ENVIRONMENTAL MANAGEMENT CERTIFICATE PROGRAM

at the
University of Washington

Self-Study Report

Prepared for
the Graduate School's 5-year Review of the Environmental Management Certificate
September 7, 2007

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Foreword

"The University of Washington is, by reputation, one of the very best of the big universities in the nation in terms of its willingness to enter into interdisciplinary studies and to create new interdisciplinary efforts. We're far, far ahead of places like Stanford and Harvard and some of the other Ivy Leaguers."

Daniel J. Evans, University of Washington Regent

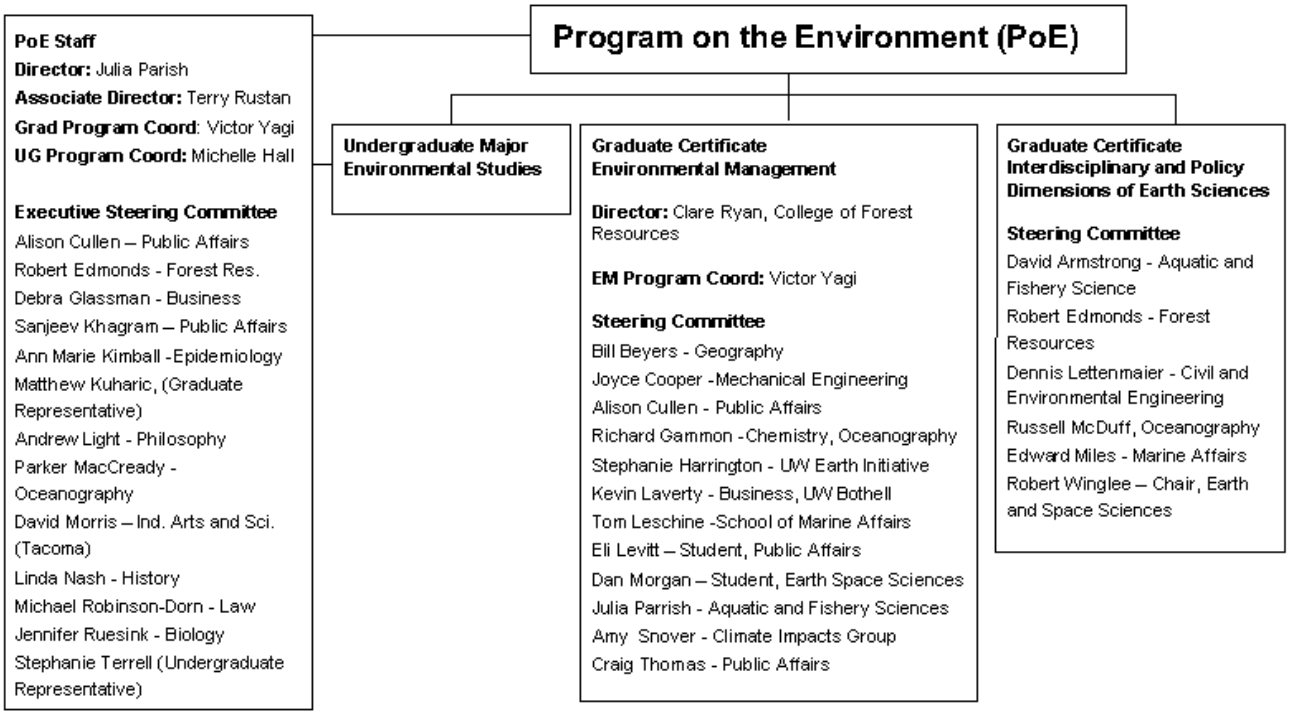
Overview of Environmental Management Certificate Program

Environmental managers face unprecedented challenges in decision making: advances in science and technology, businesses considering sustainability as a core driver of strategy, and growing public awareness of the role of the environment in healthy communities and sustainable economies. The University of Washington's Environmental Management (EM) Certificate Program is based on the idea that managing the most important environmental issues requires a systems approach that integrates knowledge from many disciplines. This requires a team of professionals from diverse fields with interdisciplinary problem solving skills. In the EM Certificate Program, graduate students from across the University tackle real-world problems with profound policy, scientific, and business ramifications. The Certificate Program currently consists of:

- A core of three required courses (Environmental Policy Processes; Role of Scientific Information in Environmental Decisions; and Business Strategy and the Environment) to complement discipline-based graduate degree programs
- Nine-month long Keystone Projects (capstone) with off-campus partner organizations that address contemporary problems in environmental management
- One elective course to further students' knowledge relevant to their academic and career goals
- The Henry Luce Speaker Series, a public series featuring prominent speakers representing the breadth and depth of environmental management. EM students have an opportunity to meet with the Luce Speakers in small, informal sessions
- Fellowships for project management of the Keystone projects

The EM Certificate Program is intended to provide education and training for a diverse array of graduate students preparing for management careers in the non-profit, for-profit and public sectors and in public-private partnerships, as well as those who will contribute legal, scientific and technical expertise to environmental decision making, locally, nationally and internationally. As a certificate program, rather than a freestanding degree program, it is designed to complement the great disciplinary strengths already provided by individual schools and departments at the University of Washington (UW). The target audience includes students from a wide array of science, policy, business, planning, engineering, and other graduate programs.

Environmental Management Certificate Program Organizational Chart



Section A: General Self-Evaluation

1. What are your unit's strengths?

One of the EM Certificate Program's greatest strengths is its capacity to provide the rigor of discipline-based training in concert with interdisciplinary teamwork. As one of the leading public universities in the world, the UW houses internationally recognized scholars in the major disciplines that encompass Environmental Management, including Business, Law, Public Policy, Civil and Environmental Engineering, Biological Sciences, Earth and Space Sciences, Atmospheric Sciences, Economics, and Public Health. Graduate students from these disciplines therefore come to the EM Certificate Program with exceptional disciplinary training.

The EM Certificate Program is located within the Program on the Environment (PoE), established in 1997 to foster and promote interdisciplinary environmental education at the UW. As a focal point for information exchange on environmental education at the UW, PoE has broad connections that are a critical resource for the EM Certificate Program. PoE is not a traditional academic department in that it does not have faculty of its own. Instead, it plays a networking role, bringing together faculty and students from across the University to augment existing programs and offer an undergraduate B.A. degree program in Environmental Studies, an undergraduate Restoration Ecology Network Certificate and two graduate Certificate programs: Environmental Management, and Interdisciplinary and Policy Dimensions of Earth Sciences (IPDES).

In the EM Certificate Program, graduate students from across the University benefit from each other's expertise and perspectives and learn to appreciate the need for interdisciplinary collaboration to tackle real-world problems with profound policy, scientific, and business ramifications. As with its parent PoE, the EM Certificate Program does not have its own faculty. Instead, the program provides salary or TA support for faculty from other departments to teach the three required core courses, and recruits faculty to mentor student teams for the Keystone Projects. In addition, the EM Program has a Steering Committee that includes a diverse group of faculty who share an interdisciplinary perspective and a problem-based approach to education and research. Because of its location in PoE at the UW, the EM Certificate Program has the capability and the commitment to draw world-class expertise from multiple disciplines and to prepare students to understand how professionals from other fields address environmental management.

2. How do you measure the success of your unit as a whole?

The EM Certificate program provides numerous benefits to students, faculty, and the larger community. A total of 71 Certificates have been awarded since the program began in 1999. These certificate recipients are now in a variety of professional positions that incorporate environmental management, such as Project Engineer for Global Energy Concepts; Conservation Director for Washington Wilderness Coalition; Regulatory Specialist for Hatch Energy; and Chief Operations Officer for WOW Baking Company.

Students in the EM Certificate Program benefit immediately from improved real-world environmental management experience. The required coursework and Keystone Projects provide excellent educational and professional experiences as students gain critical skills in complex project scoping, design, analysis, leadership, and written and oral communication. The relationships with community partners often lead to internship and career opportunities for all students. Participating community partners (local businesses and industry associations, public agencies, and non-profit organizations), benefit through completion of a project that fills an urgent management need. In addition, partners are more easily able to tap into University expertise. The Keystone Projects are a means for knowledge generated at a leading research university to be applied to problems and concerns of the local community, and creates on-going partnerships that will help to sustain long-term approaches to regional environmental management problems.

The Keystone Projects are an important vehicle for transferring UW's expertise to the community. Through mentoring the students on Keystone Projects, faculty mentors provide their expertise where needed, but also integrate their knowledge with the other disciplinary areas represented by the graduate student team members. In this way, expertise and knowledge makes its way into the community through the solutions developed as part of the projects. The transfer of expertise continues beyond the duration of the projects as the students take with them the knowledge gained from their mentors, student colleagues, and community partners, along with their disciplinary knowledge, into the professional world. In addition, faculty mentors are introduced to problem areas and potential partners for future research and educational activities.

The larger community benefits as well, by hosting and working with the Keystone teams. Through the EM Certificate Program, community partners have a unique opportunity to work with exceptional graduate students from the UW, who offer both rigorous discipline-based capabilities with interdisciplinary knowledge, tools, and teamwork. Keystone teams offer community partners a wealth of practical skills and expertise; at the same time, our students gain valuable experience in applying academic research to real-world issues.

A major success for the EM Certificate Program was securing a $600,000 grant from the Henry Luce Foundation in 2005, which allowed us to significantly expand and augment the capstone portion of the Certificate Program into its present form with the Keystone Projects. Through Keystone Projects, we break down the barriers that can prevent knowledge generated at a leading research university from being applied to real-world problems and concerns of the local community. We seek to develop long-term partnerships with Keystone partners that will help to create long-term approaches to regional environmental management problems and help to make the EM program self-sustaining. These long-term partnerships not only help to make a difference in the region, but also to push University researchers to further their own knowledge and the state of practice in their fields.

The feedback from Keystone partners has been overwhelmingly positive. The Keystone Projects enabled partner organizations to accomplished outcomes that

would not have occurred if the organization had been acting alone. The following evaluation form excerpts are from the Port of Tacoma, one of the Keystone Project community partners in 2006-2007:

> "*The research results and the overall project performance far exceeded our expectation in terms of depth, quality, and thoroughness. I would say "a job well done!" UW graduate students did not miss a beat adjusting to the Port's significant personnel changes throughout this project."*
>
> *The UW team was able to obtain a lot of frank, yet constructive, feedbacks from the Port's local stakeholders. The cost data associated with an EMS development by other US ports helped our planning. The Port plans to incorporate EMS and the Project team's recommendations into our long term management strategy. We will implement all recommendations in phases with slight modifications to fit the Port's maritime business.*
>
> *The Port of Tacoma Managers and staff are so impressed with the quality of your program, the high caliber of students from diverse program working well together, and most of all- the great faculty guidance*."

Prior to receiving the grant for the Keystone Projects from the Luce Foundation, students gained project-based experience through a one or two-quarter long capstone project course – Global Commercialization of Environmental Technologies. Students worked on faculty-supervised interdisciplinary teams to develop business plans for commercializing environmentally friendly technologies around the world. Gretchen Hund, from Pacific Northwest National Laboratory, and Kevin Laverty, UW Bothell, co-taught the capstone course prior to receiving the Luce Grant. Final reports for capstone and Keystone Projects are available on the EM Certificate Program website http://courses.washington.edu/emkstone/index.shtml

3. What are your unit's weaknesses?

Certificates require extra work (and time) for students to complete. Graduate students at the UW are often funded to work on a particular grant and carry a heavy load of required courses, so involvement in the EM Certificate Program requires an overload or the expense of an extra year of study. This limits the number of students who are interested in enrolling in such a program.

The EM core curriculum has become stable, but at times challenges arise in ensuring student access to the core courses offered by other departments. PoE has funded TA or faculty salary support to help with this.

The strength noted above, that of being able to gather faculty together, can also be perceived as a weakness. Because the program does not have core faculty of its own, there is continual work to be done to encourage and provide incentives for faculty to participate in the program. Faculty involvement in interdisciplinary efforts

is often a challenge, yet there has been a small core group of faculty involved in the EM Program over the years. The Luce grant, through its provision of funding for faculty mentors, has helped encourage and support a new group of faculty to become involved, and the EM Certificate Program seeks to be able to provide additional incentives and rewards for faculty who are involved in the program.

It is difficult at times to interact with other faculty and programs across the UW that are involved in interdisciplinary efforts. For example, there is little to no interaction with PoE's other certificate program (IPDES). It is likely that increased interaction would benefit all programs, – whether certificate programs or other interdisciplinary efforts here at UW, or in other institutions.

Currently, the EM Certificate Program is supported by a mix of public funds from the UW and private funds from the Henry Luce Foundation. The Luce Foundation support is slated to expire after academic year 2008-2009, and we are beginning this year to transition to other sources of support. Proposals for smaller amounts of funding ($30,000 - $50,000) have been submitted to appropriate foundations. The current model of the Keystone Project will have to be modified in the "post-Luce" era of the EM Certificate Program, most likely back to the one to two-quarter capstone course that was offered in the past.

4. What changes have occurred in teaching, research, and service in your field over the past decade that have influenced your conception of the unit's role?

One major change in graduate education and research has been increased emphasis on interdisciplinary, team-based training for graduate students. The EM Certificate Program has been at the leading edge and one of the innovators in this area, so this change has been in line with the goals and objectives of the EM program from the start. One major change in the last two years has been receipt of $600,000 grant from the Henry Luce Foundation. This allowed us to significantly expand and augment the capstone component of the curriculum into the year long Keystone Projects discussed above.

5. How do faculty participate in governance and strategic planning?

Faculty participate in a number of ways, primarily through teaching the three core required courses and in mentoring Keystone Project teams. In addition, faculty serve on the EM Steering Committee, where policy, curriculum, and admission matters are discussed. Sub groups on admissions and curriculum meet regularly. Please refer to section D for a more comprehensive discussion of faculty governance.

Faculty mentors on the Keystone Projects are recruited and "matched" with a project that aligns with their scholarly expertise and interests. Many of the mentors on previous projects were renowned for their expertise, and the projects were of

great interest to them professionally. Faculty mentors are involved for the entire academic year, and assist the Luce Graduate Student Fellow in providing team leadership and project management. The mentors provide overall leadership and assist the team and outside partner in developing project scope, goals, objectives, and tasks. Faculty mentors also liaison with team and community partner organizations as needed.

Section B: Teaching

1. For interdisciplinary programs: How are teaching loads negotiated and balanced between home departments and the interdisciplinary unit?

Several of the faculty who teach the core required courses have been able to incorporate the course into their regular teaching portfolio. For example, Dr. Alison Cullen has taught the "Role of Scientific Information in Environmental Decisions" every other year as part of her regular teaching assignment. Dr. Cullen has also taught the "Environmental Policy Processes" course on a regular basis, and now a new Evans School faculty member, Dr. Craig Thomas, is teaching that course. Dr. Kevin Laverty, from the Business School at UW Bothell, regularly teaches the "Business Strategy and the Environment" course. The EM Certificate Program has at times used PoE state budget funds to provide faculty salary support for those that teach required core courses, or TA support as appropriate.

2. How does the program evaluate the instructional effectiveness of faculty?

Faculty who teach core courses are evaluated using the regular evaluation procedures and forms that all UW faculty receive. The Program also conducts a mid-year and end of year in-person and email review process for the core courses and Keystone course, and post-graduate review of the EM program. Keystone Projects are evaluated every quarter over the academic year via written and oral course evaluations from student peers, faculty mentors, and community partners. Students receive individual evaluations from their graduate student team colleagues as well as faculty mentors. In addition, each Keystone Project is evaluated by the community partner that initiated and proposed the project. Teams meet with partners on a regular basis (usually a minimum of twice per quarter) and receive regular feedback from their community partners. Upon completion of the Keystone Project, community partners complete an evaluation and feedback form that is used to provide information for the current project team and to ensure continuous improvement.

Section C: Research and Productivity

1. For interdisciplinary programs: How do you balance the demands of home departments and of the interdisciplinary unit?

This is one of the major challenges for the EM Program, and perhaps any interdisciplinary program. As mentioned above, faculty and students are already heavily loaded with teaching and research responsibilities, so involvement in an interdisciplinary program is a challenge. To help with this, PoE has provided faculty and TA salary support for EM core courses where needed. In many cases the faculty teaching core courses have made that a part of their regular teaching loads. In addition, the Program seeks to encourage faculty that are already doing interdisciplinary work to participate. Often the Keystone or capstone projects are closely aligned with a faculty member's research program, so there are added incentives to participate in the program.

Section D: Relationships with other units

1. In what ways do you collaborate with units at other institutions or at the University of Washington?

At the UW, collaboration occurs at several levels. Because PoE does not have a faculty of its own, the core courses are offered through other departments. The Evans School of Public Affairs, Business School, College of Forest Resources (CFR), and the School of Marine Affairs (SMA) offer, or have offered, courses that serve, or have served, as the core EM curriculum. EM students are also required to take an elective that fits the objectives of the program from any UW department that is outside their own department. Faculty from across the University are invited to serve on the EM Steering Committee. Currently, faculty with appointments in Public Affairs, SMA, Biology, Business, Law, Geography, Oceanography, and Chemistry are on the steering committee.

The EM Certificate Program co-sponsors appropriate events with departments across campus and with other institutions to foster interdisciplinary collaboration. For example, during Spring 2007, the Business School's CFO Forum and EM co-sponsored a public forum on *Sustainability and Finance* with panelists from the *Wall Street Journal* and Standard and Poor's (London).

Faculty mentors from multiple departments participate on Keystone projects. The Keystone Projects include at least one community partner and often includes multiple partners, which brings together people from different disciplines within and between participating organizations.

Keystone Project interim and final reports are made widely available on the web, as well as through written materials. Each team maintains a project web site for the year-long duration of the project that displays current progress and products. In addition, project teams present their work at least once each quarter, with a final

culminating public Environmental Management Symposium at the end of the year. Many of the teams create short "fact sheets", updates, or newsletters (in addition to any final project reports) that are widely distributed to the community partner and organizations that interact with them. Student team members and faculty also present project results at a variety of professional association meetings (e.g., Georgia Basin-Puget Sound Research Conference), and some have been developed into manuscripts for submission to peer-reviewed journals. Most valuable, however, is that community partner organizations report that they take the final products from the projects and actually use them in their environmental management decision making.

PoE maintains electronic listservs for publicizing events and disseminating information to UW faculty, students and staff, external organizations, and individuals in the community. The Graduate Program Coordinator maintains a presence with student groups from multiple disciplines, and provides program and administrative leadership in collaboration with the EM Program Faculty Director.

The EM Certificate Program has had relatively little interaction with other units at other academic institutions. Interaction with other interdisciplinary units here at UW, whether certificate programs or other programs such as the IGERTS, has also been limited.

2. What are the impacts of these collaborations?

Collaboration is one of the core missions of the EM program, and critical to its success. Collaboration brings together students and faculty from different departments, raises awareness of the program in departments across campus, and exposes a broad audience to the topics of sustainability and interdisciplinary education. Collaborations with outside partners have been greatly enhanced since the receipt of the Luce grant. This has had positive impacts for the UW in that these organizations now know where to go to at the UW, and impacts for faculty and students in terms of applying their expertise to real problems for real organizations.

3. Do members of your unit engage in or have opportunities to engage in interdisciplinary research?

The core curriculum is designed around the concept of interdisciplinary education, meaning that students in the certificate are required to take coursework that is often not in their primary area of expertise or training. In this way, they gain a knowledge of and appreciation for other disciplines and how they can contribute to problem solving, in addition to learning how to communicate across disciplinary divides. Students and faculty participate in year-long interdisciplinary research projects. Faculty who serve as mentors on the Keystone projects work with an interdisciplinary team of students to develop comprehensive solutions to regional problems.

4. Do ties to other units or other kinds of interdisciplinary opportunities aid you in recruiting new faculty and graduate students?

Ties to departments help to recruit faculty to serve on the Steering Committee and to solicit faculty to act as mentors for Keystone Projects. It also helps to attract students from those departments into the program. The Keystone Projects have become a signature feature of the EM program and have attracted students interested in working on specific projects in the program.

5. In what ways, if any, do they improve your graduate and undergraduate education?

Interdisciplinary collaboration is a central theme of the curriculum and the projects. Students gain interdisciplinary problem solving and communication skills, as well as learn to work across disciplines for developing comprehensive solutions to complex problems. While emphasizing the value of interdisciplinary problem solving, the EM Program, through the diverse disciplines represented by its students, provides EM students with an opportunity to develop an understanding of and respect for what various disciplines contribute to comprehensive problem solving. Students also benefit from practical experience addressing real issues and opportunities to work with practitioners at government agencies, businesses, and non-profit organizations.

6. Do you face impediments to developing interdisciplinary research or connections with other units?

One impediment, likely faced by all similar programs, is that faculty and students are extremely busy, so developing contacts and working in connection with other units is challenging due to existing teaching and research workloads. Connections are established and maintained due to faculty who are more personally inclined to participate in the interdisciplinary, applied work that is involved in the certificate. A major impediment is time and inclination of faculty and students to add interdisciplinary work to their already overloaded plates.

Often, the university and home departments do not have an explicit way to reward or provide incentives and support to faculty who participate in interdisciplinary research, while in other departments this is not as much of a problem. A few students have been discouraged from participating in the EM Program by their advisors, who appear to view interdisciplinary research as a distraction from their primary disciplinary studies.

7. Expansion of interdisciplinary programs is an emerging issue. Describe your unit's relationships with other units and work with other units to plan future initiatives.

Maintaining relationships with other departments is critical to the EM Program's success. The EM Program co-sponsors events with other department and strives to

be a catalyst for interdisciplinary collaborations. However, as mentioned earlier, it is difficult to get the time to get faculty together to interact on interdisciplinary work. Often faculty are participating in addition to their "regular" teaching and research loads.

8. How could the university aid you in strengthening such ties? <u>For already existing interdisciplinary programs</u>*:*

In the past, the Graduate School has convened workshops or meetings where faculty and students involved in interdisciplinary programs at the UW and other institutions have met and discussed program successes and challenges. There are many things to learn from each other about these efforts, and the Graduate School taking the lead to convene such interactions was useful, although this has not been done in several years.

The issue of incentives and rewards for participating in interdisciplinary programs is a constant challenge. Some units have explicitly included interdisciplinary activities as a metric for faculty evaluation for merit and promotion. Often it appears that the structural issues of the different departments and units at the UW pose a barrier, so if there were a way to structurally "allow" faculty to participate in interdisciplinary programs, this would help to overcome this challenge.

9. How do you maintain relationships with contributing units? Are there other units that could enhance your interdisciplinary perspective? Do you face impediments in approaching these other units? How could the university aid you in solidifying old relationships and fostering new ones?

Relationships with other units are maintained through agreements to offer core courses, and through faculty representation on the Steering Committee. While the personal relationships between the Director and staff of PoE and EM and participating units are important it is imperative to institutionalize EM relationships with units so that rotating EM leadership and Steering Committee membership do not result in loss of momentum and connections. There are a number of UW units that could augment the EM Program's interdisciplinary perspective. However, it is often difficult to approach individuals and units if there are not clear incentives or ways to facilitate involvement with the program.

10. There is an expectation of faculty participation in the governance of the Department, the College or School, and the /University. How do faculty members within your unit meet this expectation? How is participation in shared governance encouraged and valued?

Faculty participate in the EM Certificate Program in a number of ways. In particular, they serve on the EM Steering Committee, and subcommittees (Admissions, Curriculum). The EM Faculty Director serves for a two-year term. Committees and governance are discussed briefly below.

The EM Steering Committee meets regularly over the academic year (2-3 times per quarter). Roles and Responsibilities of the Committee include:

- Admissions – set admission policies, including setting enrollment cap and admissions guidelines.
- Set overall strategic objectives.
- Establish curriculum structure, content, and policies.
- Program planning and budgeting.
- Curriculum Committee oversight.
- Admissions Committee oversight.

Membership, composition and term of service for EM Steering Committee members.

1. Steering Committee will include voting and non-voting members.
2. Non-voting Steering Committee membership will be open to any interested members of the University Community.
3. At least three continuing or graduated EM students will be recruited to serve as Non-Voting members.
4. Voting and non-voting members of the Steering Committee shall be UW faculty, visiting faculty, professional staff, graduate students, or EM alumni.
5. Voting Membership shall be set at no fewer than 7 and no more than 9, and members will be selected to represent the following:
    - The Director of the Steering Committee (1 member);
    - One teaching faculty for each of the three core courses (3 members; for team-taught courses, voting responsibility for a course may be shared or rotated among teaching team);
    - One additional member from each of the disciplines that represent the three core areas of the EM curriculum: (1) law and policy; (2) science, engineering, and technology; and (3) business, management, and economics (3 members);
    - Up to two additional "at-large" members (as need and opportunity arise) from any of the three core areas or other disciplines (up to 2 members).
6. Nominations for voting membership vacancies to be filled may come from existing Steering Committee members or by self-nomination.
7. Vacancies in voting membership shall be filled during Spring quarter for the following academic year.
8. Voting members will be appointed by PoE Governing Board.
9. Term of membership for voting members shall be three academic years, with option for re-appointment upon mutual concurrence and approval of the PoE Governing Board.
10. Voting membership shall be staggered by year, such that terms will expire for approximately one-third of members at the end of each academic year.

11. Present members will be polled whether they want to be appointed as voting member. Initial voting members will be appointed for one year, for two years, or for three years commencing 2002-2003.

Responsibilities of Voting Steering Committee Members

1. Voting members of the Steering Committee shall attend Steering Committee meetings or designate a proxy/substitute to attend and vote in their place.
2. Voting members of the Steering Committee shall be available to serve on a sub-Committee, ad-hoc committee, or working group, as appointed by the EM Director, during two of the three years of the appointment.

Admissions Committee

1. Admissions Committee will consist of two voting members of the Steering Committee and the Graduate Program Coordinator.
2. Admissions Committee will be responsible for setting application procedures and deadlines; reviewing applications; establishing recruitment plans; and deciding on admissions according to policies established by the Steering Committee.

Curriculum Committee

Role: To develop proposal to PoE Directors for EM curriculum and budget for following academic year.

1. Curriculum Committee shall consist of the EM Director, PoE Director(s) (*ex officio*), Graduate Program Coordinator, and two additional voting members of the Steering Committee.
2. Curriculum Committee will consist of members who volunteer and agree to serve. In the event of more than two volunteers, Curriculum Committee will be appointed by joint decision of Director of EM Steering Committee and PoE Co-Directors.
3. The Curriculum Committee will be responsible for developing a preliminary curriculum program proposal for review and discussion by Steering Committee for the following academic year, following procedures and timelines below.
4. Curriculum Committee and EM Director develop final curriculum proposal for following academic year and submit to PoE by 31 January.
5. Instructor review and selection if/when outside instructors sought.

Section E: Diversity

1. Describe for your unit the inclusion of underrepresented groups for students (by entering cohort), faculty (by rank) and staff.

Applicants Accepted into the Environmental Management Graduate Certificate Program

	Not Ind	Caucasian	Hawaii/Pac Is	Asian	Afro Am	Hispanic	Total	% Minority*	Female	Male
1999	1	5	1	1			8	0.25	5	3
2000	4	5					9	0.00	3	6
2001	4	8		2		1	15	0.20	8	7
2002	1	10	1				12	0.08	6	6
2003	3	12					15	0.00	8	7
2004	6	7		1			14	0.07	12	2
2005	4	8		1	1		14	0.14	8	6
2006	1	11					12	0.00	7	5

The Graduate Program Coordinator met with the Associate Dean of the Go-Map program to identify diversity recruitment strategies for the upcoming academic year. EM program will participate in diversity recruiting events in the spring of 2008.

Section F: Degree Programs

a) Certificate Program Objectives

The Certificate Program in Environmental Management is intended to provide education/training for a diverse array of graduate students preparing for management careers in the non-profit, for-profit and public sectors and in public-private partnerships, as well as those who will contribute legal, scientific and technical expertise to environmental decision making, locally, nationally and internationally. As a certificate program, rather than a freestanding degree program, the EM Certificate is designed to complement the great disciplinary strengths already provided by individual schools and departments of the UW. The target audience includes students from professional degree programs, as well as those from diverse science and engineering programs.

EM Certificate Academic Goals

The program recognizes the following goals for the education of its students:

a. Understand the multiple values and cultural perspectives behind environmental issues confronting the modem world, nationally and internationally. Develop skills and models for identifying, understanding, communicating with and working with diverse stakeholder groups.

b. Understand the contribution that science and technology can make to the interpretation and resolution of environmental issues.

c. Understand the goals and methods of the Public, private and non-profit sectors, and the ways that these can be harnessed so as to contribute to the development of a sustainable society. Understand the impact of environmental issues on businesses. Understand the impact of business activity on the environment. Understand models for integrating environmental and economic goals.

d. Understand the roles and capacities of the public, private and non-profit sectors, and their interactions in the real world.

e. Understand the principles and power of strategic thinking, life cycle analyses, and other means for achieving long-term, multiple-objective issues management.

Standards – As graduate students, applicants have had to meet the qualifications of their individual department and in addition students accepted into the EM Program must have taken at least one policy related course and demonstrated a proficiency in quantitative analysis. The Luce Fellows are selected in a competitive process based on their academic and employment histories and through interviews.

Section G: Graduate Students

1. Recruitment and retention

a. Please describe recruitment/outreach programs to attract graduate students. Specifically address outreach to underrepresented groups. Describe measures you use to assess the success of your efforts. How successful have they been?

Recruitment and outreach is conducted by providing information about the EM program to advisors and program coordinators of graduate departments at the UW, holding information sessions that are advertised to the University community, and contacts with student organizations. Each quarter, the Graduate Program Coordinator contacts advising offices, and holds information open houses. At the beginning of academic year, the Graduate Program Coordinator attends as many unit orientation sessions as possible (e.g., Engineering, CFR, College of Ocean and Fishery Sciences, Evans School) to brief new graduate students about the EM Certificate Program.

In 2006, we solicited proposals for a Keystone Project from an organization committed to Environmental Justice (EJ) issues, with the goal of making connections with people working on EJ issues and as a means of attracting students from underrepresented populations into the program. An EJ project would also bring the University expertise into lower income communities, which likely have less access to these resources. We did not receive any proposals for projects; however, we plan to continue exploring ways to engage the community working on EJ.

The internal database was recently updated to include diversity metrics, which will allow us to track the number of students from underrepresented groups.

b. What are your retention rates?

Please see Appendix A.

2. Advising, Mentoring and Professional Development

a. In what ways do you communicate academic program expectations to students? Such information should include: timelines, phases and benchmarks of the degree program; procedures for committee formation; coursework, exam and presentation requirements; and standards of scholarly integrity.

Upon entering the EM Certificate Program, students are provided with an information packet with program requirements. The Graduate Program Coordinator reviews student progress at the end of the academic year. Quarterly reviews are also incorporated into the Keystone course.

b. In what ways do you inform students of your unit's graduation and placement record? Such information should include time to degree; average completion rates (Master's and Ph.D.); and employment of graduates two and five years after degree completion.

We do not currently report our units graduation and placement record.

c. Please attach an example of your departmental mentoring/advising plan.

The following is an example of the form used to gather basic student information and to track progress towards the Certificate. The information is stored and maintained in hard copy and in an Access database. Student progress is monitored by graduate program coordinator.

Environmental Management Graduate Certificate Program Information

Name		Date:		
Student #				
Preferred Email				
Other Email				
Daytime Phone				
	Street	City	ST	Zip Code
Address (local)				
Address (permanent)				

UW College/School/Dept/Program	Area of Concentration	Degree	Expected Grad Date	Grad Date

Previous Degrees	Major	Institution	Date

Fill in applicable information

	Dept	Number	Expected/ Actual Qtr	Credits/Grade	Instructor
Core – Science					
Core - Business					
Core – Policy					
Elective/seminar					
Elective					
Elective					
			Year		
Keystone/Capstone Project					

3. Inclusion in governance and decisions

a. In what ways do you include graduate students in the governance of your department?

Students serve on the EM steering committee.

b. Please describe your grievance process and characterize the nature of any grievances that have been lodged over the past 3 years. If the characterization is likely to reveal any students' identities, please address this issue in a separate but accompanying document addressed to the Dean of the Graduate School.

Students would submit grievances to the Graduate Program Coordinator, who would then confer with EM Faculty Director and PoE Director if needed.

4. For graduate student service appointees, please describe:

a. Appointment process.

Graduate appointments come in the form of fellowships, which are awarded once per year, and to one graduate student per Keystone Project group. Students submit a letter of application, resume, and letters of recommendation. The faculty mentors for each project interview prospective students and select the student who will receive the fellowship and assume more of a leadership and management role for the Keystone Project.

b. Average duration of appointment.

Three academic quarters.

b. Mix of funding among the various appointments (teaching, research and staff assistantships, fellowships, traineeships).

Fellowships only.

c. What criteria do you use for promotions and salary increases?

These are fixed duration appointments and are subject to available funding. Promotions and salary increases do not apply.

d. In what ways are graduate student service appointees supervised?

The student fellows are supervised by the Faculty Mentor.

f. What training do graduate student service appointees receive to prepare them for their specific role?

In order to prepare students for the project based learning experience in the Keystone Projects, we include skills workshops in ***team building, project management and communication*** as part of the Keystone course. These workshops are outside the normal academic curriculum, but have proven to be very beneficial part of the learning experience. The workshops have taken advantage of expertise available through connections to the EM program. Previous instructors include Diana Gale, who is on the faculty of the Evans School of Public Affairs and the Cascade Center for Public Service and Leadership, and David Secord, former director of PoE and an Aldo Leopold Leadership Fellow.

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III. APPENDICES

Appendix A. Graduate Student Statistical Summary

								Year-long Keystone Proj.			
	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005		2005-2006	2006-2007	2007-2008	Total
Anthropology					1						1
Aquatic & Fish. Sci			1	1	1	2					5
Astronomy				1							1
Atmospheric Sciences	1			1	2	1		1			6
Biochemistry	1										1
Botany	1	1									2
Business			1	1	2			3	2	1	10
Engineering	2	1	2	2	1			3	2	3	16
Earth & Space Sciences			1		1			1	1	1	5
Economics		1	1								2
Env Health					1						1
Epidemiology		1									1
Forest Resources		1								3	4
Geography			1		1	1		1			4
Geology								1			1
History						1					1
International Studies				2							2
Law										1	1
Marine Affairs	1	2		1	1	2		2	3	4	16
Occupational and Env. Health										1	1
Oceanography					1						1
Policy Studies (Bothell)					1						1
Political Science						1					1
Public Affairs	2	1	8	3	1	6		3	4	8	36
QERM										1	1
Architecture & Urban Planning						1		1		1	3
Entered Program	8	8	15	12	14	15		16	12***	24	124
Completed*	8	6	15	9	6	8		10	9		71
Pending		1				4		4	3		12
Withdrew or DNF**	0	1	0	3	9	3		2	0		18
Minorities											
Female											
Disabilities											

* "**Completed**" refers to the number of student who enter that year that completed the certificate at some point in the future.

** "**Withdrew"** refers to students who entered that year and formally withdraw from the program, "**DNF"** refers to students who did not complete all of the requirements before graduating or leaving the UW

*** Graduate program coordinator left mid-year, which hampered recruitment.

Appendix B. Academic Unit Profile

Environmental Management Certificate Yearly Budget	State Funds	Grad School	Luce Grant 2005-2008
EM Director	8000		
Grad Program Coordinator		25000	25000
Role of Science - Faculty Salary	6000		
Role of Science - TA Salary	4500		
Environmental. Policy Proc - TA Salary	5000		
Business Strategy and Nat. Env. - Faculty Salary	15000		
Keystone Mentors			40000
Fellowships - Stipend			72000
Fellowships - Tuition Waiver		24000	24000
Speaker Series			20000
Project Discretionary			4000
Benefits - Core	7371		
Benefits - Keystone			15000
Subtotal	$ 45,871	49000	200000
Total Budget	$ 294,871		

Shading indicates funds allocated for the Keystone Course

Appendix C. List of special pathways, options, certificates, etc. within degree

N / A

Appendix D. List of core faculty

Branden Born – Urban Design and Planning
William Byers – Geography
Patrick Christie – Marine Affairs
Allison Cullen – Public Affairs
Joyce Cooper – Mechanical Engineering
David Fluharty – Marine Affairs
Richard Gammon – Chemistry, Oceanography
Martha Groom – Interdisciplinary Arts and Sciences (UW Bothell)
Marc Hershman – Marine Affairs
Gretchen Hund – Pacific Northwest Laboratory
Kevin Laverty – Business (UW Bothell)
Thomas Leschine – Marine Affairs
Julia Parrish – Aquatic and Fisheries Sciences
Nancy Rottle - Landscape Architecture
Clare Ryan – Forest Resources
Amy Snover – Climate Impacts Group
Craig Thomas – Public Affairs

Appendix E. Placement of graduates, last 3 years
Currently not available

Appendix F. Academic Unit's mission statement

The Certificate Program in Environmental Management is intended to provide education and training for a wide array of graduate students preparing for management careers in the non-profit, for-profit and public sectors and in public-private partnerships, as well as those who will contribute legal, scientific and technical expertise to environmental decision making, locally, nationally and internationally. As a certificate program, rather than a freestanding degree program, the EM Certificate is designed to complement the great disciplinary strengths already provided by individual schools and departments of the UW. The target audience includes students from professional degree programs, as well as those from diverse science and engineering programs.

Appendix G. Faculty Curriculum Vitae

William B. Beyers

Academic Training

University of Washington, B.A., 1962, Ph.D., 1967
Special graduate student participant, NSF Summer Institute on Computer Mapping, Northwestern University, August, 1963
Special graduate student participant, NSF Summer Institute in Regional Science, University of California, Berkeley, 1964

Teaching Fields
Economic Geography
Regional Analysis
Regional Science
Location Theory
Geography of the Pacific Northwest

Academic Employment

University of Washington, Department of Geography:
Assistant Professor 1967-74;
Associate Professor 1974-81;
Professor 1981-present;
Department Chair, 1991-1995, 2005-2007

Harvard University, l971, Visiting Assistant Professor and Research Associate, Regional Science
Cornell University, l971, Visiting Assistant Professor, Center for Urban Development Research
Swiss Federal Institute of Technology (Geographisches Institut, Eidgenössische Technische Hochscule Zürich), 1987-1988, Guest Professor
Hong Kong Baptist University, University Fellow, 1999

Selected Recent Publications

Gateways to the Global Economy. Edited by Åke Anderson and David E. Anderson. Cheltenham UK, Edward Elgar, 2000. IX & 399 pp. Review in Papers in Regional Science, Volume 81, No. 2 (April 2002), pp. 298-299.

Wings of Power: Boeing and the Politics of Growth in the Northwest. By T.M. Sell. Seattle, University of Washington Press, 2001. Review in Pacific Historical Review, August 2002, pp. 509-510.

Contributions to Economic Analysis, Volume 249, Regional Science Perspectives in Economic Analysis. A Festschrift in Memory of Benjamin H. Stevens. Edited by Michael L. Lahr and Ronald E. Miller. Elsevier, Amsterdam, 2001. Xlv & 441 pp. Review, in Economic Systems Research, Vol. 15, No. 1, pp. 98-100.

"On the Geography of the New Economy: Perspectives from the United States," Service Industries Journal, Vol. 23, No. 1, pp. 4-26.

"Manufacturing and Services," 9th edition, Atlas of the Pacific Northwest. J. Kimmerling & P. Jackson Editors. Corvallis, Oregon State University Press, p. 127-138

"Implications of IT advances and E-commerce on Transportation in Producer Services," Growth and Change, Vol. 34, pp. 433-455.

Range of Glaciers: The Exploration and Survey of the Northern Cascade Range by Fred Beckey. Oregon Historical Society Press, Portland OR, 2003. Review in Oregon Historical Quarterly, Vol. 104, pp. 600-601 (With Stephen J. Hyde).

"Service industries and development trajectories in the Seattle metropolitan region," in Service Industries and Asia-Pacific Cities, Edited by Peter W. Daniels, K.C. Ho, and Thomas A. Hutton London, Routledge, pp. 265-282.

"Services and the Changing Economic Base of Regions in the United States," The Service Industries Journal , Vol 25, No 4, pp. 1-16 (June 2005)

2005 Study on Land Use and Local Government Finance. (With Local Government Finance and Research Division of the Washington State Department of Revenue under the direction of the Washington State Office of Financial Management and Anne Bonds & Derik Andreoli). Washington State Office of Financial Management, Olympia WA. ix & 154 pp.

"Input-output models," Encyclopedia of Human Geography. Edited by Barney Warf. Sage Publications, Thouasand Oaks CA. pp. 259-260.

"Producer services," Encyclopedia of Human Geography. Edited by Barney Warf. Sage Publications, Thouasand Oaks CA. pp. 382-383.

"Approaching research methods in economic geography," Edited by Sharhistha Bagchi-Sen and Helen Lawton Smith. Economic Geography: Past, Present and Future. Routledge, London, pp. 186-196.

"Trends in Service Industry Employment in the United States, 1985-2000," in Service Industries Handbook, edited by Peter Daniels and John Bryson. Published, but copy not received as of date of this posting.

"Cultural and Recreational Industries in Rural America: Opportunities for State Legislators," The Journal of Regional Analysis and Policy, Vol 37, No 1, pp. 47-49.

Patrick J. Christie, Ph.D.
CURRICULUM VITAE

Assistant Professor
University of Washington
School of Marine Affairs and
Henry M. Jackson School of International Studies
3707 Brooklyn Ave. NE
Seattle, WA 98105-6715
e-mail:patrickc@u.washington.edu
Telephone: (206) 685-6661
FAX: (206) 543-1417

Professional Preparation

B.S.	University of Wisconsin- Madison, Zoology	1987
M.S.	University of Michigan, School of Natural Resources and Environment, Conservation Biology	1993
Ph.D.	University of Michigan, School of Natural Resources and Environment	1999
Postdoc	NSF Postdoctoral Fellow (PSFMETE program) at University of Washington	1999-2001

Research and Teaching Interests

Comparative evaluative research on ecosystem-based management, integrated coastal management, fisheries, and marine protected areas in Puget Sound, Southeast Asia and Latin America. Quantitative and qualitative research methods.

Appointments

Assistant Professor at the School of Marine Affairs and Henry M. Jackson School of International Studies, the University of Washington. 2002-present.
Research Assistant Professor at the School of Marine Affairs, the University of Washington. 2001-2002.
Research Associate at the School of Marine Affairs, the University of Washington. 1999-2001.
U.S. Peace Corps Volunteer. Philippines. 1987-90.

Selected Publications

Christie, P. D.L. Fluharty, A.T. White, R.L. Eisma-Osorio. 2006. Assessing the feasibility of ecosystem-based fisheries management in tropical contexts. *Marine Policy 31:239-250.*

Christie, P. 2005. Is integrated coastal management sustainable? *Ocean and Coastal Management* 48:208-232.

Christie, P. 2005. Observed and perceived environmental impacts of integrated coastal management in two Southeast Asia sites. *Ocean and Coastal Management*. 48:252-270.

Christie, P., K. Lowry, AT White, E.G Oracion, L. Sievanen, R.S. Pomeroy, R.B. Pollnac, J. Patlis, L. Eisma. 2005. Key findings from a multidisciplinary examination of integrated coastal management process sustainability. *Ocean and Coastal Management* 48:468-483.

Christie, P. 2004. MPAs as biological successes and social failures in Southeast Asia. In *Aquatic Protected Areas as Fisheries Management Tools: Design, Use, and Evaluation of These Fully Protected Areas.* J. B. Shipley (editor), pp 155-164. Bethesda, Maryland: American Fisheries Society.

Christie, P., B.J. McCay, M.L. Miller, C. Lowe, A.T. White, R. Stoffle, D.L. Fluharty, L. Talaue-McManus, R. Chuenpagdee, C. Pomeroy, D.O. Suman, B.G. Blount, D. Huppert, R.L. Villahermosa Eisma, E. Oracion, K. Lowry, R.B. Pollnac. 2003. Toward developing a complete understanding: A social science research agenda for marine protected areas. *Fisheries* 28(12):22-26.

Christie, P., A.T. White and E. Deguit. 2002. Starting point or solution? Community-based marine protected areas in the Philippines. *Journal of Environmental Management* 66:441-454.

Milne, N., R. Wright, and P. Christie. 2004. A review of integrated coastal management educational materials: Matching materials with needs. *Coastal Management* 32:61-75.

Olsen, S.B. and P. Christie. 2000. What are we learning from tropical coastal management experiences? *Coastal Management* 28:5-18.

(d) Synergistic Activities

Establish and evaluate an Internet collaborative program between various Filipino academic/practitioner institutions and the School of Marine Affairs as a means for active, cross-cultural education in environmental management (with USAID and NSF grants). Creation of linkage between UW and Northwest Indian College to conduct research and joint courses on marine policy analysis (funded for 2007-2009). Pew Fellowship in Marine Conservation project to study the socio-ecological dimensions of marine conservation efforts and develop a training program with The Nature Conservancy and Food and Agriculture Organization.

(e) Collaborators & Other Affiliations

Collaborators and Co-Editors.
See publications.

Graduate and Postdoctoral Advisors.
Ivette Perfecto, Jim Diana, Barbara Israel, Pat West: University of Michigan.

Thesis Advisor and Postgraduate-Scholar Sponsor.
Masters students: Claudia Capitini, Nicole Milne, Maggie Ostdahl, Heather D'Agnes, Jesse Port, Monika Thiele, Jamie Doyle. Total of 7 students.

(f) Mentoring underrepresented undergraduate or graduate students

I will be mentoring Northwest Indian College students beginning Fall 2007. I have mentored foreign students (8) from developing countries. Various minority students take my courses at UW. I am the minority affairs coordinator at the School of Marine Affairs (starting January 2007), and will coordinating new recruitment activities to SMA.

Joyce Cooper

Associate Professor, Mechanical Engineering
Director, Design for the Environment Laboratory
cooper@me.washington.edu
206 543-5040

Education:
Duke University (PhD 1996)

Biography

Professor Cooper's background combines environmental assessment with product design and management. Her research interests include the development and enhancement of Design for Environment (DFE) methodologies and models, as related to (1) innovative, sustainable, and concurrent technology development, design, and dissemination; (2) life-cycle assessment (LCA) and environmental performance measurement; (3) Industrial Ecology.

Her industrial experience includes product design and development, manufacturing supervision, quality assurance, life cycle management, pollution prevention site assessments, and facility project coordination.

Professor Cooper directs the UWME DFE Laboratory, located in the Mechanical Engineering Building room G20. The facility includes a library of DFE literature and computing resources supported by computer aided design, materials selection, and LCA tools and databases. All who are interested in learning more about UWME DFE research and educational activities are invited to stop by the lab.

Selected Publications

Weitz, K.A., J.K. Smith, J.L. Warren. "Developing a Decision Support Tool for Life-Cycle Cost Assessments." Total Quality Environmental Management, 4, 23-36 (1994)

Smith, J.K., J.J. Peirce, "Life Cycle Assessment Standards: Industrial Sectors and Environmental Performance," The International Journal of Life-Cycle Assessment, 1, 115-118 (1996)

Fava, J., J. Smith, "Integrating Financial and Environmental Information for Better Decision Making," Journal of Industrial Ecology, 2, 9-11 (1998)

Cooper, J.S., J. Fava, "Teaching Life Cycle Assessment in Universities in North America," Journal of Industrial Ecology, 3, 13-17 (2000)

Cooper, J.S., J. Fava, "Teaching Life-Cycle Assessment at Universities in North America, II: Building Capacity," Journal of Industrial Ecology, 4, 11-15 (2001)

Tolle, D.A., D.J., Hesse, G.B. Chadwell, J.S. Cooper, D.P. Evers, â€œComparison of Two Equivalency Factor Approaches with Simplified Risk Assessment for LCIA of Toxicity Impact Potential,â€ The International Journal of Life-Cycle Assessment, 6, 96-105 (2001)

Rounds, K.S., J.S. Cooper, "Development of Product Design Requirements using Taxonomies of Environmental Concerns," Research in Engineering Design, 13, 94-108 (2002)

Fava, J., J.S. Cooper, "Alignment of North American Activities to the UNEP/SETAC Life-Cycle Initiative," Journal of Industrial Ecology, 5, 3-5 (2002)

Cooper, J.S., "Life Cycle Assessment and Sustainable Development Indicators," Journal of Industrial Ecology, 7, 12-15 (2003)

Mehta, V., J.S. Cooper, "Review and analysis of PEM fuel cell design and manufacturing," Journal of Power Sources, 114 (1) 32-53 (2003)

Cooper, J.S. "Specifying Functional Units and Reference Flows for Comparable Alternatives," International Journal of Life Cycle Assessment, 8, 337-349 (2003)

Cooper, J.S. "Design Analysis of PEMFC Bipolar Plates Considering Stack Manufacturing and Environmental Impact," Journal of Power Sources,129, 152-169 (2004)

Fitch, P.E., J.S. Cooper, "Life Cycle Energy Analysis as a Method for Material Selection," Journal of Mechanical Design, 126, 798-804 (2004)

Fava, J., J.S. Cooper, "Life-Cycle Assessment in North America: An update on capacity building," Journal of Industrial Ecology, 8, 8-10 (2004)

Cooper, J.S., B. Vigon, M. Curran, W. Franklin, "Life Cycle Assessment in Management, Product and Process Design, and Policy Decision-Making," Integrated Environmental Assessment and Management, 1, 60-65 (2005)

Fitch, P., J.S. Cooper, "Life Cycle Modeling for Adaptive and Variant Design- Part 1 Methodology," Research in Engineering Design, 15, 216-228 (2005)

Fitch, P., J.S. Cooper, "Life Cycle Modeling for Adaptive and Variant Design- Part 2 Case Study," Research in Engineering Design, 15, 229-241 (2005)

Wincewicz, K.C., J.S. Cooper, "Review and analysis of SOFC design and manufacturing alternatives," Journal of Power Sources, 140, 280-296 (2005)

Cooper, J.S. "Evolution of an Interdisciplinary Course in Design for Environment at the University of Washington," International Journal of Engineering Education, Accepted for publication in the special issue "Educating Students in Sustainable Engineering" (2006)

Cooper, J.S. "Teaching Life Cycle Assessment to Interdisciplinary University of Washington Graduate Students," International Journal of Engineering Education, Accepted for publication in the special issue "Educating Students in Sustainable Engineering" (2006)

Alison Cullen

Professional Preparation

- *Massachusetts Institute of Technology, Civil/Environmental Eng.* *B.S. 1984*
- *Harvard University, School of Public Health* *Environmental Health Mgmt* *M.S. 1989*
- *Harvard University, School of Public Health* *Environmental Science* *Sc.D.1992*
- Harvard University, School of Public Health postdoctoral fellowship Environmental Science and Eng & Health Policy and Management 1992-93

Appointments

9/06 - University of Washington Seattle, WA
Daniel J. Evans School of Public Affairs: Associate Dean for Research

9/00- University of Washington Seattle, WA
Daniel J. Evans School of Public Affairs: Associate Professor of Environmental Policy and Management

9/95-9/00 University of Washington Seattle, WA
Daniel J. Evans School of Public Affairs: Assistant Professor of Environmental Policy and Management

6/00-6/01 National Center for Atmospheric Research Boulder, CO
Environmental and Societal Impacts Group: Visiting Scientist

7/93-7/95 Harvard University Boston, MA
School of Public Health: Assistant Professor, Health Policy and Management and Environmental Health

12/85-1/88 Gradient Corporation Cambridge, MA
Environmental Engineer

6/84-12/85 U.S. Environmental Protection Agency Boston, MA
Water Management Division, Region I: Environmental Engineer

Selected Publications

Anderson, C.L., Cullen, A.C., and Stamoulis, K., 2006, "Bounded Rationality and Decision Making Along the Policy Chain in Vietnam," submitted to *Journal of Economic Psychology.*

Bogen, K., Cullen, A., Frey, H.C., and Price, P., "Exposure Analysis: State of the Science and Bridges to Dose-Response, Risk Characterization and Decision Making," accepted for publication *Toxicological Sciences*.

Markoff, M., and Cullen, A.C., 2007, "Impact of Climate Change on Pacific Northwest Hydropower," accepted for publication in *Climatic Change*.

Cullen, A.C., Kramer, C.B, and Faustman, E.M., 2007 "The Application of Genetic Information for Regulatory Standard Setting under the Clean Air Act: A Decision Analytic Approach," accepted for publication in *Risk Analysis*.

Cullen, A.C., Labiosa, W., Levin, P., and Grossman, E., 2007, "Integrating the Sciences: Natural and Social Science Support for Decision-Making," in Mary Ruckelshaus and Michelle McClure (eds.), *Sound Science: Synthesizing Ecological and Socio-economic Information about the Puget Sound Ecosystem*, ed. NW Science Fisheries Center, NOAA Fisheries Service.

Kramer, C.B, Cullen, A.C., and Faustman, E.M., 2006, "Policy Implications of Genetic Information on Regulation under the Clean Air Act: The Case of Particulate Matter and Asthmatics," Environmental Health Perspectives*, 114(3), 313-319.* [online 26 October 2005]
http://ehp.niehs.nih.gov/docs/2005/8299/abstract.html

Cullen, A.C. and Small, M., 2003, "Uncertain Risk: The Role and Limits of Quantitative Assessment," in Timothy McDaniels and Mitchell Small (eds.), *Risk Analysis and Society: An Interdisciplinary Characterization of the Field*, Cambridge University Press.

Hornbaker, M. and Cullen, A.C., 2003, "Regulating Technological Risk: Applying the Precautionary Principle," *Human and Ecological Risk Assessment*, 9: 789-810.

Bates, S., Cullen, A., and Raftery, A., 2003, "Bayesian Uncertainty Assessment in Multicompartment Deterministic Simulation Models for Environmental Risk Assessment," *Environmetrics*, 14:355-371.

Cullen, A.C., 2002, "Comparison of Model Predictions and Measurements for PCB Concentration in the vicinity of Greater New Bedford Superfund Site" *ES&T*, **36**:2033-2038.

Gertler, N. and A.C. Cullen, 2000, "Effects of a Perceived Risk on Property Values During a Transient Cancer Scare: Implications for Risk Valuation and the Value of Life," *HERA*, **6**:731-745.

Cullen, A.C. and H.C. Frey, 1999, *Probabilistic Techniques in Exposure Assessment: A Handbook for Dealing with Variability and Uncertainty in Models and Inputs*, Plenum Press, New York, NY.

Synergistic Activities

1. Center for Study and Improvement of Regulation (CSIR), Carnegie Mellon-University of Washington
2. NW Power and Conservation Commission, integrated modeling of the impact of climate change on decisions related to future energy supply in the northwest US
3. National Research Center for Statistics and the Environment University of Washington 1997-2001 Executive Board
4. National Center for Atmospheric Research, Boulder, Colorado – Assessment Initiative, Wildfire Risk Decision Making
5. National Academy of Sciences – Committee on Assessment and Remediation of the Coeur d'Alene Superfund Site

Collaborators and Other Affiliations

a. Collaborators and Co-Editors

Larisa Altshul (Harvard University)
C. Leigh Anderson, Elaine Faustman, Andrew Gordon, Peter Guttorp, Sally Liu, Adrian Raftery, Paul Waddell (all of University of Washington)
Ken Bogen (Lawrence Livermore National Laboratory)
H.Christopher Frey, North Caroline State University
Mitchell Small, Carnegie Mellon University
Linda Mearns, Kathleen Miller (National Center for Atmospheric Research)

b. Graduate and Post-doctoral Advisors

John Evans, Senior Lecturer on Environmental Science
Joseph Harrington, professor, Harvard University, School of Public Health
Thomas McKone, professor, University of California at Berkeley
P. Barry Ryan, professor, Emory University
John D. Spengler, Harvard University, School of Public Health

c. Thesis Advisor and Postgraduate-Scholar Sponsor

Samantha Bates Donna Vorhees
Ashley Steel Christine Drew Margaret Hornbaker

David L. Fluharty
Associate Professor, School of Marine Affairs
Wakefield Professor of Ocean and Fishery Sciences
fluharty@u.washington.edu
Education

- Ph.D., University of Michigan, 1977
- M.A., University of Washington, 1972
- B.A., University of Washington, 1968

Specialties

- Climate variability and fishery management
- International management of fisheries and marine mammals
- Nonrenewable (oil, gas, minerals) natural resource management
- Training programs for natural resource managers from developing countries
- Management institutions

Additional Background

- **Senior Research Associate**, School of Marine Affairs, 1989-91
- **Research Associate**, School of Marine Affairs, 1983-89
- **Freelance researcher**, 1982-83
- **Research Associate**, School of Marine Affairs, 1978-82
- **Postdoctoral research**, School of Marine Affairs, 1976-78

Richard H. Gammon

Professor of Chemistry
Professor of Oceanography
Adjunct Professor of Atmospheric Sciences
(Physical and Environmental, Ph.D., Harvard University, 1970)
(206) 543-1609
gammon@chem.washington.edu

Representative Publications

“Atmospheric 14CO: a tracer of OH concentration and mixing rates.”, P. D. Quay, S. King, D. White, M. Brockington, B. Plotkin, R. Gammon, S. Gerst, and J. Stutsman, *J. Geophys. Res*., 105 15147 (**2000**).
"Production and Consumption of Methyl Halides in a Freshwater Lake.", W. Huang, X. Bu, L. Nguyen, R Gammon, and J Bullister, *Limnology and Oceanography*, 45 1537 (**2000**).
"Variability in Delta-pCO_2 in the Subarctic North Pacific.", P. Murphy, R. Feely, E. Harrsion, and R. Gammon, *Tellus,* 50B 185 (**1998**).
"Examining a Coupled Climate Model Using CFC-11 as an Ocean Tracer.", K. W. Dixon, J. Bullister, R. Gammon, and R. Stouffer, *Geophys. Res. Lett*., 23 1957 (**1996**).
"Basin-wide Distributions of Chlorofluorocarbons CFC-11 and CFC-12 in the North Pacific 1985-89.", M. Warner, J. Bullister, D. Wisegarver, R. H. Gammon, and R. Weiss, *J. Geophys. Res*., 101 20525 (**1996**).

Awards & Activities

Fulbright/Hayes Fellowship, Grenoble, France
NOAA/ERL Outstanding Research Article Awards
NSF Postdoctoral Fellowship, Astronomy, University of California, Berkeley
DOW Award for Excellence in Chemistry Teaching
Phi Beta Kappa and High Honors in Chemistry, Princeton University

MARTHA J. GROOM

Associate Professor & Associate Director
Interdisciplinary Arts & Sciences
University of Washington, Bothell
18115 Campus Way NE
Bothell, WA 98011-8246

Adjunct Associate Professor
Department of Biology
University of Washington
Kincaid Hall, Rm 410C
Seattle, WA 98195-1800

Education

Ph.D. University of Washington, Zoology, 1995.
M.S. University of Florida, Zoology, minor in Tropical Conservation, 1989.
A.B. Princeton University, Dual Degree in Biology & Public and International Affairs, *magna cum laude*, 1984.

Appointments

Associate Director, Interdisciplinary Arts & Sciences, University of Washington, Bothell (Sept 1, 2007-June 30, 2009).

Associate Professor, Interdisciplinary Arts & Sciences, University of Washington, Bothell, and *Adjunct Associate Professor*, Department of Biology, University of Washington, Seattle (Sept 16, 2000 – present, *Assistant Professor* Sept 16, 1998-Sept 15, 2000).

Assistant Professor, Department of Zoology North Carolina State University (July 1, 1995-June, 1998). *Associate Faculty*, Department of Botany, Program in Biomathematics, and Program in Wildlife and Fisheries Science. Promoted to *Associate Professor* on July 1, 1998. *Adjunct Associate Professor* 1998-2005.

Current Grants

2006-7: Gauging the impacts of growth in biofuel industry on biodiversity. $6,971. The Nature Conservancy, Washington, Office of Conservation Science.

Selected Publications

Inman, F.M., T.R. Wentworth, **M.J. Groom**, C. Brownie, and R. Lea. 2007. Using artificial canopy gaps to restore avian habitat in tropical timber plantations. *Forest Ecology and Management* 243:169-177.

Gold, W., K. Ewing, J. Banks, **M. Groom**, T. Hinckley, D. Secord, and D. Shebitz. 2006. Collaborative Ecological Restoration. *Science* 312:1880-1881.

Gleffe, J.D., J.A. Collazo, **M.J. Groom**, and L. Miranda-Castro. 2006. Avian reproduction and the conservation value of shaded coffee plantations. *Neotropical Ornithology* 17:271-282.

Groom, M.J., Meffe, G.K. and R.C. Carroll, and contributing authors. 2005. *Principles of Conservation Biology, 3rd Edition*. Sinauer Associates: Sunderland, MA. 793 pages.

Borkhataria, R., J.A. Collazo and **M.J. Groom**. 2006. Additive effects of vertebrate predators on insects in a Puerto Rican coffee plantation. *Ecological Applications* 16 (2): 696-703.

Carlo-Juglar, T.A., J.A. Collazo, and **M.J. Groom**. 2003. Avian fruit preferences across a Puerto Rican forested landscape: pattern consistency and implications for seed removal. *Oecologia* 134:119–131.

Groom, M.J. 2001. Consequences of subpopulation isolation for pollination, herbivory, and population growth in *Clarkia concinna concinna* (Onagraceae). *Biological Conservation* 100 (1): 55-63.

Watchman, L.H., **M. Groom**, and J.D. Perrine. 2001. Science and uncertainty in habitat conservation planning. *American Scientist* 89(4): 351-359.

Groom, M.J. and T.E. Preuninger. 2000. Inbreeding depression is not diminished in isolated subpopulations of *Clarkia concinna concinna* (Onagraceae). *Evolutionary Ecology* 14 (3): 155-180.

Groom, M.J. 1998. Allee effects limit population viability of an annual plant. *American Naturalist* 151:487-496.

Groom, M.J. and N. Schumaker. 1993. Evaluating landscape change: the dimensions of deforestation and habitat fragmentation. Pp 24-44 in *Biotic Interactions and Global Change*, (P. Kareiva, J. Kingsolver, and R. Huey, eds.). Sinauer, Sunderland, MA.

Groom, M.J. 1992. Sand-colored nighthawks parasitize the anti-predator behavior of three bird species. *Ecology* 73: 785-793.

Collaborators & Other Affiliations

Collaborators and Co-editors:

John Banks (University of Washington, Tacoma)
C. Ron Carroll (University of Georgia)
Jaime Collazo (North Carolina State University)
Kern Ewing (University of Washington)
Warren Gold (University of Washington, Bothell)
Elizabeth Gray (The Nature Conservancy)
George Hess (North Carolina State University)
Tom Hinckley (University of Washington)
Margaret Kinnaird (Wildlife Conservation Society)
Gary Meffe (Society for Conservation Biology)
Jim Miller (Iowa State University)
Kent Redford (Wildlife Conservation Society)
Toddi Steelman (North Carolina State University)
David Secord (Wilburforce Foundation)
David Stokes (University of Washington, Bothell)
Janette Thompson (Iowa State University)

Graduate Advisors:

Peter Kareiva -- University of Washington
Douglas Schemske -- University of Washington
Bob Paine -- University of Washington
Dee Boersma -- University of Washington
Peter Feinsinger -- University of Florida
John Robinson -- University of Florida
Jane Brockman -- University of Florida

Former Graduate Students (present position):

Roxana Aragon (University of Buenos Aires)
Tomas Carlo (Penn State University)
Melissa Davis (NC Dept of Natural Resources)
Juan Manuel Morales (Cambridge University)
Todd Preuninger (Environmental Consultant)
Wendy Fisher (Whatcom County Planner)
Faith Inman (Hawaii Dept. of Natural Resources)
James Saracco (Scientist, US Fish and Wildlife Service)

Marc J. Hershman

Professor, School of Marine Affairs
Adjunct Professor, UW School of Law
hershmj@u.washington.edu

Education

- A.B., 1964, and J.D., 1967, Temple University
- Graduate study, 1970, University of Miami School of Law

Specialties

- Law of the coastal zone and marine environment
- Legislative, administrative, and socioeconomic aspects of uses of coasts and their resources
- Coastal planning and management
- Port development
- Exclusive economic zone use and governance
- Administrative law

Background

Associate Professor, School of Marine Affairs, and **Adjunct Associate Professor**, UW School of Law, 1976-81
Associate Professor of Law and Marine Studies, Law School, Louisiana State University, 1974-76
Coordinator, Sea Grant Law and Socioeconomics Program, Louisiana State University, 1974-75
Assistant Professor of Law and Marine Studies, Law School, Louisiana State University, 1974-75
Executive Director, Louisiana Advisory Commission on Marine and Coastal Resources, 1972-74
Research Associate, Louisiana State University, 1970-74

Mr. Hershman, who was director of the University of Washington School of Marine Affairs from 1993 to 2003, brings considerable experience to the School. Recognized internationally for his expertise in coastal zone management, he has been a leader in the study of ocean and coastal policy for 30 years:

- In the early 1970s, Mr. Hershman served as Executive Director of the Louisiana Advisory Commission on Coastal and Marine Resources, a study commission concerned with the best use and management of the extensive coastal wetlands and marine waters of the state.
- In 1972, he founded *Coastal Management Journal*, one of the premier academic publications on coastal zone management; he continues to serve as Editor-in-Chief.
- In the 1970s and 1980s, his work on coastal management program development, offshore oil development decisions, water quality in coastal management programs, waterfront revitalization, siting of LNG facilities, wetlands protection, waterfront awareness, and other topics resulted in published books, monographs and many articles and papers.
- In 1988, he edited *Urban Ports and Harbor Management: Responding to Change Along U.S. Waterfronts*, a major text on ports and their emerging role as providers of public goods, including redeveloped waterfronts and an improved environment.
- In the past decade, his leadership on a three-year evaluation of the US Coastal Zone Management Program has led directly to proposals for reform that are now under consideration by Congress.

A Leader in the Pacific Northwest

In the Pacific Northwest, Mr. Hershman has generated a legacy of forward-thinking initiatives to broaden public understanding of, and appreciation for, maritime industry.

- He founded and chaired the Safe Marine Transportation (SMarT) Forum, which brought together a broad cross-section of stakeholders to develop strategies for avoiding marine casualties and spills in Puget Sound.
- He founded and served as Board Member of "Odyssey: The Maritime Discovery Center", a unique and interactive museum on contemporary uses of the sea, and now a catalyst for Seattle's waterfront revival.
- In 1998, he was the recipient of the Puget Sound Maritime Achievement Award, honoring his major contributions to the region's maritime field.

A Leader in the Field

Mr. Hershman has also served as:

- Commissioner on the US Commission on Ocean policy (2001 - 2004), one of 16 national experts appointed by President Bush to recommend changes and reforms to US ocean policy, regulation and research.
- President of The Coastal Society, an organization of private-sector, academic, and government professionals dedicated to addressing emerging coastal issues;
- Co-Founder of the Marine Affairs and Policy Association, promoting education and research in the marine policy field; and
- Active member of the Ocean Governance Study Group, an alliance of marine policy leaders at academic institutions across the United States.

In addition, he has received Distinguished Service Awards from The Coastal Society in 2002 and 2004.

Presidential Appointment

On June 15, 2001, President George W. Bush named Marc J. Hershman to serve on the U.S. Commission on Ocean Policy, on the recommendation of U.S. House Minority Leader Richard A. Gephardt. The Commission was charged with performing a study to recommend broad policies for how the U.S. addresses its coastal and ocean areas.

GRETCHEN E. HUND
Senior Staff Scientist
Pacific Northwest National Laboratory

EDUCATION

1984 M.S., Political Science (Science, Technology and Public Policy). Massachusetts Institute of Technology, Cambridge, Massachusetts.
1979 B.A., Geology. Middlebury College, Middlebury, Vermont

SELECTED EXPERIENCE

2002 - Present **Senior Staff Scientist, Global Security and Technology Policy**
Pacific Northwest National Laboratory, Seattle, Washington

1990 - 2002 **Research Leader, Environmental Policy and Management**
Battelle Seattle Research Center, Seattle, Washington

1987-90 **Project Director, U.S. Congress, Office of Technology Assessment, Oceans and Environment Program, Washington, D.C.**

1985-86 **Analyst, U.S. Congress, Office of Technology Assessment, Oceans and Environment Program, Washington, D.C.**

1984 **Analyst, U.S. Nuclear Regulatory Commission, Division of Waste Management, Washington, D.C.**

1983-84 **Research Assistant, Massachusetts Institute of Technology, Cambridge, Massachusetts**

1982-83 **Research Assistant, Massachusetts Institute of Technology, Cambridge, Massachusetts**

1980-82 **Research Assistant, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts**

1980 **Geophysical Research Assistant, U.S. Geological Survey, Woods Hole, Massachusetts**

1979 **Teacher at Colorado Outdoor Education Center, Florissant, Colorado**

SELECTED PUBLICATIONS

Hund, Gretchen, Jill Engel-Cox, and Kim Fowler. 2004. *A Communications Guide for Sustainable Development: How Interested Parties Become Partners*. Battelle Press, Columbus, Ohio (ISBN 1-57477-140-X).

Hund, Gretchen. 2004, "Insights into the New ISO Environmental Communication Standard (ISO-14063)," in the Proceedings of the Air and Waste Management Association 97th Annual Conference and Exhibition held in Indianapolis, IN, June 21-25.

Hund, G., J. Engel-Cox, K. Fowler, H. Klee. October 2002, "Two-way Responsibility: The Role of Industry and its Stakeholders in Working Towards Sustainability," is a chapter in the book *Unfolding Stakeholder Thinking* affiliated with the *Journal of Corporate Citizenship,* Greenleaf Publishing Ltd.

Hund, G., Laverty, K., & Thomas, L. 2002. Commercializing Environmental Technologies: Experience from a Multi-disciplinary Course at the University of Washington. Paper presented at BELL Conference (Business Environment Learning Leadership), organized by World Resources Institute, Santa Barbara CA, July 18-20.

Hund, G., J. Engel-Cox, K. Fowler, S. Selby, and M. Haddon. March 2002. "World Business Council for Sustainable Development Toward a Sustainable Cement Industry -- Communications and Stakeholder Involvement in the Cement Industry", Battelle and ERM.

Hund, Gretchen and Marylynn Placet. 2001."Synthesized Themes from Round One Stakeholder Dialogues", developed under contract to the World Business Council for Sustainable Development as part of the project *Toward a Sustainable Cement Industry: A Blueprint for the Future*.

Hund, G., J. Engel-Cox, K. Fowler, T. Peterson, S. Selby, and M. Haddon. 2001. "Communication and Stakeholder Involvement Guidebook for Cement Facilities," Battelle and ERM, developed under contract to the World Business Council for Sustainable Development as part of the project *Toward a Sustainable Cement Industry: A Blueprint for the Future*.

Milchikov, A, M. Davidko, B. Poralo, G. Hund 1999. "A Radiological Survey Approach to Use Prior to Decommissioning: Results from a Technology Scanning and Assessment Project focused on the Chornobyl NPP," in process of clearance by the Pacific Northwest National Laboratory for the U.S. Department of Energy, March 1999.

Riggs, K.B., T.J. Kelly,G. E. Hund, R. Fuerst. 1998. "Verification of Advanced Air Monitoring Systems," Air and Waste Management Association, Annual Meeting.

Hund, G.E. "Stakeholder Involvement – Free Consulting that Results in Enduring Decisions," prepared for the 1st International Conference on Remediation of Chlorinated and Recalcitrant Compounds, May 1998.

Kirwan-Taylor, H., G.H. McCabe, A. Lesperance, J. Kauffman, P. Serie, L. Dressen. 1996. "Enhancing Technology Acceptance: The Role of the Subsurface Contaminants Focus Area External Integration Team<" prepared for the U.S. Department of Energy under Contract DE-AC06-76RLO 1830, PNNL 11334/UC-602, BSRC-800/96/013, September 1996.

McCabe, G.H. and P.J. Serie. "Expediting Environmental Cleanup – Nationwide Stakeholder Involvement in DOE's Plume Focus Area," National Association of Environmental

Professioinals 20th Annual Conference and Exposition "Environmental Challenges: The Next Twenty Years." June 1995.

McCabe, G. Hund. 1995. *Mitigation Options for Radioactive Material Dumped at Sea in the Russian Arctic Region*. Prepared for the Congressional Office of Technology Assessment, June 1995.

McCabe, G. Hund, and K.F. Wellman. 1994. *Regional Approaches to Address Coastal Erosion Control Issues: Coastal Erosion Management Studies*. Prepared for CH2M Hill in support of a Coastal Erosion Management Study for the Washington Department of Ecology. BSRC-80/94/011, Battelle Seattle Research Center, April 1994.

McCabe, G.H., B. Brockbank, S. Stein. 1994. "Regional Stakeholder Involvement to Enhance Technology Acceptance," Draft *DOIT Project Demonstration Resource Manual*," Western Governors' Association, Federal Advisory Committee to develop On-Site Innovative Technologies. March 1994.

McCabe, G. Hund, and K.F. Wellman. 1993. *Policy alternatives for Coastal Erosion Management*. Prepared for CH2M Hill in support of a Coastal Erosion Management Study for the Washington Department of Ecology. PNL-8548/BHARC-800/93/04, Battelle Seattle Research Center, July 1993.

McCabe, G. Hund. 1993. "Radioactive Waste: A View from Abroad." *Forum for Applied Research and Public Policy*, University of Tennessee Energy, Environment, and Resources Center and Oak Ridge National Laboratory, Knoxville, TN, Spring 1993).

McCabe, G. Hund, C. Orians, C. Cluett, K. Branch, and N. Johnson. 1991. "Conceptual Framework Used in Preparing: *Driving Variables that Impact Environmental Quality: Final Set of Deliverables*," in support of U.S. Environmental Protection Agency Environmental Forecasting Project, Battelle HARC: Seattle, WA, November 1991.

PROFESSIONAL AFFILIATIONS

Pacific Science Center, Vice President of the Board of Directors and Chair of the Nominating and Governance Committee

Washington Foundation for the Environment, on the Board of Trustees

KEVIN J. LAVERTY

University of Washington Bothell, Business Administration Program
Box 358533, Bothell WA 98011
Phone: (425) 352-5338 Fax: (425) 352-5338
Email: laverty@u.washington.edu

PROFESSIONAL PREPARATION

Massachusetts Institute of Technology	Architecture	S.B.	1972
University of Iowa	Urban and Regional Planning	M.A.	1977
University of Wisconsin, Eau Claire	Business Administration	M.B.A.	1984
University of California, Los Angeles	Policy and Strategy	Ph.D.	1993

APPOINTMENTS

1994-present	Assistant/Associate Professor, Business Administration Program, University of Washington, Bothell
1993-1994	Visiting Lecturer, Graduate School of Management, University of California, Irvine
1985-1987	Lecturer, School of Business, University of Wisconsin, Eau Claire
1980-1985	Principal Planner, City of Eau Claire, Wisconsin

SELECTED PUBLICATIONS

Coff, R.W., and K.J. Laverty. 2007. Real Options Meet Organizational Theory: Coping with Path Dependencies, Agency Costs, and Organizational Form. *Advances in Strategic Management*, Volume 24: *Real Options Theory*. Jeffrey J. Reuer and Tony W. Tong, eds. 333-361.

Laverty, K.J. 2004. Managerial Myopia or Systemic Short-termism? The Importance of Managerial Systems in Valuing the Long Term. *Management Decision*, 42, (8): 949-962.

Laverty, K.J. 2001. Market Share, Profits, and Business Strategy. *Management Decision*. 39(8): 607-617.

Coff, R.W., and K.J. Laverty. 2001. Roadblocks to Competitive Advantage: How Institutional Constraints and Decision Biases Hinder Investments in Strategic Assets. *Journal of High Technology Management Research*. 12(1) 1-24.

Coff, R.W., and K.J. Laverty. 2001. Real Options on Knowledge Assets: Panacea or Pandora's Box? *Business Horizons*. 44(6): 73-79.

Laverty, K.J. 1996. Economic "short-termism": The debate, the unresolved issues, and the implications for management practice and research. *Academy of Management Review*. 21(3):825-860.

SYNERGISTIC ACTIVITIES

Dr. Laverty is Associate Professor at the University of Washington Bothell's Business Administration Program. He was the Faculty Director of the University of Washington's Environmental Management (EM) Graduate Certificate Program from January 2004 until June 2006 and is the Principal Investigator for "University of Washington Environmental Management Program Keystone Projects." His current work on business strategy and environmental sustainability builds on both his seven years of experience in local government planning and his study of problems involving long time horizons, intangible assets, and social dilemmas. His articles on "short-termism" and real options have been cited in leading journals in management, psychology, accounting, economics, and law. In 1999, he received the University of Washington's highest teaching honor, the Distinguished Teaching Award.

Graduate and Postdoctoral Advisors:

Richard Rumelt University of California, Los Angeles
José de la Torre Florida International University
Marvin Lieberman University of California, Los Angeles
Melvin Pollner University of California, Los Angeles
William Ouchi University of California, Los Angeles
Lynne Zucker University of California, Los Angeles

Tom M. Leschine
Director, School of Marine Affairs
Professor, School of Marine Affairs
Adjunct Professor, School of Aquatic and Fishery Sciences
tml@u.washington.edu

Education
B.S., 1967, M.A., 1970, and Ph.D., 1975, University of Pittsburgh

Specialties
- Quantitative methods applied to resource management and environmental impact assessment
- Marine pollution management
  - Ocean policy studies

Additional Background
- Management analyst, U.S. Coast Guard, 1991-92
- Research Associate Professor, School of Marine Affairs, 1983-87
- Appointed to the Graduate Faculty, University of Washington, 1984
- Scientific Visitor, Environmental and Societal Impacts Group, National Center for Atmospheric Research, 1983
- Policy Associate, Marine Policy Center, 1978-83
- Research Fellow in Marine Policy, Woods Hole Oceanographic Institute, 1976-78
- Assistant Professor of Mathematics, University of Pittsburgh at Greensburg (Associate Professor with tenure, 1976), 1970-76

Julia K. Parrish

Associate Professor/Associate Director, Aquatic & Fishery Sciences
Director, Program on the Environment
jparrish@u.washington.edu, 206-221-5787

Education

B.S. 1982 Biochemistry/Biophysics from the Biology Department, Carnegie-Mellon University
Ph.D. 1988 Zoology Department, Duke University Dissertation Title: Costs and Benefits of Schooling in Fish , Major Professor: Peter Klopfer

Employment

2000-ongoing: Assistant Professor – School of Aquatic and Fishery Sciences, and Zoology Department, University of Washington
1995-1999: Research Assistant Professor - Zoology Department, University of Washington
1991-94: Research Associate - Institute for Environmental Studies, University of Washington
1990-91: Postdoctoral Fellow - Fisheries Research Institute, College of Ocean & Fisheries Science, University of Washington
1989: Postdoctoral Scholar - Biology Department, UCLA, in the laboratory of William Hamner

Honors, Awards, and Service

Prizes

2000: CASE Circle of Excellence Silver Metal (one of 2 nationally) for abcnews.com 8 part written series on common murres on Tatoosh Island.
1998: NOAA Year-of-the-Ocean Environmental Hero (one of 25 nationally) for development of COASST (Coastal Observation and Seabird Survey Team), a citizen science program which teaches volunteers to identify and record information about beached bird carcasses on Washington beaches, collates and analyzes those data, and provides baseline and trend information to management agencies, conservation organizations, and the public.

Fellowships

1990-91: College of Ocean & Fisheries Science Postdoctoral Fellowship
1988: Raney Award, American Society of Ichthyologists and Herpetologists
1985-88: International Women's Fishing Association Fellowship
1985-87: Bermuda Biological Station Summer Research Fellowship (1985-6)
Bermuda Biological Station Graduate Internship (1987)
1986: Bradley Graduate Fellowship, Duke University Marine Laboratory

Honors

2001: Elective Member of the American Ornithologist's Union

Professional Society Committee Service

Pacific Seabird Group, Chair (2000)
Pacific Seabird Group, Executive Council (1999-2001)
U.S. GLOBEC (Global Oceans Ecosystems Dynamics) Scientific Steering Committee (2000-)

Government Service

Olympic Coast National Marine Sanctuary, chair of Research Advisory Panel (1996-1998)
Seattle Public Utilities, Water System Advisory Committee (1998-1999)
Scientific Advisor for Laurent Dagorn, Tuna Behavior Project, Tahiti Station, IRD (French international development agency)

Community Service
Center for Environmental Law and Policy, Board Member (1996-1999)
Executive Director of COASST (Coastal Observation and Seabird Survey Team), a citizen science project to collect baseline data on seabird beachings in the Pacific Northwest. As of 2002, COASST administers approximately 120 volunteers, 3 staff, and 6 student interns.
Scientific Advisor to Earth & Sky (science-oriented Public Radio Program; 1998-)
Research Advisor to Seattle Audubon Society (2001-2002)
Research Advisor to Seattle Aquarium (2002-)
Research Advisor to The Menzies Project (2002-)

Advising and Teaching

PostDoctoral Fellows and Research Scientists
Todd Hass, Zoology Department, Coastal Observation and Seabird Survey Team (COASST)
Steven Viscido, Zoology Department, Co-advise with Daniel Grunbaum.
Michelle Wainstein, School of Aquatic and Fishery Science, Seabird Conservation
Francis Wiese, School of Aquatic and Fishery Science, Seabird Conservation

Graduate Students
Kim Dietrich, School of Aquatic and Fishery Science, M.S.
Nathalie Hamel, School of Aquatic and Fishery Science, ongoing. M.S.
Christina Maranto, Ph.D.
Joanna Smith, School of Aquatic and Fishery Science, Ph.D.
Suzann Speckman, Ph.D.
Stephani Zador, Ph.D.

Selected Publications

Refereed Journal and Book Articles
Parrish, JK, *Wiese, FK, & *Smith, JL. Dams as avian predator attractors and the efficacy of predator control strategies. Biological Conservation *accepted with revision*
Parrish, JK & *Viscido, S. Traffic rules of fish schools: A review of agent-based approaches. in: CK Hemelrijk (ed.) Self-Organization and Complexity, Cambridge University Press *in press*
Hilborn, R, **Parrish, JK**, Litle, K. 2005. Fishing Rights or Fishing Wrongs? Rev. Fish Biol. Fish. 15:191-198.
Parrish, JK, Viscido, SV & Grünbaum, D 2002 Self-organized fish schools: An Examination of emergent properties. Biol. Bull. (*in press*)
Parrish, JK 2001. Behavioral Approaches to Marine Conservation. In: Marine Conservation. E. Norse & L. Crowder (ed.) Island Press, Covelo, CA (*in press*)
Parrish, JK, Marvier, M. & Paine, RT 2001 Direct and Indirect Effects: Interactions between Bald Eagles and Common Murres. Ecol. Appl. 11:1858-1869.
Parrish, JK & Edelstein-Keshet, L 1999 Complexity, pattern, and evolutionary trade-offs in animal aggregation. Science 284:99-101. (*invited article as part of a special section on complexity*)
Parrish, JK 1999. Using behavior and ecology to exploit schooling fishes. In: *Behavior and Fish Conservation: Case Studies and Applications*. G. S. Helfman (ed.) special edition of Envir. Biol. Fish. 55:157-181.
Parrish, JK, Lemberg, N, & South-Oryshchyn, L 1998. Effects of colony location and nekton abundance on at-sea distribution of four seabird species. Fisheries Oceanography 7(1):126-135.
Boersma, PD & **Parrish, JK** 1998. Flexible growth rates in Fork-tailed Storm-petrels: A response to environmental variability. Auk. 115:67-75.
Parrish, JK, & Turchin, P 1997. Individual decisions, traffic rules, and emergent pattern in schooling fish. In: *Animal Groups in Three Dimensions*. **Parrish, JK**, & Hamner, WH (eds.) Cambridge University Press, New York. pp:126-142.
Parrish, JK & Paine, RT 1996. Ecological interactions and habitat modification in nesting Common Murres, *Uria aalge*. Bird Conservation International 6:261-269

Parrish, JK & Boersma, PD 1995. Muddy waters: Seabird mortality following the *Exxon Valdez* oil spill. American Scientist 83:112-115.
Parrish, JK 1995. Influence of group size and habitat type on reproductive success in Common Murres (*Uria aalge*). Auk 112:390-401.
Brandt, CA, **Parrish, JK**, & Hodges, CN 1995. Predictive approaches to habitat quantification: Dark-rumped Petrels on Haleakala, Maui. Auk. 112:571-579.
Parrish, JK 1993. Comparison of the hunting behavior of four piscine predators attacking schooling prey. Ethology. 95(3):233-246.
Parrish, JK 1992b. Do predators 'shape' fish schools: Interactions between predators and their schooling prey. Nether. J. Zool. 42(2-3): 358-370. (*invited as part of a symposium proceedings*)
Parrish, JK 1992a. Levels of diurnal predation on a school of flat-iron herring, *Harengula thrissina*. Env. Biol. Fish. 34:257-263.
Ruben JR & **Parrish, JK** 1990. Antiquity of the chordate pattern of exercise metabolism. Paleobiology 16:355-359.
Parrish, JK 1989. Re-examining the Selfish Herd: Are central fish safer? Anim. Behav. 38:1048-1053.
Parrish, JK 1989. Layering with depth in a heterospecific fish aggregation. Env. Biol. Fish. 26:79-85.
Parrish, JK, Strand, SW & Lott JL 1989. Predation on a school of flat-iron herring, *Harengula thrissina*. Copeia 1989:1089-1091.
Parrish, JK & Kroen, WK 1988. Sloughed mucus and drag-reduction in a school of Atlantic silversides, *Menidia menidia*. Mar. Biol. 97:165-169.

NANCY ROTTLE

Assistant Professor, Department of Landscape Architecture
Adjunct Assistant Professor, Department of Architecture
Box 355734
University of Washington
Seattle, WA 98195-5734
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206.543.7897 (Voice)
206.685.4486 (Fax)

EDUCATION

Master of Landscape Architecture, University of Oregon, Eugene, Oregon. Award of Excellence.
Bachelor of Landscape Architecture, University of Oregon, Eugene, Oregon. Award of Excellence.
Montessori Certification, St. Nicholas Training Centre, Federal Way, Washington; London, England.
Bachelor of Arts in Education, cum laude, Fairhaven College, Western Washington University, Bellingham, Washington. Majors: Concentration in Educational Psychology; French. Minor: Education.

ACADEMIC POSITIONS

2001- 2006 **istant Professor**: Department of Landscape Architecture, University of Washington
Summer 2001 **Visiting Instructor**: Harvard Graduate School of Design
"Sustainable and Ecological Design, Green Urban Infrastructure, and Regionalism"
Summer 2000 **Visiting Instructor**: Harvard Graduate School of Design
"Sustainable and Ecological Design, Green Urban Infrastructure, and Regionalism"
Summer 1999 **Visiting Instructor**: Harvard Graduate School of Design
"Sustainable and Ecological Design, Green Urban Infrastructure, and BioRegionalism"
Summer 1998 **Visiting Instructor**: Harvard Graduate School of Design
"Sustainable Landscape Architecture, Ecological Design, and Green Urban Infrastructure"
Summer 1997 **Visiting Instructor**: Harvard Graduate School of Design
"Sustainable Landscape Architecture and Ecotourism."
1988 - 1987 **Instructor**: University of Oregon, Department of Landscape Architecture, Design Studios
1986 - 1983 **Graduate Teaching Fellow**: University of Oregon, Department of Landscape Architecture, Plants and Planting Design Courses, 9 Terms
1986 - 1980 **Primary Teacher**, Barwell, Leicestershire, England
1974 - 1981 **Primary Teacher**, Montessori Program, Lake Wilderness Elementary School

Professional Practice

1990 - 2001 **Senior Associate, Associate**: Jones & Jones, Architects and Landscape Architects, Seattle, Washington
1990 - 1989 **Landscape Architect**: Richard Haag Associates,Seattle, Washington
1988 **Landscape Architect**: Ron Lovinger and Associates, Eugene, Oregon
1988 - 1986 **Principal**: Landscape Designer, Nancy Rottle Landscape Design, Eugene, Oregon
1984 **Landscape Architect Intern**: U.S. Forest Service, Oregon Dunes Recreation Area, Reedsport, Oregon

Peer Reviewed Papers

2006 Rottle, Nancy, "Collaborative Visioning for the New Normal: Designing Seattle's Open Space for the Next Century," abstract accepted, paper submitted for CELA 2006 (blind peer reviewed).
2005 Rottle, Nancy, "Factors in the Landscape-based Greenway: A Mountains to Sound Case Study," in *Landscape and Urban Planning,* Fabos and Ryan, Eds., Elsevier. (blind peer reviewed)
2005 Rottle, Nancy, "Universal and the Local: Practising the Scholarship of Engagement," in *Landscape Review*, Canterbury, N.Z. (blind peer reviewed)
2005 Rottle, Nancy, "Expressing Place-Perceiving Place: A Narrative Landscape Design

Evaluation," abstract and paper in Conference Proceedings of the Council of Educators in Landscape Architecture, September 2005, Athens, Georgia. (blind peer-reviewed)

2004 Rottle, Nancy, Rene Senos and Jim Sipes, "Widening the Net: Innovative Strategies for Cultural Landscape Preservation," in *Proceedings for American Society of Landscape Architects Conference*, Salt Lake City, Utah. (peer reviewed).

2004 Rottle, Nancy, "A Continuum and Process Framework for Rural Historic Landscape Preservation: Revisiting Ebey's Landing National Historical Reserve," paper in *Proceedings for the Fourth National Symposium in Historic Preservation*, Goucher College, Delaware. (blind peer reviewed)

2003 Rottle, Nancy, "Urban Foodshed Sites and Systems: Growing the Community Table", *Arcade Architecture / Design in the Pacific Northwest*, June 2003. (peer reviewed)

Book Chapters

2005 Rottle, Nancy, "A Continuum and Process Framework for Rural Historic Landscape Preservation: Revisiting Ebey's Landing National Historical Reserve," book chapter in *A Critical Look at Cultural Landscapes and Historic Preservation*, forthcoming. (peer reviewed)

2005 Rottle, Nancy, "Message in the Medium: Watershed Awareness through Design of a Watershed Education Center," book chapter in *Facilitating Watershed Management: Practical Approaches and Case Studies,* Robert France, ed., Lanham, MD: Rowman and Littlefield, 2005. (invited).

2005 Rottle, Nancy, "Engaging Changing Communities in the Community Design Studio", in *(Re)Constructing Communities: Design Participation in the Face of Change,* Jeffrey Hou, Mark Francis and Nathan Brightbill, Eds. Center for Design Research, University of California, Davis.

Editor Reviewed Publications

2006 Rottle, Nancy and Brice Maryman, "Open Space Seattle 2100: Designing Seattle's Green Network for the 21st Century," in *Landscape Architecture Magazine* (forthcoming)

2006 Rottle, Nancy and Julie Johnson," Youth Design Participation to Support Ecological Literacy: Reflections on Charrettes for an Outdoor Learning Laboratory, " to be published June 2006 in the journal *Children, Youth and Environments.*

2006 Rottle, Nancy and Anna O'Connell, "A Site Rating System for Sustainable Landscapes," in *The Public Garden,* American Association of Botanical Gardens and Arboreta.

2002 U. S. Green Building Council, Cascadia Chapter, "Cedar River Watershed Education Center", co-authored project Case Study with Paul Olson.

2000 Rottle, Nancy, "Water Comes to Life at the Cedar River Watershed Education Center," *Daily Journal of Commerce,* April 20, 2000.

1988 Helphand, Kenneth I. and Nancy Rottle, "Cultivating Charm; The Northwest's First Female Landscape Architecture Firm at Deepwood Gardens." *Garden Design*, Autumn 1988.

Self-Published (World Wide Web)

2006 Rottle, Nancy and Brice Maryman. Eds. *Green Futures Toolkit,* Collection of open space research papers and case studies; at www.open2100.org

2006 Open Space Seattle 2100 Website Text; at www.open2100.org

AWARDS, EXHIBITS & PUBLISHED DESIGN WORK

Awards

2005 Dean's Award for Faculty Development, College of Architecture and Urban Planning, University of Washington.

2004 National Merit Award for Design, American Society of Landscape Architects, "Cedar River Watershed Education Center."

2004 Varey Faculty Award, College of Architecture and Urban Planning, University of Washington

2003 Honor Award for Design; Peoples' Choice Award; American Society of Landscape Architects, Washington Chapter, "Cedar River Watershed Education Center."

2003 Award of Merit for Historic Preservation Plan, American Planning Association/Planning Association of Washington, "Continuity and Change: A Study of Landscape Change,

Cultural Landscape Integrity and Preservation Strategies for Ebey's Landing National Historical Reserve."

2003 National Scenic Solutions Award, from Scenic America, for "Farmland Analysis, Case Studies and Preservation Recommendations at Ebey's Landing National Historical Reserve."

2003 Scenic Solutions: Designs and Methods for America the Beautiful. Scenic Solutions Case Study: "Ebey's Landing National Historical Reserve." Scenic America and the USDA Natural Resources Conservation Service.

2002 AIA Committee on the Environment, Project selected for Top Ten "What Makes It Green" Case Study: "Cedar River Watershed Education Center."

2002 Cascadia Chapter US Green Building Council, Project selected as premier local project by EnvironDesign 6 Host Committee for EnvironDesign Conference: "Cedar River Watershed Education Center."

2000 ASLA Merit Award in Communication, for TimePlaces Heritage Tour, Mountains to Sound Greenway, Washington.

1983 "Nature, City, Future", IFLA First Place Student Design Competition, narrative and group design work published in *Garten und Landschaft*.

Published Design Work

2005 "Cedar River Watershed Education Center," in Miller, Dave, *Toward a New Regionalism; Environmental Architecture in the Pacific Northwest,* Seattle: University of Washington Press.

2004 Cedar River Watershed Education Center, Case Study in Strom, Nathan and Woland, *Site Engineering for Landscape Architects*, 2004, Hoboken: Wiley and Sons.

Exhibits Curated

2006 Open Space Seattle 2100: Designing Seattle's Green Network for the Next Century, at Seattle City Hall, and at University of Washington Odegaard Library

2002 Design Work of Richard Haag, College of Architecture and Urban Planning, University of Washington

Awards for Studio Projects

2006 National APA Student Award, Applied Project Category, for Studio Project, "Pioneering Palmer's Future: Strategies for Managing Growth."

2005 Washington ASLA Student Honor Award, for Studio Project, "Pioneering Palmer's Future: Strategies for Managing Growth."

2005 College of Architecture and Urban Planning Award for Class Project, "Pioneering Palmer's Future: Strategies for Managing Growth"

2005 Washington ASLA Student Merit Award for Studio Project, "Town and Country: Envisioning Burlington, Saving Skagit Farmland."

2004 American Planning Association/Planning Association of Washington, Merit Award for Class Studio Project, "Town and Country: Envisioning Burlington, Saving Skagit Farmland."

2003 Planning Association/Planning Association of Washington, Honor Award for Class Studio Project, American "Alternative Futures for Homer, Alaska."

1984 IFLA International Student Competition, First Place for Team Project, Munich, Germany.

CLARE M. RYAN

University of Washington, College of Forest Resources, Box 352100, Seattle, WA 98195
Phone: (206) 616-3987 Fax: (206) 685-0790 Email: cmryan@u.washington.edu

PROFESSIONAL PREPARATION

Western Washington University.	Environmental Science.	B.S. 1983.
University of Michigan.	Natural Resource Policy and Administration.	M.S. 1990.
University of Michigan.	Natural Resource and Environmental Policy.	Ph.D. 1996.

APPOINTMENTS

1997-present:	Assistant/Associate Professor, College of Forest Resources, University of Washington
2004-2005:	Visiting Scholar, USDA Forest Service, PNW Research Station. Seattle, WA.
1988-1996:	Lecturer/Teaching Assistant, School of Natural Resources, University of Michigan
1990-1993:	Environmental Scientist, US EPA, National Vehicle and Fuel Emissions Lab
1986-1988:	Water Quality Specialist, US EPA Region 10, Water Division
1983-1986:	Community Relations/Solid Waste Specialist, Washington Dept. of Ecology

SELECTED PUBLICATIONS

Ryan, C.M., and R.D. Bidwell. 2008. (forthcoming). Watershed Partnerships as New Governance Strategies: Community-Based and Intergovernmental Approaches. *International Journal of Public Administration*.

Bidwell, R.D., and C.M. Ryan. 2006. Collaborative Partnership Design: The Implications of Organizational Affiliation for Watershed Partnerships. *Society and Natural Resources*. 19(9) 827-842.

Ryan, C. M., and J. Klug. 2005. Collaborative Watershed Planning in Washington State: Implementing the Watershed Planning Act. *Journal of Environmental Planning and Management*. 48(4) 491-506.

Alberti, M., J.M. Marzluff, E. Shulenberger, G.A. Bradley, C. M. Ryan, C. Zumbrunnen. 2003. Integrating Humans into Ecology: Opportunities and Challenges for Urban Ecology. *Bioscience* 53(12):1169-1179.

Stankey, G. H., B.T. Bormann, C.M. Ryan, B. Shindler, V. Sturtevant, R.N. Clark, C. Philpot. 2003. Adaptive Management and the Northwest Forest Plan: Rhetoric and Reality. *Journal of Forestry*. 101(1): 40-46.

Ryan, Clare M., and S.M. Jensen. 2002. Scientific, Institutional, and Individual Constraints on Restoring Puget Sound Rivers. In: *Restoration of Puget Sound Rivers*. D.R. Montgomery, S.M. Bolton, D. B. Booth, and L. Wall, eds. University of Washington Press.

Bash, Jeffrey S. and Clare M. Ryan. 2002. Stream Restoration and Enhancement Projects: Is Anyone Monitoring? *Environmental Management*. 29(6):877-885.

Ryan, Clare M. 2001. Leadership in Collaborative Policy Making: An Analysis of Agency Roles in Regulatory Negotiations. *Policy Sciences*. 34:221-245.

Ryan, Clare M. 2000. Getting to the Table: Incentives for Participation in Regulatory Negotiations. *Environmental Practice*. 2(2):147-155.

Wondolleck, J.M., and C.M. Ryan. 1999. What Hat Do I Wear Now? An Examination of Agency Roles in Collaborative Processes. *Negotiation Journal*. 15(2):117-133.

SYNERGISTIC ACTIVITIES

Dr. Ryan is Associate Professor at the University of Washington's College of Forest Resources, and has adjunct faculty appointments at both the Daniel J. Evans School of Public Affairs and the School of Marine Affairs. Currently, she is the Faculty Director of the University of Washington's Environmental Management (EM) Graduate Certificate Program. The EM program brings together graduate students from across the University to take core courses in science, business and policy, and work on interdisciplinary project teams for outside partner clients. Dr. Ryan has expertise in natural resource policy design and implementation, collaborative decision-making, and has worked as a scientist and manager for more than 7 years in state and federal natural resource management agencies. She offers more than 10 years of professional experience in qualitative and quantitative research design within federal natural resource management agencies and universities. Recently, Dr. Ryan completed research

projects and publications examining the implementation of adaptive management on federal forestlands; learning methods and motivations for land management actions in nonpoint source pollution; and institutional analysis of collaborative watershed planning and restoration groups.

COLLABORATORS & OTHER AFFILIATIONS

Collaborators and Co-editors:
Marina Alberti (University of Washington)
Jeffrey Bash (Washington Department of Ecology)
Ryan Bidwell (Colorado Wild)
Bernard Boermann (USDA Forest Service)
Susan Bolton (University of Washington)
Derek Booth (University of Washington)
Gordon Bradley (University of Washington)
Lee Cerveny (USDA Forest Service)
Roger Clark (USDA Forest Service)
Jacqueline Klug (Washington Department of Ecology)
John Marzluff (University of Washington)
David Montgomery (University of Washington)
George Stankey (Oregon State University)
Bruce Shindler (Oregon State University)
Eric Shulenberger (University of Washington)
Victoria Sturtevant (Southern Oregon University)
Craig Zumbrunnen (University of Washington)

Graduate and Postdoctoral Advisors:
James Crowfoot -- University of Michigan
Steven L. Yaffee -- University of Michigan
Rachel Kaplan -- University of Michigan
Barry G. Rabe -- University of Michigan
Julia M. Wondolleck -- University of Michigan

Thesis Advisor and Post-Graduate Scholar Sponsor:
Jeffrey Bash (Washington Department of Ecology)
Ryan Bidwell (Colorado Wild)
Stephen Buffington
Emil Cherrington (Belize Land Conservancy)
Miki Fujikawa
Anna Hohl
Jennifer Ise (US EPA)
Sara M. Jensen (US Department of Housing and Urban Development)
Michael Jensen
Jacqueline Klug (Washington Department of Ecology)
Amber Kocsis (Tanana Chiefs, AK)
Sarah Murray
Peter Nelson (University of Washington Cooperative Ecosystem Studies Unit)
Brian Petersen (PhD student at UC Santa Cruz)
Kim Waldron (Microsoft)
Jay Watson (Executive Director, Hood Canal Coordinating Council)

CHARLES A. SIMENSTAD
Research Professor
Coordinator, WETLAND ECOSYSTEMS TEAM
School of Aquatic and Fisheries Science, College of Ocean and Fishery Sciences
University of Washington, Box 355020, Seattle, Washington 98195-5020
(206) 543-7185, -4650; FAX: (206) 685-7471
E-mail: *csimenstad@u.washington.edu*
URL: http://www.fish.washington.edu/people/simenstd/currvita.html

Education

M.S., 1971, Fisheries, University of Washington
B.S., 1969, Fisheries, University of Washington

Positions Held

Res. Professor, School Aquatic & Fishery Sciences, University of Washington, July 2006 - present
Res. Assoc. Prof., School Aquatic & Fishery Sciences, University of Washington, July 2001-July 2006
Coordinator, Wetland Ecosystem Team, August 1990-present
Fisheries Biologist II-Senior Fisheries Biologist, Fisheries Research Institute, University of Washington, November 1972 to July 2001;
Fisheries Biologist II, Fisheries Research Institute, University of Washington, 1971-1972.

Honors and Positions

2005-2007 Council Member, Estuarine Coastal Sciences Association
1998-2007 *Estuaries* Editorial Board; Associate Editor, Habitat Restoration and Wetlands
1994 Fellow, American Association for the Advancement of Science
1993 University of Washington, PSO Award for Excellence

Research Interests-Expertise

- Estuarine and nearshore marine ecosystem structure and dynamics, focusing on trophic interactions, especially those of detritus-based food webs; use of stable isotopes to trace trophic pathways
- Landscape ecology of coastal wetlands; influence of landscape structure on fish behavior and ecology
- Coastal wetland restoration ecology; planning and functional assessment of restored and rehabilitated wetlands
- Estuarine ecology and life history diversity of juvenile salmonids, and ecology of their epibenthic (crustacea) prey such as harpacticoid copepods and gammarid amphipods
- Coastal ecosystem management, with emphasis on watershed influences on estuarine processes
- Community ecology of nearshore marine fish assemblages of the North Pacific, especially related to structuring influence of predators

Scientific Societies *American Association for the Advancement of Science, Estuarine and Brackish Water Sciences Association, Estuarine Research Federation; International Association of Meiobenthologists; Man and Water Network; Pacific Estuarine Research Society; Sigma Xi; Society for Ecological Restoration; Society of Wetland Scientists; Western Society of Naturalists; World Association of Copepodologists*

Selected Recent Publications

Day, J. W., Jr., D. F. Boesch, E. J. Clairain, G. P. Kemp, S. Laska, W. J. Mitsch, K. Orth, H. Mashriqui, D. R. Reed, L. Shabman, C. A. Simenstad, B. J. Streever, and R. R. Twilley. 2007. Restoration of the Mississippi Delta: lessons learned from Hurricanes Katrina and Rita. *Science* 315: 1679-1684.

Toft, J., J. Cordell, L. Stamatiou and C. A. Simenstad. 2007. Fish distribution, abundance, and behavior along city shoreline types in Puget Sound. *N. Am. J. Fish. Mgmt.* **27**: 465–480.

Koehler, M. E., K. L. Fresh, D. A. Beauchamp, J. R. Cordell, C. A. Simenstad and D. Siler. 2006. Diet and bioenergetics of lake-rearing juvenile Chinook salmon in Lake Washington. *N. Am. J. Fish Mgmt.* 135: 1580-1591.

Visintainer, T. A., S. M. Bollens, and C. A. Simenstad. 2006. Community composition and diet of fishes as a function of tidal channel order: A field study in China Camp Marsh, San Francisco Estuary. *Mar. Ecol. Prog. Ser.* **321**: 227-243.

Van Cleve, F. B., T. Leschine, T. Klinger, and C. A. Simenstad. 2006. An evaluation of the influence of natural science in regional-scale restoration projects. *Environ. Mgmt.* **37**: 367-379.
Simenstad, C. A., D. Reed, and M. Ford. 2006. When is restoration not? Incorporating landscape-scale processes to restore self-sustaining ecosystems in coastal wetland restoration. *Ecol. Engineer.* **26**: 27-39.
Reisewitz, S. E., J. A. Estes, and C. A. Simenstad. 2006. Indirect food web interactions: sea otters and kelp forest fishes in the Aleutian archipelago. *Oecologia* **146**:623-631.
Boström, C., E. L. Jackson and C. A. Simenstad. 2006. Seagrass landscapes and their effects on associated fauna: A review**.** *Est. Coast. Shelf Sci.* **68**: 383-403.
Bottom, D. L., K. K. Jones, T. J. Cornwell, A. Gray, and C. A. Simenstad. 2005. Patterns of Chinook salmon migration and residency in the Salmon River Estuary (Oregon). *Est. Coastal Shelf Sci.* **1**:79-93.
Bottom, D. L., C. A. Simenstad, J. Burke, A. M. Baptista, D. A. Jay, K. K. Jones, E. Casillas, M. H. Schiewe. 2005. Salmon at river's end: The role of the estuary in the decline and recovery of Columbia River salmon. U.S. Dept. of Commerce, NOAA Tech. Memo., NMFS-NWFSC-68, 246 p.
Dean, A. F., S. M. Bollens, C. A. Simenstad and J. R. Cordell. 2005. Marshes as sources or sinks of an estuarine mysid: demographic patterns and tidal flux of *Neomysis kadiakensis* at China Camp marsh, San Francisco estuary. *Est., Coast. Shelf Sci.* 63: 1-11.
Simenstad, C. A., C. Tanner, J. Cordell, C. Crandell and J. White. 2005. Challenges of habitat restoration in a heavily urbanized estuary: Evaluating the investment. *J. Coast. Res.***40**: 6-23.
Garono, R. J., C. A. Simenstad, R. Robinson and H. Ripley. 2004. Using high spatial resolution hyperspectral imagery to map intertidal habitat structure in Hood Canal, WA (USA). *Can. J. Remote. Sensing* 30:54-63.
Lubetkin, S. C., and C. A. Simenstad. 2004. Two multi-source mixing models using conservative tracers to estimate food web sources and pathways. *J. Appl. Ecol.* **41**: 996-1008.
Simenstad, C. A., A. Wick, S. Van de Wetering, and D. L. Bottom. 2003. Dynamics and ecological functions of wood in estuarine and coastal marine ecosystems. Pages 265 to 277 *in* S. V. Gregory, K. Boyer, and A. Gurnell, editors. **The Ecology and Management of Wood in World Rivers**, American Fisheries Society Symp. 37, Bethesda, MD.
Gray, A., C. A. Simenstad, D. L. Bottom and T. J. Cornwell. 2002. Contrasting functional performance of juvenile salmon in recovering wetlands of the Salmon River estuary, Oregon USA. *Restor. Ecol.* **10**: 514-526.
Simenstad, C. A., W. G. Hood, R. M. Thom, D. A. Levy and D. L. Bottom. 2000. Landscape structure and scale constraints on restoring estuarine wetlands for Pacific Coast juvenile fishes. Pp. 597-630 i*n* M. P. Weinstein and D. A. Kreeger (eds.), **Concepts and Controversies in Tidal Marsh Ecology**, Kluwer Academic Publ., Dordrecht. 864 pp.
Simenstad, C. A., and J. R. Cordell. 2000. Ecological assessment criteria for restoring anadromous salmonid habitat in Pacific Northwest estuaries. *Ecol. Engineering* **15**:283-302.
Simenstad, C. A., S. B. Brandt, A. Chalmers, R. Dame, L. A. Deegan, R. Hodson, and E. D. Houde. 2000. Habitat-Biotic Interactions. Pp. 427-455 (Chap. 16) *in* J. E. Hobbie (ed.), **Estuarine Science: A Synthetic Approach to Research and Practice**. Island Press, Washington, DC. 539 pp.

Recent Collaborators (other than listed on publication list)

Ginger Armbrust, Jennifer Burke, Megan Dethier, David Duggins, Miles Logsdon, Jeffrey Richey (UW); Guy Gelfenbaum (USGS); Antonio Baptista (OHSU); Kurt Fresh (NOAA); Nadav Nur (PRBO); Steve Crooks (PWA); Tim Counihan, Jim Hatten, Ian Waite (USGS); Scott Todd, Chris Weller (PNPTC)

Current Member-Graduate Student Committees (noted where Chair)

Justin Boevers, M.S., School of Marine Affairs, Univ. Washington; Caren Crandell, Ph.D., Forest Resources, Univ. Washington; Eva Dusek, M.S., Aquatic & Fishery Sciences, Univ. Washington (Chair); Emily Howe, Ph.D., Aquatic & Fishery Sciences, Univ. Washington (Chair); Mary Ramirez, M.S., Aquatic & Fishery Science, Univ. Washington (Chair); Alexandra Von Saunder, M.S., Aquatic & Fishery Sciences, Univ. Washington (Chair) [on-leave]; Jessica Silver, M.S., Aquatic & Fishery Sciences, Univ. Washington; Sarah Spilseth; M.S., Aquatic & Fishery Sciences, Univ. Washington (Chair); Carl Young, M.S., Aquatic & Fishery Sciences, Univ. Washington (Chair)

CRAIG W. THOMAS

University of Washington, Evans School of Public Affairs, Box 353055, Seattle, WA 98195-3055
Phone: (206) 221-3669 Fax: (206) 685-9044 Email: thomasc@washington.edu

PROFESSIONAL PREPARATION
University of Washington, Seattle International Studies B.A. 1983
University of California, Berkeley Public Policy M.P.P. 1988
University of California, Berkeley Political Science Ph.D. 1997

APPOINTMENTS
2006-present Associate Professor, Evans School of Public Affairs, University of Washington
2003-2006 Associate Professor, Political Science, University of Massachusetts, Amherst
1997-2003 Assistant Professor, Political Science, University of Massachusetts, Amherst
1988-1994 Research and Teaching Assistant (part-time), University of California, Berkeley
1988-1991 Administrative Analyst (part-time), California Policy Seminar, Berkeley
1985-1986 Project Assistant, World Resources Institute, Washington, DC
1984-1985 Executive Assistant, Environmental Task Force, Washington, DC
1983-1984 Production Manager, Thomas & Kennedy Typographers, Seattle

SELECTED PUBLICATIONS
Koontz, T.M., and C.W. Thomas. 2006. What Do We Know and Need to Know About the Environmental Outcomes of Collaborative Management? *Public Administration Review*, Special Issue on Collaborative Management, supplement to issue 66:6, 111-121.

Koontz, T.M., T.A. Steelman, J. Carmin, K.S. Korfmacher, C. Moseley, and C.W. Thomas. 2004. *Collaborative Environmental Management: What Roles for Government?* Washington, DC: Resources for the Future.

Thomas, C.W. 2003. *Bureaucratic Landscapes: Interagency Cooperation and the Preservation of Biodiversity*. Cambridge, MA: MIT Press.

Thomas, C.W. 2003. Habitat Conservation Planning. In *Deepening Democracy: Institutional Innovations in Empowered Participatory Governance*. A. Fung and E.O. Wright, editors. London: Verso Press.

Schweik, C.M., and C.W. Thomas. 2002. Using Remote Sensing to Evaluate Environmental Institutional Designs: A Habitat Conservation Planning Example. *Social Science Quarterly* 83:244-262.

Thomas, C.W. 2001. Habitat Conservation Planning: Certainly Empowered, Somewhat Deliberative, Questionably Democratic. *Politics and Society* 29:105-130.

Thomas, C.W. 1999. Linking Public Agencies With Community-Based Watershed Organizations: Lessons From California. *Policy Studies Journal* 27:544-564.

Thomas, C.W. 1998. Maintaining and Restoring Public Trust in Government Agencies and Their Employees. *Administration and Society* 30:166-193.

Thomas, C.W. 1997. Public Management as Interagency Cooperation: Testing Epistemic Community Theory at the Domestic Level. *Journal of Public Administration Research and Theory* 7:221-246.

La Porte, T.R., and C.W. Thomas. 1995. Regulatory Compliance and the Ethos of Quality

Enhancement: Surprises in Nuclear Power Plant Operations. *Journal of Public Administration Research and Theory* 5:109-137.

SYNERGISTIC ACTIVITIES

My research pursues two lines of inquiry and teaching, which merge in the study of collaborative environmental management. One line examines specific collaborative efforts for environmental improvement in the areas of habitat conservation planning, watershed management, and invasive species control. The other examines public management more generally, including regulatory processes, interagency collaboration, and organizational learning. My research accordingly analyzes the use of multi-sector collaborative processes as an alternative to centralized regulatory processes, the challenges public managers confront when participating in collaborative efforts, and the role of collaboration in bringing new ideas into the policy-making process. As a political scientist, I am particularly interested in the role of ideas (e.g., scientific ideas) in guiding decision-making processes, and the role of stakeholders in these processes.

COLLABORATORS & OTHER AFFILIATIONS

Collaborators and Co-editors:

JoAnn Carmin (MIT)
Archon Fung (Harvard University)
John Gerring (Boston University)
Tom Koontz (Ohio State University)
Katrina Smith Korfmacher (University of Rochester)
Todd La Porte (University of California, Berkeley)
Cassandra Moseley (University of Oregon)
Leon Osterweil (University of Massachusetts, Amherst)
Charles Schweik (University of Massachusetts, Amherst)
Norman Sondheimer (University of Massachusetts, Amherst)
Toddi Steelman (North Carolina State University)
Eric Wright (University of Wisconsin, Madison)

Graduate and Postdoctoral Advisors:

Bruce Cain (University of California, Berkeley)
Eugene Bardach (University of California, Berkeley)
Todd La Porte (University of California, Berkeley)

Thesis Advisor and Post-Graduate Scholar Sponsor:

Zuhre Aksoy (Professor, Bogazici University)
Kemi George (Ph.D. student, University of Massachusetts, Amherst)
Laura Hatcher (Professor, Southern Illinois University)
Ron Salz (Professor, University of Connecticut)
George Thomas (Professor, Williams College)

Craig ZumBrunnen

Professor, Department of Geography
University of Washington, Seattle, WA 98195
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Work Telephone: (206) 543-4915
FAX: (206) 616-2465

Professional Preparation

Ph.D. in Geography, University of California at Berkeley, Sept. 1973.
Master of Science in Geological Sciences, California Institute of Technology, June 1968.
Bachelor of Arts *cum laude*, Major field: geology; University of Minnesota, June 1966.

Appointments

Professor, Dept. of Geography, University of Washington, Sept. 1995 - present.
Affiliate Professor, Nelson Mandela Metropolitan University, Pt. Elizabeth, SA, July 2004-present
Co-Director, Program on the Environment, University of Washington, Sept. 2000 – July 2004
Associate Professor, Dept. of Geography, University of Washington, Sept. 1979 -Sept. 1995.
Assistant Professor, Dept. of Geography, University of Washington, 1977 - 1979.
Member, JSIS REECAS Program Faculty, University of Washington, 1977 - present.
Member, JSIS, Middle East Program, University of Washington, 1993 - present.
Assistant Professor, Dept. of Geography, The Ohio State University, 1973 - 1977.
Research Associate, Inst. for Comparative & Foreign Studies, U.W., 6/75-8/75 & 6/76-8/76
Visiting Assistant Professor, Dept. of Geography, U.C. at Berkeley, Summer 1974.

Selected Publications

Perepechko, A., Kolossov, V. & ZumBrunnen, C. (2007) "Remeasuring and Rethinking Social Cleavages in Russia: Continuity and Changes in Electoral Geography 1917-1995," ***Political Geography**, 26:* 179-208.

Craig ZumBrunnen, "Transnational Corporations (TNCs), Globalization and Russian Environmental Policy," ***Zeszyty Naukowe, Nr 18, Warszawa: Szkola Glówna Handlowa w Warszawie: Kolegium Gospodarki Swiatowej***, 2005, pp. 187-211.

Alexander S. Perepechko, Jessica Graybill, Craig ZumBrunnen and Dmitry Sharkov, "Spatial Database Development for Russian Urban Areas: A New Conceptual Framework," ***GIScience & Remote Sensing***, Vol. 42, No. 2, 2005, pp. 122-148.

Marina Alberti, John Marzluff, Eric Shulenberger, Gordon Bradley, Clare Ryan, and Craig ZumBrunnen, "Integrating Humans into Ecology: Opportunities and Challenges for Studying Urban Ecosystems," ***BioScience***, Vol. 53, No. 12 (December 2003), pp. 1169-1179.

Craig ZumBrunnen and Nathaniel Trumbull, "Environmental Policy Challenges," ***Russia's Policy Challenges***, Stephen Wegren, editor. Armonk, New York: M. E. Sharpe, 2003, pp. 250-275.

Craig ZumBrunnen & Nathaniel Trumbull, "An Emerging Northwest Russia Environmental Information Network: IT Capacity Building for Environmental Protection and Sustainable Development," ***NETCOM***, Vol. 16, Nos. 1-2, 2002, pp. 53-72.

Marina Alberti, Gordon Bradley, Kristin Hill, John Marzluff, Clare Ryan, Eric Schulenberger, Craig ZumBrunnen "Integrated Graduate Education and Research Training in Urban Ecology at the University of Washington," ***Ecological Economic Management and Planning in Regional and Urban Systems***, Moscow, Russia: Institute of Control Sciences, Russian Academy of Sciences, 2001), pp. 78-79.

Craig ZumBrunnen & Nat Trumbull, "Obstacles and Opportunities to the Establishment of an Environmental Information Network in Northwest Russia," ***Journal of Urban & Regional Development Research***, Vol. 8, No. 1, November 2000, pp. 37-65.

Craig ZumBrunnen, "Rusia y la cei Europea," ***Europa Contemporrránea un Análisis Geográfico*****,** (Barcelona: Ediciones Omega, S.A., 2000), pp. 615-715.

Craig ZumBrunnen & Nat Trumbull, "An Emerging Northwest Russia Environmental Information Network: Environmental Protection and Sustainable Development Needs for the Transition Economies," ***Geocyberspace: Building Territories on the Geographical Space of the 21st Century*** (IGU Commission on Communication Networks and Telecommunication, 2000), pp. 25-45.

Craig ZumBrunnen, "Comments on Cultural Attitudes and Environmental Issues," ***Proceedings of Conference on Environmental Security: Cultural Attitudes about the Environment and Ecology and Their Connect on to Regional Political Stability*** (Columbus: Battelle Press, 1999), pp. 53-58.

Craig ZumBrunnen, "A Survey of Pollution Problems in the Soviet and Post-Soviet Russian North," Chapter 5 in ***Contested Arctic: Indigenous Peoples, Industrial States, and the Circumpolar Environment,*** Eric A. Smith & Joan McCarter, eds. (Seattle: U.W. Press, 1997), pp. 88-121.

Piotr Jankowski & Craig ZumBrunnen, "Towards a Modeling Support System for Simulation of Water Quality in Streams and Lakes," ***Journal of Computing in Civil Engineering***, V. 7, N. 3 (July 1993), pp. 354-71.

Craig ZumBrunnen, "Mechanisms for Environmental Quality Management: Framework for Application in Ukraine," in ***Ekonomika ukraini: minule, suchasne i maybutne–The Economy of Ukraine: Past, Present and Future,*** Proc. of 1st Congress of the Int'l Ukr. Econ. Assoc., (Kiev: Ukr. Acad. Sci., Inst. of Econ., 1993), pp. 168-183.

Craig, ZumBrunnen, "Problems and Prospects for the Development of New Commercial Structures in Russia and the Russian Far East," ***Annals Japan Assoc. of Econ. Geog.,*** V.39, N.1 (1993), pp. 50-67.

Craig ZumBrunnen, "Kak ya uchustoval v ODI," ***Kentavr: Metodologicheskiy igrotekhnicheskiy al'manakh***, No. 1, 1992, pp. 3-6 [in Russian].

Craig ZumBrunnen, Editor, Co-Translator (C. ZumBrunnen & J. Quam) Contributor, ***Urban Geography in the Soviet Union and the United States*** (Savage, MD: Rowman & Littlefield Publishers, Inc., 1992).

Craig ZumBrunnen, "Environmental Conditions," Chapter 15 in ***The Ukrainian Economy: Achievements, Problems, Challenges***, (Cambridge: Harvard University Press, 1992), pp. 312-358.

Craig ZumBrunnen, Editor and Co-Translator, ***Urban Geography in the Soviet Union and the United States*** (Savage, MD: Rowman & Littlefield Publishers, Inc., 1992). "Preface," pp. xvii-xix, Il'ya Zaslavsky and Craig ZumBrunnen, "Soviet Urban Geography Since the Time of Perestroyka," Chapter 8, pp. 203-211.

Craig ZumBrunnen and Jeffrey Osleeb, ***The Soviet Iron and Steel Industry*** (Totowa, New Jersey: Rowman & Allanheld, 1986) (with Jeffrey Osleeb; principal author ZumBrunnen).

Piotr Jankowski & Craig ZumBrunnen, "A Model Management Approach to Modeling and Simulation of Natural Systems," ***Proceedings of the 4th International Symposium on Spatial Data Handling*** (Zürich: Geographisches Institut Universität Zürich, July 1990), pp. 531-540.

Couple of recent conference papers:

"Climate Change, Kyoto and Russian Carbon Credits," III Scientific Conference on "Economic Globalization and Environmental Policy" Warsaw School of Economics, May 25-26, 2006

"Some Perspectives on the Human Dimensions of Environmental Change," UPE – UW Regional Capacity Building and Coastal Adaptation Seminar, University of Port Elizabeth, South Africa, July 5-9, 2004.

"Water Quality, Policies, Efficiency, Equity: Modeling the Value of Ecosystem Services," Humboldt Univ., International Urban Ecology Conference, Berlin, Oct. 2002.

"The Potential Role of Information Technology and Information Networks for Sustainable Development Planning for the Incheon Region," with N. Trumbull and J. Lundberg, Incheon, Korea, May 2003.

Honors and Awards:

Award for Excellence in Undergraduate Teaching, Department of Geography, June 2000; University of Washington's first Institute of Teaching Excellence, Fort Worden, WA, June 13-18, 1999.

Teaching:

Physical Geography, Urban Ecology, Problems of Resource Management, Integrating Renewal Energy into Society, Mathematical Modeling, courses on Russia/NIS

Graduate Advisors:

Heinz Lowenstam & Harrison Brown, Geology, California Institute of Technology (M.S. degree)
David Hooson, Department of Geography, U.C. Berkeley (dissertation advisor)

Recent Thesis Advising:

Jessica Graybill, Ph.D. U.W. Geography 2006 (dissertation advisor)
Nathaniel Trumbull, Ph.D. U.W. Geography 2006 (dissertation advisor)
Sophia Flores-Cruz, joint M.A. JSIS-REECAS & Public Affairs 2005 (adviser)
Josh Newell, UW Geography M.A. 2002 (adviser)
David Jeschke, M.A. U.W. Geography 2000 (thesis advisor)
Aleksandr Perepechko, Ph.D. U.W. Geography 1999 (dissertation advisor)
Total number of students advised with completed degrees: 5 PhDs (+3 additional current doctoral degree candidates advisees- Josh Newell, Greg Simon and Steven Garrett), 25 M.A.s

Selected Relevant Grants

Co-PI, Urban Ecology, NSF Igert international supplement, June 2002 ($75,000).
Co-PI, Urban Ecology, NSF IGERT grant, August 2001- August 2006 ($3,340,000).
Co-PI, “Urban Ecology” initiative, U.W. Tools for Transformation two-year, March 2000 ($332,210)
PI, Short-Term Research Opportunity Grants (IREX) 1994 ($2,500), 1985-1986 ($1,900).
PI, National Council for Soviet and East European Research, 1980-1981 ($40,000).
Co-Pi “Soviet Resources in World Economy” AAG consortium from NSF, 1977 - 1981 ($250,000).
Co-PI, Ford Foundation, Soviet Resources, 1975-1977 ($60,000).

Appendix H. HEC Board summary – The summary should be no more than 5 pages total, specifically addressing each of the following items in order:

a. Name of unit authorized to offer degree

Program on the Environment

b. School or College(s) as applicable

N/A

c. Exact title(s) of degrees offered

Graduate Certificate in Environmental Management

d. Year of last review
N/A

e. Brief description of the field and its history at the University of Washington

An Environmental Management Certificate Program existed as part of the Business School from 1992-1999. In spite of being rated as one of the top eight programs in environmental business education in the United States by the World Resources Institute in 1998*, the Dean of the Business School decided to terminate the program. The EM Certificate was administered by PoE on an interim basis during the 1999-2000 academic year.

PoE, at the request of Associate Provost Debra Friedman, formed a working group to develop options for a new Environmental Management Certificate that embodied the strengths of the original EM program, but with a wider institutional foundation. The working group included faculty and students from the Graduate School of Public Affairs, The School of Business, (Seattle and Bothell), the Collage of Arts and Sciences and the School of Marine affairs. The working group also received input from The Director of the Environmental Management Certificate Program developed by University Extension, the Chair of the Department of Economics, the School of Law, as well as a focus group representing diverse outside constituencies. PoE received formal approval for EM Certificate Program for the 2000-2001 academic year.

A curriculum working group was convened to discuss the curriculum, goals, and ideas for changes and improvement in support of future planning. The working group, consisting of Patrick Christie, Joyce Cooper, Alison Cullen, Gordon Enk, Dave Groves, Greg Hicks, Margaret Hornbaker, Tom Leschine, Jack Mezaros, Jonny Palka, Porranee Rattanaviwatpong, Chris Potter, Amy Snover, Matt Steuerwalt, Heidi Wahto, and Mike Wallace reviewed the program's mission, and academic goals, and focused on the following program areas:

Prerequisite requirements
Framework of the curriculum
    Integrating themes across courses
    Course specific content
    Integrating cases or examples
Curriculum packaging
    Core courses
    Consulting project
    Seminar

The working group recommended the following requirements for the EM Certificate Program:

- Three core courses (3-4 credits each),
- One or two quarter seminar (1 credit per quarter),
- Capstone project (4 credits across the academic year).

The core courses, in the areas of policy, business/economics, and science/analysis, were to be taken by all EM students. Environmental Policy Processes (PBAF 590) fulfilled the policy requirement. The Business of the Environment (BA541) fulfilled the business requirement, but it was not consistently available, so it was recommended that a group of faculty develop a permanent course. A course meeting the science/analysis requirement envisioned by the working group was not available and could not be created in time for the 2000-2001 academic year, so a menu of courses was offered to fulfill the science/analysis requirement in the interim. The working group created the syllabus for a course to fulfill the core science/analysis requirement under the titled of "The Role of Science in Environmental Decision Making." The course was created and offered by the Evans School of Public Affairs starting in 2002-2003.

In 2004, the curriculum committee recommended establishing as the three core courses "Environmental Policy Processes" (PBAF 590), "Business Strategy and the Natural Environment" (ENVIR 5xx), and "The Role of Science in Environmental Decision Making" (PBAF 595), "Global Commercialization of Environmental Technologies" (ENVIR 550) as the capstone course, and a seminar to be developed (ENVIR 501). The recommendation was adopted.

In 2005 the EM program received a $600,000 grant from the Henry Luce Foundation as seed money to implement year-long Keystone Projects (expanding the existing capstone) into the EM curriculum. The money was earmarked for student fellowships, salary for faculty mentors, staff support, and a speakers series. The certificate requirements were modified such that the one-quarter capstone course was replaced by a year-long Keystone Project, the seminar requirement was eliminated, and the number of credits for the certificate increased from 18 to 21 credits.

*World Resources Institute, Grey Pinstripes and Green Ties: MBA Programs Where the Environment Matters, 1998.

e. Documentation of continuing need for your program

Hawken, P., Lovins, A., & Lovins, L.H. (1999). Natural capital: Creating the next Industrial Revolution. New York: Little, Brown.

Hart, Stuart L. "Beyond Greening: Strategies for a Sustainable World." Harvard Business Review 75, no.1 (1997): 66–76.

Corporate Sustainability Links - http://depts.washington.edu/poeweb/news/suscorp.html

f. Assessment information relating to student learning outcomes and program effectiveness.

Currently, assessment is based on evaluation forms and informal feedback. See section B

g. Please complete the following grid:

	2004	2005	2006
Number of certificates granted in each of the last three years	12	9	10

i. Plans to improve the quality and effectiveness of the program. What is the process by which your unit sets its overall goals?

The EM Steering Committee, with recommendations from the curriculum and admissions committees sets the overall program goals.

How often are departmental goals reviewed and reassessed?

There is not a formal schedule for reviewing the program goals; however, there is an effort to continuously assess and suggest improvements in program operations.

In what ways do you anticipate the goals of your program will change in the next ten years?

Three trends will likely affect the goals of the EM Certificate Program: 1) increasing emphasis on interdisciplinary collaboration; 2) desire to transfer University expertise into the community; and 3) an increasingly global scope of environmental issues. In addition, there appears to be a high probability that a new College of the Environment will be created at the UW in the next several years. The academic goals of the EM Certificate Program are closely aligned with current trends supporting interdisciplinary collaboration and transfer of information into the community, so those goals will remain stable. Incorporating global components to

the Program has been considered, but has not moved beyond preliminary discussion.

Describe your goals for the next 5-7 years.

Securing stable sources of funding, increasing the number of students, strengthening connections to departments and other interdisciplinary programs at the UW, establishing a consistent recruitment process, solidifying relationships with community partners, University-wide recognition of the program, national recognition of the program, and recognition of the program by employers.

Describe areas and strategies for developing your potential for academic and pedagogical leadership in your field.

The Keystone Projects have become a signature feature of the EM Certificate Program. The project-oriented approach is proving to be an effective learning model for students, a vehicle for interdisciplinary collaboration for faculty, valuable for community partners, and an effective means for transferring knowledge from the University into the community. It is also a vehicle for students to establish connections to community partners for future employment. We can look to a few universities in Europe, such as Aalborg University in Denmark, whose entire curriculum is centered around problem-based learning, for examples of the extent to which project-oriented learning can be implemented.

We plan to strengthen established relationships with community partners and create a structure for community partners to contribute funding or other resources to the projects. In addition, we hope to institutionalize submitting Keystone project proposals as part of an organization's planning process. By institutionalizing relationships with government agencies, businesses and non-profit organizations, the EM Certificate Program can become a model for interdisciplinary collaboration and transfer of University expertise into the community, as well as continue to provide innovative interdisciplinary graduate education and training.

How could the college and/or university assist you in achieving your goals, especially through means other than increased budgets?

Access to Development personnel to help create and implement a strategy for raising awareness and support of projects with potential donors would be helpful in sustaining the EM Certificate Program.

Graduate School and/or the Provost encouraging interaction and learning among interdisciplinary efforts on UW campus or other institutions. Sharing "best practices" for interdisciplinary education and research will help all programs and participants.

Facilitate faculty and student participation in EM Certificate Program – this may take the form of faculty release time to teach core courses, or permitting students

to enroll in courses from other departments. The goal is to make it easier for both faculty and students to participate without being penalized by home units.

Provide recognition and publicize the collaboration between the University and the community partners as a way to raise awareness of the program and provide incentive for potential partners to participate in Keystone Projects.