University of Alaska Fairbanks

New Degree Program Request: Format 3

Master of Arts in Marine Science

30 Credits Minimum

Submitted by
Brenda Konar, Associate Dean and Professor
Graduate Program in Marine Sciences and Limnology
School of Fisheries and Ocean Sciences
Sept 30 2015 (Oct 7 resubmitted)
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I. Cover Memorandum

A. Name of Person Preparing Request

This request has been prepared by Brenda Konar, Associate Dean and Professor in the School of Fisheries and Ocean Sciences (SFOS). It has been developed in direct collaboration with the faculty and staff in the SFOS Graduate Program in Marine Sciences and Limnology (GPMSL). Additional comments and expertise were provided by the SFOS Curriculum Council Committee, Fisheries Division faculty within SFOS, and various members of agencies and industry (including the U.S. National Park Service, National Oceanic and Atmospheric Administration, U.S. Geological Survey, U.S. Fish and Wildlife Service, Shell Oil, Seldovia Village Tribe, and Coastal Resources Associates Inc.).

B. Brief Statement of the Proposed Program

Nearly three quarters of the earth is covered by oceans harboring most of life’s diversity, feeding populations around the world, and regulating global climate. In the U.S., Alaska has more coastline than any other state, with over 54,000 km (U.S. Census Bureau 2012). Alaska’s waters are some of the most productive in the world, supporting healthy ecosystems with active fisheries and subsistence communities. Globally and locally, the ocean is changing, while it is also seeing an increase in harvest and development, such as oil and gas. Climate concerns for ocean health currently include acidification, warming temperatures, increased sea level, zones of reduced oxygen content, storms, and runoff, and associated changes in water circulation productivity, and food web dynamics. In addition to climate, increased harvest and industry activities as well as general ocean use will have impacts on ocean health. Largely because of the growing concerns for our oceans’ health, sustainability and proper management, trained scientists at various education levels are needed. It is proposed here for GPMSL to implement a Master of Arts (M.A.) program in Marine Science at the University of Alaska Fairbanks. While there are a variety of ocean-related degrees offered in Alaska and across the nation, currently no M.A. in any marine science field is offered at any institution in Alaska. The M.A. will complement existing degree programs by providing secondary education for professionals such as teachers, agency and industry employees.

We envision a new graduate degree within SFOS/GPMSL, a M.A. in Marine Science. This degree will be offered by existing faculty currently involved in the Master of Science programs in Marine Biology and Oceanography, with the three curricula sharing many courses. The M.A. will differ from the two existing M.S. degrees in that it will require a larger number of elective courses to allow students to focus on coursework that is in line with their interests, while at the same time provide students with knowledge in a broad range of subject matters. The M.A. degree will place less emphasis on attaining in-depth knowledge of the scientific process through independent research; rather, students will select either a smaller project or a comprehensive literature review instead of completing a research thesis. Producing M.S. theses requires a significant investment of time and financial support. In GPMSL, most M.S. students receive stipends and tuition waivers that allow them to work full-time on their degrees. These are funded through their advisor’s external grants or through competitive fellowships. In many cases, research projects are very time consuming, and additional time spent seeking funding for
research expenses can also prolong the time to completion of the degree. In the last 25+ years, GPMSL M.S. programs in Marine Biology and Oceanography have graduated 125 students. Of these students, only 7% graduated in two years or less, with 39% graduating in three years or less. However, many students have taken longer to graduate, with 17% of these 125 graduates taking over five years to complete their degrees. A Master of Arts in Marine Science would fill a niche for students who want an advanced degree understanding of marine sciences to promptly join the workforce, but do not have career goals that require undertaking original scientific research as is done when completing M.S.-level thesis research. Recently, the interest in an MA degree in Marine Science has risen, and currently the only option for students is to receive a Master of Arts in a Marine Science related topic through the Interdisciplinary Studies Department. Offering a Master of Arts in Marine Science through GPMSL would provide a focused option for students who are not interested in a more general Interdisciplinary Studies degree.

This M.A. degree program is intended for college graduates and working professionals to pursue further study in marine sciences. The program will provide broadened and scholarly perspectives in the broad fields of marine biology and oceanography, sustainable use of ocean resources, and related societal impacts. This degree is designed to be relevant to those pursuing careers in a broad range of sectors, including (but not limited to) teaching, government policy, and industry.

Objectives:
The objective of this proposed Master of Arts in Marine Science degree program is to provide students with the knowledge base to be highly competitive in obtaining positions or advancing their careers in state and federal management agencies and/or related industries in Alaska and elsewhere. In meeting this need, the University of Alaska Fairbanks will become the University of Choice for educating today’s marine science experts. As one of the premier Arctic Ocean sciences programs in the nation, the UAF School of Fisheries and Ocean Sciences Graduate Program in Marine Science and Limnology will educate the professionals who will work to oversee the sustainability of Alaska’s healthy oceans in the face of changing climate and increased human impact. This proposed degree program will increase student recruitment and retention at UAF. It will also support the many agencies and industries with an interest in the health and sustainability of our ocean.

Career Opportunities:
Graduates who complete the Master of Arts in Marine Science degree would be competitive for a wide variety of agency, industry, and private sector positions, particularly within the State of Alaska. For example, graduates would be qualified for entry-level positions in government agencies such as the U.S. Fish and Wildlife Service, U.S. Geological Survey, National Ocean and Atmospheric Administration, Bureau of Ocean Energy Management, etc. A student with a M.A. in Marine Science would have an academic advantage over those with undergraduate degrees in applying for these highly competitive positions.

We requested input from potential employers of graduates from the proposed program, and received encouraging responses. We have attached specific letters but also wanted to include some email conversations we had while developing this degree. One of the Program Leaders at the USGS-Alaska Science Center commented that our proposed M.A. “... seems similar to a
program at SFU [Simon Fraser University] when I was there, in the Resource and Environmental Management program. A lot of the kids that came out of that program ended up working for consulting firms or in regulatory agencies, equivalent to Fish and Wildlife Service or National Park Service in this case. So I think that there is a role for a program like that, and opportunities for students that receive that kind of degree.... I would certainly consider hiring someone like that in a technical capacity, and would give them stronger consideration than someone with only a B.S., given similar levels of experience.” Similarly, the Director of Science and Research of one of Alaska’s regional citizens advisory councils stated that “I do see the value of a M.A., especially for jobs that require an understanding of basic science (which can be obtained with a B.S. degree) but would benefit from maybe a little more focus on marine biology/oceanography. For example, I think agencies often hire folks with a B.S. in basic biology, but their job requires an understanding of the coastal or ocean environment. A M.A. might help fill that need”. In addition, Alaska Native organizations would also have interest in these graduates. The Environmental Coordinator of the Seldovia Tribal Council stated that “This sounds really cool and maybe more interesting to someone who wants to continue working in their community, maybe for their Tribe. We have started asking for a minimum of a Masters in Biology for our department. Having someone who is more versed would definitely make them more usable. We have done a lot of training after we get folks hired but coming in with more of a broader understanding would make that easier.” Also, industry sees a need for these graduates. A member of the oil industry thought that the M.A. program could be valuable to industry/agencies that do not have much familiarity in marine issues, but find themselves having to deal with these complex problems in their job. Many of these students might already have an advanced degree (e.g., terrestrial biology/environmental science), but have little to no familiarity with marine issues. The M.A. could be attractive to them because it is a degree that allows them to work in their present job while pursuing career advancement and continued education.”

The proposed new program will prepare students for success in a competitive job market by providing a more advanced curriculum than can be obtained in an undergraduate program. Students may be attracted to the M.A. as an alternative to the existing M.S. because completion of a research-based thesis project might not be necessary for their career goals, and following a path that does not require rigorous, time-consuming research would allow them flexibility to continue working on their current job and complete their degree relatively promptly. We envision students will be able to complete the degree within two years, compared to the average completion time of four years for our M.S. graduates because M.A. students will obtain their science communication and research synthesis skills through a small project or a literature review instead of through independent research, and external funding will not be necessary while in the program. The M.A. degree will better prepare students for the above-mentioned post-graduation employment possibilities quickly and inexpensively, make them more marketable than baccalaureate graduates and, consequently, produce employable students. The unique program that we propose to deliver will prepare our M.A. graduates for the specific requirements associated with the Alaska agencies and organizations listed above, and would also make them well qualified for similar jobs throughout North America.
C. Approval Signatures

See attached
Graduate Program Head, Marine Science and Limnology
Date

See attached
Curriculum Council Chair,
School of Fisheries and Ocean Sciences
Date

See attached
Dean, School of Fisheries and Ocean Sciences
Date

President, UAF Faculty Senate
Date

Dean of the Graduate School
Date

Chancellor, University of Alaska Fairbanks
Date

President, University of Alaska
Date
C. Approval Signatures

For the Graduate Program Head, Marine Science and Limnology:

Kathryn Henn
September 24, 2015
Date

For the Curriculum Council Chair, School of Fisheries and Ocean Sciences:

J. Andrés López
September 24, 2015
Date

For the Dean, School of Fisheries and Ocean Sciences:

Brunda Benar, ASSOC. DEAN
September 24, 2015
Date

For the President, UAF Faculty Senate:

September 24, 2015
Date

For the President, University of Alaska:

September 24, 2015
Date

For the Board of Regents:

September 24, 2015
Date
Board of Regents (Chair)
II. Identification of the Program

A. Description of the Program

1. Program Title:
   Master of Arts in Marine Science

2. Credential Level of the Program:
   Master of Arts

3. Admissions Requirements and Prerequisites:
   Students applying for this program must have a Bachelor of Arts or a Bachelor of Science with a minimum 3.0 GPA. Also, a current Graduate Record Examination is required with the applicant scoring at the 55th percentile or better in at least two of the three areas (verbal, quantitative, and analytical writing). Students will be admitted on the basis of their ability and academic preparation, and the capability of the program to meet their particular interests and needs. Faculty will review requests for admission throughout the year. Students will not be financially supported by their advisors or the university.

4. Course Descriptions of Required Courses and Recommended Electives.
   From the 30 required credits, only nine may be at the 400 level. The remaining must be at the 600 level.

   a. Students must take a minimum of 12 credits from the following eight courses:

   **MSL F419—Concepts in Physical Oceanography**
   3 credits, Offered Fall Alternate Years
   This course establishes the physical concepts that account for fluid motion of the oceans on our rotating earth. This course will include the role of the Coriolis force, ocean stratification, wind driven and thermohaline circulation, tides and the major ocean gyres and why they are present. The physical forces that influence biological production will be presented. These foundation concepts will be part of a well-rounded undergraduate program in marine science or establish the foundation for graduate students. Prerequisites: MATH F200X (or higher) or PHYS F211X (or higher) or instructor permission. (3+0)

   **MSL F610 Marine Biology**
   3 credits, Offered Spring
   Biology of the major plant and animal groups in the sea and their roles in pelagic and benthic systems. Physical, chemical and geological features affecting marine organisms and the role of bacteria in the sea. The basic biology and adaptations of selected species of zooplankton
and nekton. The benthos-shore biota, shelf and deep-sea organisms: basic biology, trophic roles and adaptations of selected species. Prerequisites: Degree in biology or permission of instructor. Recommended: Courses in invertebrate zoology, ichthyology, and vertebrate zoology. (3+0)

**MSL F615 Physiology of Marine Organisms**
3 credits, Offered Fall
A study of the physiological systems of and adaptation to the marine environment, intertidal, pelagic, and deep benthos environment and energy flows will be discussed. Prerequisites: Graduate standing or permission of instructor. (3+0)

**MSL F620 Physical Oceanography**
4 credits, Offered Fall
Physical description of the sea, physical properties of seawater, methods and measurements, boundary processes, currents, tides and waves, and regional oceanography. Prerequisites: Math F202X; PHYS F103X or PHYS F211X; science or engineering degree; or permission of instructor. (3+3)

**MSL F630 Geological Oceanography**
3 credits, Offered Spring
Topography and structure of the ocean floor. Theory of plate tectonics. Geology of ocean basins, continental slope, shelf and coastal environments. Major sediment types and distributions. Sediment transport and deposition. Interaction between seawater, rock, and sediment. Paleoceanography. Prerequisites: Graduate standing or permission of instructor. Upper-division standing are invited to contact the instructor. (3+0)

**MSL F640 Fisheries Oceanography**
4 credits, Offered Fall Odd-numbered Years
Oceanography of marine processes affecting commercially important fisheries (finfish and shellfish) and species that affect them. Interactions between fisheries resources and physical, biological, geological and chemical oceanography, as well as climatological and meteorological conditions. Topics include recruitment, transport, natural mortality, predator-prey relationships, competition, distribution and abundance. El Nino/La Nina, regime shifts, and climate change. Emphasis on early life history of fishes. Examples from fisheries and ecosystems worldwide are used. Prerequisites: MSL F620; MSL F650; or permission of instructor. Recommended: FISH F400. (4+0)

**MSL F650 Biological Oceanography**
3 credits, Offered Fall
Survey of biological processes emphasizing organic matter synthesis and transfer including topics essential to a basic understanding of contemporary biological oceanography. Primary and secondary production, standing stocks, distribution, and structure and dynamics of phytoplankton and zooplankton populations. The transfer of organic matter to higher trophic levels and food webs. Nutrient cycling, especially but not exclusively nitrogen, phosphorus and silicon, microbiological processes relevant to nutrient cycling. Heterotrophic production, benthic communities coastal ecosystems, the influence of organisms on the composition of seawater, particularly with reference to oxygen and carbon dioxide regimes. Aspects of regional oceanography. Prerequisites: Upper-division standing in a science major. (3+0)

MSL F660 Chemical Oceanography
3 credits, Offered Spring
An integrated study of the chemical, biological, geological and physical processes that determine the distribution of chemical variables in the sea. Topics include biogeochemical cycles and the use of tracers to follow these complex chemical cycles. The chemistry of carbon is considered in detail. Interactions with the atmosphere and lithosphere (including implications of the mid-ocean ridge vent system to ocean chemistry) are examined. Prerequisites: Graduate standing. Cross-listed with CHEM F660. (3+0)

b. Students must take a minimum of 2 credits of graduate seminar-style courses. These may include but are not limited to:

MSL 692 IMS Seminar
1 credit, Offered every semester
Introduction to various topics in Marine Science through guest lectures. Recommended: Graduate status. (1+0)

MSL F601 Professional Development
1 credit, Offered Spring Odd-Numbered Years
Improve ability to make oral and poster presentations and to write resumes and cover letters. Includes lectures, discussions, and four individual projects. Students are encouraged to use their thesis/dissertation material for the posters and oral presentations. Feedback on all projects will be given by both instructor and students. Recommended: Graduate status. (1+0)

MSL F602 Proposal Writing
1 credit, Offered Fall
Familiarize students with the proposal writing process. Writing proposals is a common requirement during graduate school and will be
continuing during the career as a scientists and researcher. This class aims to cover some common rules about good proposal writing. Students will be required to write a proposal and to give feedback to 1-2 proposals of classmates. Recommended: Graduate status. (1+0)

**MSL F605 Controversies in Marine Science**
1 credit, Offered Spring Even-Numbered Years
Introduction to the idea that science is fluid and controversies and disagreements do occur. These disagreements are often published in the primary literature. This course will be a discussion/debate of various controversial topics in marine science. Recommended: Graduate status. (1+0)

c. Students must take a minimum of 2 credits of practical experience at either the 400 or 600 level. This requirement may be satisfied through independent studies arranged by the student with an appropriate instructor, or through enrollment in field courses such as:

**MSL F421/MSL F623 Field Course in Subtidal Studies**
2 credits, Offered Spring
Students will propose a hypothesis and experimentally test it during a one-week field trip to the Kasitsna Bay Lab. Prior to field trip, students will develop a proposal, dive plan and materials list in relation to their project. Undergraduates will present their findings in an oral presentation to the class while graduate students will present theirs in a public seminar and produce a conference-ready poster. Special fees apply. Prerequisites: MSL F420, basic biology/ecology courses, SCUBA (open water) certification. Special Conditions: Must have a current SCUBA physical approved. (1+1+8)

**MSL F450/MSL F651 Marine Biology and Ecology Field Course**
4 credits, Offered Summer Odd-numbered Years
Advanced understanding of marine organisms in an ecological and evolutionary context through field and laboratory work at the Kasitsna Bay Marine Lab. Includes collection of marine macroalgae, invertebrates and plankton and relating their anatomical organization to habitat, lifestyle and ecology. Emphasis on familiarization with Alaska's nearshore flora and fauna, the ecological function of organisms and ecosystem dynamics. Includes employing different field sampling techniques and experimental designs in various habitats found around the Kasitsna Bay Marine Lab, e.g. rocky intertidal, open water, mudflats, seagrass beds and salt marshes. Prerequisites: One year of biology and permission of instructor. Recommended: Basic courses in ecology and invertebrate zoology. (3+6)

**MSL F456/MSL F656 Kelp Forest Ecology**
4 credits, Offered Summer Even-numbered Years
Introduction to knowledge, hypotheses and disputes regarding components of nearshore tidal communities and the ecological interactions that influence their structure and dynamics. Includes primary published literature in marine subtidal ecology, and local Alaska subtidal flora and fauna. Work underwater conducting ecological research. Includes formulating questions, collecting and analyzing ecological data, report writing and feedback. Special fees apply. Prerequisites: UAF Science Diver certification. (28+35)

MSL F625 Shipboard Techniques
3 credits, Offered As Demand Warrants
Introduction to modern oceanographic shipboard sampling and analysis techniques. (2+3)

d. Students must take a minimum of 6 credits of graduate non-thesis research/project (MSL 698). To be determined by the major advisor and student.

e. Students must take a minimum of 8 credits of electives. Electives will be selected based on student interest, relatedness to their degree and approval by their major advisor.

5. Requirements for the degree

a. Sample of course of study. Only two years are shown as this is a 2 year degree.

<table>
<thead>
<tr>
<th>Course #</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSL 615</td>
<td>Physiology of Marine Organisms</td>
<td>3</td>
</tr>
<tr>
<td>MSL XXX</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>MSL 650</td>
<td>Biological Oceanography</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Semester Credits 9</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSL 610</td>
<td>Marine Biology</td>
<td>3</td>
</tr>
<tr>
<td>MSL 660</td>
<td>Chemical Oceanography</td>
<td>3</td>
</tr>
<tr>
<td>MSL 692</td>
<td>Seminar</td>
<td>1</td>
</tr>
<tr>
<td>MSL 698</td>
<td>Project Credits</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Semester Credits 9</td>
<td></td>
</tr>
<tr>
<td>Summer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSL F651</td>
<td>Independent Study</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Or MSL summer field course</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Semester Credits 2</td>
<td></td>
</tr>
</tbody>
</table>
Fall
MSL 692   Seminar          1
MSL 698   Project Credits   2
XXX XXX   Elective          2
Semester Credits 5

Spring
MSL 698   Project Credits   2
XXX XXX   Elective          3
Semester Credit 5

Total 30

b. General catalog layout.

The Master of Arts (M.A.) degree in marine science offers a broad degree program, which can include topics such as marine ecology, organismal biology, ecosystem processes, and oceanography. Students will select courses offered by the graduate program in marine sciences and limnology, and a variety of electives, which can also be from the fisheries program or the statistics or biology and wildlife departments. While the M.A. degree is primarily based on a project instead of a research-oriented thesis, M.A. graduate students still are afforded excellent opportunities for laboratory and field experiences through the Institute of Marine Science. Laboratory facilities are available in Fairbanks, the Seward Marine Center, the Juneau Center, and at the Kasitsna Bay Laboratory.

Students considering an M.A. in marine science should have a strong background in the various fields of oceanography, ecology, biology, molecular biology or biochemistry. Students are admitted on the basis of their ability and the capability of the program to meet their particular interests and needs. Faculty review requests for admission throughout the year. There is no financial support for students in this program.

M.A. Degree

1. Complete the following admission requirement:
   a. Submit GRE scores.
2. Complete the general university requirements.
3. Complete the master's degree requirements, including a comprehensive exam
4. Complete a project or literature review.
5. Complete a minimum of 12 credits from the following*:
   MSL F419--Concepts in Physical Oceanography—3 credits
   MSL F610--Marine Biology—3 credits
   MSL F615--Physiology of Marine Organisms—3 credits
   MSL F650--Biological Oceanography—3 credits
   MSL F620 or MSL 419--Physical Oceanography — 4 credits
6. Complete 2 credits of graduate seminars
   MSL 692--IMS Seminar
   MSL F601--Professional Development
   MSL F602--Proposal Writing
   MSL F605--Controversies in Science

7. Complete 2 credits of practical experience at either the 400 or 600 level. These may be
   independent studies or regularly scheduled classes such as:
   MSL F421/623--Field Course in Subtidal Ecology
   MSL F450/651--Marine Biology and Ecology Field Course
   MSL F456/656--Kelp Forest Ecology
   MSL F625--Shipboard Techniques

8. Complete 6 credits of graduate project or literature review. To be determine by the major
   advisor and student.

9. Complete 8 credits of electives. Electives will be selected based on student interest,
   relatedness to degree and approval by their major advisor.

Minimum credits required--30 credits
* Students must earn a B- grade or better in the core courses of the degree program
  before being eligible to take the comprehensive exam.

B. Program Goals

1. Objectives and Learning Outcomes:
   This program will provide graduates with the knowledge base to be
   competitive for positions in state and federal management agencies, private
   industry (e.g., natural resource development), and tribal organizations in
   Alaska and elsewhere. Specific educational outcomes include the following:
   a. Have a graduate-level understanding of key concepts in marine biology
      and oceanography;
   b. Have the ability to apply written, verbal, and technological skills to
      effectively communicate with other professionals and laypersons in their
      chosen field;
   c. Have an appreciation for and understanding of the need for lifelong
      learning and developing professional skills;
   d. Learn to gather, interpret, and synthesize published scientific information
      for application to current issues such as resource management practices.

2. Relationship to UAF Mission:
   The relationship between the Master of Arts in Marine Sciences objective to
   the academic mission of UAF is that the M.A. provides high quality, cutting-
   edge education to graduate students seeking a career (or to advance their
   career) in Marine Sciences. The following goals have been identified in the
UAF Strategic Plan 2012-2019, to which the new M.A. in Marine Science will contribute:

a. Promote UAF as Alaska’s premier research enterprise in partnership with state and federal agencies, industry, Alaska Native organizations, and civic groups;
b. Serve Alaska’s diverse communities in ways that are increasingly responsive and accessible and enhance the social, economic, and environmental well-being of individuals and communities;
c. Create or expand graduate programs in targeted areas of identified need and existing strengths;
d. Enhance UAF’s competitive advantage by attracting and keeping the best and brightest students, staff, faculty;
e. Develop innovative approaches to managing University resources to support its mission and position it to meet challenges of the future.

The Master of Arts in Marine Science degree program directly meets each one of these five strategic plan goals.

3. Occupational Competencies to be Achieved
The proposed degree program will offer graduate students the unique ability to achieve a broad academic background in Marine Science, while focusing their project or literature review on a scientific topic of their personal interests.
   a. To develop knowledge on broad topics in Marine Science;
   b. To sharpen critical thinking, written and oral communication, and professional skills relative to Marine Sciences.

4. Relationship of Courses to the Program Objectives
Coursework will provide the necessary knowledge and experience in the competency areas outlined above. The emphasis in the core courses is on the acquisition of a broad graduate-level knowledge in marine biology and oceanography. Additional courses in the program allow students to focus on areas of interest. As such, the associated electives serve to broaden and deepen the program content.

III. Personnel Directly Involved with Program

A. All personnel are SFOS faculty currently offering relevant courses.

Ana Aguilar-Islas, Assistant Professor Chemical Oceanography
MSL 460/660-Chemical Oceanography
MSL 463/663-Chemical Coastal Processes

Eric Collins, Assistant Professor Biological Oceanography
MSL 449/650- Biological Oceanography
Sarah Hardy, Associate Professor Biological Oceanography/Marine Biology
MSL 412/612- Early Life Histories of Marine Invertebrates
MSL 654- Benthic Ecology

Russ Hopcroft, Professor Biological Oceanography/Marine Biology
MSL 449/650- Biological Oceanography
MSL 653- Zooplankton Ecology

Lara Horstmann-Dehn, Associate Professor Marine Biology
MSL 615- Physiology of Marine Organisms
MSL 619- Biology of Marine Mammals

Katrin Iken, Professor Marine Biology, Program Head of Graduate Program in
Marine Sciences and Limnology
MSL 602- Proposal Writing (can count towards seminar requirement)
MSL 610- Marine Biology
MSL 450/651- Marine Biology and Ecology Field Course

Mark Johnson, Professor Physical Oceanography
Current Undergraduate Course:
MSL 419- Concepts in Physical Oceanography
MSL 620- Physical Oceanography

Brenda Konar, Professor Marine Biology, Associate Dean School of Fisheries and
Ocean Sciences
MSL 601- Professional Development (can count towards seminar requirement)
MSL 605- Controversies in Marine Science (can count towards seminar requirement)
MSL 421/623- Field Course in Subtidal Studies
MSL 459/656- Kelp Forest Ecology

Andrew McDonnell, Assistant Professor Chemical Oceanography
MSL 461/660- Chemical Oceanography
MSL F694- Chemical, Physical and Biological Interactions in the Oceans

Brenda Norcross, Professor Fisheries Oceanography
MSL 640- Fisheries Oceanography

Jennifer Reynolds, Associate Professor Geological Oceanography, Director Institute
of Marine Science
MSL 630- Geological Oceanography

Harper Simmons, Associate Professor Physical Oceanography
MSL 632- Oceanographic Data Analysis and Visualization

Thomas Weingartner, Professor Physical Oceanography
MSL 620- Physical Oceanography
MSL 624- Oceanic-Atmospheric Gravity Waves
MSL 626- Continental Shelf Dynamics

Peter Winsor, Associate Professor Physical Oceanography
MSL 403- Estuaries Oceanography

Matthew Wooller, Professor Chemical Oceanography/Marine Biology
MSL 661- Stable Isotope Techniques in Environmental Research

B. Administrative and Coordinating Personnel

Katrin Iken, Program Head of the Graduate Program in Marine Sciences and Limnology.
Responsibilities: Overall coordination and management of the graduate programs.
Dr. Iken also teaches classes, mentors students, and conducts research. She also will administer and coordinate the new M.A. in Marine Science.

C. Classified Personnel

The following individuals are directly involved in the Marine Sciences graduate program.

Christina Neumann, Academic Manager
Responsibilities: Coordination and management of the SFOS academic office.

Mercedes Anderson, Academic Program Coordinator
Responsibilities: Assists the Academic Manager

IV. Enrollment Information

A. Projected Enrollment/Present Information

We anticipate attracting people currently employed in relevant industry or government agency jobs whose career goals do not require the experience of conducting a full thesis research project, but are interested in furthering their education. The number of graduate students enrolled each year in the M.S. in Marine Biology and the M.S. in Oceanography has ranged from 21 to 36 between 2000 and 2014, with an average of 29 graduate students per year. Since 2000, our program has graduated one to ten M.S. students per year, averaging 5.4 students per year. M.S. and M.A. students can also get a marine science-related degree through Interdisciplinary Studies with the assistance of our faculty. Since 2000, eight M.S. and five M.A. students have completed these Interdisciplinary degrees. Four of these five M.A. students completed their degree since 2009, demonstrating a recent increase in demand for the M.A. degree. Currently, if a student has finished their coursework and passed their comprehensive exam, but
is unable to complete a full thesis research project, they can switch to an Interdisciplinary M.A. degree. With the new M.A. in Marine Science, this will become an option for students not able or wanting to complete a full thesis research project.

The most important measure of success is the number of graduates who complete the program and find gainful employment in their profession. With the number of faculty and resources that currently exist, we expect to have approximately 20 graduates enrolled each year in the mature program, with a graduation rate of five per year. If we get four to five students to enroll per year in the first few years of the program, we feel that it will take approximately 5 years to reach a mature program.

B. How determined/who surveyed/how surveyed
GPMSL faculty have spoken with colleagues from traditional government agencies (e.g., U.S. Fish and Wildlife Service, U.S. Geological Survey, National Oceanic and Atmospheric Administration, Bureau of Ocean and Energy Management), an Alaska regional citizens advisory council, an Alaska Native organization, and members of the oil industry to get input on this new degree program. We have attached formal letters of support from some of these colleagues. We have also spoken to current students at UAF. We polled the undergraduates who are currently enrolled in the Marine Science Minor and out of 14, four replied and all of these were favorable. Two specifically asked when this degree might be available as they would be interested in enrolling.

C. Minimum enrollments
The minimum number of enrolled students for this program will be three students per year. Since this new degree does not require new faculty or new courses, we feel that three students would be sufficient to keep the program active. Since this program does not require additional faculty or courses, any students enrolled in it and taking courses would increase tuition revenue and enrollment in GPMSL and other courses.

D. Maximum enrollment
The maximum enrollment for this program would be 30 students. With this many students, some of our core courses could reach maximum enrollment as many of these have limits of 15-20 students. In that situation, we would need to consider offering more sections, which may require more faculty and Teaching Assistants.

E. Special Restrictions on Enrollments
Similar to our Masters of Science degree, we request that students applying to the Master of Arts in Marine Science degree program would have a minimum undergraduate GPA of 3.0 and GRE scores (in verbal, quantitative, and written) of 55.

V. Need for Program
A. Required for Other Programs.

All of the courses that will be required for the Master of Arts in Marine Science are also required for the Masters of Science in Marine Biology and in Oceanography. There are no organizations, agencies, or other professional entities that require a Masters of Arts in Marine Science, although this advanced degree may make these students more attractive to these groups rather than a student with a Bachelor’s degree. The M.A. degree is a terminal degree and not required for another program, although it may better qualify a student than a B.S. degree for a subsequent Ph.D. program.

B. Employment Market Needs

SFOS faculty have talked with agency and other professional entities to determine the need for a Master of Arts in Marine Science (see attached letters). We discovered that this degree would not be preferred over a Master of Science, but it would be preferred over a Bachelor’s degree. Currently, to get a Master of Science in Marine Biology or Oceanography, students must complete research projects that require significant time and resources. In GPMSL, most of these M.S. students are funded through external research grants to their advisor because of the significant time commitment. We feel that if we offer a Master of Arts in Marine Science, we will attract students who want an advanced degree, but investing time or resources into completing a thesis project is a deterrent to enrollment into the M.S. Currently, these students receive a Master of Arts in a marine science-related topic through the Interdisciplinary Studies program. We have been seeing more students who want an M.A. in recent years. By offering a Master of Arts in Marine Science, students would have an option for an advanced degree in Marine Science without solely relying on an Interdisciplinary Studies degree. This is advantageous for the students as the degree on their resume stating M.A. in Marine Science instead of M.A. in Interdisciplinary Studies will be more specific and descriptive of the specific background they will bring to a potential job.

C. Other Group Interests

Another group who may be interested in our proposed M.A. is military and military dependents. We have had students who have come to GPMSL wanting to pursue a masters, but not having the time or resources to complete the project associated with the M.S. The M.A. would be a viable option for students who are interested in completing an advanced degree in less time than the M.S. can afford.

VI. Resource Impact

There are no new resources needed for this new degree program. All courses that are required for the M.A. in Marine Science are currently being offered though GPMSL. Some of these courses are experiencing low enrollment, and it is hoped that the new M.A. will alleviate the low enrollment problem.

B. Facilities/Space Needs
Currently, no new facilities or space are needed for the M.A. in Marine Science because the faculty and courses already exist. If this program grows in size, then additional classroom space and faculty may be needed if additional sections of courses are added to meet increased demand.

C. Credit Hour Production
The M.A. in Marine Science degree program will provide a significant increase in credit-hour production for UAF by attracting new students. Assuming that 20 students are enrolled in this program every year, and that each of these students takes nine credit hours per semester, credit-hour production would be expected to increase by approximately 180 credit-hours per semester.

D. Faculty
No new faculty are needed for the M.A. in Marine Science.

E. Library/Media materials, Equipment, and Services
The Rasmuson library faculty and staff have worked with SFOS faculty over the past several years to remain current with their library holdings in the marine sciences. The library holds subscriptions to all of the major periodicals required to support this program. Many journals can now be accessed online, which will minimize the impact on physical library resources. As a result the impact of this degree program on library resources will be small.

VII. Relation of Program to other Programs within the System.

A. Effects of Enrollment Elsewhere in the System
The creation of a Master of Arts in Marine Science should have minimal impacts on other degree programs in the UA system. The only program that this may impact is M.A. in Interdisciplinary Studies. Currently, Interdisciplinary Studies is the only program that awards M.A. degrees in marine science related fields. Students in that program are currently advised by GPMSL faculty. While we may pull students away from Interdisciplinary Studies, the creation of a M.A. in Marine Science should attract even more students and should result in a net gain in students and credit hours.

B. Duplicate/Approximate Other Programs in the System.
There is no duplication or approximation of other programs at UAF. Currently, there is no Master of Arts in Marine Sciences at any MAU in Alaska. Other institutions in North America do offer Master of Arts in Marine Sciences related areas such as Nova Scotia University with a M.A. in Marine and Coastal Studies, the University of Rhode Island with an M.A. in Marine Affairs, and Boston University with a M.A. in Marine Biology.

C. Relation to Research and Service Activities
Graduate students registered in the Master of Arts in Marine Sciences will work with GPMSL faculty on their research project or literature review. Faculty will
receive workload credits for working with these M.A. students and students will receive guidance and expertise on marine science topics for their project or literature review. Students will be encouraged to present their M.A. projects at community and research conferences and meetings. SFOS is committed to growing its outreach component.

VIII. Implementation/Termination

A. Date of Implementation
   This degree program is expected to be available for the fall semester 2016.

B. Plans for Recruiting Students
   SFOS will make this program known to faculty and students in the UA system and communities in Alaska through multiple press releases and internal communications. We will also use our newly renovated web site to highlight this degree to recruit students from outside UAF. In addition, many of our faculty are regularly contacted with requests for graduate school. Even if these faculty do not have funding for a graduate student in the M.S. or Ph.D. programs, they can steer potential students towards the M.A. degree as an alternative. We will also advertise this program with specially produced flyers that will highlight and outline this new degree to rural communities, military facilities and agencies through our faculty connections with them.

C. Termination Date
   There is no anticipated termination date for this program

D. Plans for Phasing out Program if Unsuccessful
   If it becomes necessary to phase out the program, students will be provided with the opportunity to complete the requirement for the Master of Arts in Marine Sciences. Because no courses or faculty will be associated solely with this program, no course cancellations or faculty termination would occur because of a program phase-out.

E. Assessment of the Program
   The M.A. would prepare a Student Learning Outcomes Assessment report every two years, as in our M.S. programs. Continued enrollment below our projected numbers for five consecutive years would be grounds for phasing out the program. Phasing out would occur over a four year period. During this phasing out, students would still be mentored by their existing advisors and could still take courses, because no classes are associated solely with the M.A. program.

IX. Program Action Request Form (see end of document)

A. Program Summary
Program Goals:

1) Brief identification of objectives and means for their evaluation:
   The objective of this proposed Master of Arts in Marine Science degree program is to provide students with the knowledge base to be competitive in obtaining positions within state, federal, and tribal organizations in Alaska and elsewhere. These graduates would be better qualified for entry-level positions than graduates with a Baccalaureate degree, and would be able to join the workforce relatively quickly as compared to M.S. students because an independent research thesis is not a requirement. The specific educational outcomes for graduates in the Master of Arts in Marine Science degree program are identified by the following core learning objectives:
   - Have a graduate level understanding of marine biology and oceanography concepts;
   - Have the ability to gather and synthesize published scientific information;
   - Have the ability to effectively communicate with other professionals and laypersons using written, oral, and technological skills;
   - Have an appreciation for and understanding of the need for lifelong learning and developing professional skills.

2) Relationship of program objectives to the Purpose of the University:
   A Master of Arts in Marine Science would fill a niche for students who want an advanced degree understanding of marine sciences to promptly join the workforce, but do not have career goals that require undertaking original scientific research as is done when completing M.S.-level thesis research.

Shaping Alaska’s Future:

This program would contribute to Theme 1 of Shaping Alaska’s Future (Student Achievement and Attainment) by providing a degree program whose aim it is to complete M.A. students in 2 years. This is possible because this degree does not require an independent research project. This program will also contribute to Theme 3 (Productive Partnerships with Public Entities and Private Industries) by producing graduates well suited to fill many employment opportunities (see letters of support in the proposal).

UAF Mission:

The relationship between the Master of Arts in Marine Sciences objectives to the academic mission of UAF is that the M.A. provides high quality, cutting-edge education to graduate students seeking a career (or to advance their career) in Marine Sciences. The following goals have been identified in the UAF Strategic Plan 2012-2019, to which the new M.A. in Marine Science will contribute:

- Promote UAF as Alaska’s premier research enterprise in partnership with state and federal agencies, industry, Alaska Native organizations, and civic groups;
- Serve Alaska’s diverse communities in ways that are increasingly responsive and accessible and enhance the social, economic, and environmental well-being of individuals and communities;
- Create or expand graduate programs in targeted areas of identified need and existing strengths;
- Enhance UAF's competitive advantage by attracting and keeping the best and brightest students, staff, faculty;
- Develop innovative approaches to managing University resources to support its mission and position it to meet challenges of the future.

**Academic Master Plan:**
This proposed M.A. in Marine Science will primarily address Goal 1 (Educate students to become informed and responsible citizens) and Goal 2 (Advance research, scholarship, and creative activity). This degree program will increase student retention and timely graduation rates for graduate students by offering a degree option that does not include an independent research project. This program will also integrate education, training and research opportunities for graduate students so that they can obtain a broad knowledge-base that can be used in many employment opportunities. Specifically, this program will mentor graduate students for professional success in world-class research by offering a broad array of coursework and experiences that focus on Alaska and circumpolar north issues.

3) **Occupational or other competencies to be achieved.**
This M.A. degree program is intended for college graduates and working professionals to pursue further study in marine sciences. The program will provide broadened and scholarly perspectives in the broad fields of marine biology and oceanography, sustainable use of ocean resources, and related societal impacts. This degree is designed to be relevant to those pursuing careers in a broad range of sectors, including (but not limited to) teaching, government policy, and industry. The proposed degree program will offer graduate students the unique ability to achieve a broad academic background in Marine Science, while focusing their project or literature review on a scientific topic of their personal interests.

4) **List of faculty directly involved with the program:**
All faculty who are currently associated with the SFOS Graduate Program in Marine Sciences and Limnology (GPMSL) would be involved in this program.

5) **Enrollment information:**
We anticipate attracting people currently employed in relevant industry or government agency jobs whose career goals do not require the experience of conducting a full thesis research project, but are interested in furthering their education.

The most important measure of success is the number of graduates who complete the program and find gainful employment in their profession. With the number of faculty and resources that currently exist, we expect to have approximately 20 graduates enrolled each year in the mature program, with a graduation rate of five per year. If we get four to five students to enroll per year in the first few years of the program, we feel that it will take approximately 5 years to reach a mature program.
6) **Need for program -- employment market needs:**

All of the courses that will be required for the Master of Arts in Marine Science are also required for the Masters of Science in Marine Biology and in Oceanography. There are no organizations, agencies, or other professional entities that require a Masters of Arts in Marine Science, although this advanced degree may make these students more attractive to these groups rather than a student with a Bachelor’s degree. The M.A. degree is a terminal degree and not required for another program, although it may better qualify a student than a B.S. degree for a subsequent Ph.D. program.

SFOS faculty have talked with agency and other professional entities to determine the need for a Master of Arts in Marine Science (see attached letters). We discovered that this degree would not be preferred over a Master of Science, but it would be preferred over a Bachelor’s degree. Currently, to get a Master of Science in Marine Biology or Oceanography, students must complete research projects that require significant time and resources. In GPMSL, most of these M.S. students are funded through external research grants to their advisor because of the significant time commitment. We feel that if we offer a Master of Arts in Marine Science, we will attract students who want an advanced degree, but investing time or resources into completing a thesis project is a deterrent to enrollment into the M.S. Currently, these students receive a Master of Arts in a marine science-related topic through the Interdisciplinary Studies program. We have been seeing more students who want an M.A. in recent years. By offering a Master of Arts in Marine Science, students would have an option for an advanced degree in Marine Science without solely relying on an Interdisciplinary Studies degree. This is advantageous for the students as the degree on their resume stating M.A. in Marine Science instead of M.A. in Interdisciplinary Studies will be more specific and descriptive of the specific background they will bring to a potential job.

7) **Resource Impact:**

There are no new resources needed for this new degree program. All courses that are required for the M.A. in Marine Science are currently being offered through GPMSL. Some of these courses are experiencing low enrollment, and it is hoped that the new M.A. will alleviate the low enrollment problem. In addition, no new facilities or space are needed for this new M.A. because the faculty and courses already exist. If this program grows in size, then additional classroom space and faculty may be needed if additional sections of courses are added to meet increased demand.

Currently, students who want a M.A. in a marine science-related topic do so through the Interdisciplinary Studies program. By offering a M.A. in Marine Science, students would have an option for an advanced degree in Marine Science without relying on an Interdisciplinary Studies degree. This is advantageous for the students as their degree would state M.A. in Marine Science instead of M.A. in Interdisciplinary Studies, which would be more specific and descriptive of the background they will bring to a potential job.

X. Draft Prospectus
Prospectus for University of Alaska Fairbanks

A. Mission and Goals:
We envision a new graduate curriculum within SFOS/GPMSL, a Master of Arts in Marine Science. This degree will be offered by many of the same faculty that offer the current Master of Science in Marine Biology and Master of Science in Oceanography, with the three curricula sharing many of the same courses. Thus, no new faculty or courses are needed for this degree program. Requirements for the Master of Arts are similar to the two M.S. degrees, but the M.A. would allow students to focus on coursework more in-line with their interests and would provide a broader range of subject matter. In lieu of an independent research thesis, M.A. students would be required to complete a project or literature review, as determined in conjunction with their major advisor.

B. Authorization:
The University of Alaska Fairbanks (UAF) is one of four individually accredited universities within the University of Alaska system. UAF has been continuously accredited since 1934 by the Northwest Commission on Colleges and Universities.

The Constitution of the State of Alaska established the University of Alaska as the state university, governed by a Board of Regents appointed by the governor. Alaska Statutes provide for a board of eleven voting members, including one student, with authority to carry out the mission of the university system and its constituent units, including the determination and regulation of the university’s course of instruction and the conferring of degrees. Members of the board have no contractual, employment, or financial interest in the university. The chair is elected from among the board. The board appoints the president of the university system, who in turn appoints the chancellor of UAF. Both officers are full-time employees whose only responsibility is to the institution.

C. Educational Offerings:

1. Descriptive information of the educational offering(s):
The objective of this proposed Master of Arts in Marine Science degree program is to provide students with the knowledge base to be competitive in obtaining positions within state, federal, and tribal organizations in Alaska and elsewhere. These graduates would be better qualified for entry-level positions than graduates with a Baccalaureate degree, and would be able to join the workforce relatively quickly as compared to M.S. students because an independent research thesis is not a requirement. The specific educational outcomes for graduates in the Master of Arts in Marine Science degree program are identified by the following core learning objectives:
   - Have a graduate level understanding of marine biology and oceanography concepts;
   - Have the ability to gather and synthesize published scientific information;
   - Have the ability to effectively communicate with other professionals and laypersons using written, oral, and technological skills;
   - Have an appreciation for and understanding of the need for lifelong learning and developing professional skills.

2. Evidence of approval by the appropriate academic policy body of the institution:
Senate signature page and BOR approval from the minutes will be provided by the Office of the Provost.

D. Planning:

1. Evidence of need for the change and the students to be served:
After discussions with agencies and other professional entities, SFOS faculty discovered that potential employers view an M.A. degree in Marine Science positively. Although the Master of Arts degree was not considered equal to a Master of Science degree, it was considered preferable over a Bachelor's degree. To earn a Master of Science in Marine Biology or Oceanography, students must complete independent research projects that take significant time and financial resources. Most M.S. GPMSL students are funded through their advisor's external grants because of the significant time commitment needed for independent research. The rigor of scientific research often causes student to have a prolonged time to completion. In the last 25+ years, GPMSL M.S. programs in Marine Biology and Oceanography have graduated 125 students. Of these students, only 7% of them graduated in two years or less, with 39% graduating in three years or less. However, many have taken longer to graduate, with 17% of the 125 graduates taking over five years to complete their degrees. A Master of Arts in Marine Science would fill a niche for students who want an advanced degree understanding of marine sciences to promptly join the workforce, but do not have career goals that require undertaking original scientific research as is done when completing M.S.-level thesis research. Recently, the interest in an M.A. degree in Marine Science has risen, and currently the only option for students is to receive a Master of Arts in a Marine Science related topic through the Interdisciplinary Studies Department. Offering a Master of Arts in Marine Science through GPMSL would provide a focused option for students who are not interested in a more general Interdisciplinary Studies degree.

2. The procedures used in arriving at the decision to change:
SFOS faculty have had discussions with agencies and other professional entities to determine the need for a Master of Arts in Marine Science. For specific comments, see attached letters of support. SFOS faculty have also internally discussed the offering of this degree and have polled potential students, and have concluded that the interest, perception, and available resources are such that going forward is appropriate.

3. The organizational arrangements that must be made within the institution to accommodate the change:
None are necessary.

4. Timetable for implementation.
Needed resources are in place, and implementation of this degree program would start the fall semester after approval.

E. Budget:
1. The budget projections (revenue and expenditures) for each of the first three years of operation:
Expenditures: Very little required. No new faculty or courses are needed and current
administrators would take on the extra responsibility of these new M.A. students. Revenue: Most of the courses that we are currently teaching in the GPMSL are not full to capacity. This new M.A. would assist these courses in obtaining higher enrollments. Assuming that five students are enrolled in this program for the first few years, and that each of these students takes nine credit hours per semester, credit-hour production would be expected to be increased approximately 45 credit-hours per semester. With the number of faculty and resources that currently exist, we expect to have approximately 20 graduates enrolled each year in the mature program, with a graduation rate of five per year. If we get four to five students to enroll per year in the first few years of the program, we feel that it will take approximately 5 years to reach a mature program.

2. Revenue and expenditures associated with the change itself: None.

3. Institutional financial support to be reallocated to accommodate the change: None.

4. The budgetary and financial implication of the change for the entire institution: There would be a net increase in student enrollment due to this new graduate degree. Some electives that these students may take can be in other departments, so this would be a net increase in tuition revenues and enrollment in those courses also. Elective topics that may interest these students include those in fisheries, GIS, statistics, and others.

F. Student Services: The Graduate Program in Marine Sciences and Limnology is supported by an Academic Manager and an Academic Program Coordinator who will be ready to assist these new students administratively.

G. Physical Facilities: Needed facilities, such as classrooms with audio-visual capacity, are already in place.

H. Library and Information Resources: No new library and information resources are needed. The Rasmuson library faculty and staff have worked with SFOS faculty over the past several years to remain current with their library holdings in the marine sciences. The library holds subscriptions to all of the major periodicals required to support this program. Many journals can now be accessed online, which will minimize the impact on physical library resources. As a result, the impact of this degree program on library resources will be small.

I. Faculty and Staff: No new faculty or staff are needed. Our current faculty include the oceanographers and marine biologists who already offer the courses required for this new degree program. The majority of these courses have room for more students (10+) to enroll in them. In some cases, these courses are currently being cancelled because of low enrollment.
20 August 2015

Dr. Brenda Konar
Institute of Marine Science
University of Alaska Fairbanks
217 O’Neill
Fairbanks, AK 99775-7220

Dear Brenda

I am writing in support of the proposal to initiate a Master of Arts program in Marine Science within the School of Fisheries and Ocean Sciences at UAF. My background includes over a decade of academic appointments and mentoring graduate students, as well as extensive work within, and in collaboration with, a number of federal agencies. Having seen both the education and employment sides of the equation, I am certain that there is an important, and often unmet, need for training that leads to careers in marine biology outside of research tracks.

There are many jobs requiring expertise in marine biology beyond a BSc that do not involve a research component, including resource management within agencies, education, natural resource policy, and an array of NGO and consulting positions. Similarly, there are many students with interests and aptitudes that align with areas of marine biology outside of research. I feel that many of these students would be better served by an MA program with less of a focus on providing skills associated with a career in research — skills that they may never use.

Perhaps ironically, given my support above, I think that MA graduates would be less competitive for jobs in my agency than those with MSc degrees. However, USGS has an explicit research mandate, so we look for young people with the interest and preparation for a career conducting scientific studies. Many of our partner agencies in the Department of Interior (Fish and Wildlife Service, National Park Service, Bureau of Land Management, Bureau of Ocean and Energy Management, etc) do NOT have research mandates, and are looking for new hires with the kinds of knowledge and skills that could be fostered within an MA program in lieu of time spent conducting a detailed research project.

I hope my comments are useful, and please feel free to follow up if you have any questions.

Regards,

Dan Esler
September 17, 2015

Brenda Konar
Professor
School of Fisheries and Ocean Sciences
University of Alaska Fairbanks
907-474-5028
bkkonar@alaska.edu

Re: developing a Masters of Arts in Marine Science Program

Dear Ms. Konar,

I believe the support of UAF for the project which can take much smaller.deg. of Marine Biology would allow them to have more thesis credit than the courses such as fisheries, statistics and GIS. These latter courses are rather valuable to Tribes and would make a student more desirable.

We look forward to hearing how this program develops. If further information is necessary, please don’t hesitate to contact me at 907-234-7898 x 222 or email me at moheim@svt.or

Sincerely,

AGE TRIBE

Michael Opheim
Environmental Coordinator
To: Brenda Konar, Professor, School of Fisheries and Ocean Sciences  
University of Alaska Fairbanks  

Subject: Development of a Masters of Arts in Marine Science program  

Dear Dr. Konar:

I am writing with respect to the proposed effort by Institute of Marine Science at UAF to develop a Masters of Arts in Marine Science program. As a Supervisory Research Biologist at the Western Ecological Research Center, I can say that we routinely hire recent graduates from various marine science programs around the country to participate in federal research projects of marine ecosystems, and we depend upon the skills, creativity and experience of these young scientists for the successful completion of this research. Some of the skills that are most valued in our new employees are 1) strong writing abilities, 2) strong analytical skills, 3) a solid understanding of study design. In my opinion, an MA program in marine science could provide a student with training in all of these areas. This would allow a graduate to immediately jump into a research program and begin to contribute to activities such as writing research proposals, working with complex, real-world data sets and drafting project reports. I am therefore strongly supportive of the proposal by the Institute of Marine Science to develop such a program.

Sincerely,

Dr. M. Tim Tinker  
Research Biologist, Field Station Principal Investigator,  
and Adjunct Professor of Ecology and Evolutionary Biology, UC Santa Cruz
Dr. Brenda Konar, Professor  
School of Fisheries and Ocean Sciences  
University of Alaska, Fairbanks

8 September 2015

Dear Dr Konar;

I am writing in support of the proposed development of a Master of Arts in Marine Science in addition to the Master of Science degree program at the Institute of Marine Sciences. Successful candidates for many agency positions often require skills beyond having strong science skills. For example, at the Kachemak Bay Research Reserve, we work collaboratively across many disciplines to provide scientific information to coastal decision-makers. At times, the person leading the program is not the subject matter expert but must have the skills to understand, correctly interpret, and translate the science to managers without a science background in a way that is relevant to their job. I believe having a Masters of Arts in Marine Science will help facilitate better integration of science into decision-making processes by providing applied emphasis on fisheries, statistics, and geographic information systems (GIS) modeling for students in the program. If you would like to discuss the program in greater depth, please do not hesitate to call (907) 226.4654.

Sincerely,

Angela Doroff
Research Coordinator,  
Kachemak Bay Research Reserve
September 14, 2015

Dr. Brenda Konar  
Professor  
University of Alaska Fairbanks  
School of Fisheries and Ocean Sciences  
PO Box 757220  
Fairbanks, Alaska 99775-7220

Dr. Konar:

I am writing in regards to the proposed development of a Masters of Arts in Marine Science at UAF. I want to thank you for inquiring about our interest as an agency and allowing for additional comments in terms of the development of the program.

I discussed the proposed MA program with several natural resource ecologists and managers within NPS and we are supportive of the MA program’s development. I also requested additional thoughts on aspects of the program that would be valuable to them as employers. Advanced GIS and statistical skills are certainly advantageous to have. In terms of additional suggestions, integrating coursework in natural resource management, policy and conservation practices would also be beneficial. Prospective graduates then would also possess an understanding of the underlying process of natural resource management. Possible internships within agencies should also be considered.

I’d be happy to discuss further. I look forward to seeing the development of this program.

Thank you,

Heather A. Coletti  
Marine Ecologist  
National Park Service
September 23, 2015

Brenda Konar  
Associate Dean  
School of Fisheries and Ocean Sciences  
University of Alaska Fairbanks  
Fairbanks, AK

Dear Brenda,

I am pleased to hear that the Institute of Marine Science at the University of Alaska Fairbanks is developing a Master of Arts in Marine Science (MAMS) degree program. The proposed program should be a meaningful way to improve the knowledge, skills, and abilities of future professionals in the fields of scientific research, marine resource management, and coastal management.

The Prince William Sound Science Center (PWSSC) hires individuals with scientific skills to serve as research assistants, technicians, educators, and more. Further, I see PWSSC as a possible partner organization for the placement of your degree-seeking candidates in science teaching or research internships as well as in seasonal- or project-based field and research technician positions.

As the only place-based non-profit research and education institute on Prince William Sound, our mission is to improve the understanding and sustainable use of ecosystems of our region. I see high potential for alignment between our organizations and our ability to serve your students while advancing our mutual missions.

Sincerely,

Katrina Hoffman  
President & CEO  
907.424.5800 x225  
khoffman@pwssc.org
# Resource Commitment to the Proposed Degree Program

<table>
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<th>New</th>
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<td>None needed</td>
</tr>
<tr>
<td>Lab Space (Sq. Footage)</td>
<td>19,406 sq ft</td>
<td>None needed</td>
<td>None needed</td>
</tr>
<tr>
<td>Computer &amp; Networking (in dollars)</td>
<td>$64,900</td>
<td>None needed</td>
<td>None needed</td>
</tr>
<tr>
<td>Research/ Instructional/ office Equipment (in dollars)</td>
<td>$232,500</td>
<td>None needed</td>
<td>None needed</td>
</tr>
<tr>
<td>Support Staff (FTE's &amp; dollars)</td>
<td>$4,381,651</td>
<td>None needed</td>
<td>None needed</td>
</tr>
<tr>
<td></td>
<td># 85</td>
<td></td>
<td># 85</td>
</tr>
<tr>
<td>Supplies (in dollars)</td>
<td>$220,500</td>
<td>None needed</td>
<td>None needed</td>
</tr>
<tr>
<td>Travel (in dollars)</td>
<td>$148,900</td>
<td>None needed</td>
<td>None needed</td>
</tr>
</tbody>
</table>

Signature: [Signature]
Dean of College/School Proposing New Degree Program
Date: 10/01/15
Board of Regents Program Action Request
University of Alaska
Proposal to Add, Change, or Delete a Program of Study

1a. UA University (choose one) UAF
1b. School or College
School of Fisheries and Ocean Sciences
1c. Department or Program
Graduate Program in Marine Sciences and Limnology

2. Complete Program Title MA in Marine Science

3. Type of Program
- □ Undergraduate Certificate
- □ Associate
- □ Baccalaureate
- □ Post-Baccalaureate Certificate
- □ Master's
- □ Graduate Certificate
- □ Doctorate

4. Type of Action
- ☑ Add
- □ Change
- □ Delete

5. Implementation date (semester, year)
- ☑ Fall
- □ Spring
- □ Summer
- Year 2016

6. Projected Revenue and Expenditure Summary. Not Required if the requested action is deletion.
   Provide information for the 5th year after program or program change approval if a baccalaureate or doctoral degree program; for the 3rd year after program approval if a master’s or associate degree program; and for the 2nd year after program approval if a graduate or undergraduate certificate. If information is provided for another year, specify (1st) and explain in the program summary attached. Note that Revenues and Expenditures are not always entirely new; some may be current (see 7d.)

<table>
<thead>
<tr>
<th>Projected Annual Revenues to the University in FY 2019</th>
<th>Projected Annual Expenditures in FY 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrestricted</td>
<td>Salaries &amp; benefits (faculty and staff)</td>
</tr>
<tr>
<td>General Fund</td>
<td>$7.5M</td>
</tr>
<tr>
<td>Student Tuition &amp; Fees</td>
<td>$950K</td>
</tr>
<tr>
<td>Indirect Cost Recovery</td>
<td>$2M</td>
</tr>
<tr>
<td>TVEP or Other (specify):</td>
<td>$40K</td>
</tr>
<tr>
<td>Restricted</td>
<td>Year 1</td>
</tr>
<tr>
<td>Federal Receipts</td>
<td>$20M</td>
</tr>
<tr>
<td>TVEP or Other (specify):</td>
<td>$n/a</td>
</tr>
<tr>
<td>TOTAL REVENUES</td>
<td>$31M</td>
</tr>
<tr>
<td>Year 2</td>
<td>$0</td>
</tr>
<tr>
<td>Year 3</td>
<td>$0</td>
</tr>
<tr>
<td>Year 4</td>
<td>$0</td>
</tr>
</tbody>
</table>

Page # of attached summary where the budget is discussed, including initial phase-in: 3

7. Budget Status. Items a., b., and c. indicate the source(s) of the General Fund revenue specified in item 6. If any grants or contracts will supply revenue needed by the program, indicate amount anticipated and expiration date, if applicable.

<table>
<thead>
<tr>
<th>Revenue source</th>
<th>Continuing</th>
<th>One-time</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. In current legislative budget request</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>b. Additional appropriation required</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>c. Funded through new internal UA university redistribution</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>d. Funds already committed to the program by the UA university</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>e. Funded all or in part by external funds, expiration date</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>f. Other funding source Specify Type:</td>
<td>$0</td>
<td>$0</td>
</tr>
</tbody>
</table>

8. Facilities: New or substantially (>25,000 cost) renovated facilities will be required.
- □ Yes
- ☑ No

If yes, discuss the extent, probable cost, and anticipated funding source(s), in addition to those listed in sections 6 and 7 above.

---

1 Sometimes the courses required by a new degree or certificate program are already being taught by a UA university, e.g., as a minor requirement. Similarly, other program needs like equipment may already be owned. 100% of the value is indicated even though the course or other resource may be shared.
9. Projected enrollments (headcount of majors). If this is a program deletion request, project the teach out enrollments.

<table>
<thead>
<tr>
<th>Year 1: 4</th>
<th>Year 2: 8</th>
<th>Year 3: 12</th>
<th>Year 4: 16</th>
</tr>
</thead>
</table>

Page number of attached summary where demand for this program is discussed: 2-3

10. Number* of new TA or faculty hires anticipated (or number of positions eliminated if a program deletion):

| Graduate TA | 0 |
| Adjunct     | 0 |
| Term        | 0 |
| Tenure track| 0 |

11. Number* of TAs or faculty to be reassigned:

| Graduate TA | 0 |
| Adjunct     | 0 |
| Term        | 0 |
| Tenure track| 0 |

Former assignment of any reassigned faculty: 0
For more information see page (n/a) of the attached summary.

12. Other programs affected by the proposed action, including those at other MAUs (please list):

<table>
<thead>
<tr>
<th>Program Affected</th>
<th>Anticipated Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interdisciplinary Studies</td>
<td>Fewer students would receive a M.A. in a marine science related field through Interdisciplinary Studies if this specific degree were available.</td>
</tr>
</tbody>
</table>

Page number of attached summary where effects on other programs are discussed: 3

13. Specialized accreditation or other external program certification needed or anticipated. List all that apply or 'none': none

14. Aligns with University or campus mission, goals, core themes, and objectives (list):
- Promote UAF as Alaska’s premier research enterprise in partnership with state and federal agencies, industry, Alaska Native organizations, and civic groups;
- Serve Alaska’s diverse communities in ways that are increasingly responsive and accessible and enhance the social, economic, and environmental well-being of individuals and communities;
- Create or expand graduate programs in targeted areas of identified need and existing strengths;
- Enhance UAF’s competitive advantage by attracting and keeping the best and brightest students, staff, faculty;
- Develop innovative approaches to managing University resources to support its mission and position it to meet challenges of the future.

Page in attached summary where alignment is discussed: 1-2

15. Aligns with Shaping Alaska’s Future themes:

Page in attached summary where alignment is discussed: 1

16. Aligns with Academic Master Plan goals:

Page in attached summary where alignment is discussed: 2

17. State needs met by this program (list): Currently there is no MA in Marine Science in Alaska. This program would produce students with a broad knowledge base that would be useful to many entities (see letters). Students enrolled in this program have the opportunity to focus on topics of interest.

Page in the attached summary where the state needs to be met are discussed: 3

18. Program is initially planned to be: (check all that apply)
- Available to students attending classes at UAF campus(es).
- Available to students via e-learning.
- Partially available students via e-learning.
Submitted by the University of Alaska Fairbanks.
(choose one above)

<table>
<thead>
<tr>
<th>Provost</th>
<th>Date</th>
<th>Chancellor</th>
<th>Date</th>
</tr>
</thead>
</table>

☐ Consensus Support of SAC  ☐ Not Supported by SAC

☐ Recommend Approval by VPAAR
☐ Recommend Disapproval by VPAAR

UA Vice President for Academic Affairs  Date

*Net FTE (full-time equivalents). For example, if a faculty member will be reassigned from another program, but his/her original program will hire a replacement, there is one net new faculty member. Use fractions if appropriate. Graduate TAs are normally 0.5 FTE. The numbers should be consistent with the revenue/expenditure information provided.

Attachments:  ☐ Summary of Degree or Certificate Program Proposal  ☐ Other [optional]

Revised: 04/20/2015
Program Summary of M.A. in Marine Science

Program Goals:

1) **Brief identification of objectives and means for their evaluation:**

   The objective of this proposed Master of Arts in Marine Science degree program is to provide students with the knowledge base to be competitive in obtaining positions within state, federal, and tribal organizations in Alaska and elsewhere. These graduates would be better qualified for entry-level positions than graduates with a Baccalaureate degree, and would be able to join the workforce relatively quickly as compared to M.S. students because an independent research thesis is not a requirement. The specific educational outcomes for graduates in the Master of Arts in Marine Science degree program are identified by the following core learning objectives:
   - Have a graduate level understanding of marine biology and oceanography concepts;
   - Have the ability to gather and synthesize published scientific information;
   - Have the ability to effectively communicate with other professionals and laypersons using written, oral, and technological skills;
   - Have an appreciation for and understanding of the need for lifelong learning and developing professional skills.

2) **Relationship of program objectives to the Purpose of the University:**

   A Master of Arts in Marine Science would fill a niche for students who want an advanced degree understanding of marine sciences to promptly join the workforce, but do not have career goals that require undertaking original scientific research as is done when completing M.S.-level thesis research.

**Shaping Alaska’s Future:**

This program would contribute to Theme 1 of Shaping Alaska’s Future (Student Achievement and Attainment) by providing a degree program whose aim it is to complete M.A. students in 2 years. This is possible because this degree does not require an independent research project. This program will also contribute to Theme 3 (Productive Partnerships with Public Entities and Private Industries) by producing graduates well suited to fill many employment opportunities (see letters of support in the proposal).

**UAF Mission:**

The relationship between the Master of Arts in Marine Sciences objectives to the academic mission of UAF is that the M.A. provides high quality, cutting-edge education to graduate students seeking a career (or to advance their career) in Marine Sciences. The following goals have been identified in the UAF Strategic Plan 2012-2019, to which the new M.A. in Marine Science will contribute:

- Promote UAF as Alaska’s premier research enterprise in partnership with state and federal agencies, industry, Alaska Native organizations, and civic groups;
- Serve Alaska’s diverse communities in ways that are increasingly responsive and accessible and
enhance the social, economic, and environmental well-being of individuals and communities;
- Create or expand graduate programs in targeted areas of identified need and existing strengths;
- Enhance UAF’s competitive advantage by attracting and keeping the best and brightest students, staff, faculty;
- Develop innovative approaches to managing University resources to support its mission and position it to meet challenges of the future.

Academic Master Plan:
This proposed M.A. in Marine Science will primarily address Goal 1 (Educate students to become informed and responsible citizens) and Goal 2 (Advance research, scholarship, and creative activity). This degree program will increase student retention and timely graduation rates for graduate students by offering a degree option that does not include an independent research project. This program will also integrate education, training and research opportunities for graduate students so that they can obtain a broad knowledge-base that can be used in many employment opportunities. Specifically, this program will mentor graduate students for professional success in world-class research by offering a broad array of coursework and experiences that focus on Alaska and circumpolar north issues.

3) Occupational or other competencies to be achieved.
This M.A. degree program is intended for college graduates and working professionals to pursue further study in marine sciences. The program will provide broadened and scholarly perspectives in the broad fields of marine biology and oceanography, sustainable use of ocean resources, and related societal impacts. This degree is designed to be relevant to those pursuing careers in a broad range of sectors, including (but not limited to) teaching, government policy, and industry. The proposed degree program will offer graduate students the unique ability to achieve a broad academic background in Marine Science, while focusing their project or literature review on a scientific topic of their personal interests.

4) List of faculty directly involved with the program:
All faculty who are currently associated with the SFOS Graduate Program in Marine Sciences and Limnology (GPMSL) would be involved in this program.

5) Enrollment information:
We anticipate attracting people currently employed in relevant industry or government agency jobs whose career goals do not require the experience of conducting a full thesis research project, but are interested in furthering their education.

The most important measure of success is the number of graduates who complete the program and find gainful employment in their profession. With the number of faculty and resources that currently exist, we expect to have approximately 20 graduates enrolled each year in the mature program, with a graduation rate of five per year. If we get four to five students to enroll per year in the first few years of the program, we
feel that it will take approximately 5 years to reach a mature program.

6) Need for Program -- Employment Market Needs:

All of the courses that will be required for the Master of Arts in Marine Science are also required for the Masters of Science in Marine Biology and in Oceanography. There are no organizations, agencies, or other professional entities that require a Masters of Arts in Marine Science, although this advanced degree may make these students more attractive to these groups rather than a student with a Bachelor’s degree. The M.A. degree is a terminal degree and not required for another program, although it may better qualify a student than a B.S. degree for a subsequent Ph.D. program.

SFOS faculty have talked with agency and other professional entities to determine the need for a Master of Arts in Marine Science (see attached letters). We discovered that this degree would not be preferred over a Master of Science, but it would be preferred over a Bachelor’s degree. Currently, to get a Master of Science in Marine Biology or Oceanography, students must complete research projects that require significant time and resources. In GPMSL, most of these M.S. students are funded through external research grants to their advisor because of the significant time commitment. We feel that if we offer a Master of Arts in Marine Science, we will attract students who want an advanced degree, but investing time or resources into completing a thesis project is a deterrent to enrollment into the M.S. Currently, these students receive a Master of Arts in a marine science-related topic through the Interdisciplinary Studies program. We have been seeing more students who want an M.A. in recent years. By offering a Master of Arts in Marine Science, students would have an option for an advanced degree in Marine Science without solely relying on an Interdisciplinary Studies degree. This is advantageous for the students as the degree on their resume stating M.A. in Marine Science instead of M.A. in Interdisciplinary Studies will be more specific and descriptive of the specific background they will bring to a potential job.

7) Resource Impact:

There are no new resources needed for this new degree program. All courses that are required for the M.A. in Marine Science are currently being offered through GPMSL. Some of these courses are experiencing low enrollment, and it is hoped that the new M.A. will alleviate the low enrollment problem. In addition, no new facilities or space are needed for this new M.A. because the faculty and courses already exist. If this program grows in size, then additional classroom space and faculty may be needed if additional sections of courses are added to meet increased demand.

Currently, students who want a M.A. in a marine science-related topic do so through the Interdisciplinary Studies program. By offering a M.A. in Marine Science, students would have an option for an advanced degree in Marine Science without relying on an Interdisciplinary Studies degree. This is advantageous for the students as their degree would state M.A. in Marine Science instead of M.A. in Interdisciplinary Studies, which would be more specific and descriptive of the background they will bring to a potential job.
Curriculum Committee SFOS

Members: Ana Aguilar-Islas (Chair)
Anne Beaudreau
Katrin Iken
Andres Lopez

New Degree Program
Degree: MA in Marine Science
First Time of Offering: Yes

3 August 2015

General Comments and Recommendations:
Consider providing information that presents formally the views of those surveyed, and substantiates the findings that lead to the creation of this degree. For example, instead of quoting from e-mails, request formal letters expressing views about the MA. If letters are provided in letterhead, it will be easy for reviewers to see the positions held by those who responded. Section IV B mentions speaking to current students at UAF, but no outcome of these conversations is given. Provide information on how many students/outiders were surveyed, and how many responded positively. These additions will help the request, given the direction of UAF to cut existing programs.

The degree is likely to take longer than 2 years to complete for those working. It will require 9 credits per semester (3 classes) plus the time to complete the project. Most likely students working full time will take 3 years to complete the degree. Consider including specifics on how students will be attracted, and mention how the MA is going to be advertised.

UAF requires 30 credits for an MA, of which 21 have to be at the 600 level. Here the required credits are 36, of which 30 must be at the 600 level. Consider providing wording that addresses these differences.

Consider communicating with someone from the Interdisciplinary Studies Program to see if this new degree is perceived negatively because of potential competition for students.

Minor comments are below

Request Form:

- Page numbers might be helpful, (but perhaps not part of format).
- Double periods are found in various places (might want to search for “...”)
- Section I. Part B. Brief Statement: Spaces missing between “changes in” and “water circulation”. Also between “ocean’s health,” and “sustainability”.

On the last page of this section: Replace “... and the lack of this rigorous, time consuming requirement could...” with “... and following a path that does not require rigorous, time-consuming research would...”
Section II. Part A Number 4: Consider changing MSL 620 Physical Oceanography for MSL 419.
4d. Change “6 credits of graduate project or literature review” to “6 credits of graduate non-thesis research/project”. MSL 698 is for this purpose.

Section II. Part B. Program Goals: Change “students” to “graduates”. For example “This program will provide students with the…” to “This program will provide graduates with the…”

Section III. Personnel Directly Involved: Change Sarah’s and Lara’s titles to “Associate Professor”
Under Mark’s courses: MSL XXX History should not be included since this is a 200 level course.
Under Andrew’s courses: MSL 694 has the wrong type size

Section III. Part B: Mercedes title should be “Academic Program Coordinator”

Section IV. Part A. Project Enrollment: Change “who do not want or need the experience of conducting a full research project and prefer to enroll directly in the new M.A. program.” to “whose career goals do not require the experience of conducting a full thesis research project, but are interested in furthering their education”.

Section V. Part B. Employment Market Needs: Change “projects that take significant time and” to “projects that require significant time and”
Change “, but do not want or do not have the resources to complete the thesis research.” To “, but investing time or resources into completing a thesis project is a deterrent to enrollment into the M.S.”
Change “without going through Interdisciplinary Studies.” to “without solely relying on an Interdisciplinary Studies degree”.
Change “for students who need a quicker completion than. . .” to “for students who are interested in completing an advanced degree in less time than. . .”

Section VII. Part E: Online journals are library resources. Maybe change to “minimize the impact on physical library resources”

Section IX. Part B. Plans for Recruiting Students: Make section about contacting agencies more prominent, and include contacting the military facilities around Fairbanks.

Section IX. Part D. Phasing out: Include explicitly that faculty positions will not need termination.

Appendix I: MSL 692 Seminar, MSL 698 non-thesis project

Appendix II: Change MSL 620 to MSL 620 or MSL 419 to give an option for students without proper math background

Prospectus. Part C: Add to the core learning objectives one about learning to gather and synthesize published scientific information

Prospectus. Part D: Do you want to include a target academic year? 16-17?