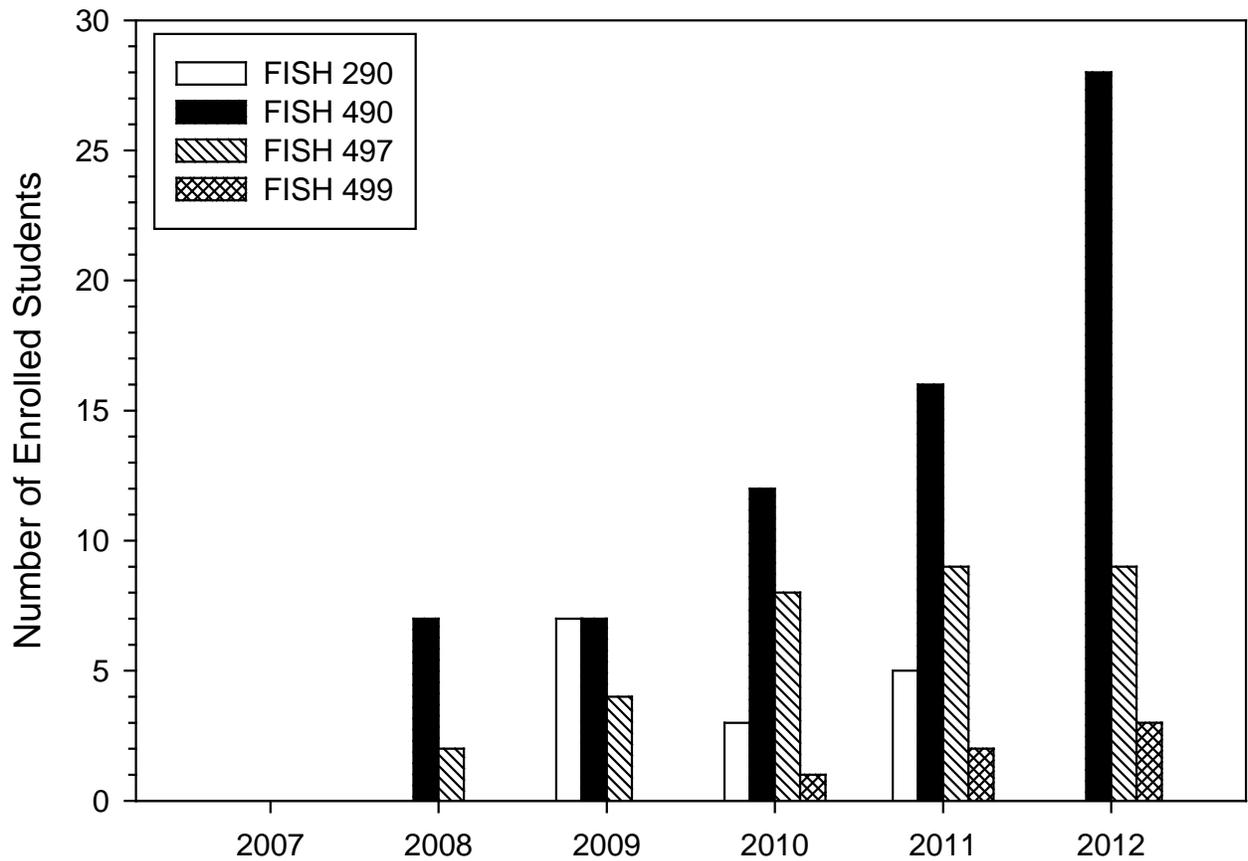


Figure 1. Number of undergraduate Fisheries students enrolled in Experiential Learning Program (ELP) courses, by academic year, since the initiation of the PCCRC grant. Note that 2008 is academic year 2008-2009, which includes the fall 2008 semester, spring 2009 semester, and summer 2009 semester.

Table 1. Agencies and organizations that have sponsored undergraduate fisheries students in the Experiential Learning Program (FISH 290 and FISH 490) since 2008.

Agency/Organization	# of Interns	Agency/Organization	# of Interns
University of Alaska Fairbanks	44	Native Village of Eyak	1
Alaska Department of Fish and Game	21	Cook Inlet Aquaculture Association	1
U.S. Fish and Wildlife Service	4	Yukon Salmon Subcommittee	1
National Park Service	2	Beach'm Fishery, Inc.	1
Montana Fish, Wildlife, and Parks	2	Bristol Bay Science and Research Institute	1
American Seafoods Company	2	LGL Alaska Research Association	1
National Oceanographic and Atmospheric Association	2	USDA Forest Service	1
		Bureau of Land Management	1

Appendix I – Samples of Student Internship Summaries

The following are student-authored summaries of their Summer Internship experiences from the Fall 2012 and Spring 2013 semesters. These summaries cover a range of student experiences and their enthusiasm for the program.

Patricia McCall

2013 Internship

May 8, 2013

My senior internship was composed of a multitude of opportunities to learn hands-on, pertinent research methods that will be useful for future career endeavors. In performing my research project of tagging least cisco whitefish to determine survivability and tag expulsion rates, I was subjected to a variety of tasks that were new to me. Firstly, raising fish in a hatchery was a novel task that familiarized me with water chemistry, feed conversion, system maintenance, and observation of fish health. This was a major part of conducting my research, since fish need relatively constant environments to thrive. Secondly, conducting research requires proposing an idea in which to base your study off of, so writing a proposal for the project to my advisor and also to the Institutional Animal Care and Use Committee to substantiate the purpose of the research in terms of using live animals was a great learning tool. Thirdly, as main investigator of the research project, I was led to organize a group of technicians and delegate tasks to commence and complete the project. This portion of my internship was great for understanding the role of a lead researcher and the organization that goes in to performing a research study. As for the study itself, I have gained significant knowledge in the biology of least cisco whitefish and their habitat requirements. Also, I was able to learn hands-on fisheries techniques that are employable in field research and data collection.

In all, my internship was a well-rounded, excellent way for me to be exposed to a variety of experiences related to the management, husbandry, analysis, and importance of fisheries research. I thank my advisor Trent Sutton for encouraging me to do my best and instructing me on the ins-and-outs of research in the hatchery setting.

Douglas Duncan

12-18-12

Summary of work with Raphaelle Descoteaux

One of the major concerns in science right now is climate change. Humans are releasing such a large quantity of greenhouse gasses into the atmosphere that it is exceeding the earth's ability to buffer their impacts. One of the places where the consequences of this can be clearly seen is in the world's oceans. As seawater absorbs these increasing quantities of gases, like carbon dioxide, it becomes more acidic. This raises questions about how organisms adapted for a less acidic environment will be able to cope with the relatively rapid increases in pH currently occurring.

Of particular concern are marine organisms that build shells. It is possible that the increased acidity of ambient water could inhibit, or even prevent their formation. If this happens there could be widespread detrimental impacts to ecosystems and subsequently the important fisheries they support. Because of this, it is absolutely vital that we come to a better understanding of the potential implications of ocean acidification to species like crabs.

This is what my work with Raphaelle Descoteaux was all about. She had raised groups several species of crab larvae in conditions ranging from 7.5 to 8.1 pH. Every few days she would remove several from each tank and freeze them to allow for a snapshot of their development. This allowed for a direct comparison of crabs raised in different acidities.

It was my job to examine the larva. After Raphaelle removed the larva from the tanks and jars, they were frozen in metal free vials. Before I could do anything else I had to thaw them at room temperature to minimize any damage.

Once free from the ice I would place them one at a time under the microscope. Using two single bristle paintbrushes I would manipulate them into several positions for photographs. First, I would lay them on their side to take a profile photo. Next I would take a close up of their abdomen, then I would turn their heads toward the microscope for a picture of their lateral spines. Finally, I would alter the angle slightly to photograph their frontal antennas. This process was repeated for each of the 5 larvae in a vial. Careful labeling of the pictures was required to keep things organized. After each larva was documented it was placed in a tray with a water sample for a later spectrographic analysis.

After the photographs were completed they could be measured. To do this I used a piece of software called ImageJ. Using scale bars on the photograph, the program was able to take accurate measurements. The attributes I measured were rostro-dorsal length, dorsal spine length, rostral spine length, abdominal segment length, lateral spine length, body length, and antenna length. Both curved and straight measurements were taken to increase accuracy and consistency. These numbers were entered into an Excel spreadsheet. This was the extent of my involvement with the project.

Unfortunately, I had to leave before any of the data was analyzed. It is hoped that the measurements from these fine body structures will help show if ocean acidification is adversely impacting shell building marine organisms like crabs.

Colby Johnson
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Cbjohnson3@alaska.edu

Dr. Sutton,

I am writing to inform you of the skills and experience I gained this past semester with my work under Dr. Sarah Hardy in the Marine Benthic Ecology Lab.

My work focused primarily around the sorting and classification of benthic marine megafauna from the USTB Research Cruise in 2012. I underwent lab safety training in order to become certified to handle formalin and alcohol present in the lab and used for specimen preservation.

After completion of training I began by removing the sediment cores from the formalin preservative and rinsing them in freshwater before finally replacing them in jars with ethanol. After the sediment cores had been rinsed and stored in ethanol I began removing small sub samples of sediment to be rinsed under fresh water in a 300 micron sieve. I then proceeded to sort and remove all megafaunal organisms from the sediment.

After removing the invertebrates from the sediment they were separated and classified by family. Of all the skills I gained through this research experience, the ability to key Polychaete worms out to a family level has been by far the most challenging and simultaneously rewarding.

The research experience I gained with Dr. Sarah Hardy has been an invaluable experience and certainly enhanced my skill base and knowledge as a Fisheries Biology student and University of Alaska at Fairbanks.

Colby Johnson

Deven Lisac
Internship learning experience
May 4, 2013

The main goal of this internship was to become familiar with laboratory techniques, gain comfort using a dissecting microscope, and learn to identify and quantify the potential invertebrate prey items found in Arctic lakes and ponds. Invertebrates included aquatic macroinvertebrates and zooplankton that are known to occur in the diets of Arctic fish. At the end of the internship I was able to identify these invertebrates to the level of taxonomic family.

This was one of my first laboratory jobs. I learned how to comfortably use dissecting microscopes, invertebrate dichotomous keys, camera software for microscopes, and developed skills for taking photographs of invertebrates (Figure 1). These techniques will give me additional skills and basic knowledge I can continue to apply as I work towards my career goals.

Further, this internship helped me gain more knowledge about the food web, and the maximum abundance of aquatic invertebrates that are popular for fish species. This internship helped me get a better understanding of lab organization and safety, gathering and entering data efficiently and accurately identifying macroinvertebrates and zooplankton to taxonomic level of order and family.

The knowledge gained from this internship will help me later in my career search. In future, I would like to work with Alaska Department of Fish and Game (in the fisheries department), and having this knowledge can help me provide general information about what resources are crucial for fish species.



Figure 1: Photograph of Bosmina, taken under a dissecting microscope.

Benjamin Overacker

Fish 490 Internship

Experience Summary

I had the opportunity this semester to work in Sarah Laske's lab, working on her Ph.D. project studying the influences of fish presence and community composition on arctic lake food webs in a changing climate.

The internship was, in truth, all too brief. It was an excellent experience and I can say that I gained more than I expected to when starting off. I am glad to have had the opportunity to participate.

I can summarize my experience into three subsets of learning. First, I learned about the project planning and approval process. Second, I learned about fish anatomy and biology. And third, I learned about proper lab process and procedure.

While working with Sarah and the others in the lab, we spent a lot of time discussing what her project was, how she came to be interested in the subject, and how it evolved to what it is now. I have had very little exposure to any graduate work in my scholastic career and had no idea what was involved in moving on to a master's degree, much less a Ph.D. program. It was eye opening to realize and to see the amount of effort that it takes to make these things happen, and it was impressive to see the dedication that Sarah has. I have often wondered about a master's program over the years, if it was right for me, or what my educational plan was- This experience, very positively and certainly, helped me to decide on a course of action.

My duties in the lab were principally to prep previously collected samples (whole fish) for analysis by removing a muscle tissue sample, liver tissue sample, and the stomach. After removal of the samples, I prepped the tissue samples for stable isotope analysis and prepped the stomach for content analysis. This was an interesting process, never having had much "hands on" experience with fish anatomy, at least not in a scientific sense. I learned much about the corporal structure, anatomy, and function of these fish and thoroughly enjoyed the work. The second phase of my job was the actual analysis of the stomach contents. This was done under a microscope. I cut open the stomach, removed the contents, and by following dichotomous keys identified the bugs, worms, flies, and any other equally tantalizing fish snack that it contained. I had never had any exposure to entomology, and it was a difficult task to take on. Add to it the fact that many of the specimens were chewed, partially digested, and soaked in ethanol. It was challenging to say the least. It was an excellent experience to learn how to properly use the keys properly and to see the discipline that it takes to do these things correctly. It was a constant battle with myself to keep from jumping to conclusions or to make guesses. This was hugely beneficial to me, as I probably tend to be more irresponsible than one has to be to produce high quality work. This experience helped me immensely with this negative attribute.

I realize that there are proper procedures and protocols to follow when working in a lab. I had never had significant experience with those procedures, but after the months spent in the lab for this internship, I now feel confident to work in another similar lab, and would be ahead in the learning curve. This would also translate to a work place with similar requirements. This is very valuable to me.

All in all I am very glad to have had the opportunity to work with Sarah, the crew in her lab, and the faculty that I would not have otherwise met. This internship was very beneficial, and I feel that it was an very positive contribution to my education. I only wish that I could have been a little more helpful, and for a little bit longer.

Appendix II – List of undergraduate Fisheries student presenters and their presentation titles for the Fall 2012 and Spring 2013 semester Undergraduate ELP Symposia.

Fisheries Undergraduate Internship Symposium!

Come listen to the
talks! There will be
refreshments!



Fall Semester
Fri. Nov. 30th 2012
11:30AM-2PM
201 ONL

Time	Speaker	Presentation Title
11:30-11:35AM	Trent Sutton	"Opening Remarks & Introduction"
11:35-11:55AM	Iris Fletcher	"Oh the Places You'll Go: Kodiak 2012"
11:55AM-12:15PM	Joseph Morris	"Frog Abnormalities on the Kenai Peninsula within Proximity to the Road System and the Kenai National Wildlife Refuge"
12:15-12:35PM	Douglas Duncan	"Quality Control on a Bering Sea Factory Trawler"
12:35-12:55PM	Lucas Stumpf	"Internship with ADF&G at the Chignik Weir"
12:55-1:15PM	Mark Evans	"Behaviors of Atlantic Halibut (<i>Hippoglossus hippoglossus</i>) Elucidated from Pop-Up Tags"
1:15-1:35PM	Robert DePue	"Tropical Marine Ecology of the Great Barrier Reef"
1:35-1:55PM	Rachel DeWilde	"Interning in the U.S. Fish & Wildlife Service Conservation Genetics Laboratory"

Fisheries Undergraduate Internship Symposium

"Don't be standofish.
All are
welcome!
Refreshments
available!"

Spring Semester
Fri. Apr. 19th 2013
12:00-3:30 PM
201 ONL

Time	Speaker	Presentation Title
12:00-12:05 PM	Trent Sutton	"Opening Remarks & Introductions"
12:05-12:25 PM	Michael Courtney	"Dispersal of Dolly Varden from the Wulik River, Evaluated Using Satellite Telemetry"
12:25-12:45 PM	Cory Graham	"Sourcing Fatty Acids to Juvenile Arctic Cod (<i>Boreogadus saida</i>) in the Beaufort Sea Using Compound Specific Stable Carbon Isotope Analyses"
12:45-1:05 PM	Alexandra Bateman	"Salmon Enumeration and Adult ASL Sampling on the Sapsuk River"
1:05-1:25 PM	Teslyn Visscher	"Steller Sea Lion and Pacific Walrus Monitoring in Southeast and Bristol Bay, Alaska"
1:25-1:45 PM	Rodney Hobby	"Kasilof River Smolt Enumeration"
1:45-2:05 PM	Christina Howard	"A Study on Habitat and Growth Patterns of Juvenile Red King Crab in Two Locations in Southeast Alaska"
2:05-2:25 PM	Melissa Rhodes-Reese	"AKFSC's Bering Arctic Subarctic Integrated Survey (BASIS)"
2:25-2:45 PM	Patricia McCall	"Tagging Least Cisco <i>Coregonus sardinella</i> : Survivability, Expulsion Rates and Recovery"
2:45-3:05 PM	Jeremy Hadden	"Counting Chinook and Coho Salmon on the Kwethluk River Using a Resistance-Board Weir and Video System"
3:05-3:25 PM	Morgan Bender	"Physiological Response of Polar Cod (<i>Boreogadus saida</i>) to Dietary Petroleum Contamination"

Appendix III – Feedback from undergraduate Fisheries students that attended the 2011 annual meeting of the American Fisheries Society.

2011 Update:

Three students attended and participated in the 2011 annual meeting of the American Fisheries Society (AFS) held in Seattle, Washington. These students included Lorelei Smith, Cory Graham, and Kelly Walker, all PCCRC interns for the 2010-2011 academic year who did an excellent job summarizing their research experiences in the PCCRC-sponsored Undergraduate ELP symposium. These funds not only provided students with additional employment experiences, but also gave them an opportunity to participate in a gathering of fisheries professionals that set records in attendance, expertise, and concurrent sessions and symposia. The AFS is a student-friendly organization and hosts a variety of activities during the annual meeting specifically geared towards student attendees. The students had the following comments about their AFS meeting experience:

Cory Graham:

I went to both the student mentor lunch where I listened to a panel of professionals answer questions and the student mentor dinner where I got to ask some fisheries professionals questions. The mentor dinner was a little frustrating because there seemed to be a lot more students than mentors but I got a few ideas of what I could do after graduation. I also went to the student social and career fair. I asked a lot of questions to the ADF&G folks; I really would like to work for them and I need to try and get them to remember me. I have heard that it is somewhat difficult to get even seasonal employment there so I might pop into the office here so they can at least put a face with my name. Overall it was a great experience for me. I found some areas of fisheries that I might like to explore and some that don't interest me as much as I thought they would.

Lorelei Smith:

Conference was great and hectic. I have attended conferences before but never that huge. You will be happy to know I participated in all the student activities. Most of them were informative and good. There were a lot of great talks at the meeting and it was nice to see meet some authors of papers I have read.

Kelly Walker:

That was an enormous meeting! The talks I went to were fascinating, and I appreciate all of the great opportunities there were for students to meet with professionals in the field. I met a few potential graduate advisors, which was, by far, the most valuable experience for me.

Appendix IV – Nunivak Island Science Camp Course Syllabus

Title: FISH 195 Introduction to Fish Biology and Fisheries Techniques
Number: FISH 195
Credits: 2.0
Grading: Pass/Fail

Instructor: Amanda Rosenberger
Phone: (907) 474-7458
Fax: (907) 796-7204
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Course Description: This summer field course will provide the students with a first introduction to the biology and ecology of fishes and some basic fisheries techniques. During the lecture and lab sessions, the major external and internal anatomic features of fishes will be introduced. Students will gain insight into general life history patterns of fishes and learn how to collect fish and use keys to identify unknown species as part of this course.

The Lecture: The schedule for the lectures is attached to this syllabus. The instructor reserves the right to change the schedule if deemed necessary. Lectures will be based on PowerPoint presentation, which will be available to the students at the lecturer's discretion.

The Laboratory: The laboratory sessions have been designed to complement the presented lecture material. As part of the laboratory, students will be required to write a laboratory journal. A complete laboratory journal will be a requirement for passing this course. In addition, each student will compile a summary and key to all local fish collected as part of the field sampling.

Grading: Your total course grade is calculated as shown below:

Attendance and participation	40%
Lab Journal	30%
Guide to Local Fishes	30%
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	100%

Course Policies: Attendance and active participation during the lecture and laboratory sessions and during the field trips is expected, and attendance will be taken at the beginning of each session. Any work missed during laboratory sessions is the responsibility of the student. With written permission from the instructor (A. Rosenberger), you may make up the missed work outside of the laboratory sessions. After two unexcused absences, you will fail this course. Students are reminded to consult the Student Code of Conduct. Cheating, plagiarism, and other forms of academic dishonesty will not be tolerated in this class.

Disabilities Services: During the course, instructors will work with the Office of Disabilities Services to provide accommodations to students with disabilities. For questions, contact the UAF Office of Disabilities Services (phone: 907-474-7043).

Date	Hours	Content	Instructor	Delivery Method
06/12/09	3	Introduction – what is fisheries science?	Rosenberger	Lecture
06/13/07	1.5	External anatomy	Rosenberger	Lecture
	1.5	Internal anatomy and (some) physiology	Rosenberger	Lecture
06/14/07	<i>Travel to Nash Harbor</i>			
06/15/07	4.0	Hands-on: external & internal anatomy	Rosenberger	Laboratory
	1.0	Natural selection, fitness, and adaptation	Rosenberger	Lecture
06/16/07	1.5	General life history of fishes	Rosenberger	Lecture
	3.0	Field sampling for juvenile fishes, identification (Seine Netting)	Rosenberger	Field trip
06/17/06	0.5	Sampling Concepts	Rosenberger	Lecture
	1.0	Measuring Stream Habitat	Rosenberger	Lecture/ Laboratory
	4.0	Stream exploration and measurements; find and deploy temperature recorders in the field; water quality	Rosenberger	Field
06/18/07	1.0	Designing a Fisheries Study	Rosenberger	Lecture
	1.5	Populations, communities, Ecosystems	Rosenberger	Lecture
06/19/07	1.5	Fisheries Management Case Study: Introduced Species & Lake Victoria	Rosenberger	Lecture
	3.0	Data management, entry, and summaries	Rosenberger	Laboratory
06/20/07	3.0	Designing keys and informative pages for local fish species – finish notebooks	Rosenberger	Laboratory