

CONSERVATION OF LIVING SYSTEMS

*A New Graduate Program
at the University of Washington*

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TABLE OF CONTENTS

BACKGROUND

| | |
|-------------------------------|---|
| Mission | 2 |
| Preamble | 2 |
| The Conservation Professional | 3 |
| The CLS Approach | 4 |
| Disciplines and Skills | 6 |

THE CLS PROGRAM 9

| | |
|--------------------------|----|
| CLS Master's Degree | 10 |
| CLS Certificate | 12 |
| Non-Degree Students/Open | 13 |

CLS CORE COURSES

| | |
|---------------------------------|----|
| Language of Conservation I & II | 14 |
| Integration of Conservation | 18 |
| Communication for Conservation | 21 |
| Practice of Conservation | 24 |

OTHER PROGRAM ELEMENTS

| | |
|------------------|----|
| Seminars | 28 |
| Pulsed Learning | 29 |
| Elective Courses | 30 |
| CLS Electives | 31 |

PROGRAM IMPLEMENTATION & MANAGEMENT

| | |
|---------------------------------|----|
| Program Size and Admissions | 36 |
| Governance Structure | 36 |
| Program Management | 36 |
| Physical Home | 42 |
| Academic Home | 42 |
| Interaction with Other UW Units | 43 |

DEVELOPING CLS: STAKEHOLDER FEEDBACK

| | |
|--------------------------------|----|
| Conservation Employers | 45 |
| Other Academic Programs | 50 |
| Meeting with Graduate Students | 58 |
| Meeting with Graduate Faculty | 66 |
| Process and Timeline | 72 |

BACKGROUND

MISSION

To produce the next generation of professionals who will define and lead the field of conservation.

PREAMBLE

Arising from the twin pressures of a burgeoning human population and an increasing individual footprint, the global issues of overexploitation, pollution, habitat degradation, species invasions, and climate change have disturbed the biocomplexity and resilience of Earth's ecosystems. These pressures affect all living organisms, including humans, as sustainable production of ecosystem goods and services are increasingly strained. The accelerating loss of resources for food and fuel, and the deterioration of air and water quality lead not only to ecosystem simplification and degradation, but also to increased disease, poverty, and social strife, as well as to the loss of economic revenue, quality of life, and sometimes even life itself. These problems have been recognized around the world, as reflected through comprehensive studies such as the United Nations' 2005 Millennium Ecosystem Assessment.

We should not be paralyzed by these apparently depressing trends. Rather, they present us with an opportunity to increase our understanding of the natural world—including ourselves—and to apply that knowledge and ingenuity to these global challenges.

THE CONSERVATION PROFESSIONAL

Growing human impacts on the environment—and the increasing effects of environmental deterioration on human health—have created an urgent need for a new type of conservation professional, able to assess the causes and consequences of human impacts on living systems, work with the myriad of stakeholders inherent in any conservation issue, and cooperatively design and implement solutions.

The Conservation of Living Systems (CLS) program was envisioned to train these professionals within a new graduate program at the University of Washington.

A wide range of stakeholders were consulted to help develop CLS, including conservation employers, UW faculty and graduate students, and leading conservation programs at other universities. A remarkably consistent set of program attributes emerged from these discussions:

1. A conservation degree at the University of Washington should **add value** to traditional disciplinary degrees—not replace them. Employers do not want “Master of nothing” conservation graduates who lack a strong disciplinary background.
2. Students must have exposure to and experience with **real-world** conservation problems and situations. Visiting instructors, an active network of professionals and employers, and the program curriculum itself will provide this experience.
3. Many current conservation employees lack training in **essential skills**, compromising their effectiveness despite disciplinary expertise. Graduates must possess demonstrated ability to work in teams, multifaceted communication skills, flexibility and responsiveness to unanticipated change, and versatile budgetary and project management experience.
4. Rather than becoming experts in a range of disciplines, students need to master **core concepts of conservation**, including knowledge sets from the natural and physical sciences; social sciences; health; policy, business, and law; and the humanities.
5. Cutting-edge conservation training and research incorporates a **human health** component; this focus has been historically absent from conservation programs.
6. Conservation graduates should reflect global diversity in their national and ethnic origins, as well as in their solid grasp of the **international** and **multicultural** aspects of conservation.

THE CLS APPROACH

We believe that the University of Washington is uniquely situated to launch a new program in conservation. The UW has made a strong commitment to building innovative interdisciplinary programs. Its world-renowned medical school; its highly acclaimed physical, natural, and social science units; and its excellent policy, law, information, and business schools provide the disciplinary bedrock needed to create a value-added program, as well as a motivated and qualified pool of prospective students.

At the intersection of conservation-related disciplines and departments at the UW, CLS will only accept students already matriculated into graduate programs within the University. By imparting interdisciplinary content and advanced problem-solving skills in an enticing environment, CLS will produce the ultimate “enhanced expert”: one who excels in the discipline of his or her choice, but who has mastered the language, integration, communication, and practice of conservation.

CLS will:

- Offer a **certificate or a concurrent master’s** in Conservation of Living Systems to qualified UW graduate students, and certain CLS courses to UW students and conservation professionals.
- Accept **competitive applications** from **students already accepted or matriculated** into existing UW graduate programs, and select students who maximize the disciplinary, cultural, and experiential diversity among program participants.
- Provide a series of **core courses** designed to deliver broad-based disciplinary fundamentals, and begin the process of moving from passive to **active learning**.
- Initiate a sense of **community** among program participants via a common core sequence, highly involved faculty and staff, and a shared physical space on campus.
- Offer a range of **electives** emphasizing **emerging disciplinary relationships** in conservation. A key intersection is human and ecosystem health.
- Offer a range of **skills courses** designed to sharpen students’ abilities to **problem-solve, communicate, and manage** people and programs flexibly and effectively in real-world situations.
- Provide select students with the capstone/practicum opportunity to work in **multidisciplinary teams** on client-oriented, **real-world** issues generated by agencies, industry, and conservation organizations.
- Incorporate teaching and project supervision by **UW faculty working in tandem with conservation professionals** from agencies, industry, and non-profit organizations.

RECOMMENDATIONS FROM STAKEHOLDERS

| RECOMMENDATIONS FROM STAKEHOLDERS <i>(italicized type indicates stakeholder group)</i> | CLS PROGRAM IMPLEMENTATION |
|---|---|
| <p>VALUE ADDED Conservation programs should augment, not replace, traditional disciplinary degrees <i>(employers, faculty)</i></p> | <p>→ Only offered to matriculated students in other graduate degree programs. Along with their primary degree, students can earn either a master's or a certificate in CLS.</p> <p>CLS is value-added; it does not create a new disciplinary unit</p> |
| <p>REAL-WORLD CONSERVATION Students require exposure to and experience with real-world conservation problems and situations <i>(students, employers, faculty)</i></p> | <p>→ Integration of Conservation core course</p> <p>Practice of Conservation core course (Capstone)</p> <p>Visiting lecturers, public speaker series, real-world curriculum, external internships and fellowships, advisory board members</p> |
| <p>SKILL SET DEVELOPMENT Conservation employees need strong work-place skills, particularly in communication <i>(employers)</i></p> | <p>→ Communication for Conservation core course, and integrated into other core courses</p> <p>Pulsed learning short courses to develop skills</p> |
| <p>DISCIPLINARY KNOWLEDGE Students need to learn the vital disciplinary knowledge sets of conservation <i>(faculty)</i></p> | <p>→ Language of Conservation core courses integrate a wide range of conservation-related fields— not <i>solely</i> conservation biology</p> |
| <p>TRANSDISCIPLINARY & INTERDISCIPLINARY Conservation instruction should integrate both multiple disciplines and the intersections between them <i>(students, faculty)</i></p> | <p>→ Entire core sequence designed to incorporate the range of conservation disciplines and their connections</p> <p>Any matriculated graduate student can take CLS courses; we encourage a discipline-diverse student body</p> |
| <p>HUMAN HEALTH Incorporate human health aspects; this focus is missing from other conservation programs <i>(students, employers, faculty, other programs)</i></p> | <p>→ Health issues integrated into core courses</p> <p>New CLS course: Environmental Conservation and Human Health; recommended for CLS students</p> |
| <p>INTERNATIONAL Expose students to international perspectives and issues. Cultivate a diverse, global student body. <i>(students, employers, faculty, other programs)</i></p> | <p>→ Global Fellows Program</p> <p>Broad-based sociological and anthropological content in Language of Conservation core courses</p> <p>International cases featured in Integration of Conservation core course</p> |

DISCIPLINES AND SKILLS

The design of the CLS courses draws from a broad vision of **disciplinary participation**, as well as a realization that students need to develop **essential skills** independent of their disciplinary specialties. The CLS program does not aim to replace traditional disciplinary studies or compete with their faculty. Instead, CLS will work at the intersection of established disciplines, bringing students of varied disciplinary expertise together in a structured set of active learning experiences designed to support depth and breadth of knowledge, issue identification, problem-solving, and effective communication. Not every CLS student will have exposure to all fields—in fact, we expect our students to be top-tier experts in their own fields, so that they bring deep knowledge to the table. As a program, however, CLS will draw from all of these fields, such that CLS graduates will be communicators in transdisciplinary studies and leaders of interdisciplinary teams.

INTERDISCIPLINARY SECTORS

We envision five overarching interdisciplinary sectors collectively involved in CLS and informing its course content. Each covers multiple traditional disciplines within the University, many of which carry over between sectors. For instance, Economics has roots in both Social Sciences and Policy and Application, as does Architecture and Urban Planning.

Natural Sciences—the study of living systems and the physical and biological factors affecting them.

Public and Environmental Health—the study of human health and well being, investigated through medicine, public health, and environmental health, from local to global scales.

Social Sciences—the study of humanity, including demography and the socio-cultural and socio-economic forces influencing human behavior.

Policy and Application—the study and practice of formulating, adopting, implementing, and evaluating policies and programs.

Humanities and Arts—the expression of human ideas, values, aesthetics, and conflicts through written, graphical, physical, and performance-based approaches.

The following table demonstrates the relationship of traditional disciplines to the five interdisciplinary sectors. This is only a partial list of the disciplines which may be integrated into CLS courses.

CONSERVATION SECTORS AND DISCIPLINES

| NATURAL SCIENCES | HUMAN AND ENVIRONMENTAL HEALTH | SOCIAL SCIENCES | POLICY AND APPLICATION | HUMANITIES AND ARTS |
|-------------------------|---------------------------------|-----------------------------|------------------------------|------------------------------|
| Atmospheric Sciences | Environmental Health | Demography and Statistics | Public Policy Law | Literature |
| Biology | Epidemiology | Environmental Psychology | Business and Marketing | Philosophy Ethics |
| Environmental Chemistry | Public Health | Environmental Anthropology | Urban Planning | Fine Arts |
| Geology | Risk Assessment | Environmental Economics | Environmental Engineering | Comparative History of Ideas |
| Oceanography | Toxicology | Geography Political Science | Landscape Architecture | Cinema and Media Studies |
| Applied Mathematics | Family Medicine Family Planning | Sociology Education | Natural Resources Management | History Communication |

SKILLS

CLS recognizes that superior skill development is crucial to the success of conservation professionals. At the same time, conservation programs at the graduate level do not typically require courses in specific skills.

CLS will stress the development of three types of skills:

Data Driven—focused on the generation, interpretation, and valuation of numeric and non-numeric patterns, and on data-driven solution-testing and adaptive management. Analytical techniques include multiple modes of knowledge acquisition, Bayesian approaches to problem-solving, and the encapsulation of other ways of knowing, especially non-Western and non-numeric approaches.

Communication—from listening to presenting. Written, spoken, and graphic presentation targeted to a specific audience and format, including one-way, two-way, and multi-way dialogue. Communication training also includes the identification of personal and group motivations, preconceived notions, and mental frameworks, and the transformation of ignorance into shared knowledge and behavioral change.

Management—project, program, personnel, and budget management, as well as policy implementation.

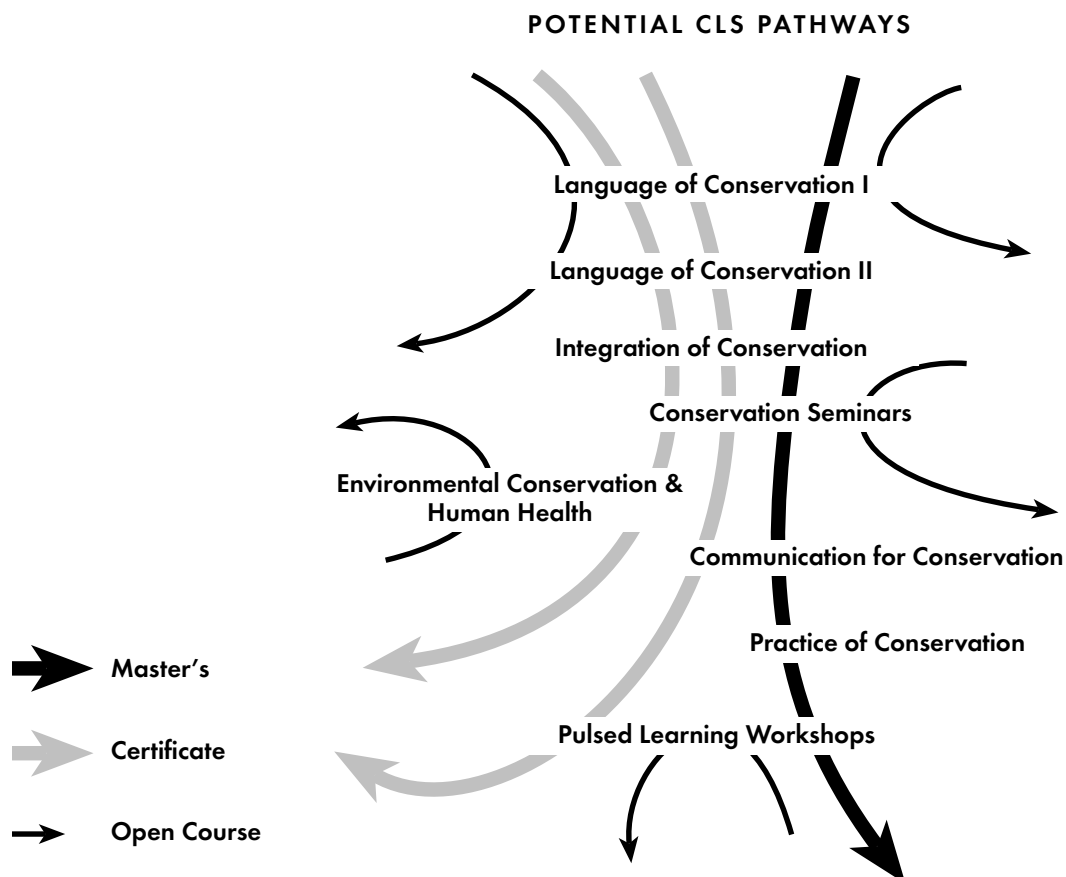
Although CLS will take advantage of existing skill development courses at the University, we also intend to develop a set of courses specialized for conservation professionals, including pulsed learning (short, intense delivery) courses, and a single quarter-long communication course. These specialized courses will be developed with an eye toward using scarce University and funding resources efficiently, making new links among interdisciplinary graduate programs, and providing students with truly value-added skills.

THE CLS PROGRAM

CLS is a flexible approach to training graduate students and returning conservation professionals. CLS will offer a series of core courses, electives, a conservation seminar, and workshop (or pulsed) courses. CLS gives the conservation student the option of:

- I Pursuing a concurrent master's (an additional 1–2 year time commitment)
- II Pursuing a certificate (an additional 1 year time commitment)
- III Taking select courses (some courses are subject to prerequisites)

The CLS program will include a sequence of five core courses. The sequence will proceed from disciplinary-based content (Language of Conservation I & II, 10 credits) to problem-driven case studies in which students interact in teams (Integration of Conservation, 5 credits), to a fully applied, highly skill-dependent, real-world exercise requiring small teams to provide effective problem-solving deliverables to partnering agencies or organizations (Practice of Conservation, 8–15 credits). The Communication for Conservation course (5 credits) will provide students with a full range of personal and interpersonal skills needed to effectively convey their results and message. Students will also be required to take a conservation-related seminar of 2–4 credits and a modest number of selected electives that remedy gaps in their background knowledge or skills.



I. CLS MASTER'S DEGREE

The CLS master's degree program will be offered as a concurrent degree to students accepted into or matriculated in any UW graduate program. The CLS master's program will serve as a value-added complement to existing master's, PhD, and professional degrees. The degree will broaden and deepen the student's disciplinary studies to include knowledge and skills useful in the conservation field. Students cannot be admitted to the UW through the CLS program, but rather must be admitted to another degree-granting graduate program before applying for the CLS master's.

This non-thesis master's will require a minimum of 36 credits, at least 8 of which will be earned by completing a real-world, client-based project. The core course requirements for all CLS master's degree students will include 20 credits, covering the disciplinary fundamentals of conservation, problem-solving in conservation, and communications methods and skills.

A 2–4 credit seminar requirement can be fulfilled by the CLS seminar or another approved conservation-related seminar. Two elective courses, totaling 6–10 credits, are chosen in conjunction with CLS advisors, who review each student's academic and professional history, current program of study, and career goals. The Capstone project, which is completed through the Practice of Conservation core course, can be finished in as few as 8 or as many as 15 credits, depending upon the scope of the student's project and his or her pace. Many students likely will choose to incorporate their PhD or other master's work into their capstone project.

The CLS master's will take one year of full-time study beyond the requirements of the student's other degree program. However, if the other program requires more than 36 credits, some courses (such as approved electives) may be counted toward both degrees. Up to 12 credits can be applied toward the requirements for both programs.

CLS MASTER'S CURRICULUM

| COURSE | CREDITS | PREREQUISITES |
|--------------------------------------|----------------|--------------------|
| CORE | | |
| Language of Conservation I (LoC) | 5 | |
| Language of Conservation II (LoC) | 5 | |
| Integration of Conservation (IoC) | 5 | LoC I&II |
| Communication for Conservation (CfC) | 4 | LoC I&II |
| Practice of Conservation | 8-15 | LoC I&II, IoC, CfC |
| ELECTIVES | | |
| Conservation Seminar | 2-4 | |
| Elective I | 3-5 | |
| Elective II | 3-5 | |
| TOTAL MS CREDITS | 36-49** | |

*** The combination of courses chosen must equal at least 36 credits. Taking the minimum credits listed above for each course will not yield 36 credits.*

MASTER'S ACADEMIC CALENDAR

| YEAR 1 | COURSE (CREDITS) | FLEXIBLE |
|--------|------------------------------------|------------------|
| Autumn | Language of Conservation I (5) | Seminar (2-4) |
| Winter | Language of Conservation II (5) | Elective 1 (3-5) |
| Spring | Integration of Conservation (5) | Seminar (2-4) |
| YEAR 2 | | |
| Autumn | Communication for Conservation (4) | Elective 2 (3-5) |
| Winter | Practice of Conservation (4-7) | |
| Spring | Practice of Conservation (4-8) | |

II. CLS CERTIFICATE

The CLS certificate program will be available to qualified students in any UW graduate program. The requirements are the same as for the master's, but without the Communication for Conservation, Practice of Conservation, and an additional elective. The certificate will require a minimum of 20 credits. There is no capstone or practicum requirement.

The certificate will take slightly less than one year to complete. A student's home department may agree to accept CLS courses as electives, which can shorten the time to graduation. Credits earned toward the certificate may be transferred toward the requirements for a CLS master's degree if a student is admitted into the master's program.

CLS CERTIFICATE CURRICULUM

| COURSE | CREDITS | PREREQUISITES |
|-----------------------------------|--------------|---------------|
| CORE | | |
| Language of Conservation I (LoC) | 5 | |
| Language of Conservation II (LoC) | 5 | |
| Integration of Conservation (IoC) | 5 | LoC I&II |
| ELECTIVES | | |
| Conservation Seminar | 2-4 | |
| Elective | 3-5 | |
| TOTAL CERTIFICATE CREDITS | 20-24 | |

CERTIFICATE ACADEMIC CALENDAR

| YEAR 1 | COURSES (CREDITS) | FLEXIBLE |
|--------|---------------------------------|----------------|
| Autumn | Language of Conservation I (5) | Seminar (2-4) |
| Winter | Language of Conservation II (5) | Elective (3-5) |
| Spring | Integration of Conservation (5) | |

III. NON-DEGREE STUDENTS/OPEN

Certain CLS courses will also serve students who are not enrolled in a CLS pathway. These courses include the Language of Conservation series, the Conservation Seminar, and any CLS electives.

First, we expect that a wide range of students currently enrolled at the UW will take advantage of specific new classes offered by CLS, but will not necessarily wish to pursue a degree or certificate option.

Second, international students attending the UW in one of several scholarship programs may take courses in addition to their regular program requirements (e.g., Hubert H. Humphrey Fellowship Program and the Population Leadership Fellowship Program at the Evans School). Ideally, CLS will develop its own Global Fellows program, and this group would further augment student ranks.

Third, our interaction with conservation employers has indicated that well-designed courses in communication and skill-based pulsed learning courses (1–10 days) will be attractive to returning professionals. Professionals can attend CLS courses on a space-available basis. CLS courses may also be offered through the UW Extension to provide more opportunity for professionals to further their education in conservation. If offered through Extension, the Communication for Conservation course would not require the usual prerequisites (Language of Conservation I and II).

CLS CORE COURSES

LANGUAGE OF CONSERVATION I & II

Required for CLS master's and certificate; available to other students

Two quarters, 5 credits per quarter, 3/5 split

Five contact hours per week: 3 lectures and a 2 hr discussion section

Discussion sections are limited to 15 students, lecture size is unlimited

Premise: Students with disciplinary depth provided by their primary academic pursuit also need to gain breadth across disciplinary sectors in order to be most marketable to the natural resource and conservation community. This course sequence conveys the disciplinary fundamentals students need to successfully integrate their expertise into conservation solutions. Rather than break the fundamentals into different courses, as is the case with most other graduate programs in conservation, we elect to present these disciplines within the framework of a two-quarter course.

Primary Goal: The primary goal of this course is to offer students an integrated examination of discipline-based fundamentals as well as the interdisciplinary nature of conservation solutions. The course will provide the foundation for the next course in the curriculum, the Integration of Conservation.

Course Format: Due to the disciplinary diversity represented in these courses, the lead faculty would coordinate a rotating set of guest lecturers, including faculty and conservation professionals, who would be charged with providing an overview of disciplinary fundamentals relative to conservation, thus creating the language of conservation. The number of lectures a guest gives would be set by the final slate of topics in the syllabus; not all guests would lecture only once, nor would each necessarily lecture for a week.

Each lecturer would be asked to provide a set of primary readings, which would include an overview article, 1–2 classic papers that have been defining in this field, and a case study reading where the content material is applied directly in a conservation setting.

In addition to coordinating the guest faculty to ensure their presentations fit the goals of the course, the faculty coordinator will lead the discussion section(s). Most importantly, the faculty coordinator will be responsible for helping the students create a portrait of the ways in which this diversity of disciplinary approaches merge to produce progress in the conservation of living systems.

The course will be set up as a 3/5 split, involving three hours of lecture, and the option of an additional two hours of intensive discussion of lecture topics and readings. The 3/5 split allows for broad outreach to students with conservation interests, as many students from across the three UW campuses could join in the lecture portion. The discussion section component would be compulsory for those students seeking a CLS master's or certificate, and enrollment in the discussion section would be restricted to give CLS students top priority.

The discussion section will also be the first avenue to introduce communication skill sets. First, the faculty coordinator will guide students to notice and evaluate differences in communication styles and modes that inevitably will be exhibited by the different guest faculty. Appreciating the nuances of what is communicated via these distinct modes, as well as why they may be chosen, will allow students to begin to understand the significance of deliberate selection of communication styles. Second, discussions will emphasize proactive, reactive, and interactive forms of idea realization and group facilitation.

One other objective of this course is to facilitate the formation of a cohort among the participants in the CLS program. Students should begin to function as a multidisciplinary learning community in which they help one another work through and appreciate each area. This is particularly relevant for those students who meet together in discussion sessions over two quarters.

Course Content: Because the suite of disciplines that apply to understanding conservation problems and formulating solutions to those problems is very large, faculty coordinators of Language of Conservation I and II might arrange the sequence of topics differently according to their expertise. However, common to any offering of this course would be attention to the full span of disciplines that contribute to and influence conservation practice. On pages 16 and 17, we present one possible curricular formulation that illustrates the span of disciplinary areas and topics needed in this course sequence.

Learning Goals

- To provide students with an understanding of the primary concepts, methodological approaches, and resulting different languages of conservation across relevant sectors and disciplines. Students are expected to gain an appreciation for each of these areas, but not to become expert in any area outside their own discipline.
- To begin the process of moving from passive to active learning by exposing students to a range of communication styles, so that they can learn to critically examine the relationship between presentation style and communication effectiveness.
- To coalesce CLS students into a multifaceted cohort, from which multidisciplinary teams will emerge.

LANGUAGE OF CONSERVATION I, LECTURES AND TOPIC AREAS

| LECTURES | POTENTIAL TOPICS |
|--|--|
| Environmental psychology | Environmental attitudes Biophilia |
| Conservation and natural resource use | Agriculture and forestry Fisheries and bushmeat |
| History of conservation | Conservation and environmental history |
| Biodiversity and evolution | Macroevolution and speciation Biogeography, biodiversity hotspots |
| Methods of inquiry and analysis | Hypothesis generation Qualitative sampling Modeling and simulation Monitoring and indicators Scaling |
| Populations and demography | Population dynamics Small populations and extinctions Spatial structure, migration, metapopulations Population genetics |
| Physiological ecology and environmental health | Habitat/tolerance limits Responses to stressors Waste disposal and habitat degradation Toxins, pesticide circles, hormone mimics, POPs Disease dynamics, epidemics, spread of vectors |
| Conservation in human-dominated environments | Consumption and land use; ecological footprint analysis; environmental space Rural conservation—soil, water, natural resources Urban environment Suburban environment Land use planning and restoration Sustainable development Place-based cultural landscapes and biodiversity |
| Environmental ethics | Utilitarianism Land ethic Animal welfare, species rights Obligation to the future |

LANGUAGE OF CONSERVATION II, LECTURES AND TOPIC AREAS

| LECTURES | POTENTIAL TOPICS |
|--|--|
| Environmental sociology and anthropology | Interpersonal interaction, conflict Cultural institutions/frameworks Environmental justice |
| Geography and conservation | Migration and trade Globalization and transnationalism |
| Environmental economics | Micro to macro Traditional and non-traditional valuation Ecosystem services with economic frames |
| Community and ecosystem processes | Species interactions; non-linearity, community structure Introductions and invasions Ecosystem process, function, and service Resilience and sustainability Human feedback to ecosystems Climate change and climate influences Restoration ecology |
| Environmental business | Sustainability Business of conservation Conservation marketing |
| Environmental law | Individual rights Public versus private goods Common pool resource regimes Harm, nuisance, and standing Laws, treaties, and conventions |
| Environmental policy | Precautionary principle Poverty and debt Institutions and policy formation Activism |
| Conservation and wild nature | Landscape-scale conservation planning Globally coordinated conservation practice Place-based ecological knowledge, conservation theory |
| Communication and community research | Negotiation and facilitation Arts-based conservation practice Healing Activism Place- and community-based conservation planning and practice; traditional ecological knowledge |
| Future directions in conservation | Framing questions and solutions |

INTEGRATION OF CONSERVATION

Required for CLS master's and certificate; available to other students (LoC I&II prereq.)

One quarter, 5 credits

3 classes per week: one hour **lecture** and two 125-minute **case discussions**

Ideal class size is 20–25 students; limited to 30 students

Premise: Conservation issues are, by definition, multi-stakeholder and interdisciplinary. Although reaching consensus is rare, conservation solutions must integrate information and approaches broadly across disciplinary boundaries, in a case-specific way. Prerequisites for successful outcomes in conservation problem-solving are identifying stakeholders; mapping their wants, needs, and constraints; and facilitating their collective inclusion. Persuasive communication skills are also crucial to proactive problem-solving.

Primary Goal: The primary goal of this course is to examine how multiple disciplines have been and should be integrated and applied in articulating and solving conservation problems within the context of the constellation of stakeholders specific to any one case.

Course Format: The course format emphasizes exploration and analysis of selected case materials. The cases deal substantively with a variety of conservation issues at different ecological, environmental, social, economic, and political scales. Two types of cases will be used: “retrospective,” in which a past event is fully analyzed, allowing students to examine decision-making successes and failures; and “decision-forcing,” in which a case is presented through to the point of decision-making, forcing the students to assume decision maker and other stakeholder roles and explore potential decision-making possibilities and case outcomes.

“*Retrospective*” case discussions will use our joint understanding of a conservation issue to explore what and why things happened, as well as what different stakeholders might have done, or should have done, had their information/approach been different. In this way, retrospective case studies provide real settings in which to probe historical behavior, realize data and disciplinary gaps, and map alternate strategies.

“*Decision-Forcing*” discussions will present existing cases and explore unfolding cases, without revealing outcomes. Students will be expected to assume the roles of decision makers and other stakeholders, and use both disciplinary information/approaches and communication skills to arrive at potential solutions. In this way, case studies provide real settings in which to test strategies and confront the reality of differing worldviews.

Cases will be evaluated along four parallel criteria:

Technical—assessment of the facts and relevant disciplinary contexts and concepts underpinning the case

Administrative—procedural and legal context

Political—socio-cultural and normative context of the case, assessed across relevant stakeholders, as well as within the geographic and geo-political scale of the case

Communication—how did communication pathways facilitate, or impede, case resolution

The goal of this learning approach is to build an ability to disaggregate complex conservation situations, assess the feasibility of different courses of action, and explore strategies to get such choices adopted and implemented.

Communication skills will be integrated into this course, with writing and/or presentations expected each week. This work may include: PowerPoint/visual presentations, decision memos, press releases, grant proposals, group facilitation, stakeholder mediation, and conflict resolution.

Course Content: Cases will all involve issues and expertise drawn from two or more of the five interdisciplinary sectors (natural sciences, health, social sciences, policy and application, and humanities). Further, the collection of cases will span spatial scales from local to regional, national, or global issues. Finally, cases will either represent primarily domestic, international, or global scales.

INTEGRATION OF CONSERVATION SAMPLE CASES

| DOMESTIC | |
|---------------|--|
| Local | Water in the West—Mono Lake |
| Regional | Let it Burn? Fire Management in Western Forests Saving Sea Turtles—Trends in Gulf of Mexico Fisheries Crossing the Border: Managing Pacific Halibut in the Pacific Northwest |
| INTERNATIONAL | |
| Local | Developing Communal Lands in Zimbabwe Sustainability and the Mexico City Lake Basin |
| Regional | The Bushmeat Crisis: Approaches and Strategies Oil Development in the Ecuadorian Amazon: Public Health and Environmental Justice |
| GLOBAL | |
| | Too Hot to Handle: Can Kyoto Create the Political Environment for Change? Preparing for a Pandemic: Birdflu/SARS |

Learning Objectives

- To understand the role(s) of multiple disciplines (such as health, policy, economics, and ecology) in conservation practice.
- To develop skills in analyzing and understanding conservation issues: in particular, identification of stakeholder values, world views, social history, social and technological resources, conception of the problem, and objectives.
- To develop skills in integrating and applying multiple disciplinary perspectives to a conservation issue.
- To develop skills in written and oral communication about conservation issues, including negotiation and facilitation skills where applicable.
- To nurture a commitment to and awareness of collaborative community-based approaches to conservation planning that seeks to integrate local knowledge into adaptive planning and management practices, and is based on respect for traditional environmental knowledge.

COMMUNICATION FOR CONSERVATION

Required for CLS master's; available to certificate and other students (LoC I&II, IoC prereq.)

One quarter, 5 credits

Two 125-minute class meetings per week: **active learning** sessions that integrate lecture, practice, and discussion

Maximum number of students is 15–20.

Premise: Effective communication is an essential element of any successful career, regardless of discipline. Conservation professionals are required to engage in a wide range of communication pathways, including presentation of ideas, results, and implications to a wide range of audiences, and facilitation and negotiation of value-laden decision-making about resource management issues. Whereas communication within the academic realm is primarily focused on sharpening the student's ability to present information, conservation often requires the ability to listen to stakeholders with differing value sets and world views, glean the essentials of the issue/problem, and work cooperatively and proactively with stakeholders towards developing shared solutions.

When we asked conservation employers what causes employees to fail in their positions, the number one reason was a *lack of communication skills*. Creating a course that specifically works to develop such skills was seen by employers as an essential element to make this program and its graduates effective, relevant, and competitive. The Communication for Conservation (CfC) course is designed specifically to address this need.

Primary Goal: This course is intended to expose students to the range of communication skills required in conservation, highlight their usefulness, and direct interested students to additional communication resources that fit their individual needs.

Course Format: This course will feature interactive sessions with a rotating panel of experts, from within the University as well as from the conservation and communication professional communities. As in the Language of Conservation, CfC will be directed by a faculty coordinator who invites and organizes expert speakers and provides integration across the course. Basic explanatory content will be paired with exercises in which students—individually and in groups—practice under the aegis of the instructor and visiting professionals, present their work, are audio and/or video-taped, and peer-evaluate performance.

Course Content: The course will include four forms of communication (written, oral, visual/graphic, and interpersonal) delivered along three pathways (one-way, two-way, and multidirectional), presented and practiced within a conservation framework.

Written: Students will learn to write in a concise, precise, audience-appropriate, and detail-oriented way. They will acquire the ability to synthesize and focus a large amount of information into compelling and effective written products. By the end of this course, students will be able to write potent one-page decision memos, op-eds, and short grant proposals, and they will have increased familiarity with effective construction of reports, journal articles, and detailed grant proposals.

Oral: Speaking and presentation skills are a key to success in the conservation field. Students will learn to prepare a spoken presentation, present audience-appropriate information, conduct on-camera and radio interviews, seek financial and programmatic support, and engage in testimony and debate.

Visual/Graphic: Visual communication skills were also stressed by conservation employers. This course will incorporate skills on delivering a message through graphic presentation, use and interspersion of graphic elements/types, storyline development, and branding. Development of mixed-media presentations to a diversity of audiences also will be emphasized.

Interpersonal: The ability to communicate, including both giving and receiving information, with people in different disciplines, positions, and cultures is essential to effective conservation. Students will learn how to listen, understand, and value what stakeholders are attempting to communicate. This includes recognition of conflict and the importance of communicating persuasively across cultures and values. This course will include facilitation, mediation, and negotiation instruction, as well as training in cross-cultural communication.

One-way Communication: Common to scientific and academic disciplines, one-way communication focuses on the delivery of information without the expectation of direct, interactive response. Examples include most written forms and lectures, and often hinge on effective graphic presentation.

Two-way Communication: Not typically stressed within a traditional academic forum, two-way communication features an interactive dialogue between the conservation professional, a member of the media, or a segment of society. Examples include print, radio, and television interviews; testimony as an expert witness before a congressional panel or at a citizens' meeting; and in-person presentation of proposals to funding organizations and donors.

Multidirectional Communication: Often featured in business and policy programs but not well used in scientific training, multidirectional communication forces the conservation professional to direct, rather than personally control, the conversation. Examples include meeting facilitation, stakeholder mediation, resource negotiation, and conflict resolution. An introduction to cultural competency, including recognition of differing viewpoints, value sets, and worldviews, and insights into detection of cultural norms and constraints will also be addressed.

Potential exercises might include:

- panel debate on local commercial radio
- national NPR interview
- facilitation of a multi-stakeholder fact-finding meeting
- testimony for King County Council/METRO Resources Committee

- legal brief for State Supreme Court hearing
- expert witness for federal advisory committee
- presentation to urban multicultural community group on an ecological restoration site
- oral defense of conservation proposal to philanthropic foundation
- one-page summary of conservation policy issue to congressional staffer
- interpretive signage for recreational and educational environmental heritage site
- logo and branding for conservation initiative
- ambush television interview on research finding with controversial implications
- in-depth interview with science reporter from major national newspaper
- conflict resolution between local conservation non-profit and corporate landowner
- spontaneous explanation of your research to a lay person whom you meet in the field

Learning Objectives

- To gain real-world experience in written, graphic, and oral communication.
- To gain the ability to gauge an audience and target communication to specific groups.
- To provide knowledge of and practice with presentation versus interactive forms of communication, and familiarity with basic facilitation and negotiation skills.

PRACTICE OF CONSERVATION

Required for CLS master's students

One to three quarters, **variable credit** (typically 5–8 credits per term, 8–15 credits total)

Instructor–student team meetings to be arranged

Limited to students pursuing CLS master's

Premise: A full appreciation and understanding of conservation issues and approaches to solutions is not possible without active participation in the process. Both students and conservation employers stressed the need for real-world experience resulting in products directly usable by collaborating agencies, industry, or non-profit organizations.

Primary Goal: The goal of this course is to put the skills and disciplinary foundation the student has learned in the core sequence into play in a real-world, client-driven context.

Course Format: Rather than use a structured classroom approach, the Practice of Conservation adopts a practicum or capstone model in which students are highly independent in the development and execution of a project and product, but are guided by faculty in three ways:

1. A faculty advisor is assigned to the project and the team, and commits to meeting with the students on a schedule ranging from weekly to monthly, depending on the length of the project.
2. The CLS Director (who may also act as a faculty advisor) is the direct University contact for all clients, reviews all proposed team projects, reviews all draft products, and may step into the process at the behest of the faculty advisor, the student team, or the client.
3. “*Just in Time*” interaction delivers needed expertise and critique as identified by the student team and the faculty advisor. Just in Time experts may come from the University or the range of conservation professionals with which CLS and the University have ties. The key is timely delivery of essential information and structural guidance outside the bounds of traditional classroom learning.

Because of the breadth of the field of conservation, this course takes a flexible approach, including the number of credits assigned to the problem, whether the project lasts for multiple quarters, and which quarter the project starts. However, there are boundaries, as follows:

- Small, multidisciplinary teams. Teams must be composed of students with differing backgrounds. Thus, three Biology students working together is likely not appropriate.
- The problem must be client-defined in conjunction with a faculty advisor. Although students may find clients—for instance, through previous internship work—it is the goal of CLS to provide a continuous interface between clients and appropriate student teams. Clients will come from all sectors involved in conservation: local, state, and federal agencies; industry and consulting; non-governmental organizations. The CLS

Director will maintain a clearinghouse of clients and client needs, and will recruit faculty advisors who are best suited to promote particular projects.

- Clients will be asked to provide a modest budget to project teams, not exceeding \$1000 except in special circumstances. Additional project funding, if needed, will be provided by CLS on a competitive basis.
- A variable amount of credit can be accrued per quarter, depending on the size of the team and magnitude of the project. We anticipate between 5 and 8 credits. A variable number of quarters can be used, but no more than three.
- This course has been successfully concluded when the student or team has delivered a final product acceptable to the client. We anticipate that this will not be a strictly academic product (e.g., a paper suitable for publication in a peer-reviewed journal), but rather a written, graphic, or oral product designed to facilitate a particular solution to the problem at hand.

Course Content: Because the Practice of Conservation is not a traditional course, but a capstone project, content is variable, but delivered within a sequential framework, as follows.

Learning Objectives

- To work in a multidisciplinary team, in which input and interaction among all members leads to the effective resolution of the problem set.
- To put disciplinary and skill set knowledge into play in a real-world context.
- To produce a product directly useful in conservation or natural resource management that can also be used by the students as proof of relevant experience (that is, on a résumé).

PRACTICE OF CONSERVATION TIMELINE

| TIME | ACTIVITY |
|--|--|
| Prior to start of first quarter | Students entering the Practice of Conservation course meet with the CLS Director to select from a set of potential problems and propose a team. |
| First week of the quarter | After provisional approval of the team by CLS, the client is contacted and asked to elaborate on the specifics of the problem, the timeline, and the required product(s). This can be in writing as a Request for Proposal (RFP), or in the form of an initial meeting. We anticipate the clearinghouse function of CLS will facilitate up-to-date problem statements from prospective clients. |
| Weeks 1–4 | Once the team members have selected the problem for their work, a faculty advisor is recruited by the Director. The team members, in consultation with their advisor, prepare a presentation for the client in which they propose their plan for addressing the problem. The proposal (oral and written) must include: specific data needs and plan for data acquisition, budget, workplan, and timeline. |
| Week 4 | Presentation of proposal to client by week 4 at the latest. |
| Week 5 | <p>The client has one week to accept, decline, or ask for modifications to the proposal.</p> <p>Simultaneously, the Director and the faculty advisor also will review the program and proposal, with the intent to accept, decline, or ask for modifications. This failsafe is needed to ensure that student teams are producing products with a high likelihood of success, and that clients and student teams are not unreasonable in their expectations.</p> <p><i>(if proposal requires minimal or no revision)</i></p> <p>Once a proposal has been agreed upon, a contract outlining the budget, workplan, and timeline is signed by team members, their faculty advisor, the client, and the Director.</p> |
| Week 6 | <p><i>(if proposal requires more extensive revision)</i></p> <p>Once a proposal has been agreed upon, a contract outlining the budget, workplan, and timeline is signed by team members, their faculty advisor, the client, and the Director.</p> |

| TIME | ACTIVITY |
|-----------------------------------|---|
| Weeks 6–12 | <p>Depending on the timeline, the team will meet weekly to bi-monthly with their faculty advisor.</p> <p>The team will meet monthly to quarterly with the client for progress updates. Meetings will focus on goals attained relative to the workplan and timeline, difficulties encountered, potential solutions, and adapted planning. Time and financial budgeting updates must be presented at all progress meetings.</p> |
| Additional quarters | <p>Most Practice of Conservation projects are expected to require two quarters of work. Evidence of progress and revisions to the workplan and timeline must be presented at the start of each additional quarter, and be approved by CLS, the faculty advisor, and the client.</p> |
| One month before finishing | <p>A draft product will be submitted to the client and to CLS for review and approval.</p> |
| Two weeks before finishing | <p>Following approval of the draft (two-week review period) or requests for modifications, a final product will be produced. To ensure quality as well as timely production, CLS will have the right to intercede on behalf of a student's team, or on behalf of a client.</p> <p>After the product has been completed, a project evaluation will be filled out by each team member, and by the client representative(s), with the aim of refining the Practice of Conservation experience for future students and clients.</p> <p>A catalog of client problems, Practice of Conservation team products, and team workplans, timelines, and budgets will be created to assist future teams.</p> <p>Teams will make a presentation at a CLS seminar to describe their work, and they will create a website that describes the project and its outcomes to enhance public awareness of their efforts.</p> |

OTHER PROGRAM ELEMENTS

SEMINARS

Premise: To gain an understanding of the diversity and difficulty of conservation issues and approaches to a solution, students must interact with conservation professionals locally, nationally, and internationally. At the same time, extended, interactive discussion among students, allowing in-depth exploration of conservation topics, range of stakeholder opinion, and range of student opinion is a fundamental part of learning how issues arise, evolve, and are solved.

Primary Goal: To create a culture of highly interactive students able to discuss and discourse knowledgeably on a wide range of issues—with each other as well as with conservation professionals and leaders.

Course Format: CLS will host, as well as facilitate, a range of seminars designed to build the CLS student cohort, bring students in contact with a range of conservation professionals, and create opportunities for future internships and employment. All certificate and master's students will be required to take at least one seminar; however, CLS anticipates offering at least one to two seminar courses per year, in one or more of the following models:

1. A highly visible **seminar series of national to international note**, bringing speakers from a range of disciplines and career approaches to speak on conservation issue identification and problem-solving. All speakers will be required to give a well-publicized public lecture in the late afternoon or early evening. A graduate class would be attached to the seminar series, allowing students to engage in lively, interactive discussion with each week's speaker, as moderated by the course instructor. CLS does not anticipate running three such series each year; rather, we would ideally like to participate in supporting existing efforts or infusing CLS materials in these related series (e.g., *Bevan Series on Sustainable Fisheries* offered at the School of Aquatic and Fishery Sciences; UW Earth Initiative's *Oceans to Stars* lecture series; *Henry Luce Speaker Series on Environmental Management*), or working with disciplinary units to develop additional series on other broad topics within conservation.
2. **Graduate discussion seminars** in which the class meets with an instructor weekly to discuss and analyze readings, or potentially to work collaboratively on a bounded reading/writing project. CLS anticipates offering 1–3 of these annually, ideally taught by a mix of UW faculty awarded a temporary fractional faculty line within CLS, or by visiting conservation professionals as part of their scholarship award. The “*Connecting with the Community*” graduate seminars offered by the Institute on the Public Humanities are one existing model at UW, which has been supported by the Simpson Center for the Humanities.
3. **Weekly seminar series** feature problem identification and solution from a broad variety of scholars, primarily drawn from the UW community. Seminar speakers would be

directed to make their seminars accessible to a broad audience (and therefore jargon-free), and to distill and illustrate methods relevant to conservation of living systems to help students and other faculty see connections for problem-solving. These seminars would be offered as lunch seminars (“*eat & learn*”). Examples include the Climate Impacts Group seminar series and the Water Center’s Tuesday morning seminar series.

4. CLS would sponsor **day or half-day events** showcasing the breadth of work in conservation, or related issues, with a chance for discussion and interaction. CLS capstone groups might present their work in such an event. A model for a successful UW-wide event was the first *UW Conservation Colloquium*, held on November 4, 2005, which attracted wide participation and interest, with over 200 attendees and an article in the *UW Daily*.

Learning Objectives

- To involve students in a range of discussions that cut across disciplines, interest groups, approaches, and stakeholder groups (i.e., students, faculty, staff) within the UW.
- To link visiting scholars to students via issue examination.
- To expose students to prominent and active conservation practitioners, providing them with an opportunity to meet with potential role models and to network with conservationists who may be able to provide future employment.
- To present the controversial issues of the day to the University community and the public.

PULSED LEARNING

Conservation professionals today can effectively learn many of the skills they need via short courses, or a “pulsed learning” model. We propose to support and internally advertise short courses that will vary in length and topic, but will follow the model of short-term total immersion learning. Offerings may be both set into the annual schedule (e.g., quantitative analysis or communication courses), as well as flexibly responsive to changing issues and new techniques (e.g., new advances in spatial modeling).

To be successful, care must be taken to keep the student-instructor ratio low in pulsed learning courses. A mix of students must also be accepted to facilitate work in interdisciplinary learning communities (i.e., not just natural science PhD students signing up for a statistics course).

Skill sets should broadly include, but not necessarily be limited to:

- Communication (verbal, written, graphic)
- Negotiation
- Project and budget management

- Team-based decision-making; problem-solving
- Data analysis (for both quantitative and qualitative data)

Goals

- Advance a particular skill set in an immersion setting.
- Provide students with the opportunity to practice the skill(s) within the bounds of their own (individual or team) project/career path.
- Link the skills initially developed in Language of Conservation, Integration of Conservation, and Communication of Conservation core courses to the dedicated use of those skills in the Practice of Conservation capstone project.
- Bring students from different career paths together in an intensive interactive setting, such that degree program students can interact with returning professionals and international fellows—extending the worldview.

Potential Delivery of Pulsed Learning Courses: 5-day to 3-week total immersion courses (8–10 hours daily, blended lecture and practical/lab) that combine specific skill acquisition with application. Limited to a small (10–15) number of students. Competitively awarded to students able to demonstrate how the course will further their specific conservation efforts. Taught by UW faculty and conservation professionals who are specifically skilled in the relevant subject and its application to conservation.

A 2-week pulsed learning course might be organized as follows:

Day 1—student introductions, what their data/problem/issue is, course expectations

Day 2~7—lectures and practical application, using instructor-provided data/materials

Day 8~13—intensive lab sessions in which students work on their problem/issue using skills acquired; rigorous oversight by instructors

Day 14 (last day)—student presentations of their results and how they achieved them

ELECTIVE COURSES

Electives will provide students with breadth and depth in conservation disciplinary sectors, as well as skills. Most electives will be existing courses within traditional disciplinary units, offered with the permission of the unit and the instructor(s). The following list of courses is meant to illustrate the diversity of offerings already present across campus, rather than to act as an exclusive set.

CLS will also create several new courses that bridge disciplines and help define the unique structure and offerings of CLS. On the following pages, two potential offerings are presented, which link ecology, resource management and public health, and development and resource conservation.

Upon admission, each candidate's academic and professional history, current program of study, and career goals will be reviewed by a faculty committee. They will recommend a CLS course of study, including a short list of (restricted) electives for each entering student. The list will aim to provide depth or breadth by recommending courses in a skill or sector: natural sciences, humanities, health, social sciences, or policy/applications.

SAMPLE CLS ELECTIVES

Natural Sciences

| | |
|---------------|--|
| BIOL 572 | Science and Environmental Policy, <i>Boersma</i> |
| ESRM 450 | Wildlife Conservation and Management, <i>Marzluff</i> |
| FISH 444 | Conservation Genetics, <i>Naish</i> |
| ME 415/CEE495 | Sustainability and Design for Environment, <i>Cooper</i> |

Social Sciences

| | |
|------------|--|
| ANTH 457 | Ecological Anthropology, <i>Smith</i> |
| ANTH 487 | Cultures and Politics of Environmental Justice, <i>Peña</i> |
| L ARCH 504 | Regional Landscape Planning, <i>Hill</i> |
| PBAF 595C | Economic Approaches to Environmental Management, <i>Layton</i> |

Public and Environmental Health

| | |
|-------------------|--|
| CLS course | Environmental Conservation and Human Health |
| ENV H 472 | Environmental Risk and Society, <i>Fenske</i> |
| ENV H 577/CEE 560 | Risk Assessment for Environmental Hazards, <i>Faustman</i> |
| UCONJ 540 | Environmental Change and Human Health, <i>Rosenblatt</i> |

Policy and Applications

| | |
|-------------------|--|
| CFR 573 | Forest Environmental Resource Planning, <i>Bradley</i> |
| LAW B 565/SMA 515 | U.S. Coastal and Ocean Law, <i>Allen</i> |
| LAW A 529 | Public Land Law, <i>Hicks</i> |
| PBAF 590 | Environmental Policy Processes, <i>Cullen</i> |

Humanities

| | |
|--------------------|---|
| CFR 592/ENVIR 500A | Ethics & Public Policy, <i>Light</i> |
| HSTAA 570 | American Environmental History, <i>Nash</i> |

Skills

| | |
|----------|---|
| ESRM 400 | Natural Resource Conflict Management, <i>Ryan</i> |
| PBAF 582 | News Media and Public Policy: Strategic Communications in the Information Age, <i>Messerschmidt</i> |
| FISH 458 | Confronting Models with Data, <i>Hilborn</i> |

NEW CLS ELECTIVE COURSE: ENVIRONMENTAL CONSERVATION AND HUMAN HEALTH

One quarter, *3/5 credits* (3 credits for students who participate in twice-weekly hour-long lectures, and the required field trip; 5 credits for students who also work in interdisciplinary teams to complete, write-up, and present a project that grows out of the field trip).

Two 1.5 hour class sessions per week, primarily **lecture** format, plus a required weekend field trip.

Class size: 25 students

Premise: Within the traditional conservation worldview, humans are cast as the negative interactors affecting ecosystem structure, function, and ultimately, viability. Thus, the classic environmental impact formula: $P \cdot A \cdot T$, or population size times affluence times technology, implies that humans act on the ecosystem from outside of it. Our abilities to harness ecosystem production of goods and services have allowed humanity to flourish. But as humans have affected ecosystems, so have ecosystems affected and contained humanity. In fact, humans have evolved within ecosystems, such that individual and societal health is profoundly affected by ecosystem change.

This course explores the human part of this feedback loop, with a focus on current and future impacts of environmental change and degradation on human beings as individuals, societies, nations, and globally. Finally, in an era of increasing human population pressures and huge advances in medicine and public health, this course explores the question of sustainability: can human and public health needs and solutions support conservation goals and *vice versa*?

Course Format: The course will be presented in three sections:

1. Introduction to conservation and public health issues, within the historical to current context of human population growth.
2. Integration field trip—exploring the on-the-ground linkages between public and ecosystem health
3. Case studies in environmental conservation and human health—an in-depth examination of negative and positive feedback.

Learning Objective

- To explore the interaction between habitat conservation, biodiversity, and human health.

ENVIRONMENTAL CONSERVATION AND HUMAN HEALTH

| LECTURES | SPECIFIC TOPICS |
|--|---|
| Overview of threats to biodiversity | Biodiversity: Habitat degradation and loss, over-exploitation, species introductions and invasions, pollution, climate change |
| Overview of threats to human health, and the interaction of health and biodiversity | Human health: Disease, epidemics and pandemics, nutrition and diet, sanitation, toxins, endocrine disruptors. Interaction between biodiversity and health. |
| Critical concepts in public health for understanding interactions between environmental and human health | Pathophysiology Epidemiological measure Emerging infectious disease, joint impacts of parasites and pathogens on humans and other species, poverty and related health impacts linked to biodiversity or habitat degradation |
| Drivers of local ecosystem change | Historic and current patterns of human settlement Agriculture, diet shifts, and habitat alteration Density and disease Poverty, nutrition, and overexploitation |
| Consequences of local ecosystem change | Human migration and globalization Food scarcity and environmental refugees Armed conflict and violence Toxins in agriculture, industry, and war |
| Field trip: weekend trip within the Pacific Northwest | Visits to an industrial site, a public health department, a public hospital, and a private community group addressing environmental issues |
| Global change and human-ecosystem feedback | Pandemics and cross-species transfer Genetic engineering and food safety Bioterrorism How climate change may affect the feedback |
| Case studies linking human and environmental health | Human settlement and urbanization: The built environment and its effect on humans and other species Food production and consequences; pesticides and herbicides and their effects on humans and other species |
| Contributing to solutions via a simultaneous focus on human and ecosystem health | Application of precautionary principle Promoting alternative economic frameworks that include health and environmental factors Ecoagriculture/Agroecology Urban planning for human and ecosystem health Lifestyle choices and the environment |

NEW CLS ELECTIVE COURSE: CONSERVATION AND SUSTAINABLE DEVELOPMENT

One quarter, 3 credits

Two 1.5 hour class sessions per week, primarily lecture format linked to discussions of case studies

Class size: 25–45 max.

Premise: Understanding the relationships among factors that undermine economic and social stability in human populations and the conservation of biodiversity may help us envision more sustainable means to foster development that supports human communities, while protecting the biodiversity upon which human livelihoods depend. Unfortunately, global development efforts traditionally focus on political, economic, and structural issues, with little or no consideration of environmental drivers of poverty and famine. Linking natural habitats and biodiversity to human development should in turn promote protection of decent living conditions for future human generations. Thus, making conservation a priority in development efforts is a major component of intergenerational ethics and social justice.

Course Format: This course will be team-taught by social and natural scientists. Case studies will be used extensively to illustrate points and to help draw out new questions and areas for future research.

Learning Objectives

- To explore the interaction between conservation of habitat, biodiversity, and preserving and improving human quality of life.
- To explore the ways in which environment and culture mutually influence one another—particularly organisms and their habitats, communities, and ecosystems—and human cultures and societies mutually influence one another.
- To introduce students to the history of international development and conservation practice, while exploring major concepts and controversies in policy, economics, anthropology, and conservation biology as they are applied to these practices.
- To review the extent to which prior efforts to link conservation and sustainable development have been successful, and to explore means to make them more successful in the future.

CONSERVATION AND SUSTAINABLE DEVELOPMENT

| LECTURES | SPECIFIC TOPICS |
|--|--|
| Introduction to conservation and sustainable development | Definitions of conservation Definitions of sustainable development Is sustainability development an oxymoron, and is coupling it with conservation an even greater one? Introduction to the environmental justice movement |
| Ethical aspects of development and conservation | Fairness across cultures Fairness and economic efficiency Intergenerational equity Duty to other species |
| Political ecology of development and conservation | Environments, cultures and economies: Reciprocal influences Insights from environmental anthropology |
| History of international development and conservation | Timeline of efforts over past century Millennium Ecosystem Assessment Millennium Development Goals and critiques of this effort: IUCH and coordinated conservation efforts by international NGOs |
| Governance, institutions and policies | International sustainable development efforts National examples: What is considered successful? What factors facilitate or undermine success? |
| Ecological economic principles and controversies | Definitions, essential traditional economic concepts, non-traditional modifications to incorporate social and environmental concerns, radical concepts in ecological economics Case studies demonstrating applications |
| Conservation biology principles and controversies | Overview, conservation applied at species and ecosystem levels Conflicts between protectionist parks and sustainable use (local community or market engaged) Conservation practices Case studies (focused on application of principles) |
| Tackling root problems | Efforts to control population growth Efforts to create more equitable societies Efforts to reduce consumption, influence trade |
| Integrating development and conservation projects | Definition, history Case studies |
| Community-based conservation | Definition, related approaches, history; case studies |
| Where do we go from here? | Evaluating progress; prospects for future work |

PROGRAM IMPLEMENTATION & MANAGEMENT

PROGRAM SIZE AND ADMISSIONS

Master's: 5–15 students admitted per year

Certificate: 5–15 students admitted per year

Total: approximately 30 students in a cohort per year; 70–90 students maximum in the program (not everyone finishes in 1 year) at full realization

GOVERNANCE STRUCTURE

- Staff—"Core Team": Director, Program Administrator, fractional faculty, hourly support
- Governing Board—representative faculty group exercises academic authority; meets once per quarter
- Steering Committee—large, widely representative group; meets once per year

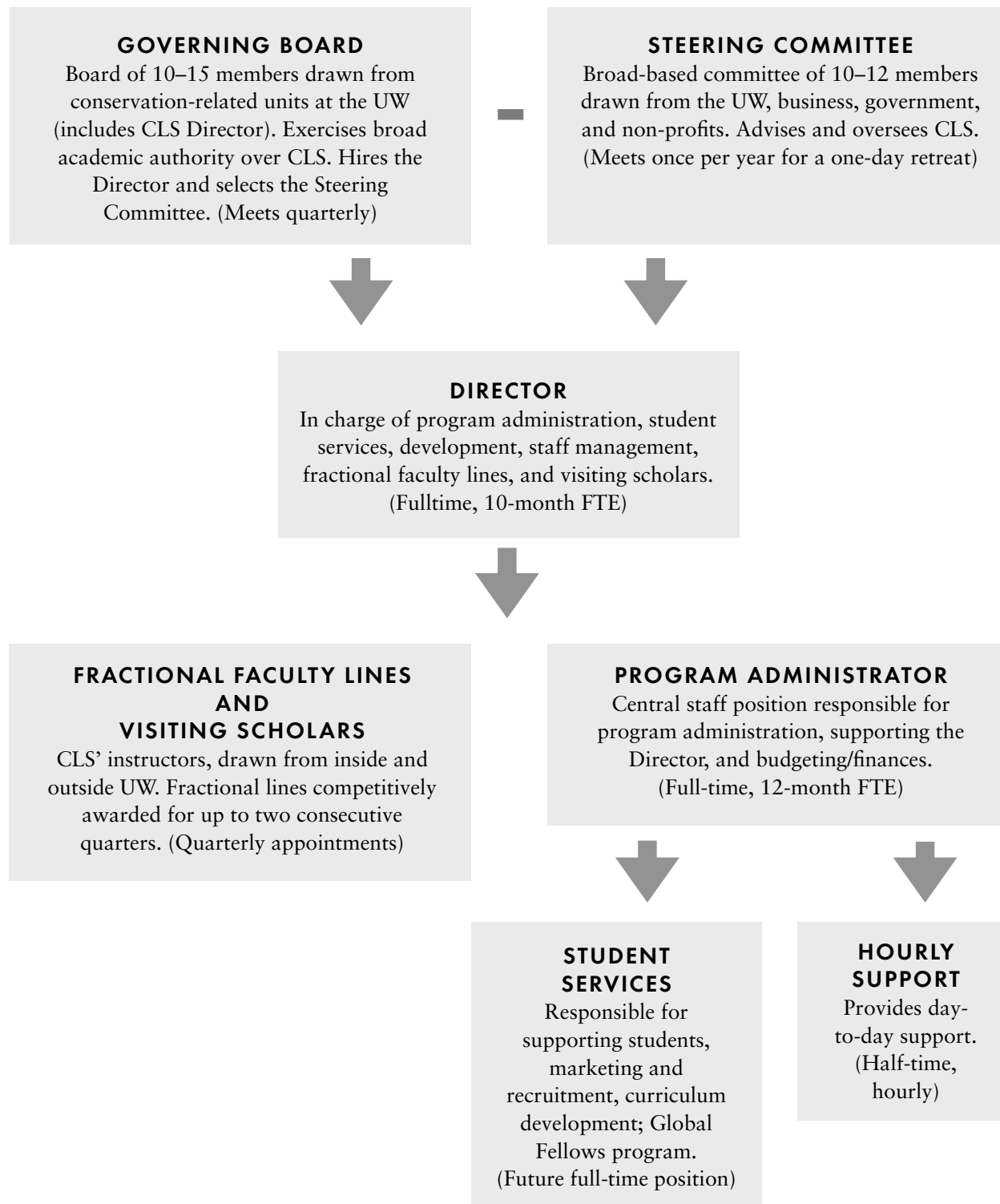
PROGRAM MANAGEMENT

In order to succeed, CLS will need a strong, visionary director, participation from faculty and practicing conservation professionals, and a support staff.

Director: A full-time position, 10-month FTE, 3-year term with 2-year extension upon favorable review. The Director has a tenured academic appointment in a school or department at the UW. This position oversees the development and integration of CLS within the framework of partner academic units across the University. Direct responsibilities include, but are not limited to: negotiation of faculty release time to participate in CLS teaching, negotiation for participation in CLS teaching by practicing conservation professionals, oversight of student teams conducting Practice of Conservation capstones, development for CLS, academic leadership of participating faculty and staff, leadership of the Governing Board, and reporting to the Steering Committee and the Graduate School. The Director will be the main contact responsible for developing and recruiting partnerships with outside organizations with a need for Practice of Conservation student teams. We anticipate that the Director may also teach one of the core courses for the first several years.

Program Administrator: A full-time administrator position, 12-month FTE permanent position. This is the central staff position of CLS, responsible for supporting and working in close coordination with the Director to facilitate and expand the program. Direct responsibilities include but are not limited to: program administration; budgeting, finance,

STAFFING AND GOVERNANCE



and development support; human resources; student services; support of and reporting to the Governing Board and Steering Committee; and support in reporting to the Graduate School. We anticipate that the Program Administrator may not be a full-time position at the inception of CLS, thus there is the possibility initially of sharing a highly qualified person (or persons, if relevant duties are easily divided) with similar programs (e.g., Program on the Environment, UW Earth Initiative).

Student Services: At the inception of CLS, this position may be assumed by the Program Administrator. However, as the program grows, a separate position to administer graduate needs and issues directly will be needed. At the anticipated peak of enrollment (15 master's students/year, 15 certificate students/year; total of 70–80 students, depending on regular degree turnover rates), a full-time position should be created. Duties would include: developing and marketing student recruitment tools, including a website; tracking student benchmarks; working with faculty to develop and improve core and elective courses; staffing the Governing Board on curricular issues; developing and marketing Global Fellows recruitment tools; facilitating Practice of Conservation capstones in consultation with the Director; interfacing with advisors for academic units with participating students and faculty in CLS; tracking program graduates.

Hourly Support: A halftime position to handle day-to-day needs of the program, including but not limited to: front office, phones, mailing, filing, ordering supplies, course support, travel support, support for visiting scholars, back-up support for Global Fellows. At full development of CLS, this position should be full-time.

Fractional Faculty Lines and Visiting Scholars: Rather than recruit permanent faculty, CLS will function with a flexible and adaptable set of instructors drawn from inside and outside of the UW, and selected to maximize cross-disciplinary aspects of each core course, and facilitate the academic-to-real-world transition each successful student must make. Fractional faculty positions will be competitively awarded within the UW, for a maximum of two quarters annually, preferably for multi-year terms to ensure continuity. Academic units will receive direct compensation for the temporary loss of their faculty, allowing units to hire temporary teaching replacements without financial hardship. All CLS faculty lines will be devoted initially to the core courses, with the possibility of teaching additional graduate seminars and advising one to two Practice of Conservation capstone teams. Faculty will be fully in residence at CLS, expected to interact on a daily basis with CLS students, faculty, and visiting scholars; and will—together with the Director and the Program Administrator—form the daily governance structure of CLS. UW faculty interested in joining CLS would be required to submit a proposal outlining how their efforts would support core CLS courses and meet CLS goals.

Visiting scholars status will be competitively awarded to individuals from outside of the UW, principally individuals from agencies, businesses, or NGOs working as conservation professionals. Academics from other institutions will be considered under certain circumstances. Although visiting scholars would be given the option of proposing to work into the existing core, CLS would prefer if potential scholars integrated themselves into

the student-faculty-staff mix by proposing an issue-driven graduate seminar, in which a small group of students and the scholar worked together to define and explore a particular conservation problem of relevance to the scholar’s work/profession. Such a seminar might include a written product (e.g., white paper, grant proposal for further work). Visiting scholars may also be called upon to offer pulsed learning skill-set courses, based on their individual expertise.

Graduate Student Assistantships: The CLS program requires serious commitment on the part of the student, and thus on the part of the student’s advisor. It is not in the interest of the student, advisor, or CLS to have underfunded students begin participation in CLS training, only to have to drop out—or do poorly—due to financial constraints. We anticipate that participation in CLS will be highly competitive, and thus that only the best and brightest from across campus will be admitted. To create a learning and doing environment that facilitates the movement from receiving knowledge to active participation in problem-solving, CLS will need to offer incoming students financial support. This will also alleviate undue burdens on grants and contracts of advisors that are otherwise supporting students to conduct disciplinary research.

PROGRAM STAFFING REQUIREMENTS (ANNUAL)

| POSITION | FTE | COMMENTS |
|--------------------------|----------|---|
| Faculty Director | 1 | assumes the central role for Practice of Conservation |
| Fractional Faculty Lines | 3.5 to 6 | see Course Staffing. Assumes that there is some teaching by visiting scholars and Director |
| Visiting Scholars | 2 to 3 | |
| Teaching Assistants | 3 to 4 | where FTE equals a 50% time appointment. |
| Graduate Assistantships | 5 | Includes 1 FTE for general program support, and 4 FTEs for competitively awarded positions (MS only) |
| Program Administrator | 0.5 | could be a shared position within a large entity; will eventually increase to 1.0 |
| Student Services | 0.5 | could be a shared position within a large entity; will eventually increase to 1.0 |
| Hourly Support | 0.5 | covering all logistics, meeting and office staffing; could initially be shared position with other programs |

Global Fellows: Although not a prerequisite for the inception of the program, it is clear from both other successful conservation graduate programs as well as from conservation employers, that participation by international students is a key element of North American student conservation education. Many international students in conservation are returning professionals seeking additional education and an advanced degree, but who may lack either a theoretical or skill set foundation. Therefore, CLS proposes the development of a Global Fellows program to actively recruit international students to spend one to several quarters in CLS, taking core courses and fully participating in CLS opportunities. These students would not, necessarily, be required to enroll in any other degree-granting program, as is the case with other certificate or master's students.

Governing Board: A faculty body of 10–15 members drawn from academic units participating in CLS, with guaranteed representation of each of the five interdisciplinary sectors (natural and earth science, public and environmental health, social science, humanities and arts, policy and application). Includes the CLS Director. Terms are two years, staggered across the membership (with the exception of the Director) and can be renewed for one additional term. Members are not compensated, and are expected to commit to quarterly meetings. The Governing Board exercises broad academic authority over CLS, including: student admissions to the certificate and master's programs; annual approval of changes to the curriculum, including core and elective changes; oversight and approval of Practice of Conservation capstone projects; critical evaluation of student progress towards certificate and master's goals; selection of teaching faculty and visiting scholars; oversight of funding and budgets. The Governing Board also participates directly in hiring the Director and selecting the Steering Committee members.

Steering Committee: A broadly based group of 10–15 members selected from within the University and also from business, government, and leaders of the conservation community. The Committee meets once annually for one to two days depending on the agenda. Members are not compensated, are appointed by the Director and the Governing Board, and serve two-year terms, with the possibility of an additional renewal of two years. The Steering Committee serves as an advisory board to the Director and the program, providing critical oversight and input into all facets of the program. Specifically, the Steering Committee will help to facilitate interaction between CLS and the client community, and aid the Director in recruiting new clients. This Committee will also take an active role in development, including recruitment of scholarships, visiting scholar fellowships, and endowed faculty lines; and will support and advise the Director.

COURSE STAFFING REQUIREMENTS

| COURSE | QTRS MIN | QTRS MAX* | VISITING SCHOLARS | TEACHING ASSISTANTS | COMMENTS |
|--------------------------------|--------------|--------------|----------------------|------------------------|---|
| Language of Conservation | 2 | 4 | | 2 | this course is two qtrs long |
| Integration of Conservation | 1 | 2 | 1 | 1 | Visiting Scholars in the case of two instructors |
| Communication for Conservation | 1 | 2 | 1 | 1 | Visiting Scholars in the case of two instructors |
| Practice for Conservation | 4 | 4 | | 0 | ongoing, as student groups move through 1-3 qtr individualized experience |
| CLS-Sponsored Electives | 1 | 2 | | 1 | |
| Conservation Seminar | 3 | 3 | 1 or 2 | 0 | includes seminar series and grad seminars |
| Pulsed Learning Workshops | 4 | 6 | 1-4 | 4-6 | |
| Total quarters | 16 | 23 | 4-8 | 9-11 | |
| Total people (annually) | 4-5** | 7-8** | 2-3 | 4-5 | |

* Min-max differences reflect the possibility of team-taught courses.

** Lower number assumes the potential for some doubling within a quarter on seminar and pulsed learning courses; includes visiting scholars for select courses.

PHYSICAL HOME

It is clear from extensive interviews of other conservation programs, as well as UW faculty and graduate students, that the success of CLS, and of any long-term interdisciplinary program, depends in part on securing a physical space within which the program is housed. A program in name only, or a program without adequate space for teaching and networking, will simply not have the same attractive value.

Ideally, CLS space should be somewhere centrally located, such that all participants across campus can most easily congregate. Although there is a need for separate, private offices, flexible open space that can be tailored to the changing needs of the program is also essential. To accommodate CLS as outlined in this document, space needs would include:

- offices for the Director and Administrator
- offices for fractional faculty and visiting scholars
- desk space for graduate students, both RAs and TAs
- centralized computation facility
- conference room and open meeting space for pulsed learning courses, Practice of Conservation team meetings, eat & learn lunch seminars, and visiting scholar workshops and special graduate seminar courses
- reception/front office space for clerical work
- access to kitchen facilities
- access to teaching space for core courses and CLS electives
- access to large-format teaching space for conservation seminars

ACADEMIC HOME

Although many other graduate programs in conservation are housed within individual departments or colleges, attempting the same with CLS may not be the most feasible solution. Because CLS is truly interdisciplinary, and is designed specifically as a value-added program tapping students and faculty across the University, the most appropriate home is above the level of department, school, or college. Because of its history of dealing with interdisciplinary programs, one potential home would be the Graduate School.

INTERACTION WITH OTHER UW PROGRAMS

CLS will play a unique role at the UW, complementing and collaborating with a wide range of other graduate programs. CLS will generate novel capabilities in terms of content, and will create synergistic opportunities across the University as well as within the broader conservation community to produce graduates with environmental leadership skills.

Traditional Disciplinary Programs: More than 15 graduate programs, ranging from Anthropology to Biology to Public Policy, have been represented by faculty and students during the CLS planning process. Indeed, it is the strength and diversity of UW's disciplinary programs that bodes well for the model of CLS presented here, in which both faculty and students from across the UW will participate in this program. CLS will interact with existing academic units, first, by compensating them for the temporary loss of faculty teaching line appointments, such that units will be able to fully replace their short-term loss of teaching. Secondly, CLS will accept a range of already-enrolled graduate students into CLS courses or degree programs. Because the structure of CLS is built around value-added skills and interdisciplinary team-building, students and faculty participating in CLS will return new depth and diversity to their home units. Finally, CLS would work with individual units to list selected courses, as space allows, as CLS electives.

Professional Programs: Two- or three-year programs in health fields, in law, and in business also have great potential to interact with CLS. Because students in these professional programs sometimes progress through the University faster than traditional master's and PhD students, in the future, CLS may explore a fast-track offering of the certificate or master's degree especially tailored to these students. Fractional faculty line appointments and the listing of select electives are also expected.

Other Interdisciplinary Programs: There are 18 interdisciplinary academic programs managed by the UW Graduate School, and many more housed across the UW campuses. These include: 1) graduate certificates housed in or administered by the Program on the Environment, such as Environmental Management, and Interdisciplinary and Policy Dimensions of Earth Sciences; 2) NSF IGERTs such as Urban Ecology, and Multinational Collaborations in Challenges to the Environment; 3) International Relief and Development; and Global Trade, Transportation and Logistics Studies; and 4) proposals under discussion in River Restoration and other emerging fields. It is essential that all of these programs complement one another and use resources wisely. Because the CLS program and its courses are both broad and skill-set oriented, we expect to work with these more focused programs to centralize and facilitate learning opportunities that cross many individual programs (e.g., Communication for Conservation and pulsed learning courses).

International Student Programs: Two prominent international student programs—the Hubert H. Humphrey Fellowship Program and the Population Leadership Fellowship Program—are housed within the Evans School of Public Affairs. Both of these initiatives bring international students to the UW who may wish to take CLS offerings, perhaps electing to participate in the certificate program. We also expect to work closely with these programs in developing the CLS Global Fellows program.

Environmental Research Initiatives: CLS has been working with the UW Earth Initiative during the entire development of this proposal. Additional interdisciplinary research initiatives that may interact with CLS include the Program on Climate Change and The Water Center. We expect select students and faculty participating in these research initiatives to make use of one or more course offerings in CLS.

DEVELOPING CLS: CONSERVATION EMPLOYERS

On September 23 and October 7, 2005, we held day-long workshops on the University of Washington Seattle campus to gather the opinions and suggestions of leaders in conservation and health organizations about the “ideal” attributes of potential employees. We also asked these individuals about proposed structures for and features of an academic program that they felt would facilitate the production of such graduates—and future employees.

A total of 22 professionals concerned with sustainability, conservation science and policy, and human and ecosystem health attended the workshops. They represented federal, state, and local governmental organizations, businesses, environmental consulting firms, and conservation-related non-governmental organizations (NGOs). Many hold high ranks in their organizations, often including significant hiring authority. The advice we received reflected remarkable consensus by the participants of the two workshops, despite large differences among their organizations in scale, sector, and institutional culture. Employer interest was also high in creating bridges between these organizations and a new conservation graduate program.

CONSERVATION EMPLOYERS BY SECTOR

| AREA | BUSINESS | GOVERNMENT | NGO | TOTAL |
|----------------|----------|------------|-----|-------|
| Local/Regional | 2 | 4 | 3 | 9 |
| National | 0 | 4 | 1 | 5 |
| International | 2 | 0 | 3 | 5 |
| TOTAL | 4 | 8 | 7 | 19 |

| | |
|----------------------------------|---|
| <i>Local Businesses:</i> | <i>Floyd Snider, consulting; Linn Gould, consulting</i> |
| <i>Local Government:</i> | <i>Department of Ecology, Department of Natural Resources, King County Public Health, Washington State Department of Health</i> |
| <i>Local NGOs:</i> | <i>Bullitt Foundation, Cascade Land Conservancy, Methow Conservancy</i> |
| <i>National Government:</i> | <i>EPA Region 10, National Park Service, NOAA Fisheries, USDA Forest Service</i> |
| <i>National NGOs:</i> | <i>American Rivers</i> |
| <i>International Businesses:</i> | <i>Disney, Weyerhaeuser</i> |
| <i>International NGOs:</i> | <i>Conservation International, The Nature Conservancy, World Wildlife Fund</i> |

SYNOPSIS

The primary message we received from employers was that they are most interested in hiring people who are experts in their chosen field, but who also have significant practical experience with real-world conservation problems. Employers were nearly uniform in affirming that an ideal conservation employee of the future would have a recognizable expertise in a discipline such as ecology, medicine, law, or policy. For example, one employer commented “the ‘jack of all trades, master of none’ is generally useless” to real progress in all conservation settings. But just as true, the expert who is unable to apply his or her knowledge and skill set to conservation in the real world is not helpful. What is needed is an expert who combines depth with other often-missing attributes and skills, particularly working in interdisciplinary teams, responsive and flexible management of personnel and projects, and communicating effectively to a wide diversity of audiences.

1. *Practical experience in addressing real-world conservation problems*

Employers were adamant that graduating students should have practical experience outside the classroom. This experience will prepare them to face the realities of diverse stakeholder opinions and values, logistical and political constraints, and the fact that no one answer is “right.” Employers also emphasized the importance of skills in problem identification, project management, negotiation and facilitation, and project completion and follow-through. Students should also gain an understanding of the complex political realities of conservation problem-solving. The overall message was that universities should help students “get real.”

Representative quotes:

“We’re interested in people who can actually do something, not just have thought about it.”

“I look most at what they really did while they were in school. Where did they apply these skills? Were they able to practice this stuff? That would jump out.”

2. *Outstanding communication skills in writing, images, and speech*

Employers emphasized the critical importance of advanced communication skills in multiple media, including the ability to negotiate and facilitate in complex organizations and situations.

Representative quotes:

“The most challenging thing for our employees to do is to write— to summarize a complex issue in one page.”

“You have to be able to take your knowledge and then go out and tell others— persuade and get the message out.”

“Conservation organizations spend a lot of time looking for funding. We need people who can write a compelling grant proposal and communicate with funders.”

“Don’t forget about PowerPoint presentations and graphics. Presenting our work to the public, and internally, means that our employees have to be able to put together succinct and convincing presentations on the fly.”

3. *Facility in working with interdisciplinary teams of conservation scholars and professionals*

This requires communication abilities in writing, images, and speech with the important addition of listening skills, appreciation for multiple perspectives and approaches, and well-developed problem-solving abilities. A grounding in distinct disciplinary approaches to conservation issues, including business skills (e.g., financial spreadsheets, budgeting, economic analysis) was seen as particularly important to, but usually lacking in, conservation employees. An ideal employee has holistic training that complements disciplinary depth.

Representative quotes:

“We need people able to work in a contentious environment, and able to do that with a compassionate or at least understanding view of diverse situations...to be able to work towards consensus.”

“We struggle with folks coming from academia not being able to work in a team and across disciplines. We need folks to be able to listen, hear, and communicate in team settings.”

“We need people who can work with a multitude of different values systems and get things done.”

“More and more we are hiring people who come from business backgrounds, because we need their ability to work with corporate entities.”

WHY DO NEW CONSERVATION EMPLOYEES FAIL ON THE JOB?

Employers reported that failure of new employees was rarely due to a lack of disciplinary knowledge. Rather, they cited as drivers of failure: a lack of effective communication skills, an inability to work on a team directed toward shared decision-making, an inability to manage budgets or staff, a general lack of business skills, and a general lack of international or cross-cultural perspectives. Finally, employers particularly emphasized that failure occurred among employees unprepared for the fast pace of conservation work, with its constantly evolving landscape requiring frequent, even continuous daily problem-solving.

Representative quotes:

“The difference between those who move ahead and those who get stuck are these skills we’ve been talking about—people skills, communication skills, team skills.”

“Our biggest problems are employees lacking communication skills and the ability to translate complex scientific information to a lay audience; plus, the lack of experience with project management, policy, and law.”

WHAT CAN THE UW DO?

Unique contributions that UW can make to conservation

Human Health and Conservation: Employers contended that the integration of public health and conservation is almost completely absent in existing conservation training worldwide, and that this unfolding vision is an exciting and promising element of the CLS program. The human-ecosystem health nexus would be a wholly novel and powerful approach that the UW could take, made possible by its unique strengths in both biomedical and environmental research. Moreover, employers argued that this is critical for increasing the diversity of participation in conservation activities among minorities and other under-represented groups of students and citizens. The biomedical and public health link is also critical in most international settings (see below), where there is often a significant overlap among the best interests of human communities, human health, organisms, and ecosystems. Sensitivity and perspectives on human diversity are especially important in tying public health to biodiversity and conservation. Specifically, this may be a cause for “disappointing” levels of public engagement in conservation issues. This point emerged independently and in multiple ways from several employers.

Global Dimensions of Conservation: Different conservation programs around the country have emphasized linkages with particular areas of the world. For example, so far there has been relatively poor integration between Pacific Rim countries and US conservation training; this could be one unique niche that the UW could fill. Given our placement in the Pacific Northwest and long history of connections with many Asian countries, we might be best able to forge new relationships to enhance conservation throughout the Pacific Rim. The overarching point is that the field of conservation involves a global intellectual community, and that people come from all over the world to study conservation at the UW.

Land-Sea Interactions and Conservation: The UW could develop strengths in conservation along marine-freshwater-terrestrial interfaces. Most conservation programs focus on terrestrial ecosystems, and a few on marine or freshwater systems. The UW’s location and world-class faculty in aquatic sciences would facilitate an emphasis on the interactions among these realms, particularly the impacts of urban centers and urbanizing areas on all realms. The UW could really shine in its ability to integrate across these major habitats, including their human dimensions.

Professional Training and Conservation: The UW can further enhance practice-based experiences for its students, particularly ones that involve interdisciplinary team efforts (see next page). This would be unusual, as most conservation programs are more course and individual project driven. Especially when connected to public health issues, this combination of strengths presents a unique opportunity to connect conservation issues with citizen interest and effective implementation. Powerful models of practice-based learning are already available in UW professional programs such as Public Health, Evans School of Public Affairs, Law School, Landscape Architecture and Urban Planning, and Engineering.

PULLING IT TOGETHER: WHAT DO EMPLOYERS SAY ARE ESSENTIAL FEATURES OF A CONSERVATION PROGRAM?

Conservation training at the UW should be a value-added service providing the tools for students to integrate successfully into real-world conservation practice. Moreover, this training should be designed to serve the larger conservation community. The real-world experiences that would make the UW unique and a leader in conservation training would be grounded in the needs and practices of partner conservation organizations, including business and industry, government agencies, and NGOs. By addressing these needs and providing a way for conservation employers to be engaged in the training of future conservation professionals, CLS would be much more than “just” an academic exercise. It would be a genuine effort to enhance conservation, with clearly measurable outcomes.

The employers emphasized that there are two main groups that could benefit from conservation training at UW: 1) students enrolled in UW disciplinary-based departments and 2) professionals returning to gain additional skills and experiences. For UW graduate students, an ideal framework would be to create a “value-added” program that would add dimensions currently lacking in the training of most graduate students, but not to offer a master’s or PhD in conservation. Specifically, employers desired core courses introducing multiple disciplinary paradigms, methodologies, and insights, generating a familiarity and respect for a broad range of perspectives and approaches.

Most employers focused on the need for practical experiences to serve as the centerpiece for this value-added training. Interdisciplinary teams of graduate students might be brought together to work on a real conservation problem provided by a governmental or NGO conservation partner. Ideally, a representative of these organizations would be involved in the course, which might take place over a quarter or two, or over a year. Students might develop individual projects that expanded into the group work, but the goal would be to provide some tangible, useful deliverable to the conservation organization.

For current employees of conservation organizations, curricular structures that take the form of short, pulsed learning courses that are flexible in content (evolving over time to include learning the use of new tools and methodologies) are most attractive. These kinds of courses could be easily taken by conservation professionals, and employers would be willing to pay for their employees to take these courses (particularly if there is an on-line, independent component that accommodates work schedules).

Regardless of whether courses are aimed at traditional or returning professional students, all should work on building effective communication skills, although a pulsed learning communications class could be an attractive option to help jump start—or refine—student skill development. Also, developing self-assessment tools would be highly useful. Students should also be trained in both quantitative and qualitative approaches to information. Pulsed learning courses focusing on particular analytic techniques (with opportunities to apply these techniques in problem-based courses) could be very effective. Instructors should be drawn both from UW faculty and visiting partners from conservation organizations.

DEVELOPING CLS: OTHER GRADUATE PROGRAMS IN CONSERVATION

There are numerous graduate programs offering master's or PhD degrees or certificates in conservation, conservation biology, conservation policy, and similar areas of study around the world. The examination of other graduate conservation programs began by compiling a list of conservation programs located in North America. A search of Peterson's Guide produced 33 such programs. Additional programs were added to the list through web searches and suggestions from committee members and other UW faculty. This long list was narrowed to approximately 20 programs, about which more data was gathered (see list at end of this section). Of the 20 programs, eight were selected for more in-depth analysis, based on program reputation, curriculum content, interdisciplinary emphasis, governance structure, and type of credential offered.

The eight programs included:

1. Antioch University New England: Resource Management and Conservation
2. Columbia University: Ecology, Evolution and Environmental Biology (E3B)
3. Duke University: Coastal Environmental Management
4. Stanford University: Interdisciplinary Graduate Program in Environment & Resources (IPER)
5. University of California, Berkeley: Environmental Science, Policy, and Management (ESPM)
6. University of Georgia: Conservation Ecology and Sustainable Development
7. University of Maryland: Sustainable Development and Conservation Biology (CONS)
8. University of Wisconsin: Conservation Biology and Sustainable Development

Interviews were conducted via telephone, email, and in person with program administrators, faculty, and students in the programs. Questions included aspects of curriculum, funding for students, program governance, challenges, and strongest/weakest program attributes.

LEARNING FROM EXPERIENCE

The programs examined were highly variable in terms of the type of degree offered, curriculum, number and background of students, pathways toward the degree, funding, and governance. No one pattern or "recipe" for what a conservation program should look like was apparent. However, several key elements emerged as important for any program in conservation.

Breadth/Interdisciplinary. Interdisciplinary programs draw students from many different backgrounds, and train students to operate in a wide range of conservation-related professional settings.

- At present, most conservation-oriented programs and their curricula are not truly interdisciplinary, although there are a few examples. One is a new interdisciplinary department—Ecology, Evolution, and Environmental Biology (E3B)—established at Columbia University in 2001.

- However, most programs studied did include elements beyond conservation biology, strictly constructed. Other requirements may include courses in policy analysis, law, or economics. For instance, the University of Maryland's CONS program requires that all students take courses in: ecology and conservation biology, resource economics, public policy, and interdisciplinary problem-solving.

Flexibility. Multiple pathways through the program are helpful to encourage participation from students with varying needs and interests. Different combinations of elements and choices for coursework and project/thesis/practicum work contribute to program flexibility, as does a choice of PhD, master's, concurrent or dual master's, or certificate options.

- Many programs include a thesis/non-thesis option.
- Programs average two to three core courses, with much of the remainder of coursework being distribution requirements and electives.
- The majority of programs offer more than one pathway (PhD, master's, concurrent or dual master's, or certificate).

Common Coursework. Required common coursework was identified as crucial by many interviewees, particularly those at strong interdisciplinary programs such as University of Maryland's CONS and Columbia University's E3B.

- All programs feature core courses, with the exception of the University of Wisconsin which has a number of distribution requirements but no core. See the chart of core courses (pages 53–54) for the types of courses required by each of the eight programs studied.
- The most common core subjects are (in order of frequency): policy, environmental economics, conservation biology, and case studies/problem-solving.
- Most programs offer separate disciplinary courses, with a few designing courses that attempt to integrate disciplines within the context of a single, or small number of, courses. Examples of programs with integrated, interdisciplinary courses are Stanford University's IPER (course in Interdisciplinary Research Approaches and Analysis) and University of California, Berkeley's ESPM (courses in Research Approaches in Environmental Science, Policy, and Management; and Case Studies in Environmental Science, Policy, and Management).

External Connections and Applied Problem Solving. Required work on applied problems, as a way to develop real-world skills and connections with outside organizations, was seen as highly desirable by many students and program administrators. Student interviewees identified collaboration and connections as some of the best attributes of their programs, whereas more practical experience was flagged as an element that was needed.

- Most programs involve some kind of group/team project on an applied issue.
- Case study courses are a common requirement. The University of Georgia, University of Maryland, and Stanford University's curricula includes a case study/practicum course.
- Few programs require "real world" experiences in their courses or as stand-alones. Only the University of Maryland and Antioch University *required* an internship with a client external to the university, among the eight programs studied in-depth.

High Quality Students. Most programs claimed to be selective in admitting students. Students often identified the prestige and reputation of their program as a reason they enrolled, and acceptance rates reflect both the perceived quality of the program and likely quality of the accepted students. Reported acceptance rates (difficult to verify) ranged from 4% to nearly 100%, with a median rate of about 25%. PhD programs appeared to be the most selective.

Sense of Community and Teams. A sense of community and team cohesion within a program attracts and retains students, according to interviewees, and supports them in accomplishing their goals. Dedicated faculty and staff, shared space in a “home” building, social activities, and common course work contribute to a program’s community ties. A program administrator at the University of Wisconsin cautioned that new programs need to work hard to develop and sustain community, for students as well as faculty; their program is only three semesters and often lacks a sense of community.

Institutional Structure and Leadership. A program’s institutional structure can affect the funding, faculty resources, course offerings, and autonomy that it holds. The governance and leadership of a program also impact success over time, particularly if a program is not fully staffed or led by dedicated individuals. The leadership and institutional structures of the programs studied differ significantly.

- Usually programs have one or two core faculty who are leaders. Several programs began as the result of the efforts of one or two faculty, although the University of Madison and University of California, Berkeley have staff running much of the program.
- Most programs are staffed, advised, or governed by a multidisciplinary faculty committee, although the particular governance configuration varies for each program.
- There are a variety of models for locating the program within the university structure, from housing a program in one department (most typical) to being shared by multiple departments or “between” departments. Most programs are hosted in natural resources institutes or departments. Only Columbia University’s E3B program is independently governed.

Funding. Many different levels and mechanisms for funding students exist—from very generous (University of California, Berkeley) to shoestring. Despite a diversity of approaches to funding, all interviewees strongly counseled that some degree of centralized funding was necessary for program success. Many students noted that funding was an important aspect of their programs, whether solid funding encouraged them to enroll or whether funding was lacking and needed improvement.

- Funding mechanisms include the availability of TA positions and RA positions for students in the program; scholarships and block grant funding; and funding on individual faculty research grants.
- International students in some programs (e.g. University of Maryland) pay their own way for the most part, whereas the success of the Duke Global Fellows Program is, in part, a product of generous private funding for all fellows.

SUMMARY

The elements of other programs which guided the development of CLS can be summarized as follows:

- A coherent and substantive core course sequence
- Courses with significant disciplinary breadth and interdisciplinary content
- Applied and real-world experiences integrated into the program
- Strong program leadership by a core team of a Director, dedicated faculty, and staff
- Adequate funding for graduate students
- Faculty funded by the program, not simply “borrowed” from their units
- A sense of community for students and faculty, facilitated by a physical location

PROGRAMS FOR POTENTIAL FURTHER STUDY (20)

Colorado State University, Fort Collins

Columbia University (MA/PhD)

Columbia University (Certificate)

Duke University

North Dakota State University

Northern Arizona University

Stanford University (PhD)

Stanford University (Dual MS)

University of California - San Diego Extension

University of California - Santa Barbara

University of California - Santa Cruz

University of California - Berkeley

University of Florida

University of Georgia

University of Maryland

University of Minnesota

University of Missouri

University of Western Ontario

University of Wisconsin

Yale University

CORE CLASSES—TARGETED PROGRAMS

Antioch New England - MS, Conservation Biology

- Conservation Biology
- Earth Systems Science
- Community Ecology of the New England Landscape
- Geographic Information System (GIS)
- Ecological Research Design

Columbia University - PhD, Ecology and Evolutionary Biology

- Evolution
- Ecology
- Conservation Biology

Columbia University - MA, Conservation Biology (E3B)

- 2-semester sequence in Conservation Biology
- Environmental policy, politics and management
- OR (Evolution and Ecology
- Economics of the Environment and an additional law/policy course

Duke University - MEM, Coastal Environmental Management

- Resource and Environmental Economics
- Marine Policy

University of Georgia - MS, Conservation Ecology and Sustainable Development

- Principles of Conservation and Sustainable Development I
- Environmental Law Practicum
- OR (Watershed Conservation
- Principles of Agroforestry/Agroecology

Stanford University - Dual MS, Interdisciplinary Graduate Program in Environment & Resources

- Case Studies in Environmental Problem Solving
- Interdisciplinary Research Approaches and Analysis

University of California, Berkeley - PhD, Environmental Science, Policy and Management

- Research Approaches in Environmental Science, Policy, and Management
- Case Studies in Environmental Science, Policy, and Management

University of Maryland - MS/dual MS, Sustainable Development and Conservation Biology (CONS)

- Applications of Microeconomics to Natural Resources and the Environment
- Public Policy and the Environment
- OR (Concepts in Animal Ecology
- Insect Ecology
- Problem Solving in Conservation and Development

University of Wisconsin - MS Conservation Biology and Sustainable Development
No core classes

INTERVIEW QUESTIONS FOR PROGRAM ADMINISTRATORS

1. What are the best attributes of your program?
2. What has been/is the biggest challenge?
3. What is the leadership structure?
4. What is the level of departmental and/or university support?
5. What is the approximate program/department budget?

CORE COURSES AND CREDITS AT TARGET PROGRAMS

| PROGRAM | DEGREE | # CORE COURSES | TOTAL CREDITS | ANALYSIS | POLICY/ LAW/ ECONOMICS | CASE STUDIES/ PRACTICA | ECOLOGY | CONBIO | OTHER SCIENCE | OTHER |
|------------------------|--|------------------------|------------------------|----------|------------------------------|---------------------------|---------|--------|---------------|--------------|
| Antioch New England | MS, Conservation | 5 | 15 (1.5 semesters) | 3 CR | | | 3 CR | 3 CR | 3 CR | 3 CR -GIS |
| Berkeley | PhD, Environmental Science, Policy and Management | 3 | | | | | | | | |
| Columbia | MA, Conservation Biology | 5 | 15 (~1.5 semesters) | | 3 CR | | 3 CR* | 6 CR | 3 CR | |
| Columbia | PhD, Ecology and Evolutionary Biology | 3 | 9 (~1 semester) | | | | 3 CR* | 3 CR | 3 CR | |
| Duke | MEM, Coastal Environmental Management | 1-then from menu | 6 (~.5 semester) | | 6 CR | | | | | |
| Georgia | MS, Conservation Ecology and Sustainable Development | 3 | 11 (1 semester) | | | 4 CR | 7 CR | | | |
| Georgia | Certificate, Conservation | 4 | 7 (~1 semester) | | | | 7 CR | | | |

6. Do you receive external funding?
7. What advice would you offer to a university developing a new program?
8. What is one aspect of your program that you would change or add if barriers did not exist?

INTERVIEW QUESTIONS FOR STUDENTS IN OTHER PROGRAMS

1. Why did you enroll in this program as opposed to others you applied to?
2. What are the best attributes of the program?
3. What are the worst attributes of the program?
4. Is the program meeting your needs? What are your needs?
5. What career path do you see yourself moving toward?

Response patterns:

1. Why enroll:
 - Location of the program
 - Prestigious/reputable program
 - Availability of funding
 - Format of program (multidisciplinary, internships, etc.)
2. Best attributes:
 - Knowledgeable/experienced faculty
 - Availability of resources (libraries, museums collections, etc.)
 - Collaboration/networking/making connections
 - Sense of community and great people
3. Worst attributes:
 - Busy faculty/too little attention from faculty
 - Too many perspectives
 - Lack of funding
4. Meeting needs:
 - Yes, overall
5. Needs:
 - To gain research experience and practical experience
 - Make connections
6. Career path:
 - Academia
 - State/federal agency
 - Non-profit

DEVELOPING CLS: MEETINGS WITH GRADUATE STUDENTS

We held four meetings with UW graduate students over the period of a year, once before we began developing the curriculum, and once in the middle of the process. The students made a number of suggestions that strongly influenced the shape of this proposal:

Students originally suggested the concept of a CLS **concurrent master's degree**, to be offered in addition to the certificate. The students pushed us to offer a more comprehensive and ambitious program, and showed us that there would be strong demand for a master's degree.

The graduate students also wanted a set of courses that would dig into the conservation concepts and issues they perceived as missing from their disciplinary studies. This comment cemented the need to develop a core series **that integrated disciplinary knowledge sets** from a wide array of base disciplines. Students were interested in drawing on the best program elements, courses, and faculty from UW's conservation-related departments and disciplines.

Students felt strongly that engaging in **real-world** problems and solution-seeking was necessary to the success of the CLS program. They told the CLS committee, "Make it real, make it useful." Students were particularly interested in applying the CLS core skills and their disciplinary knowledge to practical problems. At the same time, there was agreement that conservation work must be based on a foundation of the best available science.

A strong **sense of community** among CLS participants was considered a necessity. Students stressed the need for a compelling **physical space** to study, meet, and just hang out. Community would also be enhanced by the presence of permanent program staff and a committed and available group of core faculty, at least some of whom had regular office hours at CLS.

CLS' emphasis on the linkage between **human health** and **environmental health** was exciting for many students.

Funding was a major concern for the students. The certificate will entail up to a year of additional work, and the master's more than a year. There was a dynamic tension between the desire to participate in such a program, and the realization that it was not "free." This sentiment reaffirmed the CLS commitment to obtaining **graduate fellowship funding**.

SYNOPSIS OF MAY 2005 MEETINGS

The meetings centered on two primary questions. The first question was: *What is conservation or conservation biology?* Students responded that:

1. The title conservation biology is too restricting and loaded with historical baggage. Natural science seems to "own" the title more than social science or policy, practitioners of which may feel left out and actively dissuaded from participating.
2. Natural and social science; science (how it works) and policy (what to do).
3. There is a strong applied, problem-solving, real-world feeling. At the same time, there

is agreement that conservation application must be based on a foundation of best available science.

4. Conservation should embody how and why humans are negatively affecting the world's ecosystems, how humans depend on those systems, and how changes in the systems (regardless of route) affect humans, from individual to societal health.

The second primary question was: *What are the attributes or elements of a graduate program in conservation, or conservation biology?* Students responded that:

1. Some foundation courses that can cross-train students coming from different disciplines are essential. At the same time, the goal is not to make everybody equally savvy in all fields. Instead, the goal should be a basic level of competence/understanding (breadth) while retaining a specialty (depth) that collectively fosters the multidisciplinary of conservation.
2. An emphasis on practical, real-world problem-solving, working “out-of-the-box,” with stakeholders/practitioners (NGOs, agencies) is essential. Giving students direct experience of conservation application; doing a project (and having a product to show for it) that “makes a difference, makes an impact.” The way in which this is accomplished (e.g., internships, practicums, team-based externships) could/should be flexible. One model will not fit the needs of all students.
3. Working in teams composed of members of different disciplines is essential. Degree-training will provide experience with individual creativity and accomplishment; a conservation program could/should provide training in group work.
4. Building a sense of community is essential. Community embodies students and faculty from a range of disciplines, all with an interest/commitment to conservation. The program should foster regular face-to-face interaction that lasts several quarters. It will take this amount of time for real understanding and cross-disciplinary dialogue to develop into meaningful interdisciplinary work. Creating opportunities for disciplines to work together is more meaningful (richer) than keeping them separate. A component of this is sense of place—that a conservation program is located in a physical space—a meeting point—at which students, faculty, others can regularly congregate.
5. Communication skills—writing, speaking, translating science—are essential. There is a great need to gain skill and experience in communication beyond talking with and to colleagues within the scientific/academic setting. A component of this is networking. The program should provide, as a consequence of its real world offerings, opportunities for students to network with the conservation professionals.
6. Flexibility is absolutely essential. The program must be able to accommodate master's and PhD students; science, professional degree, and policy students; students with a primary commitment to conservation and students who wish to “stick their foot in the water but not necessarily jump in.” Therefore, a range of offerings, opportunities rather than a strict curriculum seems appropriate. A caveat to this is that a degree-granting program is less useful than a panoply of opportunities not currently available (see above) but definitely needed.

NOTES OF MAY 2005 MEETINGS

Question 1: What is conservation or conservation biology?

We asked this question to get a sense of the diversity of opinion in the room, and whether the term conservation biology included the social sciences and policy realms or was primarily seen as an extension of natural science.

A process of getting humans to stop destroying the earth

Anthropogenic disruption of ecosystems; human impacts; mediation of impact

Embodies an ethical continuum: conservation, preservation, utilitarian

Sense of scale

Multiscale

Long-term view

“Emergency” science—start with bad problems—don’t have long periods of time to study

Preservation of life

Prevent loss of biodiversity and ecosystem processes, function, service

Conservation of functioning systems; process and parts

Diversity and stability

Biodiversity preservation; resilience of ecosystems

Biological science

Aspects of biology and ecology

Need a firm grasp of experimental biology, so can apply new discoveries to applied side

Biological research that has conservation implications

Can’t put biology on top; not realistic

Can’t expect natural scientists to be the decision makers

Sociology of conservation (anthropology, law, policy)—what factors cause humans to conserve or not conserve

Sustainability in a biological model not different from an economic model—need to take in economic issues in decisions

Conservation also includes cultural and anthropological conservation—how do humans use their environment for sustenance, for culture, for fighting disease

Needs to incorporate economics and political science

Non-biological issues and systems: population growth and policy ramifications

Culture and community

Integrating humans into larger biological systems

Must start in natural or social science, but then become competent in other fields

Multidisciplinary—conservation program benefits if people come from different areas

Interdisciplinary

Human/nature dichotomy needs to be bridged—need to communicate across disciplines and learn to micro-manage smaller systems for anthropogenic reasons

Better to integrate natural and social science

More encompassing is better—natural and human/social systems together

Have a broad familiarity and an open mind

Applies natural and social sciences around biodiversity and prevention of loss

An applied science; will attract people interested in that aspect

Applied, but based on basic science; translation of science key

Strong communication skills

Effective management of natural resources; exploitation at a sustainable level

Requires adaptive management

Fixing the problem, not just identifying it

Working within the constructs of management and policy

Need knowledge of legal system

Management—how do you implement conservation?

Advocacy

Conservation implies a loss of objectivity

Conservation biology muddled with advocacy

Question 2: What are the attributes or elements of a graduate program in conservation or conservation biology?

We asked this question within two contexts: 1. if the student was just applying to such a program, 2. if the student was already in a degree-granting program and was augmenting their education with conservation.

Foundation classes (so everyone has at least a basic level of knowledge)

Courses in natural science to form a base

Ecological economics course

Social science needs natural science, and *vice versa* courses

Need for sociological, ethical, ecological underpinnings

Better way of finding out what is currently available at the UW (course-wise)

Learn experimental study design to help identify impacts of anthropogenic activities

Interaction among natural science, social science, and policy

Must deal with people; cross-disciplinary

Students and faculty with different disciplines working together

Challenging-different points of view

To make a program whole, you need to focus on the causes of the conservation problems; glue for learning how to be interdisciplinary

Communication beyond standard science talk; contact development, networking

Learn to be an effective communicator

Team-based research would be much richer

Team-based, cohort, interdisciplinary applied work important

Working outside of the box, but keeping science close (personally loves being a scientist)

Focus on applying to real-world issues

Formally capture real-world work experience while still in the academic environment

Problem-based learning (real-life situation as case studies)

Practical skills

Practical skills—how do you create a conservation program on the ground?

Analytic power

Practicum, capstone, externship-practical skill sets developed

Working with conservation groups, agencies in the field

Working with conservation groups, agencies over longer term (two-year internships)

Working in a team for an NGO

Direct involvement of conservation corps and stakeholders (contributing cases)

Feeling that the work results in positive impact

Breadth and depth

Flexible, must appeal to many

Educate a broad range of students: those coming specifically for conservation and those who might like to take a look

Cohort important

Meet regularly with people from many different disciplines; long-term communication and dialogue is needed for understanding (more than a 10-week quarter)

Sense of community important; interdisciplinary, required, synergistic project (concrete experience and a piece of paper to show that you did it)

Sense of community

Sense of place

A physical place to go to meet, interact with students, faculty

Funding is important

Funding for internships would make them much more appealing

Why not a degree-granting program?

Policy track and research track

Impossible to have a degree program at grad level; PhD is research-based

Why not just subsume CFR, Biology, PoE, SAFS, and SMA into larger environmental college?

Problems the program will need to address:

Need to be able to deal with conflicting desires of the committee

Interdisciplinary approach good, but worried about breadth without depth; balancing act

Worried about too much for a master's student

If interdisciplinary and team-based from the get-go, then worried about level of knowledge of the participants

Don't eliminate people who might be interested "on the side"; lots of material here

SYNOPSIS OF DECEMBER 2005 MEETINGS

Students were invited to review an early draft of proposed program elements and provide the committee with feedback. In general, the response was extremely positive. Students were excited by the list of curricular elements, the concept of building and using skills, and the value-added nature of the program. Many said that this was exactly the kind of program they wanted, and even suggested that a well-branded program could be in itself a strong advertising tool to recruit exceptional students to the UW.

NOTES OF DECEMBER 2005 MEETINGS

Several comments, caveats, and reservations stood out:

Content

Some students were worried that too much emphasis was being placed on the value-added skill sets (e.g., communication) at the expense of disciplinary content. They wanted a set of courses that would dig into the conservation concepts and issues they perceived as missing from their disciplinary studies. This comment cemented the need to develop a core series, integrating knowledge sets from a wide array of base disciplines.

Students were interested, in an almost epiphanal way, about the linkage between human/public health and ecosystem/environmental health. This reinforced the decision to inculcate this element in the program.

Real World Component

All students were very enthusiastic, and strident, about the need for any practicum/capstone project to be based 100% in the real world. The feeling was overwhelmingly for reaching out to agencies and environmental organizations to solicit actual on-the-ground problems on which student teams could work. “Make it real, make it useful” were common themes in many of the students’ comments.

At the same time, students were fairly adamant that such a project have clear structure and faculty/mentor facilitation. Simply dumping a team of students into an NGO to solve a problem was not attractive. In fact, this affirms many of the CLS discussions about the need for faculty involvement in this process. Clearly, a team coach, or even a set of coaches with different expertise (negotiation, facilitation, communication, graphics, quantitative analysis, qualitative analysis, etc.) would be good.

Students also felt strongly that a team model, although potentially difficult (if a member doesn’t perform, for instance), is ultimately the best practice for the real world. Most felt that some system for member and team accountability needed to be part of the program. This comment echoes the need for a clear structure.

Some students wondered whether this type of exercise wouldn’t also be useful in creating the network connections that lead to jobs. For instance, might not students who had participated in a team practicum then be more likely to get summer internships at the same organization, and jobs after graduation.

Finally, an additional facet of real world-ness the students gravitated towards were visiting scholars, particularly from the non-academic community. Students thought that these experts would be particularly good at teaching.

Skill Sets and Pulsed Learning

Some students worried that the skill sets outlined as potentials for pulsed learning courses were not really obtainable in a days-to-weeks format. For instance, good communication skills or good quantitative skills. This comment affirms the CLS notion that these skills need to be introduced in the core, built on in the case study course, polished in the pulsed learning offerings, and put to use in the practicum.

Many students worried that they would not be able to take such courses because of time conflicts with regular quarter-system courses and commitments (e.g., TAing). However, when options such as summer, spring break, etc. were proffered, most students thought that was a great compromise. This worry illustrates the need to adequately explain the pulsed learning model, and make sure it isn't the *only* model to deliver these skills.

Cross-University Collaboration

Many students pointed out departments, programs, or people that they felt should be included in developing CLS and didn't see represented. All students felt that honest and intensive cross-campus collaborations were necessary. Many students voiced the desire to learn about disciplines they saw as necessary for conservation, but weren't directly involved in themselves. Although not explicitly articulated, students seemed to be calling for a clearinghouse function of the CLS program, both in terms of allowing students to more clearly see their options, as well as facilitating outside organizations (NGOs, agencies) who might come looking for a particular blend of expertise.

Sense of Community, Sense of Place

All students voiced support for a program that created a strong sense of community among participants: cohorts of students, groups of students, faculty, and visitors. Program elements most likely to affect this were:

core courses

team-work capstones

the studio— a central physical location with the infrastructure to draw students and faculty alike

in-residence sabbaticals for faculty, requiring the faculty member to be present in the program space (rather than visiting from a home department office space)

some faculty involved for the long-term (that is, not just quarter to year-long sabbatical fellowships and visiting scholars) that could/would act as mentors for program participants

The "Badge"

Students were generally receptive to the concept of a certificate, in the model of a graduate minor.

One innovative suggestion was a concurrent master's, to be awarded *only* to master's or PhD students enrolled already at the UW. In other words, this degree would not be independently conferred.

They were also receptive to the notion of curricular flexibility—that all students wouldn't necessarily go through the entire program. Multiple entry and exit points (e.g., taking a single class, taking only the core, taking pulsed learning classes, participating in the seminars, taking the entire series of offerings) were attractive to many of the students. However, all students worried about the branding of the program. If there is such curricular flexibility, what is the “badge” that students taking less than the “full meal deal” receive?

Finally, some students argued for a master's or a PhD program that conferred a degree in Conservation. As a whole, this was a minor voice in the group.

Time and Money

If students availed themselves of the entire set of offerings, this would entail at least a year of additional work. How would this be paid for? There was a dynamic tension between the desire to participate in such a program, and the realization that it wasn't “free.” This sentiment reaffirms the CLS commitment to obtaining graduate fellowship funding.

DEVELOPING CLS: MEETINGS WITH GRADUATE FACULTY

We held two meetings with faculty in May 2005, to explore the question:

What are the elements of a forefront, innovative graduate program in conservation that would make you, and your students, want to be involved?

Thirty-five faculty from fourteen disciplinary units attended.

SYNOPSIS OF FACULTY MEETINGS

The program must be selective. Participation must be seen as desirable. Student participants should have a value-added product allowing them more access to jobs they want.

The program should provide a strong sense of community. Community-building can be created in a myriad of ways: a sense of place, a shared experience. Examples might include a UW-wide symposium, a UW-wide seminar series, a highly acclaimed speaker series, interdisciplinary teams in problem-based intern or externships. The point is to have multiple pathways that bring people together on a regular basis.

The program must be unique. We are not interested in a check-box course selection approach, or in emulating (competing directly with) existing conservation programs at other universities. Rather, we are interested in putting together a program that builds on the strength already existing within the UW and in the Pacific Northwest. One of the most innovative directions is developing the humans-affect-ecosystem-affect-humans loop. This touches on all natural and social science disciplines discussed, as well as policy and law, and interjects human and public health, disciplines heretofore not a major part of the conservation dialogue.

The program must seriously accommodate voices from outside of the traditional academic environment. In speaker series, as visiting scholars; as providers of cases, externships, and graduate fellowships; and as advisory board members, colleagues from the “real world” need to be substantively involved.

Programmatic structure should be flexible and innovative. Rather than provide a one-size-fits-all set of requirements, the program should focus on providing students with additional breadth they would not otherwise acquire within their disciplinary units. Can we go beyond the simple dichotomy of certificate versus degree-granting? We should focus on particular elements that provide the training and opportunities needed, and construct the framework around them, rather than adopting an academic structure *a priori* and then struggling to fit a round peg into a square hole. Elements brought up repeatedly included:

1. Problem-based learning—real-world case studies provided by practitioners outside of the UW (agencies, NGOs, industry), and tackled by interdisciplinary teams of students. A real product (white paper, etc.) produced on a real timeline is required. Projects could be local through international.

2. Within the UW seminar series—Conservation in Practice—where faculty and student participants from across campus come (weekly?) to learn about what others are doing. Focus is on problem-solving work. Maybe a lunchtime seminar to expand the dialogue, interaction aspect.
3. Highly acclaimed speaker series in conservation, inviting local through international practitioners from a wide range of disciplines and approaches. Speakers spend several days on campus interacting with faculty and students. A chance for students to garner ideas, and network with the conservation (and job-providing?) cognoscenti.
4. Core courses. These need not necessarily be discipline-based, but could/should provide students with skills and concepts common to all; that is, those necessary to be an effective problem-solver in conservation. Disciplinary needs should/could be accommodated by: 1. deciding on the “core disciplines” all students within the program should be familiar with, and 2. suggesting/requiring specific courses that would bring students up to speed. Again, the goal is not to make all students equal, but rather to give students base training to broaden their perspectives given their chosen field.

The program must make an impact. The principal goal is not simply to draw in students, instead it is to train students so that future generations of graduates are more able to solve today’s conservation problems.

Without a strong vision and a strong leader, the program will come to nothing. This means that the committee must move things forward toward the definite goal of rolling a specific program structure out. It also means there needs to be a critical mass of faculty involvement and *serious buy-in* from the UW upper administration. The program will not survive if it relies only on the “additional” interest and time of already harried faculty.

NOTES OF FACULTY MEETINGS

Questions, Issues

Who are the consumers?

How to attract better students?

How to make sure students leave with skills they need?

How can students make a difference?

Graduates can get a job *and* be effective

How to attract faculty support?

Challenge to find “core faculty”

University need to improve reward structure for interdisciplinary participation

Departmental buy-in; top down buy-in, incentives

How to attract funding?

Complexity—conservation is so many things

Breadth versus depth—@ UW a program strength would be breadth
Requirement/scheduling issues
Different issues for master's vs. PhD students
Traditional graduate students vs. working professionals?
Professionals wanting additional training—should we accommodate?
Strong vision and clear/strong leadership of program
Staffing
Need a market analysis: what is the academic competition? what are employer needs?

Concepts, Disciplines

Include humanities, arts. Communicative power of arts is valuable.
Indigenous arts/knowledge
Ethics, Social Justice, and Policy
Environmental Law; Environmental Justice
Provide multiple ways of knowing
An integrated experience
Clearinghouse—information and opportunities
Revitalize thinking
Desired/competitive
Critical mass
A real home for the program, the students, and the faculty
Interaction with non-academics
a source of real-world problems for problem-based learning
a source of funding
members of an advisory board
Scales—man and biology: new territory that is not addressed elsewhere.
Great opportunity to close loop of humans altering the environment and humans affected by that changed environment—exciting to set up program that recognizes that feedback.
Amazing opportunity because Med School so closely linked to our science departments
Biggest novelty is focus on humans and biology—interdisciplinary not so novel, but the closed loop and conflicts among the health of humans and ecosystems is what makes this unique
Goal is to change world/make impact.

Skills, Pedagogy

Focus on practical methods
Problem-based cases. Focus may change over time.
Problem-based learning
Using cutting edge tools, technology

Focus on what to do to make the students most effective

Creating an Identity

-for program

-for students

Community—something different from what the degree-granting unit provides

Cohort—community

Cohesion, but also specialization

Cadre of dedicated faculty

Interdisciplinarity—stimulation of an alternative perspective; seeing things through someone else's lens; different epistemologies—this is conversation that needs to happen

Interdisciplinary collaboration—not just meeting in a course, but long-term connections

Explicit contribution to real-world project

REAL—outside ivory tower

Service projects—local to international; way to create and maintain interdisciplinary momentum

Team work

STRUCTURE, LOGISTICS

Something very different from the standard.

Commitment of students involved—highly selective—not everyone gets in

Vision for potential of the students—belief in students—raise the bar and they will rise to the occasion

Real interdisciplinary courses—team-taught across disciplines

Structure, but not necessarily core courses

Core knowledge set

Identify the required disciplinary knowledge so students get a taste of the breadth of conservation. May need a few, new, truly unique courses that they take—also builds community.

Certificate—but not based on courses

Students want a credential, a “badge” in Conservation Biology

Best chance for success is Certificate

Certificate is course driven, more available to course-driven Master's students; less available to PhD students.

Certificate not good outlet—doesn't provide the intellectual glue.

I don't see faculty or students getting excited about a certificate program

Certificate as a stand alone wouldn't be much better than what we had before

Interdisciplinary degree

Problem with Master's is wide breadth, not deep enough in one area.

Where do these students get jobs?

Interdisciplinary degree run through the Graduate School.

If this process doesn't result in degree, not worth it.

Speaker series as hub

Seminars & interactions with visiting speakers

We're missing the boat if we don't involve others outside university—they are part of the real-world issues, they will be giving jobs to the graduates, they show how we are relevant.

Flexible, responsive—not one size fits all

First year very structured—only gets flexible and open after first year, develops cohort experience

Key first year experience

Many different opportunities rather than one size fits all

Master's & PhD with multiple entry points

Core program that exists on modest endowment—other aspects through other funding.

Student support; most compelling is student support—everyone wants to work with best students

Fellowship

Groups of faculty have to participate together in applying for combined buy-outs; funding for buyout

Undergraduate research support and involvement

SPECIFIC STRUCTURAL ELEMENTS

Seminar series promoting UW faculty interaction and allowing all to speak on the conservation work they are doing: Conservation in Practice; problem and solution driven, with rigorous and novel science

Seminar provides the spark to bring us together to learn about new kinds of work

Seminar series on “what's hot?” and “who's doing what?”—great way to identify resources and potential students to work with department

Speaker series bringing outsiders (academics, non-academics) in to speak and interact with students and faculty. Modeled on Bevan Series and Urban Ecology IGERT.

Engaging speakers -> can keep group together when wandering

Connections and networking—students involved

Visiting practitioners

Core courses required, but mixed and broad don't work well

Cohort-building elements

Few, new, truly unique courses that they all take

Shared (tough) courses first year

Quarterly reading seminar

Key team project

A UW-wide Conservation Symposium—just to highlight the breadth here at the UW—do this in Fall 2005 to help kick off the new program.

everyone gets 5 minutes (3 visuals) to explain what they do

lots of time for interaction

use as a chance to get draft program proposal out there

PROCESS AND TIMELINE

March 2004: the Graduate School Council discontinued the graduate certificate program in Conservation Biology Policy.

September 2004: An interdisciplinary group of faculty and graduate students is convened by the Program on the Environment and the UW Earth Initiative, with the support of the Dean of the Graduate School, to discuss future approaches for graduate education in conservation at the UW. Participants represented all three UW campuses, six schools and colleges, and thirteen programs.

The attendees at the meeting recommended that:

- a graduate program in conservation should be developed
- the program should be broadly interdisciplinary, with participation from natural and social sciences, policy/law, medicine/public health, and humanities
- the program should be problem-, not discipline-based, applied, and require teamwork and communication across disciplines
- the program must enjoy broad support across the university, teaching responsibilities shared among participating units
- the program must be led by a dynamic, vibrant faculty Director with substantial time and energy committed to the program.

CLS TIMELINE

2004

MARCH

The Graduate School discontinues the certificate in Conservation Biology Policy.

SEPTEMBER

An interdisciplinary group of faculty and graduate students recommend the development of a graduate program in conservation.

2005

APRIL

A committee is convened to propose a graduate program: Conservation of Living Systems (CLS). Committee meets weekly.

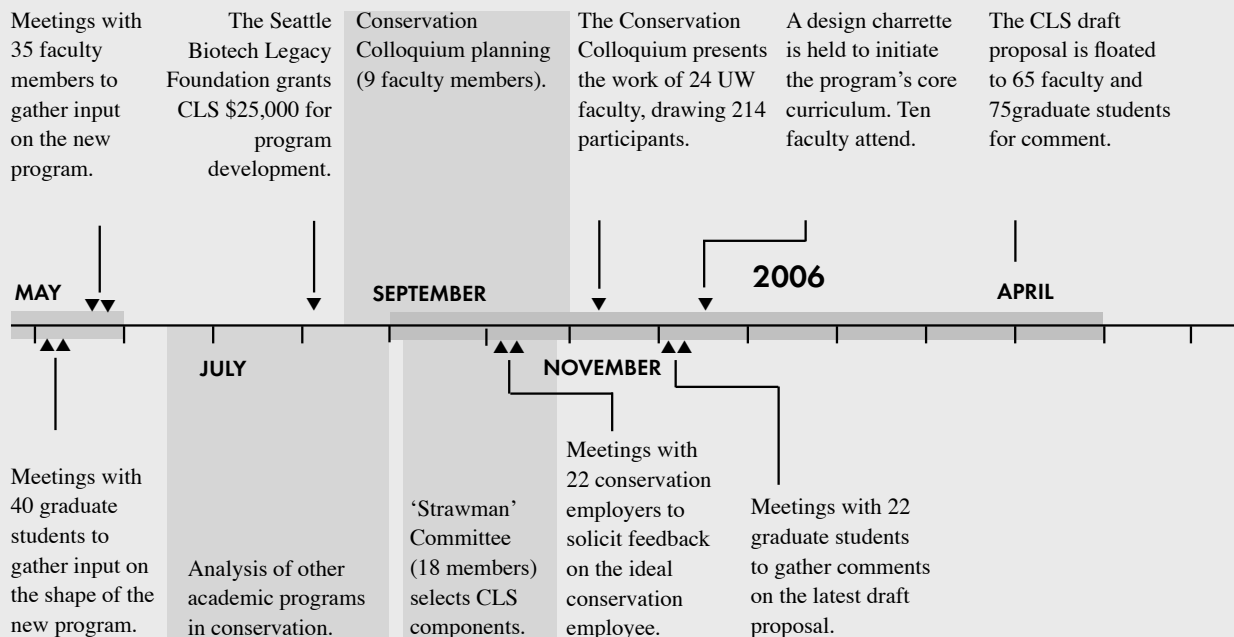
April 2005: A committee of four individuals was created to lead the development of the new program:

- Julia Parrish, Associate Professor, Aquatic & Fisheries Science, Biology; Adjunct Associate Professor, School of Marine Affairs
- Roger Rosenblatt, Professor and Vice Chairman, Family Medicine; Adjunct Professor, Health Services.
- Clare Ryan, Associate Professor, College of Forest Resources; Adjunct Associate Professor, Daniel J. Evans School of Public Affairs and School of Marine Affairs
- David Secord, Director, Program on the Environment; Research Associate Professor, School of Marine Affairs

An RA, Corrie Watterson, (MA candidate in the Evans School of Public Affairs) was also hired to organize the work of the committee from the summer of 2005 through the spring of 2006.

May 9 & 10, 2005: the committee meets with graduate students to gather input on the shape of the new program; two meetings are held. Forty students attend.

May 16 & 20, 2005: the committee meets with faculty to gather input on the shape of the new program; two meetings are held. Thirty-five faculty members attend.



June–September, 2005: The committee analyzes other academic programs in conservation. Faculty and students in targeted programs are interviewed.

August 9, 2005: The Seattle Biotech Legacy Foundation grants the committee \$25,000 to develop the CLS program.

August–November, 2005: A faculty committee plans the Conservation Colloquium.

September 23 & October 7, 2005: The committee meets with 22 conservation employers over two meetings. We asked employers: 1. What type of student are they looking for? 2. What skill set(s) make students most attractive? and 3. What opportunities are possible for interaction between your organization and the UW?

September 20, October 18 & October 25, 2005: Eighteen members help to develop the draft CLS proposal (“the strawman”) over three meetings.

November 4, 2005: The first-ever Conservation Colloquium presents the conservation-related work of 30 UW faculty, and draws 214 students, faculty, and staff from around the UW. This day-long event, which highlighted a cross section of faculty work and encouraged faculty from across the University to engage in a discussion of conservation issues.

December 1 & 2, 2005: the committee meets with graduate students again to present the draft program (“the strawman”). Twenty-two students attend.

December 15, 2005: A faculty charrette is held to develop the program’s core curriculum. Nine faculty attend.

April 2006: A draft program proposal is floated to 65 conservation-oriented faculty and 75 graduate students for comment.

GRADUATE STUDENT ATTENDEES—FIRST MEETINGS

| NAME | DEPARTMENT |
|-------------------|--|
| Elizabeth Addis | Biology |
| Alison Agness | Aquatic & Fishery Sciences |
| Joe Anderson | Aquatic & Fishery Sciences |
| Ryan Bidwell | Forestry |
| Amanda Bradford | Aquatic & Fishery Sciences |
| SaraBreslow | Anthropology |
| Aaron Clark | Biology |
| Jerry Davison | Biology |
| Lucy Flynn | Aquatic & Fishery Sciences |
| Nathalie Hamel | Aquatic & Fishery Sciences |
| Donna Hanser | Aquatic & Fishery Sciences |
| Jelte Harnmeijer | Astrobiology and Earth and Space Sciences |
| Kirstin Holsman | Aquatic & Fishery Sciences |
| Allen Jason | Environmental & Occupational Health Sciences |
| Van R. Kane | Forestry |
| Anjali Kumar | Psychology |
| Kate Litle | Marine Affairs |
| Christina Maranto | Biology |
| Kristin Marshall | Aquatic & Fishery Sciences |
| Sean McDonald | Aquatic & Fishery Sciences |
| Siri Nelson | Biology |
| Corey Niles | Law School |
| Maggie Ostdahl | Aquatic & Fishery Sciences |
| Fernanda Oyarzun | Biology |
| Margarita Ramos | Medicine |
| Sarah Ross-Viles | Health Services |
| Anne Salomon | Biology |
| Mia Siscawati | Anthropology |
| Elizabeth Skewes | Biology |
| Ben Starkhouse | Aquatic & Fishery Sciences |
| Scott Stolnack | Aquatic & Fishery Sciences |
| Kristi Straus | Aquatic & Fishery Sciences |
| Patricia Townsend | Biology |
| Blake Trask | Marine Affairs, Urban Planning |
| Ursula Valdez | Biology |
| Andrew Van Eck | Biology |
| Eric Wagner | Biology |
| Eric Ward | Aquatic & Fishery Sciences |
| Peter Westly | Aquatic & Fishery Sciences |
| Stephanie Zador | Aquatic & Fishery Sciences |

FACULTY MEETING ATTENDEES

| NAME | DEPARTMENT |
|----------------------|---|
| James Agee | Forest Resources |
| John E. Banks | UW Tacoma, Interdisciplinary Arts & Sciences (IAS) |
| David Battisti | UW Earth Initiative (UWEI) Atmospheric Sciences |
| Linda Brubaker | Forest Resources |
| Paula Bruntlinger | Health Services |
| Beth Bryant | Marine Affairs |
| Bob Edmonds | Forest Resources |
| Tim Essington | Aquatic & Fishery Sciences |
| Kern Ewing | Forest Resources |
| David Fluharty | Marine Affairs |
| Robert Francis | Aquatic & Fishery Sciences |
| Vince Gallucci | Aquatic & Fishery Sciences |
| Martha Groom | UW Bothell, IAS/UW Seattle, Biology |
| James Ha | Psychology |
| Steven Harrell | Anthropology |
| Stephanie Harrington | UWEI |
| Peter House | School of Public Health and Community Medicine |
| Terrie Klinger | Marine Affairs |
| Charles Laird | Biology |
| Bruce Lippke | Forest Resources |
| David Mabberley | Center for Urban Horticulture/Arboretum |
| Mark Oberle | School of Public Health and Community Medicine |
| Julia Parrish | Aquatic & Fishery Sciences, Biology, Marine Affairs |
| Dan Peplow | Forest Resources |
| Sarah Reichard | Forest Resources |
| Roger Rosenblatt | School of Medicine, School of Public Health and Community Medicine |
| Jennifer Ruesink | Biology |
| Clare Ryan | Forest Resources, Public Affairs, School of Public Health and Community Medicine |
| Daniel E. Schindler | Aquatic & Fishery Sciences |
| David Secord | Program on the Environment, Marine Affairs |
| Doug Sprugel | Forest Resources |
| Josh Tewksbury | Biology |
| Sam Wasser | Biology |
| Stephen West | Forest Resources |
| Craig ZumBrunnen | Geography |

EMPLOYER MEETING ATTENDEES

| ORGANIZATION | REPRESENTATIVE |
|---|-----------------------|
| American Rivers | Rob Masonis |
| Bullitt Foundation | Denis Hayes |
| Cascade Land Conservancy | Bryan Glynn |
| Conservation International | Keith Alger |
| Consultant | Linn Gould |
| Department of Ecology | Maria Victoria Peeler |
| Disney | Jackie Ogden |
| Environmental Protection Agency Region 10 | Julie Hagensen |
| Floyd Snider consulting | Teri Floyd |
| King County Public Health | Ngozi Olero |
| Methow Conservancy | Katherine Bill |
| National Park Service | Darryll Johnson |
| National Park Service | Kathy Jope |
| NOAA Fisheries | Doug Demaster |
| NOAA Fisheries | Usha Varanasi |
| The Nature Conservancy | Elizabeth Gray |
| The Nature Conservancy | Len Barson |
| USDA Forest Service | Deanna Stouder |
| WA State Dept of Health, Division of Environmental Health | Janice Adair |
| WA State Dept of Natural Resources | Craig Partridge |
| Weyerhaeuser | Cassie Phillips |
| World Wildlife Fund | Shaun Martin |

STRAWMAN FACULTY PARTICIPANTS

| NAME | DEPARTMENT |
|-----------------------|---|
| James Agee | Forest Resources |
| Ginger Armbrust | Oceanography |
| Dee Boersma | Biology |
| Tim Essington | Aquatic and Fishery Sciences |
| Kern Ewing | Forest Resources |
| Richard Fenske | Environmental & Occupational Health Sciences |
| Martha Groom | UW Bothell, IAS / UW Seattle, Biology |
| Steven Harrell | Anthropology |
| Aaron Katz | Health Services |
| Terrie Klinger | Marine Affairs |
| Mark Oberle | School of Public Health and Community Medicine |
| Julia Parrish | Aquatic and Fishery Sciences, Biology, Marine Affairs |
| Michael Robinson-Dorn | Law |
| Roger Rosenblatt | School of Medicine, School of Public Health and Community Medicine |
| Clare Ryan | Forest Resources, Public Affairs, Marine Affairs |
| David Secord | Program on the Environment, Marine Affairs |
| Sam Wasser | Biology |
| Stephen West | Forest Resources |

GRADUATE STUDENT ATTENDEES - SECOND MEETING

| NAME | DEPARTMENT |
|-------------------|---|
| Alison Agness | Aquatic and Fishery Sciences |
| Katie Barndt | Forest Resources |
| Kay Caromile | Forest Resources |
| Katy Doctor | Aquatic and Fishery Sciences |
| Heather Dowey | Public Affairs |
| Jessica Drees | Aquatic and Fishery Sciences |
| David Haak | Biology |
| Stephanie Jader | Aquatic and Fishery Sciences |
| Van Kane | Forest Resources |
| Adam Lewis | Evans |
| Kate Litle | Marine Affairs |
| Molly Mathias | Forest Resources |
| Shannon McCluskey | Aquatic and Fishery Sciences |
| Ashley Peck | Law |
| Margarita Ramos | Medicine |
| Joel Rice | Quantitative Ecology and Resource Management (QERM) |
| Stan Rollman | Forest Resources |
| Christina Smith | Anthropology |
| Jo Smith | Aquatic and Fishery Sciences |
| Nicolas Vikstrom | Law |
| Peter Westley | Aquatic and Fishery Sciences |
| Carl Young | Aquatic and Fishery Sciences |