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www.sfu.ca/vpacademic**MEMORANDUM**

ATTENTION	Senate	DATE	December 11, 2013
FROM	Jon Driver, Vice-President, Academic and Provost, and Chair, SCUP	PAGES	1/1
RE:	Faculty of Environment: Full Program Proposal for an Environmental Resource Management Major (SCUP 13-64)		

At its November 20, 2013 meeting, SCUP reviewed and approved the Full Program Proposal for an Environmental Resource Management Major within the Faculty of Environment, effective Fall 2014.

Motion:

That Senate approve and recommend to the Board of Governors the Full Program Proposal for an Environmental Resource Management Major within the Faculty of Environment, effective Fall 2014.

c: A. Clapp
D. Burns

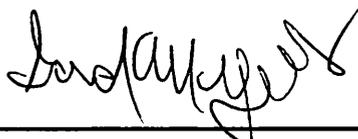
A handwritten signature in blue ink, appearing to be "Jon Driver".



OFFICE OF THE ASSOCIATE VICE-PRESIDENT, ACADEMIC

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MEMORANDUM

ATTENTION	Senate Committee on University Priorities	DATE	November 8, 2013
FROM	Gordon Myers, Chair Senate Committee on Undergraduate Studies	PAGES	1/1
RE:	Faculty of Environment (SCUS 13-48e)		

Action undertaken by the Senate Committee on Undergraduate Studies at its meeting of November 7, 2013, gives rise to the following recommendations:

Motion

That SCUP approve and recommend to Senate the Full Program Proposal for the Environmental Resource Management Major within the Faculty of Environment.

The relevant documentation for review by SCUP is attached.

FULL PROGRAM PROPOSAL
Environmental Resource Management Major
Faculty of Environment (FENV), Simon Fraser University
December 10, 2013

Executive Summary

This document contains a proposal for a new major in Environmental Resource Management (ERM) under a possible new credential, a Bachelor of Environment (BEnv). The program is proposed to begin September 2014. It is accompanied by separate Full Program Proposals for the BEnv credential, a BEnv in Global Environmental Systems, and a BBA/BEnv Joint Major in Sustainable Business.

The ERM major would prepare students to enter positions or continue in graduate studies in the broadly defined area of resource management, including energy, fisheries, agriculture, forestry, cultural resources, and tourism. Students would have a solid understanding of the structure, function and interplay of social and biophysical systems, basic ability to use geospatial, modeling and other analytical methods and tools in support of decision making, good understanding of the role of policy and governance in resource management, and some depth in one sector of resource management.

The content of this FPP is the result of 3 years of consultation with faculty (FENV and non-FENV), staff, students, alumni and perspective employers. Four previous documents, each more refined, were distributed for comment and discussion. A design committee made up of faculty from different FENV units reviewed the Notice of Intent and supporting documents, developed the program's educational goals, and determined the required and elective courses of the ERM major articulated in this FPP.

This major takes full advantage of the expertise existing across FENV units and includes core requirements characteristic of BEnv majors. The core includes courses focusing on the social and natural sciences, methodologies needed in resource management, communication, and a capstone experience that requires students to apply and integrate knowledge and skills acquired in the program. Apart from the BEnv core, the ERM major requires that students complete additional courses that focus on historical and socio-cultural perspectives; indigenous/First Nations perspectives; biophysical perspectives; resource management; methodology; trade-offs in decision-making; communication and conflict resolution; and legislation, policy and regulation.

Recruitment will focus on four potential sources of students: current students in FENV; undecided students at SFU; new students from secondary schools and university transfer programs; and new students through our dual entry program. We hope to admit 10 students in the first year, building to 20 students after 5 years. This would translate to a steady enrollment of approximately 75 students in the ERM program once it has matured. The ERM major can be mounted at a relatively low cost by using primarily unfilled seats in existing courses, increasing class sizes where appropriate, and utilizing existing administrative capacity in the FENV Dean's Office. Six new courses will need to be developed and taught in order to mount the ERM major, and additional sections of existing courses may be required.

Credential to be awarded:

Bachelor of Environment (BEnv) in Environmental Resource Management (ERM)

Location of program:

All courses will be offered at SFU Burnaby; some courses will also be offered at SFU Vancouver and SFU Surrey.

Faculty offering the new degree program:

Faculty of Environment

Anticipated program start date:

September 2014 (See enrolment plan below for development timeline)

Description of the proposed program: Aims, goals and objectives

This major would take full advantage of the expertise existing across FENV units, characteristic of BEnv majors. It would prepare students to enter positions or continue in graduate studies in the broadly defined area of resource management, including fisheries, agriculture, forestry, cultural resources, energy and tourism. ERM program requirements, directed by educational goals, provides students with a solid understanding of, the interplay of historical, biophysical and socio-cultural factors, Indigenous/First Nations Perspectives, resource use and sustainability, geospatial, statistical and modeling methodologies, decision making, communication, conflict resolution, and legislative/regulatory frameworks as they related to resource management.

The ERM program requirements include courses from each of the areas of study in the BEnv core (i.e. earth systems, ecology, biology, human role in nature, the social and built environments, environmental stewardship and governance, and the global scale). Courses selected as options in each category were most applicable to resource management. Refer to the BEnv Credential FPP for goals and details of the BEnv core generally. ERM educational goals guided selection of upper-division requirements. These goals address the knowledge and skills needed in the field of resource management and were informed by ERM design committee expertise and input from environmental professionals.

Linkages between the educational goals and the curriculum

Design of the ERM major has been driven by the educational goals of the BEnv (see BEnv Credential FPP) and of the ERM program (below). The ERM design committee, composed of representatives from FENV units and the FENV Dean's Office, developed these ERM educational goals. The committee worked from the draft ERM program level educational goals provided in the ERM major NOI and the results of extensive consultation with FENV and non-FENV faculty, students, staff, alumni and external environmental professionals. The Teaching and Learning Centre provided assistance in development of these educational goals.

BEnv program-level learning outcomes have been developed in the following areas (see BEnv Credential FPP for details):

- Natural Sciences – earth systems, ecology and biology.
- Social Sciences – human role in nature, social and built environments, stewardship and governance, and the global scale.
- Methodology, Practice and Communication – quantitative and geospatial analysis, modeling, fieldwork, collaboration and environmental communication.
- Integration – sustainability, systems, complexity, decision-making and application in a capstone course.

ERM Educational Goals

Graduates of the ERM major are expected to understand the importance, theory and practice of management and decision making in ERM as articulated in the following educational goals:

- 1) Analyze resource management challenges from historical, biophysical and socio-cultural perspectives, including differences among and implications of indigenous and First Nations perspectives.
- 2) Analyze resource use and sustainability in terms of biophysical and socio-cultural processes and their interactions.
- 3) Apply geospatial, statistical and systems modeling to inform management and conservation of biophysical and socio-cultural resources.
- 4) Integrate biophysical and socio-cultural information to identify trade-offs and uncertainties in ERM decision-making.
- 5) Apply principles of effective communication and conflict resolution to multi-stakeholder negotiations.
- 6) Critique and analyze common ERM documents, using ERM principles.
- 7) Evaluate legislation, policy and regulatory frameworks related to resource conservation, management and use.
- 8) Demonstrate subject area knowledge of at least one resource management sector.

Distinctive characteristics of the ERM major

- Builds upon a foundation in the social and natural sciences;
- Students learn methods and tools needed to manage resources and the environment;
- Draws upon courses from multiple academic units within and outside of FENV;
- Program flexibility allows students to concentrate in areas related to environmental management and governance; and
- Knowledge integration and practice are built into the program design.

Content and Summary of Requirements for Graduation

All students undertaking the ERM major would require lower division preparation in earth systems, ecology, biology, the human role in nature, social & built environments, stewardship & governance, the global scale, and quantitative and geospatial methods. The major includes lower division courses in archaeology, First Nations issues and environmental complexity.

Upper division coursework addresses the eight educational goals. Students must complete upper division courses in the categories of Historical and Socio-Cultural Perspectives, Indigenous/First Nations Perspectives, Biophysical Perspectives, Resource Management, Methods to Inform Decision-Making, Integration and Trade-offs in Decision-Making, Communication, Risk and Conflict Resolution, Legislation and Policy, and a capstone course that provides students with the opportunity to apply and integrate knowledge and skills acquired in the ERM program. The program has been designed to allow students the flexibility to gain related qualifications such as the Certificates in Cultural Resource Management and Spatial Information Systems.

ERM Major Summary:

BEnv Core:

- Lower Division 11 courses (= 34 credits)

ERM Major Requirements:

- Upper Division 10 courses (= 30-41 credits)

TOTAL: 64-75 credits

Lower Division Requirements (11 courses)

Complete all of:

FNST 101-3	The Cultures, Languages and Origins of Canada's First Peoples
GEOG 111-3	Earth Systems
POL 253-3	Introduction to the Public Policy Process
REM 200-3	Introduction to Resource Management (new course)

Choose 1 of:

GEOG 251-3	Quantitative Geography
STAT 101-3	Introduction to Statistics
STAT 201-3	Statistics for the Life Sciences
STAT 203-3	Introduction to Statistics for the Social Sciences
STAT 270-3	Introduction to Probability and Statistics

Choose 1 of:

BISC 101-4	General Biology
BISC 102-4	General Biology

Choose 1 of:

ENV 221-3	Systems Thinking (new course)
ENV 222-3	Environmental Controversy

Choose 1 of:
GEOG 253-3 Introduction to Remote Sensing
GEOG 255-3 Geographical Information Science I

Choose 1 of:
ARCH 201-3 Introduction to Archaeology
ARCH 286-3 Cultural Heritage Stewardship in Global Context (new course)

Choose 1 of:
EVSC 100-3 Introduction to Environmental Sciences
GEOG 215-3 Biogeography
BISC 204-3 Introduction to Ecology

Choose 1 of:
FNST 212-3 Indigenous Perspectives of Landscape
GEOG 221-3 Economic Geography
GEOG 241-3 Social Geography
REM/SCD 201-3 Introduction to Sustainable Community Development

Upper Division Requirements (10 courses):

Historical and Socio-Cultural Perspectives (choose 2 of:)

ARCH 363-3 Landscape Archaeology (new)
ARCH 365-3 Archaeological Perspectives on Human Ecology
ENV 320W-3 Ethics and the Environment
GEOG/HIST 377-4 Environmental History
GEOG 389W-4 Nature and Society

Indigenous/First Nations Perspectives (choose 1 of:)

FNST 332-3 Ethnobotany of British Columbia First Nations
FNST 353W-3 First Nations Heritage Stewardship
FNST 401-3 Aboriginal Rights and Government Relations
FNST 433-4 Indigenous Environmental Activism

Biophysical Perspectives (choose 1 of:)

GEOG 315-4 World Ecosystems
GEOG 317-4 Soil Science
GEOG 319-4 Landscape Ecology
REM 311-3 Applied Ecology and Sustainable Environments

Resource Management: Information Integration and Trade-offs in Decision Making (choose 2 of:)

ENV/REM 321-3	Ecological Economics
GEOG 322W-4	World Resources
GEOG 327-4	Geography of Tourism
GEOG 385-4	Agriculture and the Environment
REM 350-4	Sustainable Energy and Materials and Management
REM 370-3	Global Resource Issues in Oceanography (new course)
REM 471-3	Forest Ecosystem Management
REM 445-3	Environmental Risk Assessment

Methods to Inform Decision Making (choose 1 of:)

GEOG 351-4	Multimedia Cartography
GEOG 352-4	Spatial Analysis
GEOG 353-4	Advanced Remote Sensing
GEOG 355-4	Geographic Information Science II
GEOG 356-4	3D Geovisualization
REM 412-3	Environmental Modeling

Communication and Conflict Resolution (choose 1 of:)

CMNS 342-4	Science and Public Policy: Risk Communication
CMNS 347-4	Communication in Conflict and Intervention
CMNS 349-4	Environment, Media and Communication
CMNS 447-4	Negotiation and Dialogue as Communication
DIAL 390W-5	Undergraduate Semester in Dialogue
DIAL 460-4	Seminar in Dialogue and Public Issues

Legislation, Policy and Regulation (choose 1 of:)

ARCH 386-3	Archaeological Resource Management
ENV 319-3	Environmental Law
GEOG 445-4	Resource Planning
REM 356-3	Institutional Arrangements for Sustainable Environmental Management

Capstone Experience (choose 1 of:)

DIAL 460-4	Seminar in Dialogue and Public Issues (if approved by Dir. for ERM)
DIAL 461-3	Field Placement in Dialogue (if approved by Director for ERM)
ENV 495-4	Environmental Capstone (new)
ENV 491-4	Directed Study in Environment (if approved by Director for ERM)
GEOG 497-4	International Field Study (if approved by Director as ERM capstone)

Additional courses may be required to satisfy WQB requirements. Several upper division W courses are program electives, and Q requirements are satisfied within the required ERM core.

Target Audience: The ERM major would be targeted towards students wishing to seek careers or continue in graduate studies in the broadly defined area of resource management and governance, including fisheries, agriculture, forestry, mining, energy, cultural resources and tourism. Flexibility within the major should allow students to gain additional knowledge in such areas as First Nations, archaeological resources management, sustainability and development. Recruitment will focus on four potential sources of students: current students in FENV; undecided students at SFU; new students from secondary schools and university transfer programs; and new students through our dual entry program.

Delivery Methods: Face-to-face courses are the primary delivery method, but some distance education courses may be included.

Anticipated Completion Time in Semesters: The BEnv may be completed in 8 semesters of full time study.

Enrolment plan for the length of the program

Our target is to get this FPP and the associated BEnv credential FPP approved by FENV units, SCUS, SCUP, Senate and the Board of Governors by January 2014. Allowing two months for the Ministry approval process, we hope that prospective students will be able to apply for admission to the ERM major in Spring 2014, beginning their studies in September 2014.

As indicated above, we will focus on high school graduates, BC college transfers, international students and uncommitted SFU students. We hope to admit 10 students into the ERM major the first year, increasing to 20 students after 5 years. Allowing for attrition, this should result a steady state enrollment of approximately 75 students in the ERM BEnv program.

New students may be admitted directly into this major; they will be required to have a Math 12 equivalent for admission. Existing SFU students can transfer internally if they have completed at least 15 units of required work in the major.

Student Evaluation: As per general regulations of the University, Faculty of Environment and the FENV units in which the program is administered.

Anticipated Contribution to the Faculty of Environment Mandate and Strategic Plan

See BEnv Credential FPP for details.

Program Design, Governance and Assessment

The ERM Design Committee was established to develop and refine the ERM major NOI into a Full Program Proposal. The committee was made up of faculty members from FENV units with

expertise in ERM. Archaeology, Geography and REM participated in the ERM Design Committee. The ERM committee addressed the following:

- Whether the ERM major should be developed under the BEnv credential;
- Review of the ERM major in terms of overlap with existing programming;
- Determining the focus, program level educational goals, courses, structure and capstone experience specific to the ERM major; and
- Recommendations on the BEnv core as it relates to the ERM major.

Since the ERM major would be interdisciplinary, involving courses from most FENV units, curriculum modifications will be directed by an ERM Steering Committee made up of faculty with expertise in ERM and with the involvement of all FENV units that wish to be represented. The director will be responsible for approving course substitutions and other day-to-day operations, and consulting with the steering committee on major changes. The Director should be chosen from among interested FENV faculty members. If no member chooses, the Associate Dean (Undergraduate) will take on the role. The FENV Undergraduate Curriculum Committee would be responsible for approval of any ERM curricular changes. To minimize the resources required to mount the program, administration and student advising for the ERM will be carried out by the FENV Dean's Office.

The ERM major would be assessed according to university regulations. The Dean's Office will support the ERM Steering Committee in carrying out periodic reviews. In addition, the BEnv and all of its majors will be reviewed externally after five years. Assuming that the program begins in 2014, review is envisioned for 2019-2020.

Level of Support and Recognition from other Post-Secondary Institutions

As per SFU's transfer credit procedures, students may transfer from BC colleges or universities to enroll into BEnv programs. FENV Dean's Office will work with Lower Mainland colleges on preparing their students for transfer into the ERM program. The proposed BEnv majors have been developed primarily from courses in the Faculty of Environment, most of which have already been articulated with the various post secondary institutions in British Columbia. Students who are part of the ERM program can transfer the courses to Environment, Geography or Science Programs in other post secondary institutions.

Letters requesting support are being sent to BC universities and colleges 1) whose students might transfer to SFU into the proposed ERM major, 2) with graduate programs that are likely to appeal to graduates of this major, and 3) that have degree program(s) similar to this major.

Evidence of Student Interest and Labour Market Demand

Seeking input from SFU students has been an important part of the BEnv consultation process. Students were involved in both BEnv forums (November 2010 and June 2012). Sustainable SFU, an SFU student organization, ran two focus groups (Burnaby and Harbour Centre campuses) in November 2012 seeking input on the BEnv as described in this document. In all these sessions students expressed strong support for the BEnv credential and its interdisciplinary content,

structure and experiential components. In the 2011 SFU Undergraduate Student Survey of the over 5000 students responding, approximately 8% were very interested in a possible Bachelor of Environment.

In recent years, Canadian employment in environmentally related jobs has been continually increasing. According to Environmental Careers Organization (ECO), between 2007 and 2010, the total number of Canadian workers who spend at least 50% of their time on environmental activities increased from 3.2% to 4%, bring the total number of such workers in 2010 to 682,000. ECO also stated that environmental employment has remained relatively strong during the recent economic downturn, and attributed difficulties in hiring to the lack of workers possessing appropriate levels of education and experience. ECO estimates that demand for environmental workers should continue to be strong into the future. Over the next decade over 100,000 environmental employees (14% of the environmental workforce) will reach retirement age (Profile of Canadian Environmental Employment: Labour Market Research Study. ECO, 2010).

U.S. environmental job market data is also encouraging. In a 2013 Georgetown University published data on unemployment rates of college graduates in 15 sectors. The agriculture/natural resource ranked third lowest with rate of 6.1/3.4/2.3 percent for recent graduates/experienced graduates/graduate degree holders. This compares with rates as high as 12.8/9.3/6.9 for architecture ([Hard Times 2013](#): College majors, unemployment and earnings. Georgetown Public Policy Institute, May 2013).

In fall 2011, the FENV Faculty Advisory Committee, met and provided guidance on development of the BEnv and its majors, stressing the importance of interdisciplinarity, experiential learning, and communication of technical information to non-specialist audiences. Committee members were Frank Brown (Director, Land and Marine Stewardship, Coastal First Nations) Hon. David Anderson (former Minister of Fisheries and Oceans), Mr. Bob Elton (former Pres./CEO B.C. Hydro), Dr. C.S. Holling (one of the conceptual founders of ecological economics), Dr. Leslie King (Director Centre for Environmental Education, Royal Roads), Mr. Bruce Morgan (Director, Change Management and Special Projects at Canadian Environmental Assessment Agency), Nancy Olewiler (Director, SFU School of Public Policy) and Dr. Barry Smit (Chair in Global Environmental Change, Univ. of Guelph).

Two surveys, targeted at environmental professionals, were implement to gather input on the BEnv credential (December 2011 – March 2012) and its proposed majors (June – August 2013). Seventy-three responses were received. The average years of experience of respondents were approximately 15. Approximately 67% of respondent strongly agreed or agreed with the statement “A Bachelor of Environment will be well perceived by potential employers”. Respondents also provided input on job demand for graduates in each of the proposed majors in the next 5 -15 years. On a scale of 5 to 1 (5-very high, 4-high, 3-medium, 2-low, 1-very low) results were as follows:

<u>Major</u>	<u>Mean</u>	<u>Very High=5</u>	<u>High=4</u>	<u>Medium=3</u>	<u>Low=2</u>	<u>Very Low=1</u>	<u>N</u>
Environmental	3.8	4	17	8	1	0	30

Resource Management							
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Summary of Resources Required and Available to Implement the Program

The ERM major can be mounted at a relatively low cost by providing students with the flexibility to satisfy graduation requirements using existing courses from FENV, and in some non-FENV units. This is part of FENV’s goal of taking advantage of the synergy within newly joined FENV units. The selection of required and elective courses was drawn mainly from existing courses, thereby reducing the costs of developing and teaching new courses. Nevertheless, we anticipate that 6 new courses will be needed in order to mount the ERM major.

We hope to also reduce the resources necessary by utilizing unfilled seats in existing FENV and non-FENV courses, increasing class sizes where appropriate, and utilizing existing administrative capacity in FENV units and the FENV Dean’s Office. However, the small number of new courses and possible increases in course offering of existing courses will require additional faculty resources and teaching assistantships. The increased demand for GIS courses is likely to require additional laboratory space and computational resources within a few years. Furthermore, additional faculty resources will be needed to mount the capstone courses when the first cohorts of ERM (and other BEnv) majors reach the culmination of their programs.

Increased AFTEs will bring increased revenues to FENV. We are making special efforts to increase FENV international student enrolments, currently low in comparison to other Faculties, by working with Fraser International College.

Related programs at SFU or other British Columbia post-secondary institutions

The following programs are related and particular attention was paid to evaluating and avoiding duplication and reducing overlap.

- B.A. Geography
- B.A. Geography Environmental Specialty
- B.Sc. Physical Geography
- B.Sc. Environmental Science

The proposed ERM major is most closely aligned with the Geography BA Environmental Specialty. However, what differentiates the proposed ERM major is 1) required core courses in FNST, POLS, BISC, ENV and ARCH, 2) upper division course electives more focused on resource management and from a broader range of FENV and non-FENV units, including ARCH, EASC, ECON, FNST, GEOG and REM, and 3) a capstone requirement.

The BEnv ERM major is distinguished from natural resource majors at other BC universities by: 1) the BEnv core, as opposed to the B.Sc. core, provides a balance of social and natural sciences, 2) a focus on the management of natural resources, and 3) program requirements that give students a broad choice of courses that meet the educational goals of the major.

University of Victoria offers interdisciplinary environmental BA and BSc degrees through a double major (Environmental Studies combined with another major). The environmental studies major focuses on ethno-ecology, ecological restoration and political ecology. The proposed ERM major, while covering some aspects of UVic's key areas of specialization, is more focused on resources management knowledge and skills.

UBC's programs in Forestry, Natural Resources Conservation, and Forest Resource Management are all BSc majors, emphasizing the natural science aspects of conservation and forestry. As a BEnv degree, the ERM major provides a more even balance of social and natural sciences.

University of Northern British Columbia offers BSc majors in Forest Ecology and Management, Wildlife and Fisheries, and Outdoor Recreation and Conservation. The first two have substantial lower and upper division science/math requirements. A high percentage of courses listed are required, in contrast to the ERM major that allows students more flexibility. Apart from a small number of specific required courses, ERM students can choose from a list of course electives to meet program educational goals. Additionally the total number of units required to meet degree requirements is less in the ERM, allowing students additional flexibility in the liberal arts.

Thompson Rivers University's Natural Resource Science Major (BNRS), and Trinity Western University Environmental Studies Program's three BSc majors also have programs with extensive science requirements and less flexibility than the ERM. Vancouver Island University's natural resource majors in Fisheries and Aquaculture (BSc) and Natural Resource Protection (BNRP) are applied degrees.

Royal Roads University has a number of programs related to resource management, all of which are degree completion (Years 3 and 4), delivered through a blended model of online delivery and intensive, short-duration courses on campus.

List of faculty members who will be teaching

The ERM major will be taught by existing faculty from all FENV units.

Proposed Program Contact Person:

Alex Clapp, Associate Dean, FENV, 778-782-8827, aclapp@sfu.ca

Dan Burns, Manager, Curriculum and Planning, FENV, 778-782-9225, dburns@sfu.ca

Environmental Resource Management Major

Bachelor of Environment

Minimum Grades

The minimum cumulative grade point average (CGPA) for continuation and graduation is 2.00.

Program Requirements

Students complete 120 units, as specified below. Additional upper division units will be required to total a minimum of 45 upper division units

Visit the [[link:program overview](#)] for a suggested course sequence.

Lower Division Requirements

Complete all of:

FNST 101-3	The Cultures, Languages and Origins of Canada's First Peoples
GEOG 111-3	Earth Systems
POL 253-3	Introduction to the Public Policy Process
REM 200-3	Introduction to Resource Management

Choose one of:

GEOG 251-3	Quantitative Geography
STAT 101-3	Introduction to Statistics
STAT 201-3	Statistics for the Life Sciences
STAT 203-3	Introduction to Statistics for the Social Sciences
STAT 270-3	Introduction to Probability and Statistics

Choose one of:

BISC 101-4	General Biology
BISC 102-4	General Biology

Choose one of:

ENV 221-3	Systems Thinking (new course)
ENV 222-3	Environmental Controversy

Choose one of:

GEOG 253-3	Introduction to Remote Sensing
GEOG 255-3	Geographical Information Science I

Choose one of:

ARCH 201-3	Introduction to Archaeology
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ARCH 286-3 Cultural Heritage Stewardship in Global Context (new course)

Choose one of:

EVSC 100-3 Introduction to Environmental Sciences

GEOG 215-3 Biogeography

BISC 204-3 Introduction to Ecology

Choose one of:

FNST 212-3 Indigenous Perspectives of Landscape

GEOG 221-3 Economic Geography

GEOG 241-3 Social Geography

REM/SCD 201-3 Introduction to Sustainable Community Development

Upper Division Requirements

Historical and Socio-Cultural Perspectives (choose two of:)

ARCH 363-3 Landscape Archaeology

ARCH 365-3 Archaeological Perspectives on Human Ecology

ENV 320W-3 Ethics and the Environment

GEOG/HIST 377-4 Environmental History

GEOG 389W-4 Nature and Society

Indigenous/First Nations Perspectives (choose one of:)

FNST 332-3 Ethnobotany of British Columbia First Nations

FNST 353W-3 First Nations Heritage Stewardship

FNST 401-3 Aboriginal Rights and Government Relations

FNST 433-4 Indigenous Environmental Activism

Biophysical Perspectives (choose one of:)

GEOG 315-4 World Ecosystems

GEOG 317-4 Soil Science

GEOG 319-4 Landscape Ecology

REM 311-3 Applied Ecology and Sustainable Environments

Resource Management: Information Integration and Trade-offs in Decision Making
(choose two of:)

ENV/REM 321-3 Ecological Economics

GEOG 322W-4 World Resources

GEOG 327-4 Geography of Tourism

GEOG 385-4 Agriculture and the Environment

REM 350-4 Sustainable Energy and Materials and Management

REM 370-3 Global Resource Issues in Oceanography
REM 471-3 Forest Ecosystem Management
REM 445-3 Environmental Risk Assessment

Methods to Inform Decision Making (choose one of:)

GEOG 351-4 Multimedia Cartography
GEOG 352-4 Spatial Analysis
GEOG 353-4 Advanced Remote Sensing
GEOG 355-4 Geographic Information Science II
GEOG 356-4 3D Geovisualization
REM 412-3 Environmental Modeling

Communication and Conflict Resolution (choose one of:)

CMNS 342-4 Science and Public Policy: Risk Communication
CMNS 347-4 Communication in Conflict and Intervention
CMNS 349-4 Environment, Media and Communication
CMNS 447-4 Negotiation and Dialogue as Communication
DIAL 390W-5 Undergraduate Semester in Dialogue
DIAL 460-4 Seminar in Dialogue and Public Issues

Legislation, Policy and Regulation (choose one of:)

ARCH 386-3 Archaeological Resource Management
ENV 319-3 Environmental Law
GEOG 445-4 Resource Planning
REM 356-3 Institutional Arrangements for Sustainable Environmental Management

Capstone Experience (choose one of:)

DIAL 460-4 Seminar in Dialogue and Public Issues (if approved by ERM Director)
DIAL 461-3 Field Placement in Dialogue (if approved by ERM Director)
ENV 495-4 Environmental Capstone
ENV 491-4 Directed Study in Environment (if approved by ERM Director)
GEOG 497-4 International Field Study (if approved by ERM Director)

Writing, Quantitative, and Breadth Requirements

Students admitted to Simon Fraser University beginning in the fall 2006 term must meet writing, quantitative and breadth requirements as part of any degree program they may undertake. See [Writing, Quantitative and Breadth Requirements] for university-wide information.

WQB Graduation Requirements

A grade of C- or better is required to earn W, Q or B credit.

(INSERT WQB TABLE HERE)

Residency Requirements and Transfer Credit

The University's residency requirement stipulates that, in most cases, total transfer and course challenge credit may not exceed 60 units, and may not include more than 15 as upper division work. In addition to the courses listed above, students should consult an academic advisor to plan the remaining required elective courses.

NOTICE OF INTENT
Environmental Resource Management Major
Faculty of Environment (FENV)
Simon Fraser University
January 29, 2013

Executive Summary

This document contains a proposal for a new major in Environmental Resource Management under a possible new credential, a Bachelor of Environment (BEnv). The program is proposed to begin September 2014. Separate NOIs are being proposed for the BEnv credential are a BBA/BEnv Joint Major in Sustainable Business and a BEnv Major in Global Environmental Systems.

This major would prepare students to enter positions or continue in graduate studies in the area, broadly defined, of resource management, including fisheries, agriculture, forestry, cultural resources, energy and tourism. Students would have a solid understanding of the structure, function and interplay of social and biophysical systems, basic ability to use geospatial, modeling and other analytical methods and tools in support of decision making, good understanding of the role of policy and governance in resource management and some depth in one sector of resource management.

The content of this NOI is the result of 3 years of consultation with faculty (FENV and non-FENV), staff, students, alumni and perspective employers. Three previous documents, each more refined, were distributed for comment and discussion. If this NOI is approved, a design committee, made up of faculty from different FENV units, will propose the specifics of the ERM major to be included in the FPP for FENV UCC approval.

This major would take full advantage of the expertise existing across FENV units and include the core requirements, characteristic of Bachelor of Environment majors. This core would include a set of courses focusing on the environmental social and natural sciences, methodology courses needed in resource management, and communication and capstone or field courses that require students to apply and integrate knowledge and skills acquired in the ERM program. Apart from the BEnv core, the ERM major requires that students complete an additional courses in geospatial methods, resource management and elective courses in the discipline that allow students to focus their studies.

Recruitment will focus on four potential sources of students; direct entry from secondary schools, transfers from colleges, international students and undecided SFU students. We hope to admit 10 students in the first year, building to 20 students after 5 years. This would translate to a steady enrolment of approximately 60 students in the ERM program once it has matured.

Mounting the ERM major can be carried out at a relatively low cost by utilizing primarily unfilled seats in existing FENV and non-FENV courses, increasing class sizes where appropriate and utilizing existing administrative capacity in FENV units and the FENV Dean's Office. Two new courses would need to be developed and taught and additional sections of existing courses may be required.

Credential to be awarded:

Bachelor of Environment (BEnv) in Environmental Resource Management

Location of program:

SFU Burnaby, Harbour Centre and Surrey Campuses

Faculty offering the new degree program:
Faculty of Environment

Anticipated program start date:
September 2014
(See enrolment plan below for development timeline)

Description of the proposed program:

Aims, Goals and Objectives

Building upon the consultation carried out by FENV over the past 3 years on BEnv design, this document proposes the establishment of an Environmental Resource Management major under a proposed new Bachelor of Environment credential.

This major would prepare students to enter positions or continue in graduate studies in the area, broadly defined, of resource management, including fisheries, agriculture, forestry, cultural resources, energy and tourism. Students would have a solid understanding of the structure, function and interplay of social and biophysical systems, basic ability to use geospatial, modeling and other analytical methods and tools in support of decision making, good understanding of the role of policy and governance in resource management and some depth in one sector of resource management.

This major would take full advantage of the expertise existing across FENV units, based on the core requirements, both lower division and upper division, characteristic of Bachelor of Environment majors. This core would include a set of courses focusing on the social and natural sciences vital to understanding environmental issues and problems, methodology courses needed in resource management (e.g. GIS, remote sensing, modeling, qualitative analysis, and risk assessment), and communication and capstone courses that require students to apply and integrate knowledge and skills acquired in the ERM program. Apart from the BEnv core, the ERM major requires that students complete coursework in geospatial methods, resource management and elective courses that allow students to focus their studies.

Draft program level learning outcomes (see the Appendices for the BEnv Credential NOI) were developed as a result of consultation with faculty, staff, students, alumni and perspective employers. A faculty ERM design committee, coordinated through the FENV Dean's Office, will finalize ERM program level learning outcomes and course requirements at both the lower and upper division (see below development process details).

Anticipated Contribution to the Faculty of Environment Mandate and Strategic Plan

For detailed information on the ERM BEnv major's contribution see the BEnv credential NOI.

Target Audience

The ERM major would be targeted towards students wishing to seek careers or continue in graduate studies in the area, broadly defined, of resource management and governance, including fisheries, agriculture, forestry, mining, energy, cultural resources and tourism. Flexibility within the major should allow students to gain additional knowledge in such areas as First Nations, archaeological resources management, sustainability and development.

Recruitment for ERM major will focus on four potential target groups:

- Direct entry students from secondary schools;
- Transfers from colleges;
- International students; and
- Undecided SFU students.

Content and Summary of Requirements for Graduation

All students undertaking the ERM major would require lower division preparation in biology, chemistry, earth systems, ecology, human place in nature, social & built environments, stewardship & governance, and the global scale. Quantitative, qualitative and geospatial methodology courses are also included in the lower division core requirements. Upper division integrative courses focusing on modeling, communication and practice are also required. Both these upper and lower division course requirements, with minor variation, would be common to all BEnv majors.

In addition to the above BEnv requirements the ERM major would require additional coursework in geospatial methods, resource management, planning and governance, and elective courses in the discipline. The latter would allow for greater flexibility with the possibility of establishing concentrations. It might also allow students the flexibility to gain related certificates such as the Cultural Resource Management and Spatial Information Systems Certificates.

ERM Major Summary:

BEnv Core:

- Lower Division 13 courses (= 39 credits)
- Upper Division 3 courses (= 9 credits)

ERM Major Requirements:

- Upper Division 9 courses (= 27-36 credits)

TOTAL: 75-84 credits

BEnv Core Lower Division Requirements (13 courses)

The ERM major would require students to complete approximately 13 courses, primarily lower division but including some upper division courses, in order to meet the BEnv core. Both a table of draft BEnv core requirements by major and a draft list of course that may satisfy these requirements are provided in the BEnv Credential NOI appendices.

ERM Major Requirements (9 courses):

In addition to the BEnv upper and lower division core requirements (see above) the proposed Environmental Resource Management Major might require courses from the following two areas as well as elective coursework:

Advanced Geospatial Methods and Tools:

GEOG 253-3	Introduction to Remote Sensing
GEOG 255-3	Geographical Information Science I
GEOG 351-4	Multimedia Cartography
GEOG 352-4	Spatial Analysis
GEOG 353-4	Advanced Remote Sensing
GEOG 355-4	Geographical Information Science II
GEOG 356-4	3D Geovisualization

Management, Planning and Governance:

ARCH 386-3	Archaeological Resource Management
ARCH 2XX-3	Cultural Heritage Resource Management (possible new)
FNST 401-3	Aboriginal Rights and Government Relations
GEOG 322W-4	World Resources
GEOG 445-4	Resource Planning
REM 2XX-3	Introduction to Resource Management (new)
REM 311-3	Applied Ecology and Sustainable Environments
REM 356-3	Institutional Arrangements for Sustainable Environmental Management
POL 253-3	Introduction to the Public Policy Process
GEOG 440W-4	Law and Geography

Electives:

Students will complete additional upper division courses from a list of elective courses (mainly FENV but also including FNST, CMNS, and SA).

Courses used to satisfy BEnv core requirements cannot be double counted to satisfy ERM major requirements. Electives should allow for flexibility (e.g. management or governance) and concentrations will be considered. Additional courses may be required to satisfy WQB requirements. However, we anticipate that Q, B-Sci and B-Soc may be satisfied through required core courses.

Delivery Methods

Face-to-face courses are the primary delivery method, but some distance education courses may be included.

Linkages between the learning outcomes and the curriculum

Design of the ERM major will be driven by both BEnv Program Level Learning Outcomes (see BEnv NOI appendices) and ERM Program Level Learning Outcomes (below). Design committees and the FENV Dean's Office will finalize these learning outcomes in development of the FPP.

Draft BEnv program-level learning outcomes have been developed in the following areas (see BEnv Credential NOI for details):

- Environmental Sciences – chemistry, earth systems, biology, and community ecology.
- Social Sciences – human role in nature, social and built environments, stewardship & governance, and the global scale.
- Methodology, Practice and Communication – quantitative, geospatial, qualitative and comparative analysis; modeling, environmental communication, collaboration and field work.
- Integrative – complexity, controversy, decision-making, sustainability, systems, and organizational function and change.

Possible ERM major program level learning outcomes include:

- Understanding the dynamics of resource types, ability to analyze these dynamics and to plan for sustainable use;
- Understanding the environmental, social, physical and ecological impacts of resource utilization, including the effects of resource extraction and development on indigenous individuals, communities and culture;
- Understanding the legislation, policy, regulation frameworks and processes related to resource conservation, management and use, including aboriginal rights, title, and First Nations relations with government and the private sector;
- Understanding stewardship practices and the interplay between conservation, extraction, restoration and public policy in resource management;
- Understanding the complexity of multi-use management involving diverse stakeholders;
- Ability to use geospatial and modeling in resource management and conservation;
- Understanding the roles that archaeological theory and methodology plays in stewardship of resources;
- Understanding the micro- and macro-economics of resource management and ability to do basic economic analysis of resource conservation and utilization;
- Ability to locate, analyze and evaluate critically the documents produced in environmental law, policy and regulations;
- Ability to understand and articulate stakeholder positions on complex environmental issues; and
- Deep knowledge of at least one sector of resource management.

The course selection, articulated in the FPP, would be driven by the finalized BEnv and ERM program-level learning outcomes.

Distinctive characteristics

Distinctive characteristics of the ERM major are (also see BEnv NOI for more detail):

- Builds upon a foundation in the environmental social and natural sciences;
- Students learn methodologies and tools needed to manage resources and the environment;
- Draws upon courses from several departments/units within and outside of FENV;
- Program flexibility allows students to concentrate in a number of areas related to environmental management and governance; and
- Knowledge integration and practice are built into the program design.

Anticipated Completion Time in Semesters

The BEnv may be completed in 8 semesters of full time study.

Enrolment plan for the length of the program

If this NOI and the associated BEnv credential NOI are approved by SCUS and SCUP by March 2013, we hope to submit Full Program Proposals for the BEnv credential and ERM major in summer or fall of 2013, with the target of getting approval from Senate and the Board of Governors by fall 2013. Allowing two months for the Ministry approval process we hope that prospective students will be able to apply for admission to the ERM major in late fall 2013, beginning their studies in September 2014.

As indicated above, we will focus on high school graduates, BC college transfers, international students and uncommitted SFU students. If NOIs and FPPs for the BEnv credential and ERM major are approved we hope to initially admit 10 students into the ERM major increasing to 20 students after 5 years. This should result a steady state enrolment of approximately 60 students in the ERM BEnv program.

Student Evaluation

As per general regulations of the University, Faculty of Environment and the FENV units in which the program is administered.

Program Design, Governance and Assessment

A design committee will be established to develop and refine the ERM major into a Full Program Proposal. The committee will be made up of primarily faculty members from FENV units but may include some non-FENV faculty with expertise in the major area. All FENV units will have the option to participate in each of the BEnv Design Committees. The ERM committee will propose the structure and specific courses for the ERM major, needed for Full Program Proposal (FPP) including:

- Whether the ERM major should be developed under the BEnv credential;
- Review of the ERM major in terms of overlap with existing programming; and
- Determining the focus, program level learning outcomes, courses, structure and capstone experience specific to the ERM major.

The design committee will also provide recommendations on the BEnv core as it relates to the ERM major, and appropriate home unit(s) for student advising and program administration.

FENV Dean's Office, working with the design committee, will provide the Full Program Proposal to the Faculty of Environment Undergraduate Curriculum Committee for approval.

Program Governance and Assessment

As part of the development of the FPP, FENV will propose a governance model for the ERM major. We anticipate that the individual FENV units that are most closely aligned with the content of the major will provide administration. If the School of Resource and Environmental Management, which focuses mainly on graduate programs, is most closely aligned to the ERM major, administration may be shared with the FENV Dean's Office. This could minimize the resources required to mount this

program. Since we anticipate that the ERM major will be interdisciplinary, involving courses from most FENV units, curriculum modifications should be done with the involvement of all FENV units. One possible model is that the ERM design committee would evolve into a steering committee responsible for reviewing and making recommendations for changes. The FENV Undergraduate Curriculum Committee would be responsible for approval of any ERM major curricular changes.

The ERM major would be assessed as per university regulations. Programs administered by individual units within FENV will be reviewed as part of the normal external review process.

Level of Support and Recognition from other Post-Secondary Institutions

As per SFU's transfer credit procedures, students may transfer from BC colleges or universities to enroll into BEnv programs.

Evidence of Student Interest and Labour Market Demand

For information on student interest and labour market demand see the BEnv credential NOI.

Summary of Resources Required and Available to Implement the Program

The ERM major can be mounted at a relatively low cost by providing students with the flexibility to satisfy graduation requirements using existing courses from FENV, and in some cases non-FENV, units. This is part of FENV's goal of taking advantage of the synergy within newly joined FENV units. The selection of required and elective courses will be drawn mainly from existing courses, thereby reducing the costs of developing and teaching new courses. Nevertheless, we anticipate up to 2 new courses may be needed in order to mount the ERM major, should it be approved.

We hope to also reduce the resources necessary by utilizing unfilled seats in existing FENV and non-FENV courses, increasing class sizes where appropriate, and utilizing existing administrative capacity in FENV units and the FENV Dean's Office. However, the small number of new courses and possible increases in course offering of existing courses will require additional faculty resources and teaching assistantships.

Increased AFTEs will bring increased revenues to FENV. We are making special efforts to increase FENV international student enrolments, currently low in comparison to other Faculties, by working with Fraser International College.

Related programs at SFU or other British Columbia post-secondary institutions

The following programs are related and particular attention will be paid to evaluating and avoiding duplication and reducing overlap.

- B.A. Geography; and
- B.A. Geography Environment Specialty.

This proposed major is most closely aligned with the Geography BA Environmental Specialty. However, what differentiates this proposed major is 1) a core focused on the environment including modeling and decision making courses, and 2) the ability for students to take upper division electives

from a broader ranges of departments to satisfy program requirements, including ARCH, EASC, ECON, FNST, GEOG and REM.

An initial scan of similar undergraduate programs dealing with environmental management in B.C. identified the following programs:

Royal Roads University

- Environmental Management B.Sc. (Online and hybrid)

Thompson Rivers University

- Natural Resource Science BNRS Major

University of B.C.

- Natural Resource Conservation B.Sc. Major
- Forest Resource Management B.Sc. Major
- Forestry B.Sc. Major

University of Victoria

- Environmental Studies B.A. (as joint major Environmental Studies with another major or minor)

University of Northern B.C.

- Forest Ecology and Management B.Sc. Major
- Outdoor Recreation and Conservation B.Sc. Major
- Wildlife and Fisheries B.Sc. Major

Vancouver Island University

- Natural Resource Protection BNRP

List of faculty members who will be teaching

REM – Jonn Axsen, Sean. Cox, Frank Gobas, Wolfgang Hayder, Karen Kohfeld, Mark Jaccard, Jonathan Moore, Mark Roseland, Murray Rutherford and Anne Solomon,
Geography – Alex Clapp, Shiv Balram, Alison Gill, Anders Knudby, and others.

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