NEW DEGREE PROGRAM REQUEST

Proposal to Establish a New Degree Program:
Graduate Certificate in Sustainability of Marine Ecosystems (SME)

Date: September 2014

Proposal Prepared by: Ginny Eckert, Professor

The sustainable management of marine resources is an inherently interdisciplinary endeavor in which management processes must be cognizant of and responsive to biological, economic, social, cultural, and political perspectives and fully engage stakeholders. This complexity provides a challenge for research and graduate student training, which traditionally occur within a single discipline. To address this challenge, we propose a Graduate Certificate program in Sustainability of Marine Ecosystems (SME) at the University of Alaska Fairbanks. This Graduate Certificate program provides training in an ecosystem-based approach that encompasses natural and social aspects. Ecosystem-based management (EBM) is the stated goal of many federal and state legislative and regulatory bodies, yet its implementation proves a challenge. Providing interdisciplinary training and a broadened perspective of the multidimensional character of marine resource issues will better prepare professionals of the future.

The proposed program was initially envisaged during the highly successful National Science Foundation (NSF) Integrative Graduate Education and Research Training (IGERT) program, Marine Ecosystem Sustainability in the Arctic and Subarctic (MESAS), which began in 2008. Two of the core courses to be used in this new certificate program were developed for the MESAS program and have been implemented multiple times. The third resulted from in-depth discussions with faculty, graduate students, and the External Review panel (Appendix A). As a result, much effort and time has been put into developing this new certificate program.

The SME Graduate Certificate constitutes a pathway by which a student can obtain interdisciplinary training, career building experiences and receive a credential signifying this achievement. This Graduate Certificate is designed to provide breadth and complement MA, MS, or PhD programs that provide depth in a field of expertise, although it is possible to enroll in the Graduate Certificate program while not being concurrently enrolled in another UAF graduate program. The coursework is composed of three core and two elective courses. A new course, Ecosystem-Based Fisheries Management (EBFM; FISH 641), sets the foundation by introducing the principles and practices of EBM and reviewing its implementation in marine settings in Alaska and worldwide. The core North Pacific Fishery Management Council (NPFMC; FISH 681) and Marine Sustainability Internship (ANTH/FISH/MSL 680) courses give students a unique opportunity to experience policy development in practice and work with partner organizations outside academia, gaining valuable career-development experience. Electives provide breadth and allow students to explore marine biology and ecology, economics, policy, management and/or human dimensions.

The goal of this certificate program is to prepare professionals to make meaningful contributions to the understanding and management of marine resources in a holistic context. This credential will signify to potential employers that the student has had training in and practical experience with marine ecosystem-based management. The certificate program will signify the excellence of UAF faculty in this topic area and attract students. By facilitating interactions among faculty, students, and private and public entities, the core courses will help to build relationships outside the university community. Furthermore, the program will foster the growing interaction between the natural and social sciences at the University of Alaska Fairbanks, engaging students and faculty in new and intellectually challenging ways.
<table>
<thead>
<tr>
<th>Table of Contents</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Cover Memorandum</td>
<td>1</td>
</tr>
<tr>
<td>II. Identification of the Program</td>
<td>4</td>
</tr>
<tr>
<td>III. Personnel Directly Involved with Program</td>
<td>7</td>
</tr>
<tr>
<td>IV. Enrollment Information</td>
<td>8</td>
</tr>
<tr>
<td>V. Need for Program</td>
<td>9</td>
</tr>
<tr>
<td>VI. Other</td>
<td>9</td>
</tr>
<tr>
<td>VII. Resource Impact</td>
<td>9</td>
</tr>
<tr>
<td>VIII. Relation of Program to other Programs within the System</td>
<td>10</td>
</tr>
<tr>
<td>IX. Implementation/Termination</td>
<td>10</td>
</tr>
<tr>
<td>X. Regents Guidelines</td>
<td>12</td>
</tr>
<tr>
<td>XI. Draft Prospectus</td>
<td>15</td>
</tr>
<tr>
<td>Appendix A: MESAS External Advisory Panel Report</td>
<td>19</td>
</tr>
<tr>
<td>Appendix B: Core and Elective Course Prerequisites</td>
<td>27</td>
</tr>
</tbody>
</table>
II. Identification of the Program

A. Description of the Program

i. Program title: Graduate Certificate - Sustainability of Marine Ecosystems (SME)

ii. Credential level of the program: Graduate Certificate

1. The UAF Graduation Office will confer the certificate.

iii. Admission requirements and prerequisites:

1. Applicants must follow the admission requirements of the UAF Graduate School

2. Prerequisites: Baccalaureate degree from an accredited institution.

iv. Course Descriptions of required and recommended elective courses:

1. Required Courses:

   a. FISH 641 Ecosystem-based Fisheries Management: During this course students will develop a deep understanding of legal frameworks, principles, governance, approaches, scientific basis, and management implementation of EBFM. A mixture of lecture and reading/class discussion will cover these topics with specific applications from around the world and the Alaska region. Prerequisites: Fisheries Management (FISH 487) or Management of Renewable Marine Resources (FISH 640) or graduate standing or permission of the instructor. (2+0)

   b. FISH 681 The North Pacific Fishery Management Council: A Case Study: This 2 week intensive course provides immersion into the scientific and policy basis for fisheries management in Alaska. Students receive classroom instruction, review current management issues, and witness the decision-making process by attending a North Pacific Fishery Management Council Meeting. Learning is enhanced by discussions with diverse stakeholders and field trips. Prerequisites: permission of the instructor. (1+0+1)

   c. ANTH/FISH/MSL 680 Marine Sustainability Internship: Internship program in marine ecosystem sustainability to broaden students' interdisciplinary training, develop new research tools, build expertise outside their home discipline, gain exposure to careers, and gain a unique perspective on research problems. The internship is for a minimum of 8 weeks and takes place during the summer. In the autumn students report on and meet to discuss their internship experiences. Prerequisites: Marine Ecosystems (MSL F652) or permission of instructor. (0+0+5-16)

2. Elective Courses: Complete at least one course in each category: natural science and social science. Courses applicable to these categories are listed in II.A.v.3.d. below. All elective courses are approved UAF courses, listed in the catalog and regularly offered.
v. Requirements for the degree:

1. Complete the general university requirements

2. Hold a baccalaureate degree from an accredited institution

3. Complete the following:
   
a. FISH 641 Ecosystem-based Fisheries Management (2 cr)

   b. FISH 681 The North Pacific Fishery Management Council: A Case Study (2 cr)

   c. ANTH/FISH/MSL 680 Marine Sustainability Internship (2 cr)

   d. Complete elective courses (at least one course from each category) to total 12 or more credits for the certificate (see Appendix B for a list of prerequisites required for these electives):

      i. Natural Sciences

         FISH 612 Fish Conservation Biology (4 cr)

         FISH 621 Estimation of Fish Abundance (3 cr)

         FISH 622 Quantitative Fish Population Dynamics (3 cr)

         FISH 640 Management of Renewable Marine Resources (3 cr)

         FISH 645 Bioeconomic Modeling and Fisheries Management (3 cr)

         FISH 670 Quantitative Analysis for Marine Policy Decisions (3 cr)

         MSL 610 Marine Biology (3 cr)

         MSL 651 Marine Biology and Ecology Field Course (4 cr)

         MSL 652 Marine Ecosystems (3 cr)

         MSL 656 Kelp Forest Ecology (4 cr)

      ii. Social Sciences

         ANTH/BIOL/NRM 647 Global to Local Sustainability (3 cr)

         ANTH/BIOL/ECON/NRM 649 Integrated Assessment and Adaptive Management (3 cr)

         CCS 612 Traditional Ecological Knowledge (3 cr)

         ECON 635 Renewable Resources Economics (3 cr)
FISH 611 Human Dimensions of Environmental Systems (3 cr)
FISH 672 Law and Fisheries (2 cr)
FISH 675 Political Ecology of the Oceans (3 cr)
PS/NORS 603 Public Policy (3 cr)
PS/NORS 647 U.S. Environmental Politics (3 cr)
PS/NORS 658 Comparative Environmental Politics (3 cr)
PS 669 Arctic Politics and Governance (3 cr)
RD 601 Political Economy of the Circumpolar North (3 cr)
RD 608 Indigenous Knowledge Systems (3 cr)

iii. Other courses may be used to fulfill the elective requirements by petition.

e. Minimum credits required: 12

4. Sample Course of Study and a 3 Year Cycle of Course Offerings

a. Sample Course of Study:

i. Fall I: Elective I

ii. Spring I: EBFM course (FISH 641) & Elective II

iii. Summer I: NPFMC course (FISH 681), Marine Sustainability Internship (ANTH/FISH/MSL 680)

b. 3 Year Cycle of Course Offerings

i. Ecosystem-based Fisheries Management (EBFM) course (FISH 641) will be offered Spring, odd numbered years, North Pacific Fishery Management Council (NPFMC) course (FISH 681) will be offered Summer, odd numbered years, and the Marine Sustainability Internship (FISH 680) will be offered every Summer

ii. Electives are regularly offered (see the chart of course availability in Appendix B)

5. Program Descriptive Paragraph for the General Catalog:

The Sustainability of Marine Ecosystems (SME) graduate certificate provides interdisciplinary study and hands-on experience across natural and social sciences to gain career-building experiences in the ecosystem-based management of marine resources. The certificate will provide students with a credential recognizing their training and expertise in this field.
B. Program Goals

i. Objectives:

1. Students will learn the fundamental components of ecosystem-based management (EBM), gain tools to address the challenges involved in its implementation, and understand the policy framework under which EBM is developing and its implications for Alaska's marine resource-based communities.

2. Students will gain an understanding of the integrative strategies currently utilized in the management of Alaska's marine resources.

3. Students will obtain career-developing experiences by engaging in practicums and the internship, building professional relationships and essential communication skills.

4. Students will gain exposure to both natural and social sciences in an integrative fashion and develop an appreciation for marine resource management in a discipline perspective outside their degree discipline.

ii. Relationship of program's objectives to "Purposes of the University": This program will educate graduate students from natural and social sciences in a curriculum that provides depth and breadth across disciplines. The program will support interdisciplinary research and marine ecosystem-based management by providing interdisciplinary training and internships. It will prepare professionals to work in and with government agencies, private industry, academia and non-governmental organizations. It will connect Alaska Native, rural and urban communities through internships and research projects in coastal communities, and engage Alaskans through internships and outreach activities.

iii. Occupational/other competencies to be achieved: Students in the program will gain an understanding of ecosystem-based management in marine systems, a key framework for many state and federal entities engaged in developing management policies. Through an internship and participation in a policy meeting, students will have the opportunity to observe and contribute to the management process. Further, these experiences will allow students to develop relationship-building and communication skills outside their degree disciplines. The internship and elective courses will also broaden and enrich students' appreciation for the multidisciplinary nature of marine natural and social sciences.

iv. The courses are directly related to the objectives of the program.

III. Personnel Directly Involved with Program

A. Faculty: brief description of duties and qualifications

i. Dr. Ginny Eckert, Professor, SFOS Fisheries Division. Dr. Eckert will lead the SME program and will serve as instructor of the Marine Sustainability Internship (ANTH/FISH/MSL 680). Principal Investigator of the NSF IGERT Marine Ecosystem Sustainability in the Arctic and Subarctic (MESAS) program, Dr. Eckert has been the instructor of this course for several years and has been instrumental in the promotion of interdisciplinary approaches to marine ecosystem management at the University of Alaska Fairbanks.
ii. Dr. Keith Criddle, Professor, Director, SFOS Fisheries Division. Dr. Criddle will co-instruct the NPFMC course (FISH 681), as he has done for several years in conjunction with the MESAS program. As co-PI of the MESAS program and PI of the related NSF Science Masters Program Sustainable Ecosystem-based Management of Living Marine Resources (SELMR) program, Dr. Criddle was instrumental in the development of the core courses and program implementation.

iii. Dr. Gordon Kruse, Professor, SFOS Fisheries Division. Dr. Kruse will co-instruct the NPFMC course (FISH 681) with Dr. Criddle and will be the primary instructor of the EBFM course (FISH 641). As a former chair and vice-chair of the scientific and statistical committee of the NPFMC, Dr. Kruse's expertise and experience in the management of Alaska's fisheries is extensive.

iv. A Steering Committee composed of the above-mentioned faculty and Dr. Paula Cullenberg (MAP Program Leader and Alaska Sea Grant Director), Dr. Jennifer Reynolds (Associate Professor and Director, SFOS IMS), Dr. Courtney Carothers (Associate Professor, SFOS Fisheries Division), Dr. Shannon Atkinson (Professor and Graduate Program Head, Fisheries), and Dr. Katrin Iken (Professor and Graduate Program Chair, Marine Science and Limnology) will act to provide on-going leadership and evaluation of the program's components and assessment of student achievement in the program.

B. No Coordinating Personnel

C. No Classified Personnel

IV. Enrollment Information

A. We would expect 4-6 students to enroll in the program every two years (to coincide with the cycle of core course offerings). Current graduate students can receive the certificate if all of the requirements are fulfilled.

B. Rationale for enrollment: The MESAS program enrolled 19 PhD students in 2008-2012. The SELMR program enrolled 11 MS students in 2010-2012. Therefore, an expected enrollment of 4-6 students each cycle is reasonable. This program is open to students in any graduate program and would most likely serve students concurrently enrolled in graduate programs in Fisheries, Marine Biology, Oceanography, Biology and Wildlife, Economics, Anthropology, Cross-cultural Studies, Natural Resources and Sustainability, Natural Resources Management, and Statistics. Students enrolled in these graduate degree programs have expressed interest in this new certificate program.

C. Minimum enrollment: The primary limiting constraint is a sufficient number of students enrolled in the NPFMC course (FISH 681). At a minimum, four students would need to enroll in this course.

D. Maximum enrollment: The primary limiting constraint is enrollment in courses. Realistically, we could maximally accommodate fifteen students in the NPFMC course (FISH 681), given constraints of room for the public at the council meeting.

E. Special restrictions on enrollments: None
V. Need for Program

A. This program complements degree programs listed in section IV.B. and provides a credential that is particularly relevant for research and management careers. In addition, this certificate provides post-baccalaureate training opportunities for professionals working in resource management agencies. Demand for the program is evident in the number of applicants to the MESAS and SELMR programs.

B. Employment market needs: An ecosystem-based approach to the management of marine resources is now the predominant method used by the National Oceanic and Atmospheric Administration/ National Marine Fisheries Service to manage the resources under its stewardship. State and non-governmental agencies are also incorporating its tenants and principles in management planning and implementation. Graduates with a more interdisciplinary, holistic understanding of the social, physical and biological drivers underlying marine ecosystems will be better prepared to make significant contributions to the field and will distinguish themselves from others in the highly competitive job market. An external review team, including representatives from natural resource agencies, evaluated the future potential of this program and suggested that it would provide excellent training for future employees in their agencies (Appendix A).

VI. Other

A. The MESAS and SELMR program attracted a high caliber of graduate student to the University of Alaska Fairbanks. The 30 PhD and Masters students in the program included a Fulbright Scholar, a National Sea Grant Knauss Fellow, four recipients of the National Science Foundation Graduate Research Fellowship, four NSF Dissertation Improvement Grant recipients, and 3 Rasmusson Fellows among them. To date, these students have been first authors on 9 journal articles, 98 posters and 133 presentations at professional meetings. The MESAS and SELMR students have also been active members of the University’s academic community, including membership on pre-professional association boards like the student chapter of the American Fisheries Society. We expect the SME Graduate Certificate to continue to attract highly motivated and well-prepared graduate students to the UAF community.

VII. Resource Impact

A. Budget: The certificate program can be offered with existing resources. Student travel for the Marine Sustainability Internship (ANTH/ FISH/ MSL 680) and to the NPFMC course (FISH 681) are currently covered by external grants, and without additional support, these costs would be incorporated into student course fees.

B. Facilities/space needs: There are no additional facility or space needs required for this program.

C. Credit hour production: This program will attract graduate students to existing degree programs and courses as well as attract students to this stand-alone program.

D. Faculty: No additional faculty are required for this program. Faculty time associated with core course instruction is reflected in annual workload assignments.
E. Library/Media resource requirements have been assessed during the development of the core courses. No additional resources will be needed for the program.

VIII. Relation of Program to other Programs within the System

A. We anticipate that the program will generate additional interest and enrollment in graduate degree programs in Fisheries, Marine Biology, Oceanography, Biology and Wildlife, Economics, Anthropology, Cross-cultural Studies, Natural Resources and Sustainability, Natural Resources Management, and Statistics.

B. The proposed program does not duplicate or approximate any other programs in the system.

C. How does the program relate to research or service activities?

   i. Contributions to research or service: This program will contribute to research activities at the University by stimulating collaborative, interdisciplinary connections between natural and social scientists. It will also contribute to service activities by promoting positive relationships with agencies, non-governmental organizations, and coastal communities through student internships.

   ii. Benefits from research or service activities: The program will benefit from the wide variety of research currently being conducted by University faculty in the support of sustainable marine resource management and the social and cultural ramifications of management policies. The program will also benefit from existing service activities, providing students opportunities in the classroom and in practicum/internships to engage and interact with individuals and entities actively involved in marine resource management.

IX. Implementation/Termination

A. Date of implementation: 2015-2016 Academic Year

B. Recruitment for the program will be conducted internally by advertising the program to students and faculty in University departments where students working on various aspects of marine resource management may be enrolled. The certificate program will also be included in advertisements for the School of Fisheries and Ocean Sciences directed to external audiences.

C. Termination date (if any): None

D. The program will be phased out if there are no applicants for four consecutive years. This will allow students in the program to complete their certificate program prior to termination.

E. The program will be assessed on a yearly basis by the Steering Committee. The Steering Committee will review applicants to the program, assess the progress of students in the program, and review the feedback from students and faculty in the program. A survey will also be sent to recent graduates to assess the program’s success at developing EBM career development skills and improving student employability. See the Student Learning Outcomes Assessment Plan below.
<table>
<thead>
<tr>
<th>Expanded Statement of Institutional Purpose</th>
<th>Intended Objectives/Outcomes</th>
<th>Assessment Criteria and Procedures</th>
<th>Implementation (what, when, who)</th>
</tr>
</thead>
</table>
| **MISSION STATEMENT:** It is of significant value for professionals working in marine ecosystems to have an understanding of ecosystem-based management, the processes by which policy and management are derived, and a broadened perspective of the multidimensional character of many marine resource management issues. The Graduate Certificate program in Sustainability of Marine Ecosystems (SME) constitutes a pathway by which a student can obtain these career-building experiences and receive a credential signifying this achievement | Students will learn the fundamental components of ecosystem-based management (EBM), gain tools to address the challenges involved in its implementation, and understand the policy framework under which EBM is developing and its implications for marine resource-based communities. | Successful Completion of FISH 641 Ecosystem-based Fisheries Management (EBFM) (B or higher)  
Student Surveys  
Steering Committee Program Review | Evaluation of written essays and participation in class discussions will comprise the EBFM grade.  
Students will complete a survey following completion of the program and one year after graduation to assess the program's success in achieving the stated objectives.  
The Steering Committee will meet annually to review program applications, assess student progress through the program, and review program components. |
| **GOAL STATEMENT:** The goal of this certificate program is to prepare professionals to make meaningful contributions to the understanding and management of marine resources in a holistic context. | Students will gain an understanding of the integrative strategies currently utilized in the management of marine resources. | Successful completion of FISH 881 The North Pacific Fishery Management Council (NPFMC) (Pass)  
Student Surveys and Steering Committee Program Review | Evaluation of a final paper and participation in class discussions will comprise the NPFMC course grade.  
As above |
| | Students will obtain career-developing experiences by engaging in practicums and, the internship building professional relationships and essential communication skills. | Successful completion of ANTH/FISH/MSL 680 Marine Sustainability Internship (B or higher)  
Student surveys and Steering Committee Program Review | As above |
| | Students will gain exposure to both natural and social sciences in an integrative fashion and develop an appreciation for marine resource management in a discipline perspective outside their degree discipline. | Successful completion of the elective courses in each discipline.  
Student surveys and Steering Committee Program Review | Grade of B or higher is required  
As above |
X. Regents Guidelines

PROGRAM SUMMARY
Graduate Certificate in Sustainability of Marine Ecosystems (SME)

Summary
The sustainable management of marine resources is an inherently interdisciplinary endeavor in which management processes must be cognizant of and responsive to biological, economic, social, cultural, and political perspectives and fully engage stakeholders. This complexity provides a challenge for research and graduate student training, which traditionally occur within a single discipline. To address this challenge, we propose a Graduate Certificate program in Sustainability of Marine Ecosystems (SME) at the University of Alaska Fairbanks. This program will provide training in an ecosystem-based approach to management that encompasses natural and social aspects. Ecosystem-based management (EBM) is the stated goal of many federal and state legislative and regulatory bodies. Providing interdisciplinary training and a broadened perspective of the multidimensional character of marine resource issues will better prepare professionals of the future.

The proposed program was initially envisaged during the highly successful National Science Foundation (NSF) Integrative Graduate Education and Research Training (IGERT) program, Marine Ecosystem Sustainability in the Arctic and Subarctic (MESAS), which began in 2008. Two of the core courses to be used in this new certificate program were developed for the MESAS program and have been implemented multiple times. The third resulted from in-depth discussions with faculty, graduate students, and the External Review panel (Appendix A).

The coursework is composed of three core and two elective courses. Ecosystem-Based Fisheries Management (EBFM; FISH 641), a new course, sets the foundation by introducing the principles and practices of EBM and reviewing its implementation in marine settings in Alaska and worldwide. The core North Pacific Fishery Management Council (NPFMC; FISH 681) and Marine Sustainability Internship (ANTH/FISH/MSL 680) courses give students a unique opportunity to experience policy development in practice and work with partner organizations outside academia, gaining valuable career-development experience. Electives provide breadth and allow students to explore marine biology and ecology, economics, policy, management and/or human dimensions.

Program Goal
The goal of this certificate program is to prepare professionals to make meaningful contributions to the understanding and management of marine resources in a holistic context. The credential will signify to potential employers that the student has had training in and practical experience with marine ecosystem-based management.

Program Objectives
1. Students will learn the fundamental components of ecosystem-based management (EBM), gain tools to address the challenges involved in its implementation, and understand the policy framework under which EBM is developing and its implications for Alaska’s marine resource-based communities.
2. Students will gain an understanding of the strategies currently utilized in the management of Alaska’s marine resources.
3. Students will obtain career-developing experiences by engaging in practicums and the internship, building professional relationships and essential communication skills.
4. Students will gain exposure to both natural and social sciences in an integrative fashion and develop an appreciation for marine resource management in a discipline perspective outside their degree discipline.
Relationship to the University of Alaska Core Themes, Shaping Alaska's Future Themes, and the University of Alaska Academic Master Plan Goals:

**Core Theme EDUCATE**
Enable master's/PhD student to master a subject area or advance knowledge

**Shaping Alaska's Future Theme**
Student Achievement and Attainment

**Core Theme DISCOVER**
Engage graduate students in research, scholarship, and creative activity

**UA Academic Master Plan**
Goal 2: Advance research, scholarship and creative activity

The SME Graduate Certificate constitutes a pathway by which a student can obtain interdisciplinary training, career building experiences and receive a credential signifying this achievement. It is designed to provide breadth and complement MS or PhD programs that provide depth in a field of expertise.

**Core Theme PREPARE**
Prepare students for jobs in Alaska

**UA Academic Master Plan**
Goal 4: Develop and enhance programs to respond to state needs

The certificate will prepare professionals to work in and with government agencies, private industry, academia and non-governmental organizations. The Alaska Maritime Workforce Plan (May 2014) identified Fishery Management Specialists, working as team members on social, economic, and biological analyses of management options as “critical but difficult to fill.” The certificate is designed to train graduate students to fill this and similar gaps.

**Core Theme CONNECT**
Partner with Alaska communities on issues of mutual interest

**Core Theme ENGAGE**
Communicate research based knowledge and engage the public in defining priorities

**Shaping Alaska's Future Theme**
R&D and Scholarship to Enhance Alaska’s Communities and Economic Growth

The core courses give students a unique opportunity to experience policy development in practice and work with partner organizations outside academia, gaining valuable career-development experience. The program will connect and engage Alaska Native, rural and urban communities through internships and research projects in coastal communities.

**Faculty**
Dr. Ginny Eckert, Professor, SFOS Fisheries Division. Dr. Eckert will lead the SME program and will serve as instructor of the Marine Sustainability Internship (ANTH/FISH/MSL 680). Principal Investigator of the NSF IGERT Marine Ecosystem Sustainability in the Arctic and Subarctic (MESAS) program, Dr. Eckert has been the instructor of this course for several years and has been instrumental in the promotion of interdisciplinary approaches to marine ecosystem management at the University of Alaska Fairbanks.

Dr. Keith Criddle, Professor, Director, SFOS Fisheries Division. Dr. Criddle will co-instruct the NPFMC course (FISH 681), as he has done for several years in conjunction with the MESAS program. As co-PI of the MESAS program and PI of the NSF Science Masters Program Sustainable Ecosystem-based Management of Living Marine Resources (SELMR), Dr. Criddle was instrumental in the development of the core courses and program implementation.

Dr. Gordon Kruse, Professor, SFOS Fisheries Division. Dr. Kruse will co-instruct the NPFMC course (FISH 681) with Dr. Criddle and will be the primary instructor of the EBFM course (FISH 641). As a
former chair and vice-chair of the scientific and statistical committee of the NPFMC, Dr. Kruse’s expertise and experience in the management of Alaska’s fisheries is extensive.

A Steering Committee composed of the above-mentioned faculty and Dr. Paula Cullenberg (MAP Program Leader and Alaska Sea Grant Director), Dr. Jennifer Reynolds (Associate Professor and Director, SFOS IMS), Dr. Courtney Carothers (Associate Professor, SFOS Fisheries Division), Dr. Shannon Atkinson (Professor and Graduate Program Head, Fisheries), and Dr. Katrin Iken (Professor and Graduate Program Chair, Marine Science and Limnology) will act to provide on-going leadership and evaluation of the program’s components and assessment of student achievement in the program.

Enrollment Information
We would expect 4-6 students to enroll in the program every two years (to coincide with the cycle of core course offerings). The basis for this estimate comes from applicant interest in the MESAS and SELMR programs. The MESAS program enrolled 19 PhD students in 2008-2012. The SELMR program enrolled 11 MS students in 2010-2012. Therefore, an expected enrollment of 4-6 students every other year is reasonable.

The primary enrollment constraint is the number of students enrolled in the NPFMC course (FISH 681). At a minimum, four students would need to enroll in this course. Realistically, we could maximally accommodate fifteen students in the NPFMC course (FISH 681), given constraints of room for the public at the council meeting.

Need for the Program
This program complements existing graduate degree programs including Fisheries, Marine Biology, Oceanography, Biology and Wildlife, Economics, Anthropology, Cross-cultural Studies, and Natural Resources and Sustainability, Natural Resources Management, and provides a credential that is particularly relevant for research and management careers. In addition, this certificate provides post-baccalaureate training opportunities for professionals working in resource management agencies. The program will attract graduate students to existing degree programs and courses as well as attract students to this stand-alone program. The certificate program will signify the excellence of UAF faculty and degree programs in this topic area.

An ecosystem-based approach to the management of marine resources is now the predominant method used by the National Oceanic and Atmospheric Administration/National Marine Fisheries Service to manage the resources under its stewardship. State and non-governmental agencies are also incorporating its tenants and principles in management planning and implementation. Graduates with a more interdisciplinary, holistic understanding of the social, physical and biological drivers underlying marine ecosystems will be better prepared to make significant contributions to the field and will distinguish themselves from others in the highly competitive job market.

Resource Impact
The certificate program can be offered with existing resources. Student travel for the Marine Sustainability Internship (ANTH/FISH/MSL 680) and to the NPFMC course (FISH 681) are currently covered by external grants, and without additional support, these costs would be incorporated into student course fees.

There are no additional facility needs required for this program. No additional faculty are required for this program. Faculty time associated with core course instruction is reflected in annual workload assignments. Library/Media resource requirements have been assessed during the development of the core courses. No additional resources will be needed for the program.
XI. Draft Prospectus

Prospectus for the Graduate Certificate in Sustainability of Marine Ecosystems (SME)

University of Alaska Fairbanks

A. Mission and Goals:

The sustainable management of marine resources is an inherently interdisciplinary endeavor in which management processes must be cognizant of and responsive to biological, economic, social, cultural, and political perspectives and fully engage stakeholders. This complexity provides a challenge for research and graduate student training, which traditionally occur within a single discipline. To address this challenge, we propose a Graduate Certificate program in Sustainability of Marine Ecosystems (SME) at the University of Alaska Fairbanks. The goal of this certificate program is to prepare professionals to make meaningful contributions to the understanding and management of marine resources in a holistic context. This credential will signify to potential employers that the student has had training in and practical experience with marine ecosystem-based management. The certificate program will signify the excellence of UAF faculty in this topic area and attract students.

The certificate supports the 2012 University of Alaska Mission Statement and advances the University of Alaska Fairbanks Core Themes. The program will educate and promote discovery in students by fostering the growing interaction between the natural and social sciences at the University of Alaska Fairbanks and engaging students in new and intellectually challenging ways. The certificate will prepare professionals to work in and with government agencies, private industry, academia and non-governmental organizations. The Alaska Maritime Workforce Plan (May 2014) identified Fishery Management Specialists, working as team members on social, economic, and biological analyses of management options as “critical but difficult to fill.” The certificate is design to train graduate students to fill this and similar gaps. The core courses give students a unique opportunity to experience policy development in practice and work with partner organizations outside academia, gaining valuable career-development experience. The program will connect and engage Alaska Native, rural and urban communities through internships and research projects in coastal communities.

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 establishes 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 SME Graduate Certificate constitutes a pathway by which a student can obtain interdisciplinary training, career building experiences and receive a credential signifying this achievement. This Graduate Certificate is designed to provide breadth and complement MS or PhD programs that
provide depth in a field of expertise, although it is possible to enroll in the Graduate Certificate program while not being concurrently enrolled in another UAF graduate program. The coursework is composed of three core and two elective courses. A new course, Ecosystem-Based Fisheries Management (EBFM; FISH 641), sets the foundation by introducing the principles and practices of EBM and reviewing its implementation in marine settings in Alaska and worldwide. The core North Pacific Fishery Management Council (NPFMC; FISH 681) and Marine Sustainability Internship (ANTH/FISH/MSL 680) courses give students a unique opportunity to experience policy development in practice and work with partner organizations outside academia, gaining valuable career-development experience. Electives provide breadth and allow students to explore marine biology and ecology, economics, policy, management and/or human dimensions.

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:

This program complements existing graduate degree programs including Fisheries, Marine Biology, Oceanography, Biology and Wildlife, Economics, Anthropology, Cross-cultural Studies, and Natural Resources and Sustainability, Natural Resources Management, and provides a credential that is particularly relevant for research and management careers. In addition, this certificate provides post-baccalaureate training opportunities for professionals working in resource management agencies. The program will attract graduate students to existing degree programs and courses as well as attract students to this stand-alone program. The certificate program will signify the excellence of UAF faculty and degree programs in this topic area.

An ecosystem-based approach to the management of marine resources is now the predominant method used by the National Oceanic and Atmospheric Administration/National Marine Fisheries Service to manage the resources under its stewardship. State and non-governmental agencies are also incorporating its tenants and principles in management planning and implementation. Graduates with a more interdisciplinary, holistic understanding of the social, physical and biological drivers underlying marine ecosystems will be better prepared to make significant contributions to the field and will distinguish themselves from others in the highly competitive job market.

2. The procedures used in arriving at the decision to change:

The proposed program was initially envisaged during the highly successful National Science Foundation (NSF) Integrative Graduate Education and Research Training (IGERT) program, Marine Ecosystem Sustainability in the Arctic and Subarctic (MESAS), which began in 2008. Following an External Review of the program by experts in the field (see Appendix A), the certificate was developed to institutionalize key components of the MESAS program and to insure that students could earn a credential signifying training in the ecosystem-based management of marine resources. Two of the core courses to be used in this new certificate program were developed for the MESAS program and have been implemented multiple times. The third resulted from in-depth discussions with faculty, graduate students, and the External Review panel (Appendix A). As a result, much effort and time has been put into developing this new certificate program.

3. The organizational arrangements that must be made within the institution to accommodate the change:

No unique organizational arrangements must be made to accommodate this program.

16
4. **Timetable for implementation**³.

The program will be implemented in the 2015-2016 Academic Year. Recruitment for the program will be conducted internally by advertising the program to students and faculty in University departments where students working on various aspects of marine resource management may be enrolled. The certificate program will also be included in advertisements for the School of Fisheries and Ocean Sciences directed to external audiences.

The program will be assessed on a yearly basis by the Steering Committee. The Steering Committee will review applicants to the program, assess the progress of students in the program, and review the feedback from students and faculty in the program. A survey will also be sent to recent graduates to assess the program’s success at developing EBM career development skills and improving student employability.

The program will be phased out if there are no applicants for four consecutive years. This will allow students in the program to complete their certificate program prior to termination.

**E. Budget:**

1. **The budget projections (revenue and expenditures) for each of the first three years of operation:**

   This graduate certificate will operate with existing resources and will serve to attract high-caliber graduate students to UAF degree programs.

2. **Revenue and expenditures associated with the change itself:**

   No additional revenue or expenditures expected.

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:**

   The certificate program can be offered with existing resources. Student travel for the Marine Sustainability Internship (ANTH/FISH/MSL 680) and to the NPFMC course (FISH 681) are currently covered by external grants, and without additional support, these costs would be incorporated into student course fees.

**F. Student Services:**

None.

**G. Physical Facilities:**

There are no additional facility or space needs required for this program.

**H. Library and Information Resources:**

Library/Media resource requirements have been assessed during the development of the core courses. No additional resources will be needed for the program.

**I. Faculty and Staff:**

No additional faculty are required for this program. Faculty time associated with core course instruction is reflected in annual workload assignments.

Faculty members who will be instrumental in the implementation of the certificate program are listed below.
Dr. Ginny Eckert, Professor, SFOS Fisheries Division. Dr. Eckert will be the primary instructor of the Marine Sustainability Internship (ANTH/FISH/MSL 680). Principal Investigator of the NSF IGERT Marine Ecosystem Sustainability in the Arctic and Subarctic (MESAS) program, Dr. Eckert has been the instructor of this course for several years and has been instrumental in the promotion of interdisciplinary approaches to marine ecosystem management at the University of Alaska Fairbanks.

Dr. Keith Criddle, Professor, Director, SFOS Fisheries Division. Dr. Criddle will co-instruct the NPFMC course (FISH 681), as he has done for several years in conjunction with the MESAS program. As co-PI of the MESAS program and PI of the NSF Science Masters Program Sustainable Ecosystem-based Management of Living Marine Resources (SELMR), Dr. Criddle was instrumental in the development of the core courses and program implementation.

Dr. Gordon Kruse, Professor, SFOS Fisheries Division. Dr. Kruse will co-instruct the NPFMC course (FISH 681) with Dr. Criddle and will be the primary instructor of the EBFM course (FISH 641). As a former chair and vice-chair of the scientific and statistical committee of the NPFMC, Dr. Kruse’s expertise and experience in the management of Alaska’s fisheries is extensive.

A Steering Committee composed of the above-mentioned faculty and Dr. Paula Cullenberg (MAP Program Leader and Alaska Sea Grant Director), Dr. Jennifer Reynolds (Associate Professor, SFOS IMS), and Dr. Courtney Carothers (Associate Professor, SFOS Fisheries Division) will act to provide on-going leadership and evaluation of the program’s components and assessment of student achievement in the program.

No coordinating or classified personnel are required for the program.
Appendix A: MESAS External Advisory Panel Report
MESAS External Advisory Panel Report

Recommendations for an Ecosystem-based Management Program as a Successor to the Marine Ecosystem Sustainability in the Arctic and Subarctic (MESAS) Program

In the School of Fisheries and Ocean Sciences University of Alaska Fairbanks

Prepared by
Doug Woodby, Panel Chairperson, Marine Fisheries Scientist, retired, Alaska Dept. of Fish and Game

Susan Abbott-Jamieson, Senior Social Scientist, retired, NOAA Fisheries/Office of Science and Technology, and Associate Professor Emerita, Department of Anthropology, University of Kentucky

Jason Link, NOAA Fisheries, Senior Scientist for Ecosystem Management

Ross Virginia, Director, Institute of Arctic Studies, Dickey Center for International Understanding, Dartmouth College

Submitted December 12, 2013
Charge to the Panel and Purpose of the Report

The Marine Ecosystem Sustainability in the Arctic and Subarctic (MESAS) External Advisory Panel was charged with identifying the key elements of the MESAS graduate training program that merit continuation, either as part of the current program, or alternately, as a new program to succeed it. The MESAS program was funded by a National Science Foundation (NSF) Integrative Graduate Education and Research Training Grant (IGERT). The program is in its fifth and final year of NSF funding. This report presents our findings, first identifying our primary recommendations, followed by an explanation of how we arrived at our recommendations, what we see as long-term goals and major benefits, as well as some additional programmatic recommendations. The report ends with a list of challenges.

Main Recommendations

- Create a successor program to replace the MESAS Program. This high-value program should be continued after the NSF-funded program ends. The new program should closely mirror the existing program except in certain elements identified later in this report. Continuation of the program will require identifying and obtaining new support money and a commitment from the UAF administration to allocate other resources (space, courses) to assist in the next phase.
  - The new program should be developed by a team composed of both natural and social science faculty. This is important because it will further the core interdisciplinary nature of the program and is responsive to student interests.

- Institute a certificate program in Ecosystem-based Management (EBM) at UAF. Many students stated that a graduate certificate in EBM would signify to future employers what is unique about their graduate training. It will also signify to others within the university what is unique about the MESAS program and will serve to institutionalize it. It can be used as a recruiting tool for students and for new faculty. It can be a source of legitimacy and an indicator of expertise when seeking external funds for program support and research. It would be a strong signal to the NSF that the MESAS IGERT was a success and that the UAF administration would support future externally funded programs in a serious way.

- Pursue creative private/public partnerships to resource this effort. Possibilities for external partnerships were discussed with the faculty, e.g., Alaska's Native Corporations and the commercial fishing industry. This program, either in whole or in part, should be able to competitively attract private/public partnerships.

Panel Composition and Procedures

The panel is comprised of Susan Abbott-Jamieson (Senior Social Scientist, retired, NOAA Fisheries/Office of Science and Technology, and Associate Professor Emerita, Department of Anthropology, University of Kentucky), Jason Link (NOAA Fisheries, Senior Scientist for Ecosystem Management), Ross Virginia (Director, Institute of Arctic Studies, Dickey Center for International Understanding, Dartmouth College), and Doug Woodybay, panel chairperson (Marine Fisheries Scientist, retired, Alaska Dept. of Fish and Game).

The panel met November 11 and 12, 2013 at the University of Alaska Fairbanks School of Fisheries and Ocean Sciences (SFOS) facility in Juneau, Alaska. Eight group interviews with students and faculty were conducted over two days; each session was devoted to specific aspects of the current MESAS program.
according to an agenda provided by the MESAS Program Steering Committee (see attachment A). The assigned topics covered major aspects of the program. Panel members were provided background material on the program in advance of the review and were invited to revise the agenda as needed.

The program elements discussed with MESAS students included the summer course and retreat, professional development opportunities, internship requirements, the small grants program, the undergraduate mentoring requirement, individual dissertation research projects, and the invited scholars program. Other topics were raised by the students during the course of their interviews, e.g., interdisciplinary research, overall curriculum, and relations with non-MESAS graduate students. Additionally, the Sustainable Ecosystem-Based Management of Living Marine Resources Science (SELMR) Master’s Program students met with the panel to discuss their experiences with the associated SELMR Program, which is also funded by NSF and is ending. Fourteen MESAS and four SELMR students met with the panel. Some students were not available because they were at remote sites conducting research, or had already completed the program and graduated. The available students represented all student cohorts, providing the panel with a good sense of the spread of student experience since the programs began.

The panel met initially with the MESAS Program Director, Dr. Ginny Eckert, and the Program Coordinator, Dr. Catherine Bradley, who provided an overview of the program’s history, detailed the charge to the panel, and answered the panel’s questions about process and expectations for the final report. They also made themselves available to the panel to answer any panelists’ questions during the panel work session on the afternoon of the second day. The topics discussed with program faculty included but were not limited to program structure, content, and development; current curriculum; perspectives on interdisciplinary research and teaching; perspectives on the mentoring requirement; commitment to continuing the existing or similar program; and possible relationships with other University of Alaska programs and departments that might complement the successor to the MESAS program. Nine MESAS faculty participated both in person and via video conferencing from the University of Alaska Fairbanks campus.

**Long-term Goals**

*The successor MESAS program should strive to achieve the following long term goals by building on the most successful program elements:*

- **Build capacity to do Ecosystem-Based Management.** The panel stresses the importance of EBM. EBM is not going away; it will remain the dominant approach for the foreseeable future in managing marine ecosystems and will provide the interdisciplinary framework to keep the program at the cutting edge of new marine science and policy research. It has been adopted by the National Oceanic and Atmospheric Administration/National Marine Fisheries Service (NOAA Fisheries Service) as the dominant approach to managing the marine resources under its stewardship. State marine fisheries management agencies also recognize the value of this approach, and many NGOs do as well.

- **Build capacity to do interdisciplinary work.** The MESAS Program is an interdisciplinary program that combines marine and social sciences to broadly train graduate students in ecosystem-based approaches for the sustainable management of living marine resources (MESAS NSF proposal, p. 2). Being broadly conversant in the relevant theories, concepts, and research designs of both marine and social sciences is basic to training future, creative scientists who can work collaboratively in multidisciplinary settings both inside and outside of academia. Many of the vexing problems affecting the health of marine ecosystems around the world can best be studied
though interdisciplinary approaches. Finding solutions to these problems will likely involve understanding and changing human behavior. Continuing to foster both faculty and student capacity to do interdisciplinary work should be a priority in the successor program.

- **Build a sense of community among students and faculty.** Over and over again the students commented on the importance to them of belonging to a scholarly and social community of students and faculty. They felt this enhanced their educational experience, their research, and a sense of growing professionalization throughout their time in the program. Both MESAS and SELMR students made these comments. Faculty also commented on the importance of fostering a sense of community both for themselves and for the program's students. Continuing to foster a sense of community among students and faculty is a cornerstone for achieving long term success in the future program.

**Program Benefits**

- **Significant benefits to the University of Alaska Fairbanks.** MESAS is a pillar of excellence and UAF should capitalize on this effort. The panel is united in believing that UAF will realize a significant return on any investment that it makes in this program. The program is on schedule to produce up to 17 new PhDs and 13 new MS professionals ready to assume careers in a variety of positions both inside and outside academia. Program faculty and students are demonstrating success in interdisciplinary collaboration to attract outside research dollars to the university, simultaneously raising the university's visibility both nationally and internationally. This successful program has enhanced UAF's competitiveness for future federal and private foundation grants, as well as fishing industry funds; past successes figure in decisions for future grants. The UAF MESAS Program is a strong program that is attracting excellent students and younger faculty. It was the sense of both the faculty and this review panel that the quality of students attracted to MESAS was very high, and that a number of top students now interested in Arctic and Subarctic marine ecosystem management as a career path would not have been at UAF without the attractive elements of MESAS or a MESAS-like program. The panel strongly urges the UAF to institutionalize the key elements of the MESAS Program so that it can continue to benefit.

- **Significant benefits to the State of Alaska.** For decades, the Alaska Department of Fish and Game has benefited greatly by employing newly graduated Masters and doctoral students from UAF who come well prepared to step into challenging resource management positions. The cohorts of MESAS and SELMR students are particularly desirable candidates for state employment because of their exceptional quality, productivity, and interdisciplinary training. Alaska stands to be a primary beneficiary of these highly motivated young professionals, many of whom favorably view the Alaska Department of Fish and Game as a career opportunity.

- **Significant benefits to the Nation.** A key policy for the major Federal agencies managing marine resources is adopting an ecosystem-based approach to management. The National Ocean Policy has explicitly codified this as a major operational framework. Other integrative efforts, particularly in the Arctic, also embrace the concept of ecosystem-based management. All Federal agencies working in the marine ecosystem have EBM as a central policy, for example NOAA, USGS-BRD, BOEM, EPA, and USFWS. Critical for the future work of doing EBM in these federal agencies will be an adequately trained workforce, with the quantitative, interdisciplinary, and integrative skills necessary to explore the complexities of marine ecosystems. The students
coming out of the MESAS and SELMR programs are precisely the type of personnel these agencies are looking to employ. The lessons learned and skills developed in the MESAS program are highly translatable to other regions and the nation stands to benefit from having a professional workforce trained in such a manner. Additionally, the research and methodologies developed in such a program will benefit the future operational frameworks of how marine ecosystem resources are managed, and the development of such knowledge and tools will depend heavily on programs such as this.

Program Strengths

- **Unusually high level of student productivity.** MESAS students have demonstrated an unusually high level of productivity of the kind targeted by MESAS training. As of this date, students have authored or co-authored 49 posters and 66 papers that have been presented at MESAS Program or UAF symposia, state chapter meetings of national professional organizations, national meetings of professional organizations, and meetings of regulatory entities. They have also served as co-authors on 8 publications in referred journals or similar publications. MESAS students have received 3 highly competitive NSF Graduate Research Fellowships since entering the program, as well as additional support from other competitive sources.

- **Strong sense of student/faculty community.** The program has achieved a strong sense of student/faculty community. This has been a significant factor in the overall program success. Based on the comments of the majority of students as well as some faculty, the required summer class for new students followed by the two day program retreat that includes all students in both the MESAS and the SELMR programs has been important in building the sense of community. They are current program strengths.

- **High rate of degree completion in a timely manner.** Both MESAS and SELMR students have moved toward degree completion in a timely manner. Among the 19 MESAS Ph.D. students, one should graduate December 2013 and the rest are on track to complete their degrees within a 5-6 year time frame. Two have decided to complete an MS degree, not continuing to the Ph.D. degree. This represents a loss rate to date of a bit over 10% mid-way into the program’s fifth year. If the program can usher its remaining students to Ph.D. degree completion, the program will be well above the national average for completion of 62.9% for the life sciences according to one Council of Graduate Schools study. Among the SELMR students, three have already completed their degrees and one more should complete it in 2013. By the end of 2014, seven more should have completed the MS degree. No one has left the program at this time. The expected average time to completion is 3.2 years.

Programmatic Recommendations

- **Maintain the following key elements:**
  - Marine Sustainability Internships - keep them. They are currently arranged for the summer between the 1st and 2nd years for each cohort.
  - Consider allowing some flexibility in their timing.
  - Consider having a committee approve timing and topic selection, e.g., student’s advisor, program director or coordinator, and one other faculty member. If possible be sure to have at least one social scientist and one natural scientist on the approving committee.
• Fish 681 North Pacific Fishery Management Council Course – keep it. Regarded by nearly all of the students as one of the most valuable experiences offered by the program. It is the students’ window into the management and policy process.

• Invited scholars program – keep it. It is an important opportunity for the students. The visitors offer networking opportunities outside Alaska with scholars who have national and international reputations. The students were in agreement that it is helpful to their personal development as future professionals. The benefits to faculty are equally clear.

• Small grants program – keep it. This opportunity is in no small part responsible for the program’s impressive productivity through attending professional meetings and presenting posters and papers. It also allowed for new innovative student driven research projects that might not have been possible under the constraints of faculty held research funding.

• Refocus the following program elements:

  • Mentoring program. As currently constituted, this appears to be one of the most problematic elements in the current program. It will profit from a refocusing, possibly by considering outreach and service to a variety of organizations in place of the mentoring model in the original program conceptualization. The target populations’ needs as they perceive them apparently have not always been congruent with the program’s original thinking about instituting the mentoring requirement. The panel agrees that involving students with some service component has merit as a professionalizing activity, but urges the program to rethink exactly what form(s) might best serve the educational goals envisioned for the program’s students and the time commitment in relation to other research and educational activities.

• Coursework:
  • In addition to the Council course and the internship, we recommend the program add a marine EBM course as a third required course.
  • Professional development opportunities should be provided in the form of short or intensive courses that teach necessary and useful technical skills, e.g., using special purpose software, improving skill with still and video cameras, and so forth. These may be offered by other units or in collaboration with other units in the University.
  • Evaluate current course options, particularly the Innovative Approaches to Marine Ecosystems (IAME) course held during spring seminar. Students were expected to take a central role in organizing and leading the course. While the goals of the course are important in pushing students to think hard about how to integrate social and natural sciences in research, it has not worked well for them. It should be revised before it is offered again. Many students at this stage of their graduate program may not have the interdisciplinary framework in hand to integrate and lead discussions on complex natural science/social science problems. Is there another way to provide the same learning opportunities?
  • Expand the list of optional courses to include courses in theory, methods, application, and science communication, e.g., research methods in individual social sciences. These courses do not appear to be included in the proposed course lists. Consider if there are additional courses that warrant being added to the lists.

Challenges
• Finding new funding for students and for the program components.
• Tension between allowing greater freedom in course selection and limiting selection.
• The MESAS program at UAF owes its success in part to faculty leadership, particularly to the efforts of Dr. Ginny Eckert. It will be important for those leading the next program to be provided adequate time and freedom to pursue and engender a strong interdisciplinary commitment among the participating faculty and students, as is evident in the current program.

Appendix B: Core and Elective Course Prerequisites
Core Courses
FISH 641 Ecosystem-based Fisheries Management  
Prerequisites: Fisheries Management (FISH 487) or Management of Renewable Marine Resources (FISH 640) or graduate standing or permission of the instructor.

FISH 681 The North Pacific Fishery Management Council: A Case Study  
Prerequisites: permission of the instructors.

ANTH/FISH/MSL 680 Marine Sustainability Internship  
Prerequisites: Marine Ecosystems (MSL F652) or permission of instructor.

Electives: Natural Sciences
FISH 612 Fish Conservation Biology (4 cr)  
Prerequisites: None

FISH 621 Estimation of Fish Abundance (3 cr)  
Prerequisites: MATH F201X; STAT F401; familiarity with PCs including word processing and spreadsheets. Recommended: FISH F421; MATH F302; MATH F314.

FISH 622 Quantitative Fish Population Dynamics (3 cr)  
Prerequisites: MATH F201X; STAT F401; Familiarity with PCs including word processing and spreadsheets. Recommended FISH F421; MATH F302; MATH F314.

FISH 640 Management of Renewable Marine Resources (3 cr)  
Prerequisites: FISH F427.

FISH 645 Bioeconomic Modeling and Fisheries Management (3 cr)  
Prerequisites: STAT F401 and MATH F200X, MATH F262X or MATH F272X; graduate standing or permission of instructor.

FISH 670 Quantitative Analysis for Marine Policy Decisions (3 cr)  
Prerequisites: STAT F401; MATH F200X, MATH F262X or MATH F272X; graduate standing or permission of instructor.

MSL 610 Marine Biology (3 cr)  
Prerequisites: Degree in biology or permission of instructor. Recommended: Courses in invertebrate zoology, ichthyology, and vertebrate zoology.

MSL 651 Marine Biology and Ecology Field Course (4 cr)  
Prerequisites: One year of biology; graduate standing; permission of instructor. Recommended: Basic courses in ecology and invertebrate zoology.

MSL 652 Marine Ecosystems (3 cr)  
Prerequisites: BIOL F472; MSL F620; MSL F650; or permission of instructor.

MSL 656 Kelp Forest Ecology (4 cr)  
Prerequisites: UAF Science Diver certification.
Electives: Social Sciences

ANTH/BIOL/NRM 647 Global to Local Sustainability (3 cr)
   Prerequisites: Graduate standing in a natural science, social science, humanities, or interdisciplinary program at UAF; and permission of instructor.

ANTH/BIOL/ECON/NRM 649 Integrated Assessment and Adaptive Management (3 cr)
   Prerequisites: Graduate student standing in a natural science, social science, humanities or interdisciplinary program at UAF or another university; or permission of instructor.
   Recommended: ANTH/BIOL/ECON/NRM F647; ANTH/BIOL/ECON/NRM F667.

CCS 612 Traditional Ecological Knowledge (3 cr)
   Prerequisites: Graduate standing or approval of the instructor.

ECON 635 Renewable Resources Economics (3 cr)
   Prerequisites: ECON F321; ECON F335 or equivalent; MATH F200X or equivalent; graduate standing; or permission of instructor.

FISH 611 Human Dimensions of Environmental Systems (3 cr)

FISH 672 Law and Fisheries (2 cr)
   Prerequisites: graduate standing or permission of instructor.

FISH 675 Political Ecology of the Oceans (3 cr)
   Prerequisites: Graduate standing or permission of instructor.

PS/NORS 603 Public Policy (3 cr)
   Prerequisites: Graduate Standing.

PS/NORS 647 U.S. Environmental Politics (3 cr)
   Prerequisites: Graduate standing or permission of instructor.

PS/NORS 658 Comparative Environmental Politics (3 cr)
   Prerequisites: Graduate standing or permission of instructor. Recommended: PS F201 or equivalent comparative politics course.

PS 669 Arctic Politics and Governance (3 cr)
   Prerequisites: PS F450, PS F452 or PS F454 or equivalent; graduate standing; or permission of instructor. A background in comparative politics and/or international relations is also recommended.

RD 601 Political Economy of the Circumpolar North (3 cr)
   Prerequisites: Graduate standing or permission of instructor.

RD 608 Indigenous Knowledge Systems (3 cr)
   Prerequisites: Graduate standing or approval of instructor.
<table>
<thead>
<tr>
<th></th>
<th>Spring Odd Years</th>
<th>Fall Odd Years</th>
<th>Spring Even Years</th>
<th>Fall Even Years</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CORE Courses</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FISH 641</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FISH 681</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Summer; Odd Years</td>
</tr>
<tr>
<td>ANTH/FISH/MSL 680</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Summer</td>
</tr>
<tr>
<td><strong>Elective Courses</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Natural Sciences</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FISH 612</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FISH 621</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FISH 622</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FISH 640</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>FISH 645</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FISH 670</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>MSL 610</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>MSL 651</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Summer; Odd Years</td>
</tr>
<tr>
<td>MSL 652</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSL 656</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>Social Sciences</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANTH/BIOL/NRM 647</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANTH/BIOL/ECON/NRM 649</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCS 612</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECON 635</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>FISH 611</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>FISH 672</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FISH 675</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PS/NORS 603</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PS/NORS 647</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PS/NORS 658</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PS669</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RD601</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RD608</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Curriculum Committee SFOS

Members: Trent Sutton (Chair)
Brenda Konar
Ana Aguilar-Islas
Andres Lopez

24 August 2014

New Degree Program
Degree Program: Graduate Certificate in Sustainability of Marine Ecosystems
Program Leader: Eckert

The following questions and comments reflect the general discussion of the SFOS Curriculum Committee (SFOS CC) regarding the Sustainability of Marine Ecosystems (SME) graduate certificate. The SFOS CC thought that the proposal would be strengthened with letters of support from agency employers which would provide solid evidence for certificate program justification. Do any of these agencies support the certificate program? An external review team with prestigious representatives from NOAA (social and natural sciences) and ADFG—the two primary agencies that serve as employers for marine resource professionals provided a thorough review of the program and their evaluation of future need. Their first recommendation is to institutionalize this program. This review is provided as Appendix A.

- Have potential employers (e.g., NOAA, ADFG, USFWS, NPS, etc.) been contacted to determine if they might have preferential interest in a student that has completed their graduate degree from UAF with the SME certificate relative to a student that has completed a UAF graduate degree but did not participate in the certificate program? Given the current scrutiny at UAF on new degree programs and low enrollment degree programs, the SFOS CC thought that the proposal would be strengthened with letters of support from agency employers which would provide solid evidence for certificate program justification. Do any of these agencies support the certificate program? An external review team with prestigious representatives from NOAA (social and natural sciences) and ADFG—the two primary agencies that serve as employers for marine resource professionals provided a thorough review of the program and their evaluation of future need. Their first recommendation is to institutionalize this program. This review is provided as Appendix A.

- In several locations throughout the proposal, it is stated that the certificate program will attract graduate students. Has this been assessed? If so, how? Any support of this nature will strengthen the proposal. Additional text added to clarify this issue in the proposal.

- Whenever a course is listed in the text, please include both the course number and course title. Done.

- Are all of the courses listed under the two elective categories available to students at all locations? For example, the FISH and MSL courses can be videoconferenced easily, but what about CCS or PS courses? Since many, if not all, of these courses are offered every other year, does the sequencing work out to where a student could complete the certificate in two years? Some of these courses have prerequisites, so does the certificate program potentially require more than 12 credits (i.e., hidden prerequisite concern)? For example, the core courses require two prerequisites from the Natural Sciences electives (MSL 652 for FISH 680, FISH 640 for FISH 641). As a result, the two electives will not be
true electives and an additional Social Science elective will need to be taken to fulfill the program requirements. The extensive list of electives were given for two reasons: to ensure that a student’s interests can be addressed while pursuing the certificate’s requirements and to ensure that coursework would be available in any semester for the student to work towards the requirements of the certificate. A chart has been added to Appendix B to show the availability of the electives (as described in the 2014-2015 UAF Course Catalog). Many options are available to a student to complete the certificate in two years. IIA.v.3.d.iii. (p.6) also stipulates that “other courses may be used to fulfill the elective requirements by petition.” Both of the core courses also allow permission of the instructor to be used in lieu of the prerequisite and the instructors are willing to consider qualified students without the prerequisite.

- The GPMSL recommended that MSL 610 Marine Biology and MSL 656 Kelp Forest Ecology should be considered for inclusion in the Natural Sciences electives category as they are companion courses to those listed (e.g., MSL 651 and 652). Done.

- ANTH/FISH/MSL 680 Marine Sustainability Internship is also called Marine Ecosystem Sustainability Internship in the text. Consistency is needed in course names throughout the document. Also, only one internship is required, yet the proposal text states “internships” which implies more than one internship is required. The internship name was standardized throughout. In the certificate objectives, “internships” was changed to “the internship.” Other references to “internships,” where it does not refer to the activities of an individual student, were maintained.

- The SFOS CC is unclear on the rationale for the steering committee composition. For example, neither the GPMSL Head nor the Chair of the Graduate Fisheries program were included as members. However, two non-academic faculty with little to no teaching experience were included on the steering committee (neither of these two individuals are teaching any classes in the certificate program either). The Steering Committee is composed of the individuals who are on the MESAS Steering Committee. These faculty members have been strong advocates for the objectives of MESAS and supportive of the development of the graduate certificate in SME. We are open to broadening this committee and welcome both the GPMSL Head and the Chair of the Graduate Fisheries program to be members of the Steering Committee.

- On page 8, it is stated that 4-6 students would be expected to enroll in the certificate program in fall of even-numbered years. Can students not enroll during the spring semester or during odd-numbered fall semesters? If the former scenario is the case, could this be a limitation for student enrollment in the program? The stipulation of enrollment in fall of even-numbered years was removed. This seems the most natural time to enter the program, as the core courses would then be taken the spring and summer of the first year in the program, but it not necessary.

- On page 8 (rationale for enrollment), the SFOS CC noticed that Biology was not listed as a discipline for potential students. Was that an oversight or would
Biology graduate students be excluded from participation in the certificate program? Oversight; corrected.

- On page 9, the number of presentations by students in the MESAS and SELMR programs is listed. Are there any publications to date? If so, why not list those (numbers) as well? Publications added, SELMR presentations and publications, presentations, and papers from the 2014 reporting period were added.

- On page 10, it is stated that the program will be phased out of there are no new students for four consecutive years. Should that state “new students”? This will be scrutinized by Faculty Senate so strong rationale and justification that is consistent with UAF policies will be needed for this section. We corrected this to state “no applicants” for four consecutive years.

- Please format the table on page 11 to fit on that page (a bit of spillover onto the next page). Done.

- In the appendix, please include the prerequisites for core courses. Done.

- Please be sure to review the proposal for consistency in tabs, margins, etc. Also, there are several undefined acronyms throughout the proposal (e.g., NPFMC, SELMR, etc.). Done; please note that the programs MESAS and SELMR and the courses North Pacific Fishery Management Council and Ecosystem-based Fisheries Management are abbreviated to acronyms following the first reference of each in the Program Request, the Program Summary (X. Regents Guidelines), and in the Prospectus (XI. Draft Prospectus).

- Who will be responsible for disseminating the certificates? This should be identified in the proposal since it is not something that would come from the UAF Graduate Office (individual departments are responsible for disseminating certificates). The certificate will be conferred through the Graduation Office. Added to page 4.
**Board of Regents Program Action Request**  
**University of Alaska**  
Proposal to Add, Change, or Delete a Program of Study

<table>
<thead>
<tr>
<th>1a. UA University (choose one)</th>
<th>1b. School or College</th>
<th>1c. Department or Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>UAF</td>
<td>SFOS</td>
<td>Fisheries</td>
</tr>
</tbody>
</table>

| 2. Complete Program Title | Sustainability of Marine Ecosystems (SME) |

<table>
<thead>
<tr>
<th>3. Type of Program</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Undergraduate Certificate</td>
<td>☐ Associate</td>
</tr>
<tr>
<td>☐ Bachelor's Degree</td>
<td>☐ Baccalaureate</td>
</tr>
<tr>
<td>☐ Master's Degree</td>
<td>☒ Graduate Certificate</td>
</tr>
<tr>
<td>☐ Doctorate</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Type of Action</th>
<th>5. Implementation date (semester, year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒ Add</td>
<td>☒ Fall</td>
</tr>
</tbody>
</table>

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 in FY 15</th>
<th>Projected Annual Expenditures in FY 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrestricted</td>
<td>Salaries &amp; benefits (faculty and staff)</td>
</tr>
<tr>
<td>General Fund</td>
<td>$0</td>
</tr>
<tr>
<td>Student Tuition &amp; Fees</td>
<td>$88,000</td>
</tr>
<tr>
<td>Indirect Cost Recovery</td>
<td>Other (commodities, services, etc.)</td>
</tr>
<tr>
<td>TVEP or Other (specify):</td>
<td>$0</td>
</tr>
<tr>
<td>Restricted</td>
<td>TOTAL EXPENDITURES</td>
</tr>
<tr>
<td>Year 1</td>
<td>$37,000</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>
<tr>
<td>TOTAL REVENUES</td>
<td>$37,000</td>
</tr>
</tbody>
</table>

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 MAU redistribution</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>d. Funds already committed to the program by the MAU</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.

9. Projected enrollments (headcount of majors). If this is a program deletion request, project the teach out enrollments.

| Year 1: 4-6 | Year 2: 0 | Year 3: 4-6 | Year 4: 0 |

Page number of attached summary where demand for this program is discussed: 3(of program summary) 14(of full proposal)

---

*Sometimes the courses required by a new degree or certificate program are already being taught by an MAU, 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.*
10. Number* of new TA or faculty hires anticipated (or number of positions eliminated if a program deletion):

<table>
<thead>
<tr>
<th>Program</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graduate TA</td>
<td>0</td>
</tr>
<tr>
<td>Adjunct</td>
<td>0</td>
</tr>
<tr>
<td>Term</td>
<td>0</td>
</tr>
<tr>
<td>Tenure track</td>
<td>0</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Program</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graduate TA</td>
<td>0</td>
</tr>
<tr>
<td>Adjunct</td>
<td>0</td>
</tr>
<tr>
<td>Term</td>
<td>0</td>
</tr>
<tr>
<td>Tenure track</td>
<td>0</td>
</tr>
</tbody>
</table>

Former assignment of any reassigned faculty: N/A
For more information see page ___ 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>SFOS, CXCS, NRM, and other CLA graduate programs</td>
<td>We anticipate that the program will generate additional interest and enrollment in graduate degree programs in Fisheries, Marine Biology, Oceanography, Biology and Wildlife, Economics, Anthropology, Cross-cultural Studies, Natural Resources and Sustainability, Natural Resources Management, and Statistics.</td>
</tr>
</tbody>
</table>

Page number of attached summary where effects on other programs are discussed: 3(of program summary) 14(of full proposal)

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): Educate: Objective 4
   Discover: Objectives 6 and 8
   Prepare: Objective 10
   Engage: Objective 17
   Connect: Objective 13

Page in attached summary where alignment is discussed: 2(of program summary) 14(of full proposal)

15. Aligns with Shaping Alaska’s Future themes:

Page in attached summary where alignment is discussed: 2(of program summary) 13(of full proposal)

16. Aligns with Academic Master Plan goals:

Page in attached summary where alignment is discussed: 2(of program summary) 13(of full proposal)

17. State needs met by this program (list): critical need for Fisheries Management Specialists

Page in attached summary where the state needs to be met are discussed: 2(of program summary) 13(of full proposal)

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.

Page # in attached summary where e-learning is discussed:

Submitted by the ___ with the concurrence of its Faculty Senate.

_________________________/__________
Provost                     Date

_________________________/__________
Chancellor                  Date
Recommend Approval

Recommend Disapproval

UA Vice President for Academic Affairs on behalf of
the Statewide Academic Council

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 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: 07/10/2014
<table>
<thead>
<tr>
<th>Resources</th>
<th>Existing</th>
<th>New</th>
<th>Others (Specify)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular Faculty (FTE’s &amp; dollars)</td>
<td>0.4</td>
<td>0</td>
<td>0</td>
<td>0.4 FTE $88,000</td>
</tr>
<tr>
<td>Adjunct Faculty (FTE’s &amp; dollars)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Teaching Assistants (Headcount)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Instructional Facilities (in dollars and/or sq. footage)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Juneau 3,295, Fairbanks 3,009</td>
</tr>
<tr>
<td>Office Space (Sq. footage)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Lab Space (Sq. Footage)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Computer &amp; Networking (in dollars)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Research/Instructional/office Equipment (in dollars)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Support Staff (FTE’s &amp; dollars)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Supplies (in dollars)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Travel (in dollars)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Signature: [Signature]

Dr. Michael Castellini, Dean, School of Fisheries and Ocean Sciences

Date: [Date]