November 2013

Self-Study Report

School of Aquatic and Fishery Sciences

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DEGREES OFFERED

Bachelor of Science in Aquatic and Fishery Sciences
Master of Science in Aquatic and Fishery Sciences
Doctor of Philosophy in Aquatic and Fishery Sciences

YEAR OF LAST REVIEW

2003

DIRECTOR

André Punt

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Executive Summary

The School of Aquatic and Fishery Sciences is the top-ranked fisheries program in the United States. Reviews published by the National Research Council and *The Chronicle of High Education* have placed the School in this position. We are widely recognized for our contributions to aquatic ecology, animal physiology, molecular ecology, population dynamics, and fisheries management. Our goal is to continue our history of outstanding achievement through innovation in research and teaching, by maintaining recognition at regional, national, and international levels, and by acting as a primary source of balanced scientific advice on issues pertinent to the management and conservation of marine and freshwater ecosystems.

The School's curriculum has a tradition of learner-focused education, which is continually reviewed and modified to ensure that offerings keep pace with student needs in a rapidly changing world. Our curriculum provides students with unique experiential learning experiences through intensive lab and field courses and our outstanding capstone research program. Our teaching program also enriches the educational mission of other units in the College of the Environment and University of Washington by contributing courses outside our major. Our teachers consistently receive high evaluations from students, and our faculty have received many College and UW teaching awards. We are contributing to the development of the Marine Biology major, which we predict will recruit more undergraduate students to the College and the University and will provide the opportunity to educate a larger number of students in aquatic and fishery sciences.

Almost all MS and PhD graduates from SAFS find job placement in areas closely related to their degrees, with many becoming faculty at leading universities or research scientists at federal and state fisheries conservation and management agencies.

The research mission of the School is broad. The contributions of our faculty, staff, and students to applied and basic research are extensive. Our research addresses central questions in marine and freshwater research, and we are involved in major collaborative programs that have national and international impact. Some of these programs are long-standing, and have had significant influence on the management of marine and freshwater systems of the Pacific Northwest and beyond.

SAFS faculty and students contribute to "real-world" solutions to environmental issues. We are highly respected by government, industry, and conservation organizations because we are seen as "honest brokers," providing unbiased scientific advice. Consequently, our faculty are continually in demand to provide external peer-review and serve as members of regional and national review panels. Our scientific contributions have earned the School a reputation for ensuring that management and conservation of marine and freshwater systems are based on the latest and most relevant science. The School also has a recognized outreach program aimed at enhancing stewardship and education among stakeholders, minorities, and the general public.

We produce many top-quality, high-impact scholarly papers. The number of peer-reviewed publications produced by SAFS faculty continues to grow, appearing in prestigious, as well as the major discipline-specific, journals. SAFS emphasizes and encourages the publication of graduate student research, and our graduate students have high publication rates, a metric of which we are particularly proud. Undergraduate students also make substantial contributions

to papers, often facilitated by their capstone research.

The School gathers funding from many diverse sources, and faculty collaborate to produce grant applications of the highest quality. We consistently receive funding to support our research and teaching missions, including through increased collaborations with industry and foundations. Endowments have been established by alumni and other donors who value our aims and achievements. These endowments are used to support faculty research through professorships and to provide fellowships and scholarships that allow us to recruit high-achieving graduate and undergraduate students.

A particular strength of SAFS is the collegiality of the faculty and students. Our faculty and students are engaged in the culture of the School and in promoting the advancement of the disciplines we represent. We engage in vigorous discussions at our School Council and faculty meetings to ensure that changes initiated to meet new challenges have wide support. The School also provides a variety of opportunities for informal interactions among faculty and graduate and undergraduate students that promote interdisciplinary contacts, learning, and a distinct sense of community.

The School has enjoyed a robust period of growth that has allowed us to expand our research into new areas and to explore additional educational directions, and extend our relevance to a broader audience of undergraduate and graduate students. At the end of 2012, the School had 34 faculty: 23 state-funded FTEs, 6 research faculty, 2 "without tenure" faculty, and 3 members of the Washington Cooperative Fish and Wildlife Research Unit. Given limitations on state funding, we are using innovative and non-traditional approaches for hiring new faculty, including partnerships with federal agencies and, in appropriate circumstances, appointment of "without tenure" faculty. New faculty have introduced novel research and teaching expertise and have strengthened our depth in other areas of study. At the end of 2012, there were 113 undergraduate majors and 96 graduate students in the program. In addition, new opportunities for interdisciplinary research and teaching were provided by the School's move from the College of Ocean and Fishery Sciences to the College of the Environment in 2010.

SAFS continues to evolve. We continually seek ways to strengthen the program through the hiring of faculty who will fill gaps in our teaching and research activities and allow us to expand into emerging and novel areas of study. To this end, we are working to increase funding for key programs and to focus our research and service where it will continue to have a major impact on basic science and on the conservation and management of marine and freshwater systems. We also embrace the need to form new interdisciplinary partnerships within SAFS, across the UW, and with our stakeholders to effectively engage in emerging environmental problems at local to international scales. We intend to increase our involvement with stakeholders, and are expanding efforts to increase underrepresented groups in the field and in the faculty. A key activity for the next 10 years will be to continue to review and revise the disciplines we represent, and the classes we teach, to meet the changing needs of employers and innovations in the field.

Part A: REQUIRED BACKGROUND INFORMATION[1]
Section I: Overview of the Organization

I.1 Mission and Organization

I.1.1 Mission

The mission of the School of Aquatic and Fishery Sciences (SAFS) is:

to excel in providing multidisciplinary and experiential learning for undergraduate and graduate students interested in the marine and aquatic environments, to conduct groundbreaking research on topics pertinent to understanding and managing these environments, and to communicate our findings to regional, national, and international audiences.

The School was founded in 1919 as the School of Fisheries to prepare scientists for practical work in the service of the federal government, the states, and private industry related to the propagation and marketing of fisheries products and management of the fishing industry. The School's mission evolved over time to reflect changes in the scope of US fisheries, such as the expansion of the groundfish fisheries in the Bering Sea and Gulf of Alaska, the passage and application of the Magnusson-Stevens Fishery Management and Conservation Act, the Endangered Species Act, and the Marine Mammal Protection Act, as well as the challenges faced by those tasked with managing marine and freshwater systems. This resulted in major changes to the structure of the School, the research and teaching emphases of individual faculty, and our key stakeholder groups, culminating in 2003 with a change to the name of the School and the redesign of our graduate and undergraduate programs.

The School has a long history of developing and applying quantitative methods to improve science and policy outcomes, and faculty and alumni have always provided management and decision-making advice. While the School maintains a focus on fish biology, conservation, aquaculture, and aspects of fisheries management, our research and education are also represented by an array of related disciplines, ranging from genetics and physiology to ecosystem science, fisheries economics, and freshwater sciences. This range of disciplines allows us to provide the most comprehensive education possible for future practitioners in the field.

At the time of the previous 10-year review in 2003, SAFS was part of the College of Ocean and Fishery Sciences. In 2010, the School joined the new College of the Environment (College) as one of its seven academic units. SAFS has been an integral participant in helping identify the mission of the College, working with colleagues to formulate and achieve the College's strategic mission.

SAFS has always taken a collaborative approach to achieving its mission. We partner with government and agencies (local and national) to conduct research, and our collaborators contribute to our teaching and mentorship programs by participating on student committees, mentoring capstone students, and giving lectures in our classes. We are also actively involved with a wide range of nongovernmental organizations, consulting companies, and the fishing industry.

We see ourselves as "honest brokers," providing unbiased scientific advice, and we continually act

1 Data related to fiscal, teaching, and mentoring are reported by academic year while data related to publications are reported by calendar year. In some cases, data were not yet available for the 2012–13 academic year so the 2011–12 academic year is taken to be the "current" year.

as external peer-reviewers for science and decision-making as a result. SAFS faculty are members of major national and international review and advisory committees, complementing our role as educators of the next generation of leaders in marine and freshwater science and policy.

I.1.2 Degree Programs

SAFS offers one undergraduate degree, Bachelor of Science in Aquatic and Fishery Sciences, and two graduate degrees: Master of Science in Aquatic and Fishery Sciences and Doctor of Philosophy in Aquatic and Fishery Sciences. The number of enrolled undergraduate majors has averaged 111 per annum from 2003 to 2012, which is 160% of the average during 1993–2002 (Figure I.1). There is a recent downward trend in the number of enrolled SAFS graduate students from 118 in 2003–04 to 96 in 2012–13 (Figure I.2). This decline, which has occurred throughout the College, is explained by several factors. Specifically, we have seen some turnover in our faculty; newly hired faculty are still developing their research plans, and several of the senior faculty nearing retirement have not taken on new students in recent years. The number of graduate students has also been affected by funding: the number of available SAFS graduate fellowships has declined compared to the mid-2000s, as has the availability of state and federal funding since 2008. SAFS faculty chair graduate student committees in the Biology and Economics departments and in the Quantitative Resource Ecology and Management (QERM) Program. SAFS faculty are currently mentoring a larger number of QERM students (11 in 2012–13) than in the past. The number of enrolled graduate students increases to 109 when the count includes students chaired in other units. The average annual graduation rate during the reporting period was 31 undergraduate majors, 15 MS students, and 10 PhD students (Figure I.3). The number of graduated and current graduate students is listed by current and past SAFS faculty in Appendix C.1.

I.1.3 Organization of the Unit

Appendix A summarizes the current administrative organization of the School.

The Director is the primary link among the

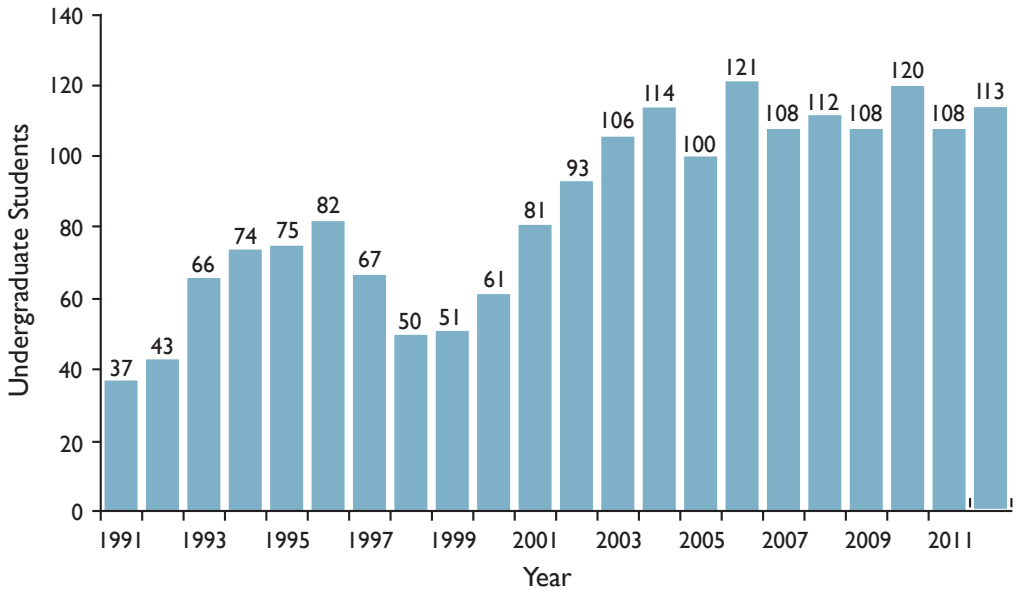

Figure I.1: Number of declared undergraduate SAFS majors, 1991–2012

faculty, Dean, University of Washington (University) administration, and external constituents. He/she (presently André Punt) coordinates issues associated with teaching and curricula; use of resources to enhance instruction; identification of priority areas for new hires; strategic uses of state and endowment funds to upgrade instructional support, field facilities, student stipends, travel, and research; and innovation and pursuit of new educational, research, and service directions proposed by faculty, students, and staff.

The Associate Director (presently Tim Essington) represents all interests of the School in the Director's absence, chairs the Recruitment, Admissions and Scholarship Committee, is an *ex-officio* member of the School Council, acts as Graduate Program Coordinator, interfaces with professional staff in the SAFS Student Services Office to resolve student issues as needed, and

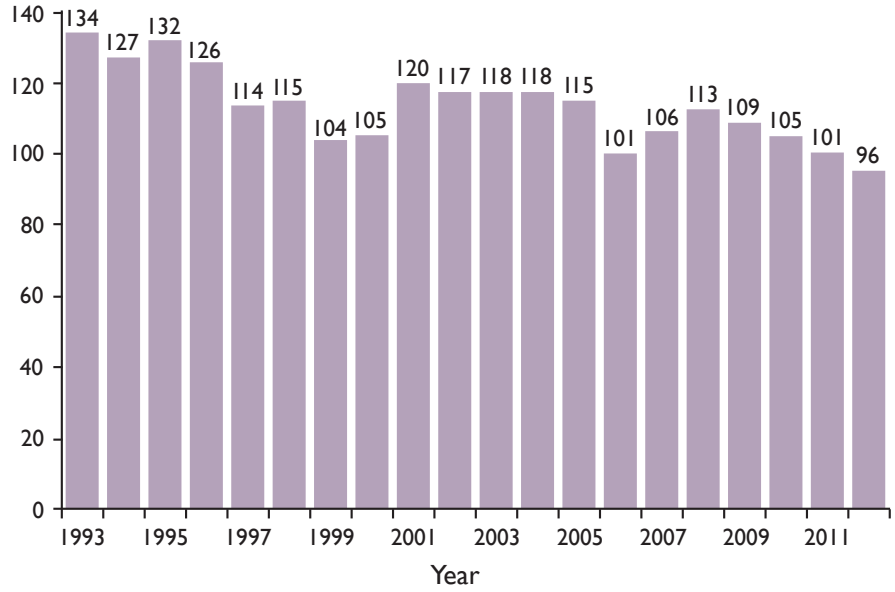

Figure I.2: Number of enrolled SAFS graduate students, 1993–2012

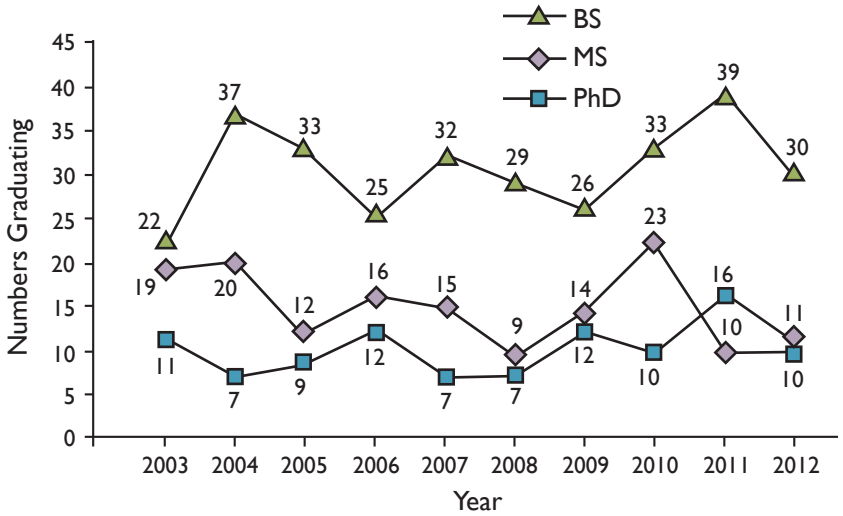

Figure I.3: Number of SAFS undergraduates, MS students, and PhD students graduating annually, 2003–12.

helps lead the new graduate student orientation each year.

The Administrator (presently Kathryn Stout) is the School's chief financial officer and oversees the state budget, advises the Director about the financial status of the School, makes financial presentations to the faculty, supervises the SAFS' Business Office and professional staff in support of central School functions (e.g., computing, publications, field camps, fish collection), and handles many diverse issues related to personnel and resources.

There were 34 faculty members on 1 January 2013 (Appendix C.2): 23 were tenure-track state-funded faculty (3 Assistant Professors, 5 Associate Professors, and 15 Professors), 6 were research faculty (one Research Associate Professor and 5 Research Professors), and 2 were WOT (without tenure) faculty. The other three faculty members are from the Washington Cooperative Fish and Wildlife Unit, which is sponsored by the US Geological Survey, Biological Resources Division that is housed in SAFS. They are integral members of the faculty who teach a graduate class annually, conduct research relevant to the mission of the School, and mentor graduate and undergraduate students. Gordon Holtgrieve joined the faculty in September 2013 as part of the Freshwater Initiative and Nathan Mantua and Claire Horner-Devine resigned their positions in 2013.

SAFS employs approximately 80 permanent classified and professional staff. Approximately 65 staff work directly for faculty members in support of their research. These staff contribute to the success of SAFS's mission in a variety of ways, including supporting field and lab activities, as well as database development and programming. The administrative organization chart (Appendix A) shows that 14 staff (down from 15 at the time of the last review) support School teaching and research functions. Activities include payroll, equipment inventory, purchasing and travel, grant and contract pre-award approval of proposals and post-award monitoring, human resources, finance, student advising, computer support, facilities management, print and electronic communication, etc. Of the current 14 staff, 10.3 fulltime FTEs are on the state budget. The balance are paid from research cost recovery and other funds. This is down from 13.9 full-time central staff FTEs during the last review.

SAFS is fortunate to have a number of affiliate faculty members (Appendix C.2). Affiliate faculty contribute to the success of the School by supporting students and faculty through facilitating the award of grants and contacts; participating in the teaching program by giving guest lectures, and in some cases, entire courses; and by being members of graduate student committees. Affiliate faculty appointments are renewed annually, and each affiliate faculty member's appointment is thoroughly reviewed by the School Council and SAFS faculty every three years.

I.1.4 Faculty Governance

Faculty meetings are held regularly during the academic year. These meetings, which are chaired by the Director (or in his/her absence the Associate Director), consist of open and executive sessions. Open sessions are used to announce developments in the administration suite and discuss policies related to recruitment and teaching and are also attended by representatives of the graduate students and staff. At executive sessions, which are restricted to faculty members, matters are discussed that are confidential and involve voting, such as promotion and tenure issues and the appointment of affiliate and adjunct faculty.

There are currently five major School committees (see Appendix C.3 for the full list of committee assignments). The first three listed below meet on a regular basis, and the other two meet as needed.

The **School Council** represents faculty interests and advises the Director on a variety of issues, including policy, budgets, and strategic opportunities. The School Council also reviews faculty Annual Activity Reports and requests for affiliate and adjunct faculty appointments. Members are elected from the faculty and have three-year terms.

The **Curriculum Committee** (CC) comprises six faculty members, the undergraduate adviser, a graduate student representative, and the Director (ex-officio). In the past five years, the CC has primarily worked to: redesign the SAFS undergraduate degree in response to trends in interdisciplinary research and workplace practices; develop, review, and promote new courses that innovate the curriculum; identify criteria for assigning Teaching Assistants (TAs) to courses; develop satisfactory progress guidelines to meet the need for increased transparency in evaluating student progress; participate in the interview process during faculty searches; define objectives, structure, and process for the expanded capstone requirement in the major; and work with other units in the College.

The **Recruitment, Admissions, and Scholarships Committee** (RASC) is a group of seven-to-eight faculty members who define criteria for graduate admissions and review applicants to the graduate program. RASC also solicits and reviews applications from continuing graduate and undergraduate students for annual endowment funds that are awarded for research and stipends.

The **Promotion and Tenure Committee** gives advice to faculty seeking promotion about the quality and scope of the person's credentials and advises the Director at an initial stage if, in their view, the faculty member has a reasonable case for promotion. Committee members then work with the candidate to prepare his/her promotion package, help identify external reviewers who might conduct evaluations, and provide a report to the entire faculty when external reviews become available.

The **Computing Committee** includes faculty, the Administrator, and the staff member in charge of computer support. This committee meets as needed to discuss, plan, and make recommendations regarding a range of subjects related to computing capability within SAFS.

In addition to these committees, three SAFS faculty are elected members of the College Council, which provides the Dean with analyses and recommendations on major decisions, such as promotion and tenure.

I.2 Budget and Resources

I.2.1 Budget Outline

The SAFS budget consists of three main components: (a) the state budget, which provides funding for tenure-track faculty, instructors, and graduate teaching assistants, as well as for some of the administrative staff; (b) the Research Cost Recovery (RCR) budget, which primarily covers basic operations and supports the administrative staff whose responsibilities relate primarily to grant and contracts or facilities management; and (c) funding from grants and contracts. The RCR budget also provides support for capstone projects, for research faculty to write grants, and for additional programmatic needs, such as start-up funding for new faculty and salary exchanges.

Figure I.4 summarizes the breakdown of the state and RCR budgets by category for 2012–13. Almost two-thirds of the state budget is allocated to tenure-track faculty, WOT faculty, temporary instructors, and benefits (up from 44% at the time of the last review). Administrative staff and benefits make up another 17% of the budget, down from 30% at the last review. The state budget has been in flux over the last five years owing to budget cuts and the consequent need to realign expenditures. SAFS has reduced the expenditure for administrative staff

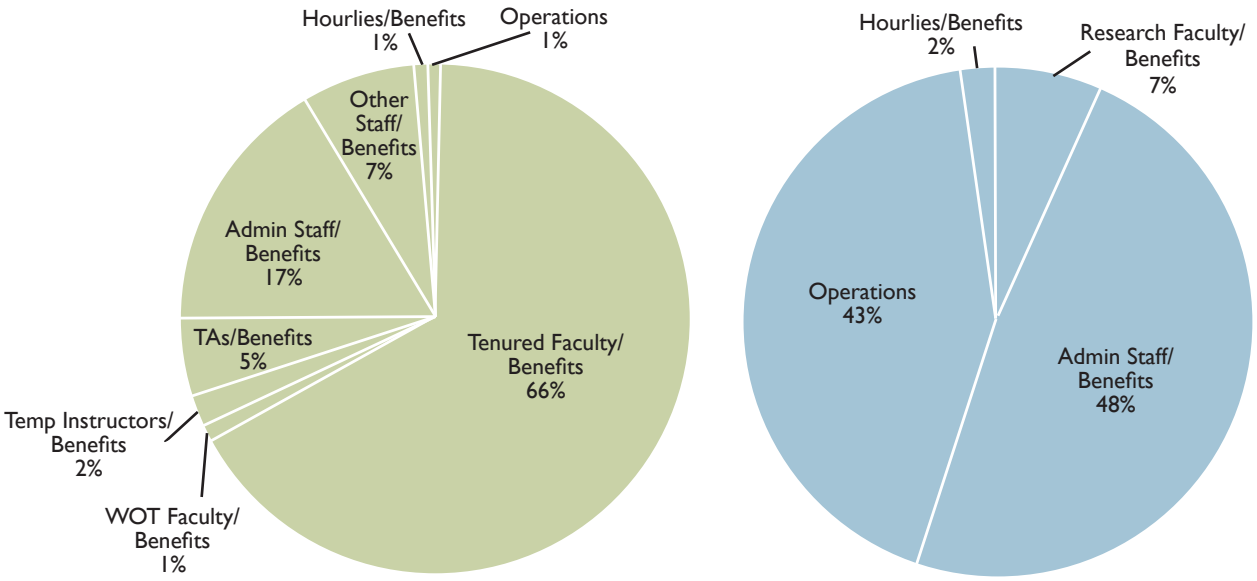

Figure I.4: Breakdown of the State budget for the 2013–14 academic year (left panel) and expenditures against the RCR budget for the 2012–13 academic year (right panel).

on the state budget substantially over these biennia (from 17.6 FTEs in 2007–08 to 10.3 FTEs in 2011–13), and now funds a substantial proportion of the administrative staff from the RCR budget.

Figure I.5 shows the time trend in direct and indirect expenses and in indirect expenses returned to SAFS annually. The total value of grants and contracts awarded to SAFS for the 2003–04 to 2012–13 fiscal years (Figure I.6, upper panel) averaged $11.6 million annually and has been largely constant over recent years. Appendix B.2 summarizes changes in the sources of grant and contract income to SAFS, and Figure I.7 provides the breakdown of grant and contract income for 2011–12.

SAFS is extremely privileged to have attracted many substantial endowments (total value $17.7 million as of 30 June 2013) through the hard work of faculty and the advancement staff of the College. The interest in donating reflects the value SAFS has to potential donors, attributable to our impact on understanding freshwater and marine systems and providing the basis for numerous successful careers. The endowments (see Figure I.8 for the time trend in endowment income) provide SAFS with the ability to fund entering and current undergraduate and graduate students (see Appendix B.3) and to support the Chew, Wakefield, Keeler, and Worthington Professorships. Many endowments are targeted towards students working in areas that reflect the donor's interest, such as salmon biology and ecology, aquaculture, and management of freshwater and marine systems. One endowment provides support for the highly successful Bevan Series (see Appendix C.4). Figure I.9 summarizes endowment expenditures during the 2012–13 academic year.

I.2.2 How does the unit evaluate whether it is making best use of its current funding?

Funding decisions necessarily involve balancing needs related to the unit's teaching mission with those engendered by new initiatives, including new hires and new research directions. Much of the budget is pre-allocated to the salaries of tenure-track faculty, teaching assistants, and

Figure I.5 Direct and indirect expenses and associated RCR returns.

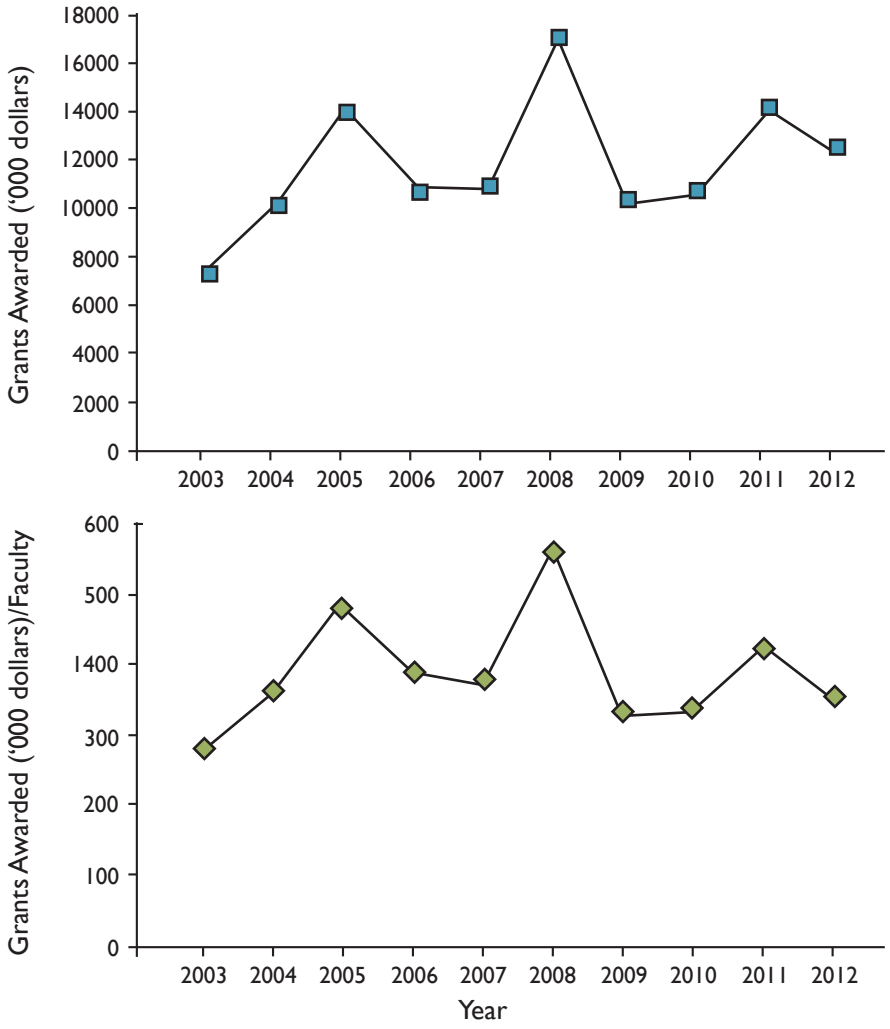

Figure I.6 Grants awarded in total (upper panel), and expressed relative to the faculty count (lower panel).

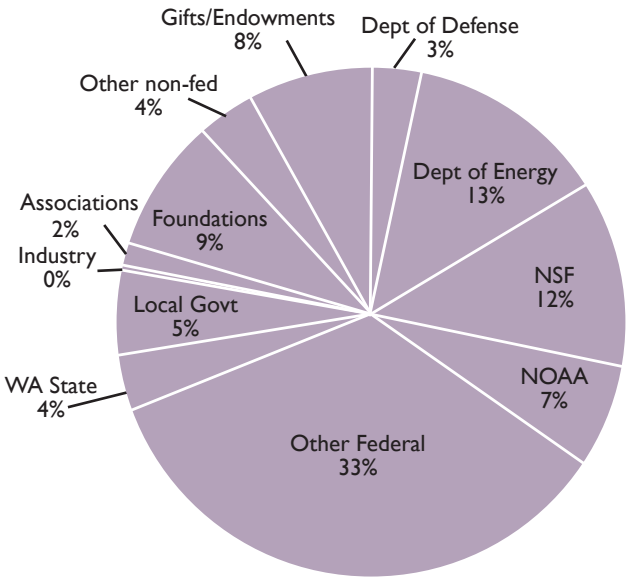

Figure I.7: Sources of funds for direct expenditures other than the State budget and RCR return during 2011–12.

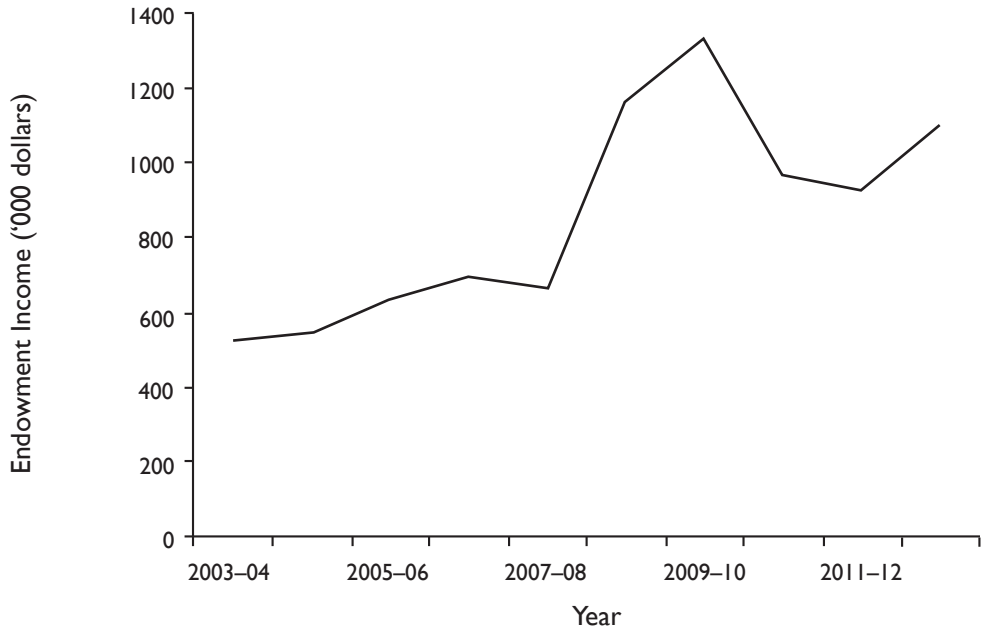

Figure I.8. Trend in endowment income

administrative staff (see Figure I.4). The remaining resources are used to support the teaching and research missions of SAFS. Each year, the annual budget and expenditures are presented to the faculty, who then provide input on how discretionary aspects of the budget should be spent, such as future hires.

The RCR budget is used to support faculty through an "RCR return," typically used to cover items that cannot be supported from

research grants. In recent years, the first priority for the non-tenure track component of the state budget has been to ensure sufficient funding to support TAs. Both the RCR budget and the endowments are used to provide support for faculty who are applying for grants that require matching funds. Although a relatively small fraction of the total cost of the projects funded, these sources can be sufficient to permit flexibility in submitting proposals to various funding sources.

Recently, the Curriculum Committee identified ways to make best use of our pool of TAs. One outcome was the establishment of a class (FISH 489 Peer Teaching Assistants in Aquatic and Fishery Sciences), which allows undergraduate students to act as peer TAs for classes that they have previously taken. The use of peer TAs gives undergraduate students an opportunity to instruct under the mentorship of faculty and graduate student TAs and permits flexibility in the allocation of graduate TAs to upper-division classes with field and laboratory components.

I.2.3 Fund-raising/development plan, or grant/contract-getting strategies

SAFS does not have a formal grant/contract-getting strategy. However, informally, faculty distribute calls for proposals and provide information on the expectations of various funding bodies. SAFS continues to target a wide range of sources, including a broad suite of foundations (Packard, Moore, Pew, etc.); federal agencies; the National Science Foundation; and gifts from stakeholders, including members of the fishing industry. The School has a number of additional ways to enhance funding. For example:

- The Director and Associate Director work directly with College advancement staff to identify and work with potential donors as they prepare their gifts to the School and the University.
- The School contributes to projects so that faculty are able to meet the match requirements for funding bodies such as Washington Sea Grant.
- The School has entered into a partnership with NOAA Fisheries. NOAA has provided the School with the resources, supplemented by state funds and funds from the College, to permit the hire of two faculty members (Chris Anderson and Trevor Branch).

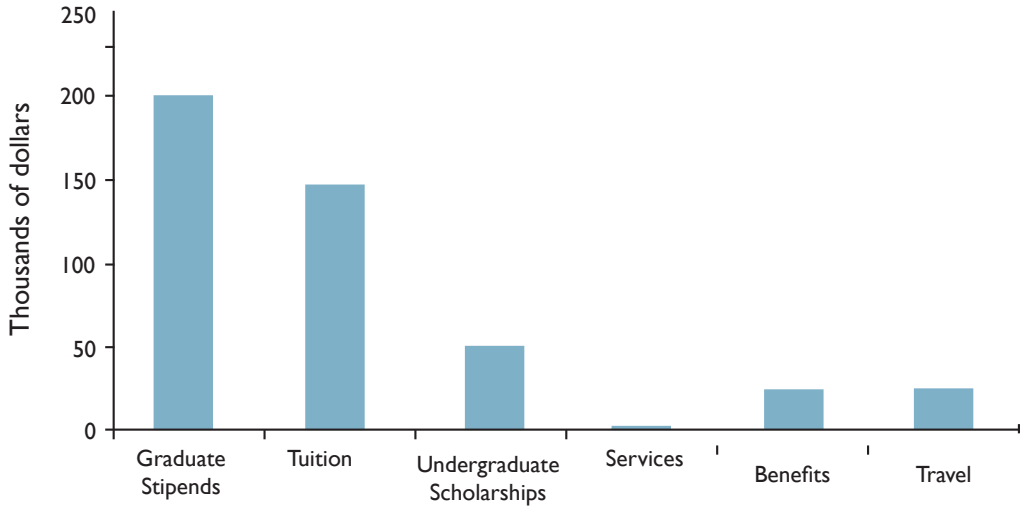

Figure I.9. Use of the endowment funding, 2012–13

Section II: Teaching and Learning

II.1 Student Learning Goals and Outcome

We offer a BS degree program and a graduate program that has MS and PhD degree tracks. Student learning goals are distinct for each program. We describe them briefly here and fully in Appendix E.1.

Undergraduate Student Learning Goals

The main goal is for students to develop foundational knowledge and skills that are relevant to understanding biological systems in aquatic environments, solving problems using sound scientific principles, and applying and communicating critical scientific analysis to environmental issues. We achieve this goal by developing student learning in the following four key areas: acquisition and synthesis of knowledge; communication skills; research skills; and critical thinking, problem solving, and attitude. Appendix E.2 outlines the undergraduate degree.

Graduate Student Learning Goals

In our graduate program, we aim to enhance student skills and knowledge so that graduates are able to advance the discipline and are employment-ready. Specifically, graduates of our MS and PhD programs can: develop, articulate, and implement novel research that addresses relevant questions or issues in a selected discipline; communicate science effectively to peers; integrate knowledge across disciplines; mentor, advise, and instruct junior colleagues in their field; and provide leadership within their chosen discipline by applying rigorous and ethical practices.

II.1.1 Evaluation of Student Learning

The School's emphasis on learner-based education provides tools for instructor assessment of student learning. In the 100- and 200-level courses, we use learner response systems (clickers), discussion-based groups, and laboratory reports. At the 300 level, activities such as proposal and paper writing and independent research provide opportunities for feedback on one or more drafts of written work. Activities at the 400 and 500 level (graduate only) typically involve evaluation of original data sets and case studies, learner-driven research, and writing papers and proposals. We also track students' progress as they advance through their degree. For example, the undergraduate degree is bracketed by two key required courses: a scientific communication course at the 200 level and the culminating capstone research project; together, they provide an invaluable means of assessing learning by comparing student assignments across years. We also gain informal insight into undergraduate learning through internships and independent research.

We have used faculty focus group discussions with the Office of Educational Assessment (OEA) to assess student learning. We provide examples from Autumn 2012 (based on performance in the capstone, Appendix E.3). This review of our capstone program culminated in a presentation to the University of Washington Regents as an exemplar program (Appendix E.4).

The SAFS Curriculum Committee (CC) serves as a key mechanism for evaluation of student learning. In 2010-11, the CC evaluated whether the curriculum for the undergraduate degree met growing needs in interdisciplinary education while retaining subject depth. We also examined whether undergraduate students were developing skills at appropriate points in their degree program.

The graduate program places an emphasis on individual mentoring from faculty. Consequently,

much of the evaluation of student learning is based on student performance, needs, and career objectives. Students typically meet with their full supervisory committee at least once per year and have more frequent meetings with individual faculty advisors. These interactions provide the main opportunity to gauge progress and to identify and resolve problems. MS and PhD students plan their coursework with guidance from their committee, based on their interests and the particular demands related to their research topic. The graduate degree program is currently being evaluated by the School.

II.1.2 Measures of Student Satisfaction

SAFS uses student evaluations, administered by the OEA, in all of our courses. We participated in the UW Academic Challenge and Engagement Study in 2012-13 (Appendix E.5), which was sponsored by the OEA, to interview seniors about challenges in the major as they applied for graduation. We receive similar feedback from graduate students at annual retreats, and from exit surveys and *ad hoc* surveys (Appendix E.6). Student Services reinstituted a senior exit survey for undergraduates in 2012 (Appendix E.7). In addition, students are represented in curricular discussions; undergraduate and graduate students have standing positions on the School's Curriculum Committee.

II.1.3 Findings of Assessment of Learning

Our 2010–11 undergraduate curriculum review concluded that students would benefit from a broader exposure to subjects within SAFS. We also found many students were taking foundation courses out of sequence, delaying many subjects until their senior year and therefore, were not receiving sufficient early education in scientific communication. Our 2011–12 evaluation with OEA (Appendix E.3) showed that our learning objectives are being well met, as exemplified by student performance in the capstone.

Graduate student progression and performance is highly satisfactory within SAFS, evidenced by performance measures such as time to degree (Appendix E.8), publication rate, and number of top paper and presentation awards (see Section III). We have identified the need for skill-based and interdisciplinary courses at the graduate level in response to larger datasets, improved technologies and analytical approaches, and increased emphasis on integration across fields. We have also identified a need to better track student progress through the degree program, with the goal of further improving time to graduation while meeting learning goals.

II.1.4 Actions Taken on Assessment of Student Learning and Decisions on Resource Allocation

Based on the 2010–11 curriculum review, the undergraduate degree was restructured, effective academic year (AY) 2011–12. Breadth in subject matter was attained by increasing the number of student credit hours required at the 300 level. Depth in the degree was achieved by increasing the number of credits required at the 400 level. The appropriate timing of courses within the degree was enhanced by changing introductory requirements and improving student advising. The number of required introductory biology courses increased, while chemistry requirements were reduced. Some introductory physics courses were replaced by physical science courses more relevant to the SAFS degree. College General Education requirements increased, but the net effect of all the changes was a decrease in prescribed courses within the SAFS degree. A 200-level scientific communications course, developed specifically for sophomores and first-quarter transfer students, was introduced and became a requirement in AY 2013-14. The full degree is described in Appendix E.2, and all the courses given by SAFS faculty are listed in Appendix E.9.

Several graduate-level courses that emphasize skill development have been introduced. Examples are FISH 552/553 Introductory and Advanced R Programming, FISH 554 Beautiful Graphics in R, FISH 546 Bioinformatics, FISH 560 Multivariate Statistics, and FISH 507 Time Series Analyses. Other courses have been updated (FISH 521 Research Proposal Writing and FISH 522 Hot Topics in Aquatic and Fisheries Science), and courses relevant to our students such as SMEA 538 Fisheries Economics have been added. We have also streamlined the tracking of graduate progress (milestones). This evaluation occurs at the beginning of each academic quarter.

Our evaluations have been used to support decisions relevant to resource allocation. For example, the Curriculum Committee (CC) and the School leadership have evaluated and reallocated TAs across courses in the last two years and have created the new courses mentioned above.

II.1.5 Accommodation of Non-majors

Many of our courses attract extensive enrolment outside the unit (e.g., FISH 101 Water and Society, FISH 250 Marine Biology, FISH 311 Biology of Fishes, FISH 324 Aquatic Animal Physiology and Reproduction, and FISH 340 Genetics and Molecular Ecology). SAFS also offers a minor in Aquatic and Fishery Sciences. In addition, some courses offer a lecture-only option, typically taken by non-majors. SAFS faculty contribute to teaching effort outside the unit (approximately half of total student credit hours generated by the unit), teaching courses for the College, the Center for Quantitative Sciences (CQS), the Quantitative Ecology and Resource Management program, and Biology.

II.2. Instructional Effectiveness

II.2.1 Methods Used to Evaluate Quality of Instruction

Student evaluations, administered by OEA, are used in all courses. Evaluation scores for SAFS courses (Figure II.1) average 4.0 for our 100- and 200-level courses, slightly above 4.0 for our 300-level courses, and close to 4.5 for our 400- and 500-level courses. Course evaluations are reviewed quarterly by the Director and discussed annually with Assistant Professors and biennially with Associate and Full Professors. Teaching assistant evaluations are reviewed by the instructor and the Director. When courses receive unusually low evaluation scores (<3.5), the Director consults with the instructor to identify problems and solutions. Peer teaching evaluations are conducted annually for Assistant Professors, and every three years for Associate and Full Professors. Informal TA evaluations are provided by each faculty instructor during and immediately after the appointment period. SAFS also uses metrics such as number of student publications, conference presentations, and student satisfactory progress to evaluate the quality of graduate mentoring.

II.2.2 Training Opportunities in Teaching, Including Graduate Students

SAFS relies on several approaches to provide teaching opportunities. Co-teaching in larger courses is frequently used to introduce Assistant Professors to instructional methods. All Assistant Professors are mentored by senior faculty. Our instructors participate in University workshops and UW-led teaching conferences. All incoming graduate students participate in orientation sessions that include workshops on

instruction, and graduate TAs are required to take University-led workshops in TA training. In addition, TAs receive ongoing course-specific training from instructors, through weekly meetings and discussions. Finally, effective AY 2013–14, we are offering a graduate seminar in teaching (FISH 507 University Teaching, Theory and Practice).

II.2.3 Response to Teaching Evaluations

Responses are largely course-specific, but there are several common themes across the degree programs. For example, the School has an established reputation for providing experiential learning, and instructors continue to introduce new approaches to enhance these experiences. Faculty members have responded to calls for

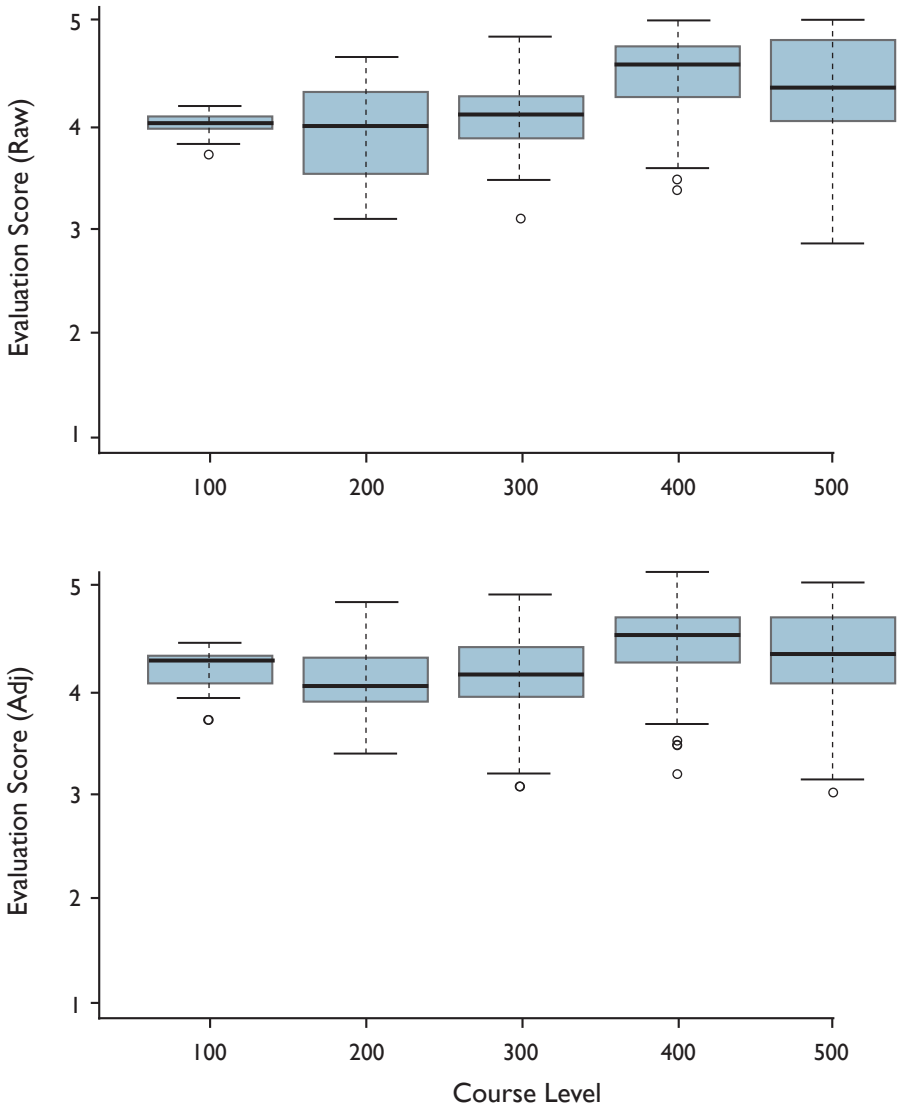

Figure II.1: Student evaluation scores for classes with a FISH prefix, 2006–13. Student evaluations are reported as a median of scores, between 1 and 5, where 5 is the maximum score. The median score is reported as the original value (top panel) and as an adjusted score (bottom panel), where adjustments are based on class size, grade expected by students, and reason for enrollment (major or non-major).

additional opportunities for student feedback. Approaches might include online activities, recording of lectures, rapid feedback on writing, peer evaluation, in-class response devices ("clickers"), collaborative learning, and problem solving during lecture sessions.

II.3 Teaching and Mentoring Outside the Classroom

II.3.1 Faculty Involvement in Student Learning

SAFS provides extensive opportunities for education in addition to classroom teaching. The most significant is the required undergraduate capstone program; all undergraduate students are mentored during independent research by a faculty instructor, a capstone coordinator, and often, graduate students, postdoctoral fellows, or agency scientists (Appendix E.4). Almost all students also conduct additional independent research with faculty, either on an *ad hoc* basis, in the Alaska field camps (FISH 491 Aquatic Ecological Research in Alaska), in internship opportunities with agency collaborators, or at Friday Harbor Laboratories. Several undergraduates participate in undergraduate (FISH 478 Topics in Sustainable Fisheries, FISH 477 Marine Biology Seminar) and graduate seminars (e.g., FISH 521 Hot Topics in Aquatic and Fishery Sciences). Finally, SAFS offers a peer TA program, in which undergraduate TAs are mentored by faculty and graduate students. As noted above, the graduate program is based on an intensive faculty–student mentorship model.

II.3.2 Recruitment of Students

Efforts to recruit students are based on the visibility of the program and the creation of an inclusive and welcoming community.

Undergraduate Students

SAFS conducts an annual informational session on the undergraduate program, advertised widely (UW, local and state community colleges, a variety of blogs, and prospective student listservs). The undergraduate adviser conducts quarterly visits to introductory FISH courses (i.e., FISH 101, FISH 250) and maintains booths at prospective majors, career, and diversity fairs. SAFS Student Services coordinates the Autumn quarter Exploring Environmental Majors seminar and participates in additional exploring majors seminars, attended by freshmen, sophomores, and transfer students. SAFS faculty and advisers participate in academic and recruiting events hosted by or directed at underrepresented groups, such as the annual Society for the Advancement of Chicano and Native American Students conference.

SAFS hosts a Student Services Blog (http://safsuw.wordpress.com/) targeted at current and prospective students, and sends a quarterly email to the UW community college listserv that reaches Washington State curriculum committee advisers. In 2011, the School revised the undergraduate SAFS website to include a section aimed at prospective students that features current undergraduate student profiles. We plan to implement efforts to increase enrolment in the major, including collaborating with premajor advisers who work with students with relevant interests and advisers who work with underrepresented and non-traditional populations, and expanding our outreach to potential majors within the UW by emailing high-achieving students in FISH introductory courses. Additionally, the head of Student Services will participate in a College-level outreach committee that will identify ways to improve outreach to prospective UW students and potential environmental majors.

Graduate Students

Graduate students are recruited by the School's reputation, interactions at conferences, faculty web-pages describing research opportunities,

instruction, and graduate TAs are required to take University-led workshops in TA training. In addition, TAs receive ongoing course-specific training from instructors, through weekly meetings and discussions. Finally, effective AY 2013–14, we are offering a graduate seminar in teaching (FISH 507 University Teaching, Theory and Practice).

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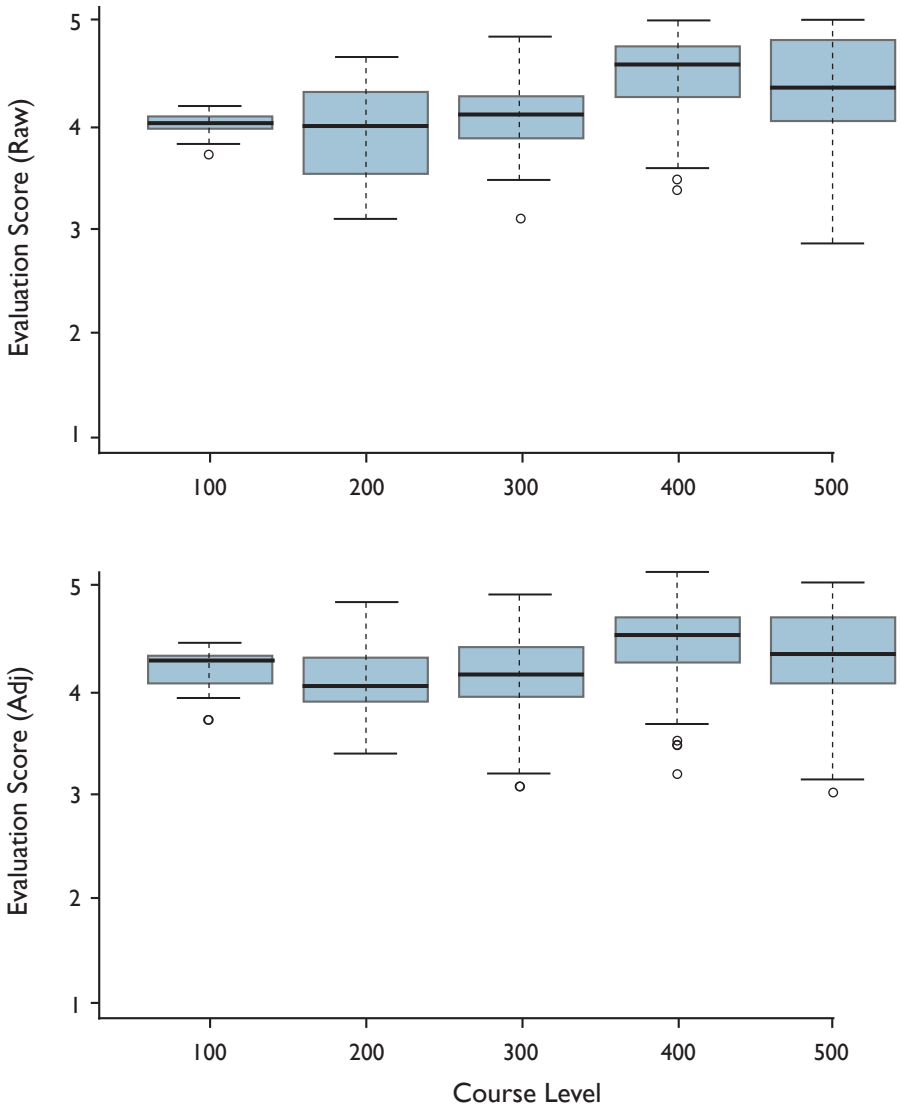

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advertisements to listservs and colleagues, and identification of top students in undergraduate programs. SAFS typically receives approximately 150 applicants per year, of which roughly 120 meet our minimum standards for acceptance based on grades, standardized test scores, letters of recommendation, and professional accomplishments. We typically make offers to approximately 12.5% of applicants (Appendix D), making our admission to our program highly competitive. Most students who are made offers of admittance accept them (>80% acceptance rate in recent years; Appendix D). SAFS offers recruitment scholarships, aimed at attracting top students and underrepresented groups. A two-day student recruitment meeting is held annually for prospective graduate students. Students learn about the School, meet prospective faculty mentors, and interact with current graduate students both formally and socially. Underrepresented students are offered additional workshops with the UW Graduate Opportunities and Minority Achievement Program (GO-MAP).

II.3.3 Evaluation of Academic Progress and Success in the Program

Academic progression through the undergraduate degree is monitored using standards described by the SAFS "Satisfactory Progress" policy (Appendix E.10). Monitoring is conducted by Student Services using an internally hosted and designed database. This database tracks quarterly course and GPA performance, and identifies struggling and high-achieving students. Academic data useful in tracking progress are also available through a newly developed College database, developed in collaboration with the head of SAFS Student Services. Graduate student progress is monitored using the graduate student "milestones" database, as well as metrics such as publication rate, time to graduation, and number of presentations.

II.3.4 Preparation for Next Phase of Academic or Professional Lives

SAFS emphasizes training that supports academic and professional careers. The undergraduate degree has been designed so that relevant skills are introduced early, nurtured through each of the courses, and tested in the capstone process (described in full in Appendix E.4). Our students report that the capstone is challenging, but very rewarding, and many capstones lead to job placements. Students are also exposed to the workplace through collaborative internships with agency scientists. Undergraduates are also encouraged to take advantage of the many career fairs and workshops offered by various UW departments, including an annual environmental career fair co-hosted with the College. SAFS Student Services Office plans two events during AY 2013–14 designed to expose students to post-graduation opportunities: a panel on applying to graduate school in autumn quarter and a visit to NOAA Sandpoint facility in winter quarter, where students will meet scientists working in related fields. During individual advising appointments, Student Services also stresses the importance of developing experiential and networking skills in preparation for academic and professional lives.

SAFS graduate students are given opportunities to network and develop professional skills through a variety of avenues. Our students become well known to potential employers because we are located near several natural resource agencies. Students develop research, writing, and presentation skill as they progress through their academic milestones. They are involved in faculty searches, so that they learn the process and expectations for academic positions. Finally, students develop instructional skills, through TAships, class instruction, faculty mentoring in courses, and a graduate-level seminar in teaching.

Section III: Scholarly Impact

III.1 Overview

SAFS faculty are involved in a broad range of scholarly activities. They conduct fundamental and applied research and frequently collaborate with colleagues within the unit, across campus, at other universities, and with scientists at government research facilities in Seattle, across the nation, and throughout the world.

SAFS has outstanding research programs that have contributed substantially to scientific understanding generally and to aquatic and fishery systems specifically. Some of these programs, such as the Alaska Salmon Program, are long-standing and iconic, while others are more recent in origin, reflecting emerging research areas within fisheries and aquatic sciences.

1. The **Alaska Salmon Program** (ASP) was recognized in 2012 by the American Fishery Society through the Carl R. Sullivan Fisheries Conservation Award. The ASP was established in 1946 to facilitate better understanding of the ecology of salmon relevant to managing sustainable fisheries in Alaska.
2. The **Global Fisheries Database** allows researchers to answer major policy questions, including what factors determine whether a fishery can be managed sustainably. The database contains fisheries and population data from more than 500 stocks around the world, which produce 40% of global catches. This research contributes significantly to the policy debates that will drive fisheries management into the future.
3. The **University of Washington Fish Collection** is affiliated with the UW Burke Museum of Natural History and Culture. It is a fully computerized, archival research collection of freshwater fishes of the Pacific Northwest and marine fishes of the North Pacific Ocean and Bering Sea. It exists to serve the educational and research needs of students and professionals around the world.
4. The **Molecular Ecology Research Lab** specializes in the application of innovative genetic and genomic technologies to questions in ecology, evolution, natural resource management, and conservation.
5. The **Wetland Ecosystem Team** (WET) conducts basic and applied research on estuarine and coastal wetland ecology. WET integrates physical, chemical, and biological interactions that influence the ecosystem goods and services that are derived from coastal wetlands. The estuarine–coastal ecology of juvenile Pacific salmon has been a long-standing research emphasis; wetland restoration ecology has been a more recent focus. WET has study sites throughout the West Coast.
6. The **Western Regional Aquaculture Center** (WRAC) is one of five regional centers in the United States. Since 1987, it has been hosted by SAFS. The WRAC is designed to support the development of the aquaculture industry within the 12 states of the western region by fostering and funding partnerships among industry, academic researchers, and extension specialists in research and outreach projects of regional significance. WRAC-sponsored projects have had major impacts in areas such as disease prevention and control, pollutant reduction, development of alternative finfish diets, assessing environmental impacts of aquaculture practices, development of new species for aquaculture, and processing of aquaculture products.
7. The **Columbia Basin Research Center** develops and applies quantitative approaches to issues involving endangered salmonid stocks in the Columbia River Basin. The center pro-

vides a publicly accessible and value-added second-tier database site, with a wide range of historical and real-time environmental and fish population data.

SAFS faculty have been highly productive, as exemplified by publication rate. Between 2003 and 2012, SAFS faculty, staff, and students published an annual average of 165 papers, or 5.4 papers per faculty member, in peer-reviewed scientific journals (Figures III.1 and III.2). The annual total and number of papers per faculty member increased over this period (Figures III.1 and III.2). SAFS faculty publish their work in a wide range of peer-reviewed scientific journals, from *Science*, *Nature*, and the *Proceedings of the National Academy of Sciences* to discipline-specific journals such as the *Canadian Journal of Fisheries and Aquatic Sciences* (Figure III.3). SAFS faculty continue to win UW, national, and international awards and provide service to the profession in diverse ways, in addition to being directly involved in the management of marine and freshwater environments. The excellence of our faculty has been recognized by invited membership to state, national, and international scientific academic societies (Appendix C.5).

The School has been at the forefront of resource assessment throughout its history. For example, SAFS faculty and past SAFS graduates have been members of Scientific and Statistical Committees of the Pacific and North Pacific Fishery Management Councils since their inception in 1976. SAFS faculty are also members of the scientific committees of the International Whaling Commission and the Commission for the Conservation of Southern Bluefin Tuna.

The faculty are frequently invited to present keynote addresses at national and international scientific conferences, give invited seminars at universities in the United States and abroad, and serve as members of scientific review panels (SAFS faculty have served on seven National Academy of Sciences panels during 2003–2012). We also contribute to

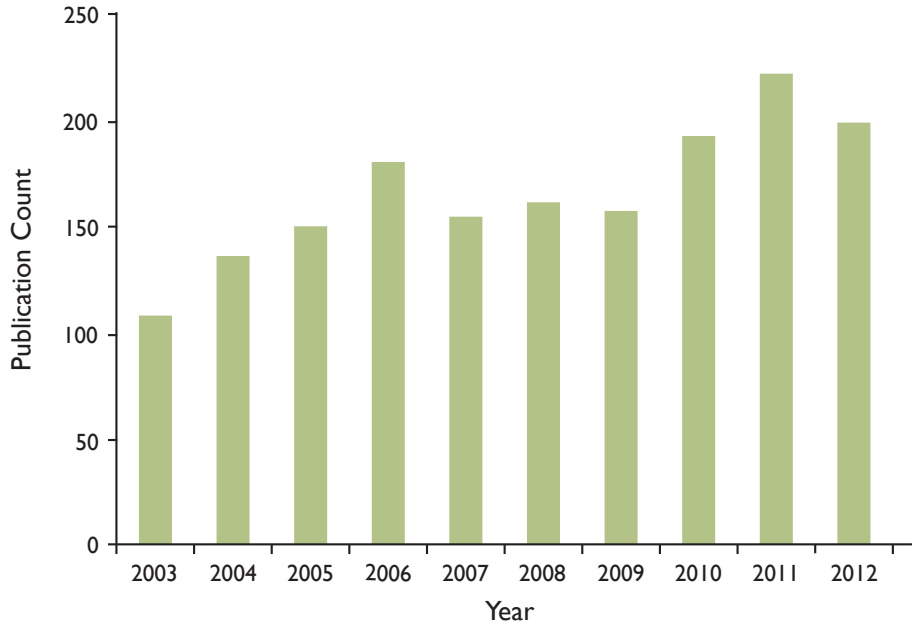


Figure III.1 Peer-reviewed papers published, 2003–12.

scientific knowledge through public lectures and testimony, publications in the print media and communication channels such as web-sites, twitter, and blogs. In the last 10 years, SAFS faculty have served as editors, associate editors, and guest editors for 53 peer-reviewed journals. The School's scientists (including postdoctoral researchers and students) also provided peer-reviews for papers submitted to more than 100 scientific journals and for proposals submitted to more than 70 funding agencies (Appendix C.5).

SAFS is involved in outreach to local communities. For example, more than 3,000 individuals visited the UW Fish Collection from 2007 to 2012. High school students are mentored through the American Fisheries Society Hutton Junior Fisheries Biology Program. SAFS faculty have been involved in bringing marine sciences to the K-12 classroom through the Ocean and Coastal Interdisciplinary Science Program and also by developing an ocean acidification curriculum for high school students that has been used by more than 800 students throughout the region for the past two years. Underrepresented minority students have been hosted in many of our laboratories through projects such as K–12 MESA (Mathematical Engineering Science Achievement). The Columbia Basin Research Center hosts a web-based sports fishing and recreation page that provides map-based access to real-time and historical information on salmon and steelhead passage and river conditions at Columbia River dams. The Coastal Observation and Seabird Survey Team (COASST) is a partnership among scientists and citizens of coastal communities in the North Pacific to monitor marine ecosystem health.

III.2 Undergraduate and Graduate Students

Undergraduate students routinely contribute to scientific research through a core component of the undergraduate degree program, the highly successful capstone program (see Section II). Many SAFS undergrads also work in research

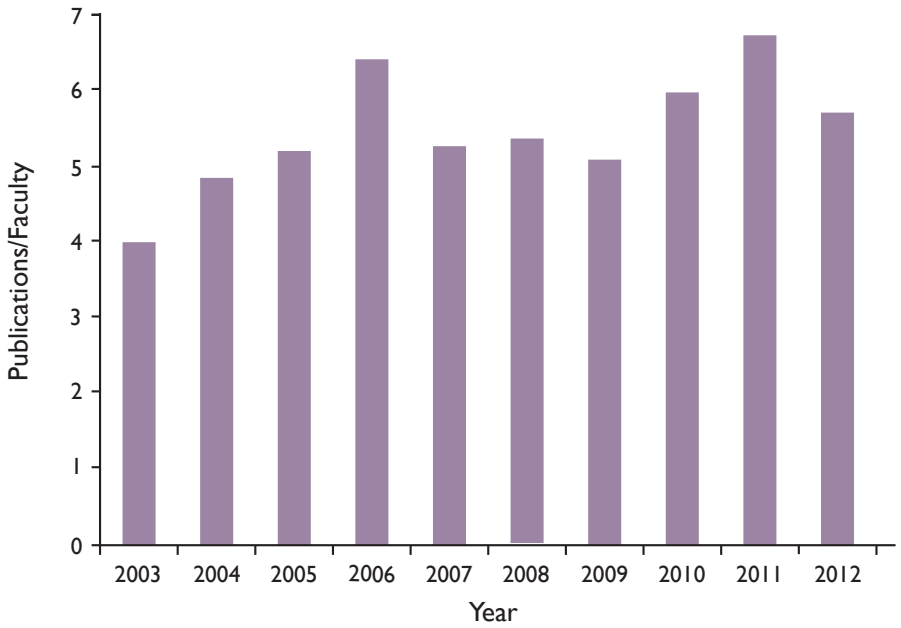


Figure III.2 Peer-reviewed papers published relative to the faculty count, 2003–12.

Figure III.3 Journals in which SAFS faculty published most frequently, 2003–12.

labs as lab or field assistants. They present posters and oral presentations at various venues including the University's Undergraduate Research Symposium and national scientific and professional meetings, and they contribute to scientific papers (undergraduate students have been co-authors of 39 peer-reviewed papers published during 2003–2012).

The graduate program aims to prepare students to lead research efforts. A total of 64%[2] of MS graduates and almost all (99 of 105 during 2003–12) PhD graduates publish peer-reviewed papers arising from their research. MS and PhD students have been authors and co-authors of 689 peer-reviewed publications between 2003 and 2012, including papers in major scientific

[2] This percentage is based on students with terminal MS degrees. Publications by MS students who continued on to the PhD program or bypassed their MS degrees to work on PhDs are counted as publications by PhD students. Consequently, a higher proportion of entering MS students publish than is indicated by this percentage.

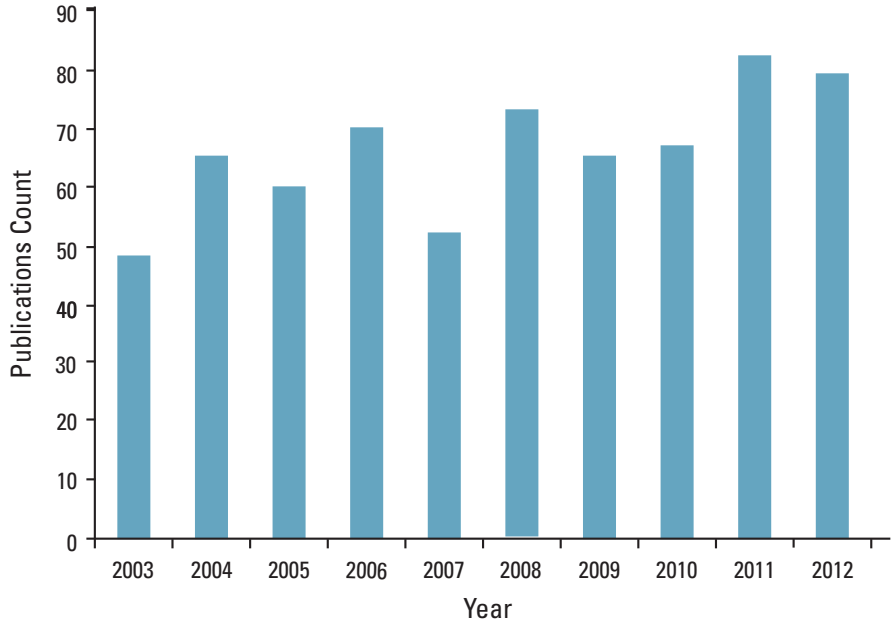


Figure III.4: Peer-reviewed papers with graduate student authors.

journals such as *Nature* and the *Proceedings of the National Academy of Sciences* (Figure III.4). SAFS graduate students obtained 14 top paper/presentation awards at national scientific conferences during the last four years. Graduate students also enhance the teaching mission as TAs and, in a few exceptional cases, they serve as instructors for a course. These avenues for professional development prepare graduate students for careers in academia, agency science, environmental consulting, and public education.

SAFS graduates are frequently awarded prestigious national awards that support their studies. During the last four years, SAFS students have been awarded 19 National Science Foundation graduate fellowships, one Environmental Protection Agency-STAR fellowship, and three National Marine Fisheries Service–Sea Grant fellowships. Graduate student research can be used for management purposes, even before publication. In addition, many graduate students provide service outside of the School.

III.3 Postdoctoral Fellows

Seventy-seven postdoctoral fellows were hosted by SAFS faculty between 2003 and 2012 (Appendix E.11). Postdoctoral fellows play a range of roles within SAFS. They are typically funded on a project-by-project basis and frequently act as leaders within laboratory groups. Activities include the organization of lab meetings and direction and guidance for research groups that typically include a mix of graduate and undergraduate students. After leaving SAFS, postdoctoral fellows take up positions as faculty members and as researchers in management agencies. Postdoctoral fellows were authors or co-authors of 210 peer-reviewed publications between 2003 and 2012 while they were at SAFS.

III.4 Impact of Program Graduates

Graduates with SAFS MS and PhD degrees are highly sought after in academia, by government agencies, and by environmental consulting companies. A total of 88% of MS and 94% of

PhD students who graduated between 2003 and 2012 have been employed either in a field related to aquatic and fishery sciences or they have progressed to further studies (Appendix F). Figure III.5 shows the current placement of SAFS MS and PhD students who graduated between 2003 and 2012. Approximately 12% of these graduates continued with their studies (MS students continued to PhD programs, either at UW or other universities). About 46% of the graduates are employed as research scientists at government scientific and management agencies (primarily with the two Seattle NOAA Science Centers [57 of 269 graduates], and with the Washington Department of Fish and Wildlife). The large number of graduates who work with state and federal agencies in the Pacific Northwest further increases the impact SAFS has on the research, management, and policy development in the region. Twelve of the graduates between 2003 and 2012 have already obtained faculty positions, two of these in SAFS (Trevor Branch and Kristin Laidre). Ten percent of the graduates are currently postdoctoral fellows, and it is expected that most of those individuals will obtain academic or agency positions. Thirteen percent of the graduates have found positions with consulting firms and some actually own their own firms. Finally, a small proportion of graduates now work with environmental non-governmental organizations (ENGOs).

III.5 Collaborative and/or Interdisciplinary Efforts

SAFS is involved in a range of collaborative and interdisciplinary research programs, with groups across the UW campus and with partners in the Pacific Northwest, and more generally, across the nation and the world.

1. The **Quantitative Ecology and Resource Management** (QERM) Program: QERM is an interdisciplinary program administered and funded by the UW Graduate School.

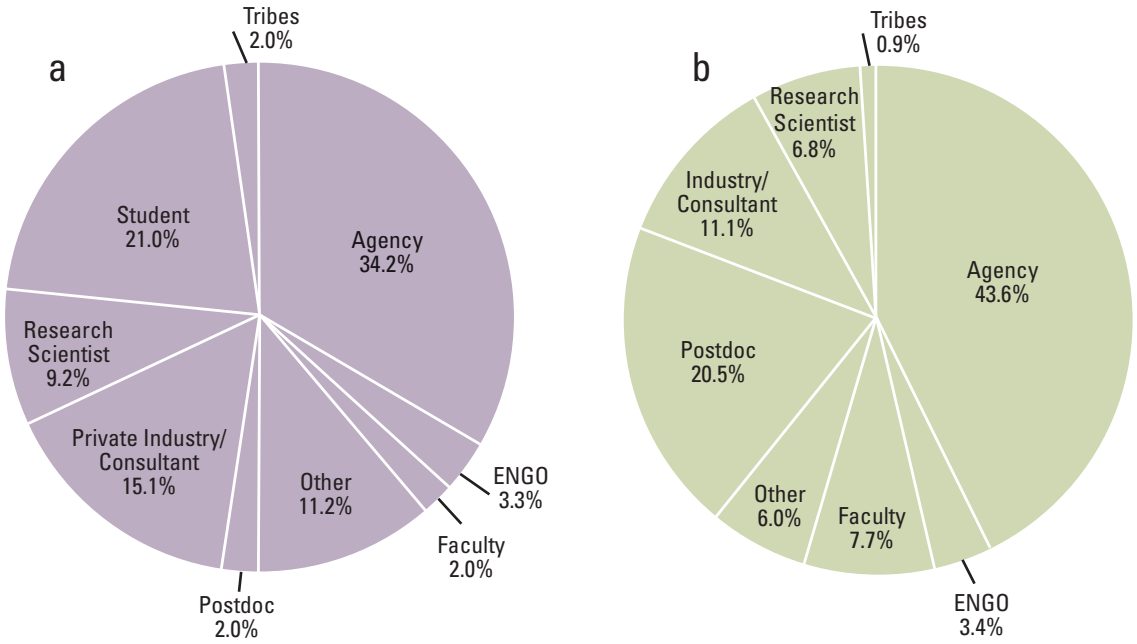


Figure III.5a: Placement of MS students advised by SAFS faculty (includes QERM and Biology students).
Figure III.5b: Placement of PhD students advised by SAFS faculty (includes QERM and Biology students).

The program recruits students who wish to study a range of statistical and mathematical problems within the area of management of terrestrial and marine systems. At present, nine SAFS faculty are chairs of the graduate committees of 11 of the 20 active QERM students (Appendices C.1 and C.6). The Director of QERM (Tim Essington) is a SAFS faculty member.

2. The **Western Regional Aquaculture Center** (WRAC): All WRAC research projects are required to address regional issues and to involve teams of investigators comprised from more than one university. All WRAC projects include an extension specialist and an industry adviser to ensure that research findings are transferred to industry in a timely fashion.
3. The **Washington Cooperative Fish and Wildlife Research Unit** (Coop): The Coop personnel conduct research, mentor graduate students, and teach graduate-level courses.
4. **Partnership with NOAA Fisheries**: SAFS faculty and NOAA scientists are joint principal investigators on numerous projects. SAFS faculty are members of major advisory bodies for federal fisheries management, and NOAA scientists are members of graduate committees. NOAA Fisheries has recognized that there is a severe lack of scientists qualified to conduct the quantitative analyses needed to support its mission. Consequently, NOAA Fisheries and SAFS have developed a memorandum of understanding that supports the hire of two tenure-track faculty (Chris Anderson and Trevor Branch), as well as funding for graduate students working in the areas of stock assessment and resource economics for fisheries management. The availability of funding for faculty and additional students has further increased the extent of collaboration between SAFS and NOAA Fisheries.
5. The **Wetlands Ecosystem Team** (WET) collaborates with researchers and students from related disciplines and divisions at the UW and colleagues in national and state natural resource agencies. WET has strong interdisciplinary ties with universities and research institutions around the country.
6. The **Molecular Ecology Research Lab's** collaboration with state and federal agencies is central to the lab's activities. For example, the lab interacts with the Washington Department of Fish and Wildlife, the Yakama Nation, and NOAA's Northwest and Alaska Fisheries Science Centers. The group participates in research under the auspices of international treaty organizations, including the Pacific Salmon Commission and North Pacific Anadromous Fish Commission. It also maintains collaborations with national and international scientists.
7. The **Freshwater Initiative**: SAFS, in collaboration with other departments in the College, the UW College of Engineering, and UW-Tacoma, proposed to develop a Freshwater Initiative to build research and education capacity in Freshwater Sciences across the University. The initiative was funded in 2012, with an initial contribution of four faculty positions, one of which is Gordon Holtgrieve. Future activities include more coordinated undergraduate and graduate curricula, and development of cross-disciplinary freshwater research projects.

SAFS teaching and mentorship is integrated across campus in several ways. Specifically, our undergraduate students are encouraged to take courses outside the School to expand their education and better prepare them for working in a diverse and interdisciplinary field. Graduate students take courses through the QERM program as well as in many other units across campus. SAFS faculty constitute the majority

of core faculty in the QERM program and have adjunct appointments in several units across campus (Appendix C.2). Also, our faculty also teach in other units, including Biology, CQS, Economics, and Environmental and Forest Resources, and they also teach courses offered at the College level. In addition, they co-teach courses at the Friday Harbor Labs. Finally, several SAFS courses are joint-listed with courses in several UW units.

III.6 Junior Faculty

All Assistant Professors are assigned a faculty mentor (usually a full professor) who helps them to advance their careers, including, but not restricted to, their research activities and teaching. The faculty mentor provides guidance on publications, obtaining research grants, and working towards achieving tenure. Since 2003, all cases for promotion from Assistant to Associate Professor have been successful. All junior faculty have annual meetings with the Director during which they describe their activities over the year and discuss their Annual Activity Reports and their aims and objectives for the next year. The Director provides advice on how they can take advantage of emerging opportunities, discusses their progress toward promotion, and explores how to work towards a stronger promotion package. The Promotion and Tenure Committee also works with junior faculty to construct a file that best portrays their achievements and contains required elements. Finally, teaching evaluations are conducted annually by faculty appointed by the SAFS Curriculum Committee for all courses conducted by Assistant Professors.

III.7 Recruiting and Supporting Faculty from Underrepresented Groups

SAFS recognizes the importance of having a diverse faculty that is representative of the communities that we serve. SAFS and the College define underrepresented groups as minorities and other demographic groups who are poorly represented in the field. When Loveday Conquest's retires in 2014, we will lack faculty from underrepresented groups. SAFS is aware of this issue and is taking steps to enhance recruitment and support. Our efforts are focused on improving diversity in the applicant pool by strengthening the diversity in our graduate program. For example, in 2012 SAFS focused its commitment to recruit minority and underrepresented students into the environmental sciences by targeting Native American students from Tribes in the Pacific Northwest, including Alaska. These groups have current and historical cultural and economic ties with the fish, invertebrate, and marine mammal resources of the North Pacific, and the research activities of many SAFS faculty relate to these resources. SAFS is also represented on the College Diversity Committee, with faculty (Loveday Conquest and Gordon Holtgrieve) and graduate student (Daniel Hernandez) and staff representation.

SAFS established a departmental diversity committee in 2011 to provide direction and focus for efforts to recruit and retain minority and underrepresented students, facilitate and coordinate outreach activities, and increase minority and underrepresented students in research programs.

Section IV: Future Directions

Our aim is to maintain our stature as one of the premier aquatic science and fisheries programs in the world by adapting our education, research, and service to the changing needs and demands of society. This ongoing evolution is of central importance to our goal of producing the next generation of researchers, managers, teachers, and policy makers. We have responded to changing needs in several ways over the last two decades.

A 10-year review in 1991 led, *inter alia*, to consolidation of our key strengths by closing several research programs and by streamlining our undergraduate degree program. In 2003, these changes were commended in a highly positive review, which found that the School has excellent and accessible faculty and staff, competitive students, and a "small school" feel. The changes between 1991 and 2002 were noted as remarkable, a testament to SAFS's culture of collaborative and collegial means of governance and administration.

We continue this ethos of excellence in our leadership and stewardship of the field by constant re-evaluation and change, ensuring that we mentor students with BS, MS, and PhD degrees who are prepared to become leaders in the future. We identify the needs of next generations of students and, simultaneously, fulfill the educational, research, and outreach goals of our new College, by providing incentives for high impact and high risk, interdisciplinary work, and by enhancing connections with ENGOs, agencies, and other stakeholders.

Retirements have led to changes in key research programs (freshwater fishes, habitats, and management: Jim Karr, Bob Wissmar, and Bob Naiman; marine fisheries management: Bob Francis and Don Gunderson). During the same period, we hired eight new faculty members (Appendix C.7) who are taking the School into new directions.

Below we list key issues and opportunities for the next 10 years. Some of these issues will be pursued immediately, while others will require thoughtful development based on faculty discussions.

IV.1. Increase support for key programs and eliminate programs that are not a focus for our projected research and teaching mission

IV.1.1 The Alaska Salmon Program

The Alaska Salmon Program (ASP) is a unique, award-winning, and iconic field program dedicated to understanding the ecology of salmon and their ecosystems in Alaska. The ASP significantly contributes to the management of salmon in Alaska and the Pacific Northwest. It supports excellent science, has collected unique long-term data sets, has high public visibility, and is strongly valued by students, faculty, and stakeholders.

We recognized the need to seek and secure long-term stable funds for the ASP during the last 10-year review. The funding base for the program diversified substantially from 2002 to 2012, and is no longer completely reliant on funding from the Alaska salmon processing industry. The processors continue to be an important partner, but their funding contributions are much smaller than in the first few decades of the program. The major sources of recent funding have been the National Science Foundation and the Gordon and Betty Moore Foundation, although grants have also been obtained from other sources, including from SAFS. Future funding for the ASP will inevitably include grants from agencies and foundations for specific projects, but the long-term sustainability of

the program would be substantially improved through an endowment to provide core support for key staff and facilities. SAFS faculty are working with potential donors and the College Advancement staff to facilitate a large endowment to support the ASP. In addition, SAFS is also developing partnerships with other academic institutions in the region, in particular the University of Alaska, with the aim of establishing new field programs and continuing existing data collection efforts.

IV.1.2 Big Beef Creek Research Station

The Big Beef Creek watershed and adjacent intertidal habitat on Hood Canal have been used for research by several SAFS faculty, both historically and recently. The facility is presently being used by a researcher from NOAA and by the state of Washington for fish population monitoring (Big Beef Creek is an indicator stream for forecasting salmon returns). The site is also used for flow monitoring and fish and habitat sampling, and is visited by students from local elementary and high schools. Costs associated with maintaining the facility are supported by revenue arising from facilities use fees as well as from SAFS and the College.

Over the last 10 years, SAFS has aimed to establish new and significant research, teaching, and graduate training opportunities at the Big Beef Creek Research Station. However, no SAFS faculty are currently using the station, and there is little likelihood of current or new faculty engagement in the near future. We have explored initiatives that encourage research at Big Beef Creek, and have identified and worked with environmental groups with the aim of supporting this unique site. While we continue to explore these options, it appears that the likelihood of success is low. It may be time for SAFS to approach the UW administration to facilitate a transfer of this Research Station, possibly permitting the establishment of broader partnerships.

IV.1.3. High Seas Salmon Research Program

The High Seas Salmon Research Program was one of the longest-running research programs at the University. From 1953 to 2005, the US Government provided support for research on issues related to Pacific salmon in the North Pacific Ocean and participation in the deliberations of the International North Pacific Fisheries Commission and the North Pacific Anadromous Fish Commission. The program was ended in 2013 owing to budget reductions, retirements, and programmatic changes.

IV.2 Invest in new faculty to replace retirements and to engage in emerging areas of study

Over time, our School has evolved to meet the changing demands of the employers of our students, the emergence of new issues and research areas, the development and expansion of technologies and data sets, and the availability of new funding opportunities. Predicting science and teaching requirements/needs 10 years hence is challenging. Our ability to maintain international excellence in research and teaching requires that we invest in new faculty who represent diverse fields, so that we can readily respond to this challenge.

As mentioned earlier in this document, the composition of the faculty has changed substantially since the last 10-year review. For example, 10 years ago our freshwater program included three senior faculty who have since retired (Bob Wissmar, Jim Karr, and Bob Naiman), and we have added two new faculty (Julian Olden and Daniel Schindler) who have continued our freshwater science research, while also taking it into new directions. Our freshwater program will be further enhanced as Gordon Holtgrieve develops his research lab and starts to mentor graduate and undergraduate students.

We expect to see more retirements in the next three years. For example, Loveday Conquest's

impending retirement (June 2014) will further reduce the number of SAFS (and College) faculty teaching quantitative courses, particularly within the CQS. In the short term, we will fund temporary instructors from our budget. However, SAFS needs to retain academic vigour in this area by hiring tenure-track faculty with research programs that focus on the development and use of quantitative methods in ecology, and who will contribute to courses in introductory and applied statistics.

SAFS faculty have established a process for selecting the priority areas for new hires. The first step is a roundtable discussion by all faculty to highlight key needs. Small groups of faculty are then established to develop position descriptions, which are brought back to the full faculty to develop a priority listing. This latter process determines the position(s) that will best enhance the School and identifies the most appropriate mechanism for hiring. Decisions are made based on a range of factors, including (a) contribution of the position(s) to the service and research missions of the School; (b) the programmatic impact of the position(s) to our high quality education (including the introduction of new courses); (c) the likely prospects for long-term sustainable funding, maintenance of research programs that will strengthen graduate student mentoring; and (d) the extent to which the new hire will collaborate within our unit, across other units in the College, and with faculty across the rest of the UW and beyond. The School strongly supports the College's initiative in interdisciplinary cluster hires within a focus area, and joint appointments as a way to increase cross-campus collaborations.

The faculty recognize that there are two ways to expand the program, characterized as "breadth vs depth," with breadth relating to hiring new faculty capable of moving the School in entirely new directions, and depth relating to enhancing existing disciplinary strengths. Future hires will likely include faculty that address both needs, but the School will need to balance this trade-off. Potential focus areas of research and teaching that the faculty have identified are: quantitative ecology, marine mammals, groundfish ecology, Arctic ecology, ichthyology, invertebrate biology, restoration ecology, aquaculture, environmental monitoring, environmental assessment and management, and ocean change. The faculty identified the analysis of large data sets as central to many of these areas and see substantial value in making connections with existing UW "big data" initiatives. A new hire may also satisfy needs in more than one of these general areas. For example, a quantitative ecologist could address curricular needs for advanced courses in applied statistics and have a research focus in any of the other general areas. In 2013, the faculty agreed that position outlines should be developed for a few broad areas. Appendix H provides position descriptions and justifications for several general areas.

We have identified diverse funding sources that can be used to support new hires. Positions can be supported through traditional modes (replace FTEs following retirements), through non-traditional avenues such as those used for Chris Anderson and Trevor Branch (a partnership between NOAA and the College), "without tenure" hires, hires of new research faculty, or cluster hires and joint appointments.

IV.3 Identify new opportunities, build on existing successes, and address ongoing concerns

1. We view the partnership between SAFS and NOAA that led to the hire of new faculty and provides additional mentorship of graduate students in critical fishery areas as a model that will inspire further partnerships between College units and federal agencies. The MOU with NOAA will need to be renegotiated to facilitate continued funding

of Chris Anderson and Trevor Branch in the next year or two. Ideally, the MOU should be expanded to include other faculty (John Horne and André Punt) whose research and teaching programs are closely aligned with NOAA.

2. SAFS faculty are among the poorest paid in the College (42% of SAFS faculty salaries are below the 25th percentile of College colleagues of similar rank). SAFS faculty are among the most productive and well-respected researchers within our peer academic community. This salary compression must be addressed so that we are able to retain our faculty and recruit new faculty that will maintain our reputation.
3. SAFS has already had a marked impact on understanding aquatic systems, how they function, and how they should be managed. This impact is achieved through publications, training the next generations of researchers and policy makers, and membership on key federal, state, and local committees. We aim to continue our central role in these areas and increase our involvement in committees through additional collaborations with agencies.
4. We see a need to foster more collaborations with faculty in the social sciences in the College, across campus, and outside of the UW. SAFS has established strong links (both historical and recent) with faculty in the School of Marine and Environment Affairs: our faculty are members of their MS committees, we contribute to their courses, and we collaborate with them on research projects. The hire of Chris Anderson, an economist, added a faculty member who works in the social sciences. However, there remains a significant opportunity for expansion in the social sciences because much of our research is focused on the interface between the natural and social sciences. Collaborative research and education should increase our impact and help prepare SAFS graduates for a changing work environment that operates at this interface.
5. Much of our research is conducted off-campus. The changed allocation model for indirect cost returns to individual units (see Part B of this report for additional details) could have substantially impacted the SAFS budget had the College not provided us with a supplement. The return of off-campus indirect costs to units has been reduced substantially. SAFS is unlikely to be able to transition much of its off-campus research to on-campus given the nature of the program, but aims to work towards using a mixed overhead rate model to partially address this problem.
6. Within the next 10 years, there will be retirements in the Coop. SAFS needs to work with Coop leadership to identify the expertise needed for replacement of unit leaders. We anticipate that the co-operators will expect new members to have stronger ties with the School of Environmental and Forest Sciences.

IV.4 Refine our undergraduate and graduate programs

The ideal time to graduation for a SAFS MS student is two-to-three years and for a PhD student is three-to-six years. Most SAFS students graduate within these time-frames (Appendix E.8). However, there is a need to monitor progress on students who are not moving forward as anticipated. The Associate Director has instituted a regular review of all graduate students against the agreed milestones.

SAFS has been involved with the development of the Marine Biology major, which we expect to be implemented in the next two years. This major is likely to have a significant impact on the number of SAFS majors. Some students

who would have been SAFS majors may shift to Marine Biology; on the other hand, the Marine Biology major could act as a recruitment tool for SAFS, other units in the College, and the UW in general. In addition, the Marine Biology major will also lead to increased enrolment in many of our undergraduate courses. We will need to respond by developing approaches for teaching larger classes while maintaining our ability to deliver experiential learning, for which we are well known. We may need to modify some of our existing courses over the next two-to-three years to address this challenge. A key immediate priority is to establish resource sharing arrangements so that the introduction of this new major will strengthen the College and UW generally, but not negatively impact SAFS, which will be central to the success of the Marine Biology major.

At the time of the 2003 review, there were few undergraduate SAFS majors and a key outcome of the review was to focus on increasing enrolment in the major. We aim to retain a vigorous undergraduate program even given the introduction of the Marine Biology major. Section II of this report outlines many of the current activities and new initiatives aimed at augmenting the number of declared majors. We plan to enhance the visibility of SAFS by maximizing faculty attendance at outreach events aimed at recruitment, such as the departmental autumn quarter information session. Many students join SAFS because of the ability to work with faculty in research labs; therefore, we plan to continue to increase the opportunities for freshmen and sophomores to work in research labs and to advertise extensively the internship and research opportunities in SAFS.

IV.5 Develop an Online Graduate-Level Program in Quantitative Science

SAFS already has the richest offerings in quantitative population dynamics of any academic unit in the world, and many students apply to our graduate program simply to take our population dynamics classes. There is also an ongoing demand nationwide for students with skills in population dynamics and quantitative ecology in general.

Discussions with students and faculty around the country suggest that interest in a program that integrates instruction from faculty in several institutions is high, and the demand for such a program is likely sustainable. A future program would be based on our existing classes, so that current students would not be negatively impacted. We would not necessarily offer a new degree, but rather the online offerings would provide an opportunity for external students to take SAFS classes that are currently undersubscribed, such as our upper division courses on population dynamics, parameter estimation, and risk analysis. We already broadcast the "Fisheries Think Tank" series (http://fish.washington.edu/news/miniworkshop/), which facilitates collaboration between NOAA and the UW in the general area of fisheries stock assessment and management advice. The content is delivered to NOAA laboratories in Seattle and elsewhere, as well as to universities on the US and Canadian west coast, and in Alaska. This new online graduate program would expand the already successful seminar series. We are currently working with College staff and faculty at Oregon State University to further develop this initiative and anticipate offering the first class with a remote lab session (FISH 559 Numerical

Computing for the Natural Resources) in fall 2014. We will use this class as a test case to help refine our plans for online education.

The benefits of this online program would be increased enrolment in our existing classes and access to courses that we do not currently teach but that are taught at partner institutions (such as Population Viability Analysis, which forms a key component of the basis for listing species under the Endangered Species Act). Ideally, remote teaching of some of our existing classes could lead to the addition of new classes to the curriculum (such as age- and length-structured stock assessment package classes, which have not been offered for several years). Additional classes could be led by affiliate faculty from NOAA (who are experts in this area) and members of partner institutions. We envision that this activity will enhance SAFS's established reputation as a leader in quantitative graduate education and will be an excellent recruitment tool for attracting students to our graduate program.

Part B: RESPONSE TO UNIT QUESTIONS

The quality of the science we produce, the education we provide, and the expertise of our faculty, students, postdoctoral fellows, and research staff reflects our ability to make use of emerging opportunities. SAFS has been identified as the top-ranked program in fisheries by *The Chronicle of Higher Education* and the National Research Council, and it is our intent to maintain this standing by building upon our strengths and identifying new research areas relevant to our mission.

Our Unit Questions address how we plan to respond to changing incentive structures and funding arrangements both within and outside the University, including:

- The implementation of Activity Based Budgeting (ABB) at the University. ABB is allocated based on teaching (tuition and state funds), and on expenses generated from grants and contracts.
    - o Additional funds associated with undergraduate teaching that are allocated to UW colleges reflect a formula based on the number of majors graduated and student credit hours. Initially, some faculty felt that the ABB concept appeared to de-emphasize experiential learning courses, which are necessarily small, in favor of large undergraduate courses. However, the College has avoided large numbers of new 100- and 200-level courses and has developed a resource allocation policy that emphasizes stability in allocation of additional resources that is not based on the exact proportion of new ABB generated by each unit. Units are increasingly learning to work within the ABB framework even though it has changed how units think about new courses.
    - o Prior to the 2012–13 academic year, UW colleges received 33% of the indirect costs generated from on-campus research and 67% generated from off-campus research. The allocation formula was subsequently changed to 35% for all indirect costs, irrespective of the source of funds or location of research. A substantial amount of the direct expenses due to research conducted by SAFS was not at the on-campus rate during the last biennium, which could mean a loss in indirect returns of $200,000-250,000 annually (roughly 30% of our total indirect return) if the policy is applied as written. The University provided the College with a supplement funded centrally to help alleviate the impact of this change, but the allocation of approximately $200,000 annually to SAFS is not currently guaranteed beyond three years.
- The College has implemented an interdisciplinary teaching requirement for all new faculty members, which can be satisfied by existing faculty teaching outside of SAFS. SAFS faculty already teach in several units and have long supported interdisciplinary teaching. However, increased teaching outside of the unit means that each time a faculty member retires and is replaced by a new faculty member, the amount of teaching that can be done within SAFS is reduced.
- The College has introduced a policy whereby retired faculty positions are "parked" for two years. This is a reasonable response to the need to fund post-retirement costs, but can place a unit in a difficult position in terms of

supporting key courses when a faculty member retires.
- Changes in federal funding have reduced budgets for our major funding sources, in particular NOAA. This has meant that opportunities for funding have decreased. Many SAFS faculty members attract agency funding because their research programs align well with agency science and management mandates, but reduced agency funding, combined with the need for agencies to maintain core activities, will lead to less funding for research for universities.

B.1 How do we maintain excellence in research given the evolving nature of aquatic and fishery science, as well as changing funding opportunities?

It is challenging to forecast research directions of individual faculty beyond current funding cycles. However, we envision future activities connected with global change, a topic that encompasses basic and applied questions related to: land use and its effects on freshwater and coastal ecosystems; increasing demand for seafood-derived protein and the ability of aquatic ecosystems to provide food through capture fisheries or aquaculture; and effects of anthropogenic and natural climate change on ecosystems and fisheries, including ocean acidification. SAFS faculty emphasize solution-based approaches to a wide range of issues. For example, they are already engaged in research and science advice on the application of Ecosystem-Based Management to fisheries and ecosystem conservation, as well as the impacts of ocean acidification and climate change on ecosystems and fisheries. We anticipate that we will continue to be leaders in many areas over the next decade.

Recently, the College has supported our ability to capitalize on our past successes by developing multidisciplinary approaches to research and education. For example, the Freshwater Initiative resulted in the recruitment of a faculty member (Gordon Holtgrieve), who is developing his program in collaboration with faculty across the College. A second initiative, the "Future of Ice," is under development, and we anticipate creating a joint appointment across units as part of this initiative.

Maintaining excellence in research without substantial additional resources at the College level will be challenging. SAFS has identified two broad approaches for addressing this challenge, ensuring continued excellence in research.

B.1.a. Increased funding for new initiatives

We obtain funding from non-traditional sources, particularly from foundations and the fishing industry more frequently than in the past. Efforts to obtain funding from these sources need to be enhanced, given the likelihood of continued lower funding from our traditional state and agency sources of support. We see a need to assist faculty in engaging in outreach activities that enhance our visibility to non-traditional funding sources. A future faculty retreat will be used to develop a set of research visions, which can be used in discussions with funding bodies and partner management agencies.

A key constraint on submitting grants to certain funding agencies (e.g., Washington Sea Grant, Alaska Sustainable Salmon Fund, National Science Foundation Major Funding Initiatives) has been the requirement for matching funds. This constraint has prevented the submission of some meritorious grant proposals. SAFS needs to assess the extent to which funds from RCR could be invested in matches and balance these demands with those associated with funding other activities, such as the Big Beef Creek Research Station and the provision of RCR returns to individual faculty. We plan to discuss the allocation of RCR returns as a core discussion point at the future faculty retreat.

B.1.b Collaborations and partnerships

Although many faculty work successfully under the single PI-lab model, we see collaboration across campus and indeed, around the world, as essential for identifying priority research topics and achieving research outcomes. Some of the recent publications in high-profile journals that have involved SAFS authors have arisen from collaborations that provide a national or international overview of a major topic. The outcomes of these collaborations can motivate the priorities of funding bodies, leading to future support. For example, recently seed money has been provided to the UW by the Packard Foundation to develop an Ocean Modeling Forum. If this initiative is successful, it should provide a basis for leveraging additional funding, and at the same time, increasing the visibility of SAFS faculty conducting research in fisheries and ecosystem management.

The partnership with NOAA, which has led to partial funding of two faculty members, is a model for SAFS and the College. While the partnership is not without risks (for example, due to reductions in the NOAA budget), it has led to increased collaboration between the two organizations, as well as providing additional funding. The ability to establish similar partnerships (e.g., with NGOs) is limited at present owing to the state of the economy. However, we intend prioritizing the development of new relationships once the economy recovers and budgets increase. Our current partnership hinges on one of the School's long-term strengths, namely quantitative analyses in fisheries management. However, we are world leaders in several other areas. Our continued growth will rely on the expansion of our visibility in those areas as well. Increased participation of faculty in review panels and in workshops and meetings with management agency staff will enhance these efforts.

B.2 How do we maintain excellence in undergraduate and graduate education given the evolving nature of the aquatic and fishery sciences, and needs of the students, as well as changing incentive structure in the University?

Our aim for our students is that they graduate with an education that enables their effective contribution to developments in the aquatic sciences. The SAFS undergraduate degree was recently redesigned to respond to a growing trend in interdisciplinary research, to meet the expectations of employers, and to maintain the depth of knowledge promoted by our academic program. SAFS is currently reviewing the requirements of the graduate programs with these same goals in mind.

We continue to add new courses to our undergraduate and graduate curricula. In the last two years, we have:

- Formalized three new courses in the statistical language R.
- Introduced a new course, FISH 464 (Arctic Ecology) to be taught by Kristin Laidre every other year. This course, which had very high enrolment in winter 2013, examines the impact of the changing Arctic on species and ecosystems, and meets a key need in an emerging discipline.
- Established a writing course, now required for all undergraduate students (FISH 290), which is offered in fall and winter each year.
- Developed a new course on resource economics that will be first taught in Spring 2013.

In 2009, SAFS revised its introductory course, FISH 101 Water and Society, to better address the ecological and social issues associated with water resources due to changes in human population growth and climate change. SAFS teaches

a second 100-level course on food (CoENV 110 Introduction to Food and the Environment), which relates production and consumption of food to energy use, water consumption, biodiversity loss, soil loss, pollution, nutrient cycles, and climate change.

Our key issues, and possible solutions, in undergraduate and graduate education are:

- ***The proposed major in Marine Biology.*** This major is both an opportunity and a challenge for us. The Marine Biology minor is already very successful. A major will substantially increase enrolment in the College, enhance our visibility across campus, and attract additional applicants to the University. Our faculty support this initiative. However, the addition of a new Marine Biology major will likely reduce the number of majors in Aquatic and Fishery Sciences. Therefore, we believe developing a model outlining resource sharing among the contributing units as paramount. We predict a higher enrolment in our courses because of the new major, placing further demands on our labs (some of which need redevelopment and expansion). We also predict an increased number of TA positions to support continued high educational standards.
- ***Ensuring that our graduate program continues to train the top researchers in the field.*** We plan to address this challenge using a number of approaches. First, we will review the requirements for our MS and PhD degrees, refine existing courses, and perhaps add new courses. Our efforts will involve discussions with key employer groups and alumni. Second, we will develop ways to improve skill development in teaching, relevant to students preparing for academic careers. Finally, we will identify ways to enhance attendance at professional and scientific meetings.
- ***Providing student access to world class aquatic research facilities.*** Many of our facilities are aging. We see reduced use of the on-campus hatchery facility and almost no use of the Big Beef Creek Research Station. In 2013, SAFS established an Aquatic Facilities Committee to evaluate how we can best use our facilities. We have also identified the need to obtain long-term sustainable funding for the Alaska Salmon Program as part of the upcoming campaign.
- ***Increasing outreach and enrolment in graduate-level courses.*** SAFS has several advanced graduate courses that are highly relevant not only to our degree program, but also to outside audiences. However, they have low enrolment. Therefore, SAFS will work with partner institutions (initially Oregon State University) to teach courses remotely and increase enrolment, and hence the impact of SAFS nationwide.
- ***Expanding the set of courses relevant to our subject area, so that students are continually exposed to ongoing developments.*** We see an immediate need for a new faculty member who can teach topics related to climate change (we currently offer FISH 330 Climate Change Impacts on Marine Ecosystems, taught by an instructor). We will continue to take advantage of opportunities to offer specialist courses, where affiliate faculty act as instructors (recent courses include a graduate course on applied time series analysis and a senior course on stream and watershed restoration, both taught by NOAA affiliates).

B.3 How do we strengthen our ability to satisfy the current and future needs of our main clients?

The main clients for the School include potential employers of our graduates, the organizations that provide funding for our research, and the institutions with which we collaborate. SAFS has very good relationships with major federal and state science and management agen-

cies, as well with groups representing the commercial fisheries of the North Pacific and the aquaculture producers of Washington State. We are particularly motivated to enhance connections with local Tribes. Individual SAFS faculty members have good connections with the Tribes through research projects and educational institutions (for example, the Northwest Indian College). SAFS prioritized building links with the Tribes in 2012, and is particularly interested in increasing enrolment of graduate students with American Indian/Alaska Native backgrounds. We are also aiming to increase collaborations with the recreational and charter fishing industries of Washington State.

B.4 How do we continue to improve our standing as a source of information on regional, national, and international environmental issues?

SAFS faculty, staff, and students provide a comprehensive array of service and value as a dynamic mix of best science, advice, testimony, education, leadership, and outreach. We are engaged in debate and help define issues of public interest such as the effects of hatcheries on wild salmon populations; the use of marine protected area for conservation, water regulation, and health of salmon; and habitat destruction and restoration. We continually discuss myriad issues with the people of Washington State that affect their lives and economy. SAFS strives to be a rational voice on issues of public concern, but also to challenge established norms by giving "outcome-neutral" voice to issues of public debate. Nevertheless, we can do more in terms of making policy makers aware of who we are and what we offer. Faculty see an increasing involvement in regional issues as key to our continued relevance. The Puget Sound region in particular provides an excellent example of many of the challenges that face freshwater and marine systems nationally and worldwide.

We remain supportive of the concept of an Environmental Institute (EI) at the University. The EI would be an avenue for interactions among the UW community, our key stakeholders, and the broader community. SAFS views the EI as a forum for contentious or controversial debates, particularly in partnerships among industry, agencies, and academia. This approach would be similar to the "bottom–up" NCEAS model or a "top-down" NRC model. A set of research questions would be identified by an advisory committee and addressed in a two-stage process; there would be original research conducted by UW faculty, students, postdoctoral researchers, and research scientists, and there would be expert panels that consist of UW faculty and other individuals. We view the EI as the forum for addressing key issues in a preconceived outcome-neutral sense. The recently funded Ocean Management Forum might provide an example of how the EI could function.

An increasing fraction of the US population obtains its information from social media and the web. The SAFS website is currently a major way for the public to view our activities. However, this website requires revision and updating. Several SAFS faculty use social media for educational and research purposes. SAFS has established a committee to identify steps to improve the website and explore the use of social media to form links with the wider community. These developments will also enhance visibility to policy makers–locally and nationally–so that they continue to view SAFS as a primary source for obtaining guidance on science and policy.

There is also a significant opportunity to strengthen our reputation as a source of long-term data sets. SAFS faculty have developed many data sets that can be used to address important questions about status and trends in aquatic ecosystems. Our value to the community will be increased by making those data sets publicly available. For example, we have made

the RAM Legacy Stock Assessment Database publicly available through a new website hosted by the UW. The database has been used in more than 30 publications already.

We have considerable impact through our involvement on committees that provide scientific review and guidance for policy makers (Appendix C.5). Ensuring that the best science is used for addressing environmental problems will require that SAFS faculty continue to be involved in these committees, notwithstanding the substantial time commitment. This visibility means that the best science is used for management of our freshwater and marine ecosystems and also highlights the value of SAFS to communities of the West Coast and Alaska.

B.5 How do we increase diversity in the aquatic sciences and the School itself?

Within our student population, underrepresented minorities comprise approximately 3% of our graduate students and 30% of our undergraduates (including Hispanics, American Indians/Alaska Natives, African Americans, and Hawaiian/Pacific Islanders). American Indians/Alaska Natives comprise a notable portion of the students in the Alaska Salmon Program internship program that is funded by the Bristol Bay Native Association. SAFS connections to American Indians/Alaska Natives also include faculty collaboration with Tribal (Washington), Native Corporations (Alaska), and First Nations (British Columbia) on research. We also have several students who are first-generation college students or are from economically disadvantaged backgrounds. In total, 20 SAFS majors (17.5% of the total) are either underrepresented minorities, economically disadvantaged, and/or first-generation college students. SAFS does not admit self-funded graduate students. This means that students who come from economically disadvantaged backgrounds and wish to pursue graduate degrees in SAFS are not further disadvantaged by having large loans when they graduate.

SAFS recognizes the importance of having a diverse faculty that is representative of the communities that we serve. SAFS and the College define underrepresented groups as minorities and other demographic groups who are underrepresented in the field. The SAFS faculty body does not reflect this diversity. The School is exploring approaches to enhance recruitment and support of a diverse faculty in the future.

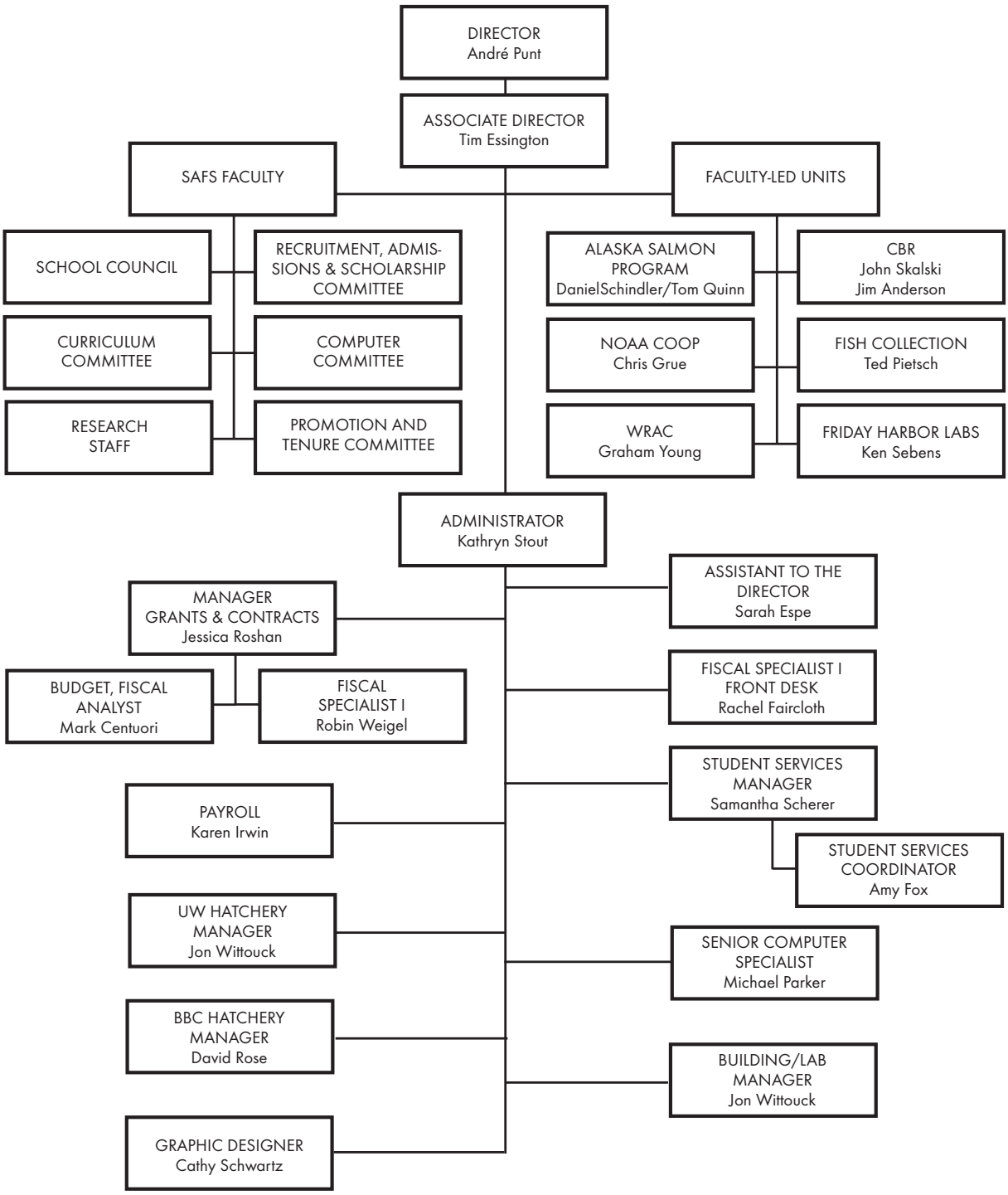
The best way to increase faculty diversity is to enhance the "pipeline"—that is, to increase the qualified applicant pool by increasing the student diversity in our graduate program. SAFS is working to achieve this goal in several ways. In 2012, the School developed a policy for recruiting minority and underrepresented students into the environmental sciences that focuses efforts on American Indian/Alaska Native students from Tribes in the Pacific Northwest. This approach was motivated by the fact that American Indians/Alaska Natives from the Pacific Northwest have current and historical cultural and economic ties with the region's fish, invertebrate, and marine mammal resources. The research activities of many SAFS faculty relate to these resources, and many SAFS faculty already collaborate with the Tribes. SAFS faculty members regularly engage in activities to enhance opportunities to recruit underrepresented groups (e.g., activities organized by GO-MAP, recruiting lab tours for MESA Community College program, and outreach to the Louis Stokes Alliance for Minority Participation).

APPENDIX A

SAFS ADMINISTRATIVE ORGANIZATION CHART

APPENDIX A

SCHOOL OF AQUATIC & FISHERY SCIENCES
ADMINISTRATIVE ORGANIZATION



FIGURE—SAFS organization chart. Note several "faculty-led" units that represent long-term external funding and support for major research programs that benefit students in all degree programs (B.S., M.S., Ph.D.). The current organizational structure is simplified compared with years past in order to better direct time and resources to our teaching and research programs.

APPENDIX B

BUDGET

APPENDIX B.1

BUDGET SUMMARY

	Biennium		
State Salary	2007–09	2009–11	2011–13
Faculty Salaries	3,293,120	3,508,754	3,566,482
TA Salaries	41,289[1]	191,233[1]	92,966[1]
Staff Salaries	1,833,080	1,724,722	1,515,146
Supplies/Services	50,129	213,240	193,941
Benefits[2]	0	668,268	1,499,043
Equipment		0	0
Total	**5,217,618**	**6,306,217**	**6,867,578**

Indirect Returns (Dept only)[3]	2007–09	2009–11	2011–13
Supplies/Services	705,939	1,037,981	1,105,426

1 – Stipends and benefits for Teaching Assistants were covered from other budgets so these figures do not reflect the total cost of Teaching Assistants.

2 – Benefits were held centrally until the 2010-11 fiscal year so 2009-11 biennium includes benefits for one academic year only

3 – As of July 2013, indirect cost returns are explicitly budgeted to cover 5% of the salaries of Research Faculty, as well as the salaries and benefits for some of the administrative staff whose responsibilities relate primarily to grants and contracts.

APPENDIX B.2

TOTAL DIRECT EXPENDITURES ('000 DOLLARS) FROM EXTERNAL SUPPORT BY SOURCE OF SUPPORT

	Dept. of Health	Dept. of Defense	Dept. of Energy	NSF	NOAA	Other Federal*	Wa State	Local Govt	Industry	Associations	Foundations	Other non-fed	Gifts/ Endowments	Total
2002–03	38	109	1207	362	-	3941	562	896	109	173	346	144	509	8396
2003–04	39	87	1132	343	261	4496	603	839	84	154	601	194	520	9093
2004–05	16	86	1402	725	1687	4149	543	726	152	128	550	220	535	9232
2005–06	37	74	1401	842	2165	3648	407	412	99	54	833	291	625	8725
2006–07	4	128	1497	662	2454	3631	277	390	124	241	1491	398	696	9540
2007–08	0	178	1561	699	1826	4054	504	502	96	237	2954	450	661	11906
2008–09	0	128	1676	765	1220	3916	587	448	230	189	2899	556	1155	12550
2009–10	0	126	1609	370	866	4113	677	663	102	324	2477	409	1327	12198
2010–11	0	316	1496	547	979	4293	792	560	25	200	1323	463	963	10977
2011–12[1]	0	375	1505	1453	810	4745	421	641	45	175	1031	450	920	11760

*NASA, Dept of Agric, Dept of Comm, Dept of Interior

1 – 2011-12 is the most recent year for which this information is available

APPENDIX B.3

UNDERGRADUATE AND GRADUATE STUDENTS FUNDED THROUGH ENDOWMENTS

AY Year	Graduate Students						Undergraduate students	
	Entry Fellowship					Continuing Students (quarters)	New ($1000)	Continuing / Transfer ($1000)
	2 quarter	5 quarter	6 quarter	8 quarter	Total quarters			
2007–08	0	1	0	6	53	2		
2008–09	0	2	1	4	48	16.5	24.5	31.5
2009–10	1	0	1	8	72	22	13.9	33.6
2010–11	0	0	5	0	30	2.5	24.8	21.8
2011–12	1	0	6	2	54	5	27.6	21.9
2012–13	2	0	4	1	36	6.5	20.0	24.1

APPENDIX C

FACULTY

APPENDIX C.1
LIST OF CURRENT FACULTY AND SUPERVISORY COMMITTEES CHAIRED (2003–PRESENT)

Major Professor	Student Name	Degree Earned Year	Degree
Anderson, Chris	Scheld, Andrew		SAFS PhD (Current Student)
	Li, Zhi		SAFS PhD (Current Student)
Anderson, Jim	Cobleigh, Molly	2003	Master of Science (AFS)
	Zorich, Nathan	2004	Master of Science (AFS)
	Steel-Feldman, Abran	2006	Master of Science (QERM)
	Li, Ting	2008	Master of Science (QERM)
	Gurarie, Eli	2008	Doctor of Philosophy (QERM)
	Bracis, Chloe	2010	Master of Science (QERM)
	Murphy, James	2010	Doctor of Philosophy (AFS)
	Bracis, Chloe	2010	Doctor of Philosophy (QERM)
	Gosselin, Jennifer	2011	Doctor of Philosophy (AFS)
	Li, Ting	2011	Doctor of Philosophy (QERM)
	Widener, Daniel	2012	Master of Science (AFS)
	Passolt, Gregor	2012	Master of Science (QERM)
	Vitense, Kelsey		QERM M.S. (Current Student)
	Burke, Brian		SAFS PhD (Current Student)
	Zapel, Edwin		SAFS PhD (Current Student)
	Rutter, Jeffrey		QERM PhD (Current Student)
Armstrong, David	Hosak, Geoff	2003	Master of Science (AFS)
	Holsman, Kirsten	2006	Doctor of Philosophy (AFS)
	McDonald, P Sean	2006	Doctor of Philosophy (AFS)
	Feldman, Chris	2009	Doctor of Philosophy (Biology)
Beauchamp, Dave	Duffy, Elisabeth J	2003	Master of Science (AFS)
	McCarthy, Sarah	2004	Master of Science (AFS)
	Sergeant, Christopher	2004	Master of Science (AFS)
	McIntyre, Jenifer K	2004	Master of Science (AFS)
	Mazur, Michael M	2004	Doctor of Philosophy (AFS)
	Moss, Jamal H	2006	Doctor of Philosophy (AFS)
	Cross, Alison D	2006	Doctor of Philosophy (AFS)
	Schoen, Erik R	2007	Master of Science (AFS)
	Berge, Hans B	2009	Master of Science (AFS)
	Lowery, Erin D	2009	Master of Science (AFS)
	Duffy, Elisabeth J	2009	Doctor of Philosophy (AFS)
	McIntyre, Jenifer K	2010	Doctor of Philosophy (AFS)
	Hansen, Adam G		SAFS M.S. (Current Student)
	Kemp, Iris		SAFS M.S. (Current Student)
	McCoy, Allison		SAFS M.S. (Current Student)
	Thompson, Jamie N		SAFS M.S. (Current Student)
	Hansen, Adam G		SAFS PhD (Current Student)
	Schoen, Erik R		SAFS PhD (Current Student)
	Siple, Margaret		SAFS PhD (Current Student)
Bentzen, Paul	Jensen, Pamela	2006	Doctor of Philosophy (AFS)
Branch, Trevor	Kuriyama, Peter		SAFS M.S. (Current Student)
	Monnahan, Cole		QERM M.S. (Current Student)
	Muradian, Melissa		QERM M.S. (Current Student)

Major Professor	Student Name	Degree Earned Year	Degree
Conquest, Loveday	Frans (Innis), Stephanie	2003	Master of Science (AFS)
	Buchanan, Rebecca	2003	Master of Science (QERM)
	Zhong, Judy	2004	Master of Science (AFS)
	Rentmeester, Steve	2004	Master of Science (AFS)
	Sethi, Suresh	2007	Master of Science (AFS)
	Maney, Roger	2007	Master of Science (AFS)
	Keim, Michael	2008	Master of Science (QERM)
	Hammond, Carwyn	2009	Master of Science (AFS)
	Danielsdottir, Marta	2009	Master of Science (QERM)
	Nelson, Ben	2010	Master of Science (AFS)
	Helyer, Jason		SAFS M.S. (Current Student)
	Broms, Kristin M		QERM PhD (Current Student)
Dickhoff, Walt	Larson, Shawn	2003	Doctor of Philosophy (AFS)
	Pierce, Andrew	2003	Doctor of Philosophy (AFS)
	Paranjpye, Rohinee	2005	Doctor of Philosophy (AFS)
	Neely, Kathleen	2006	Master of Science (AFS)
Essington, Tim	Wiedenmann, John	2004	Master of Science (AFS)
	Reum, Jon	2006	Master of Science (AFS)
	Watson, Jordan	2007	Master of Science (AFS)
	Marshall, Kristin	2007	Master of Science (AFS)
	Paulsen, Caroline	2008	Master of Science (AFS)
	Beaudreau, Anne	2009	Doctor of Philosophy (AFS)
	Hunsicker, Mary	2009	Doctor of Philosophy (AFS)
	Whitehouse, George Andy	2011	Master of Science (AFS)
	Ferris, Bridget	2011	Doctor of Philosophy (AFS)
	Reum, Jon	2011	Doctor of Philosophy (AFS)
	Hodgson, Emma		SAFS M.S. (Current Student)
	Koehn, Laura		SAFS M.S. (Current Student)
	Moriarty, Pamela		SAFS M.S. (Current Student)
	Oken, Kiva L		QERM M.S. (Current Student)
	Stawitz, Christine C		QERM M.S. (Current Student)
	Froehlich, Halley E		SAFS PhD (Current Student)
Francis, Robert	Strom, Are	2003	Master of Science (AFS)
	Field, John	2004	Doctor of Philosophy (AFS)
	Weitkamp, Laurie	2004	Doctor of Philosophy (AFS)
	Agostini, Vera	2005	Doctor of Philosophy (AFS)
	Gaichas, Sarah	2006	Doctor of Philosophy (AFS)
	Ortiz, Ivonne	2007	Doctor of Philosophy (AFS)
	Little, Judith	2009	Doctor of Philosophy (AFS)
	Sharma, Rishi	2009	Doctor of Philosophy (QERM)
Friedman, Carolyn	Nelson, Sonya	2005	Master of Science (AFS)
	Bouma, Joshua	2007	Master of Science (AFS)
	Stevick, Bethany	2010	Master of Science (AFS)
	Burge, Colleen	2010	Doctor of Philosophy (AFS)
	Straus, Kristina	2010	Doctor of Philosophy (AFS)
	Lowe, Vanessa	2011	Master of Science (AFS)
	Crosson, Lisa Marie	2011	Master of Science (AFS)
	Dorfmeier, Elene M	2012	Master of Science (AFS)

Major Professor	Student Name	Degree Earned Year	Degree
Friedman, Carolyn	Miller, Jason J		SAFS M.S. (Current Student)
	Gregg, Jacob L		SAFS PhD (Current Student)
Friedman, Carolyn Herwig, Russell	Chaiyapechara, Sage	2008	Doctor of Philosophy (AFS)
Friedman, Carolyn Roberts, Steven	Metzger, David C	2012	Master of Science (AFS)
	Crosson, Lisa Marie		SAFS PhD (Current Student)
Gallucci, Vincent	Tribuzio, Cindy	2004	Master of Science (AFS)
	Menon, Mukta	2004	Master of Science (AFS)
	Rand, Kimberly	2007	Master of Science (AFS)
	Rice, Joel	2007	Master of Science (QERM)
	Vega, Nicole	2007	Master of Science (QERM)
	Silva, Alexandre Aires	2008	Doctor of Philosophy (AFS)
	Taylor, Ian	2008	Doctor of Philosophy (QERM)
	Ness, Hans	2009	Master of Science (QERM)
	O'Brien, Shannon	2011	Master of Science (AFS)
	Hariharan, Aneesh		QERM PhD (Current Student)
Grue, Christian	King, Kerensa A	2003	Master of Science (AFS)
	Smith, Bridget C	2003	Master of Science (AFS)
	Tamayo, Mariana	2003	Doctor of Philosophy (AFS)
	Kertson, Brian N	2005	Master of Science (Forestry)
	Curran, Catherine A	2007	Master of Science (AFS)
	Sternberg, Morgan R	2009	Master of Science (AFS)
	Smith, Michael C	2009	Master of Science (Forestry)
	Frew, John A	2010	Master of Science (AFS)
	Kertson, Brian N	2010	Doctor of Philosophy (Forestry)
	King, Kerensa A	2011	Doctor of Philosophy (AFS)
	Troiano, Alexandra		SAFS M.S. (Current Student)
	Frew, John A		SAFS PhD (Current Student)
	Poovey, Angela		SAFS PhD (Current Student)
	Yahnke, Amy		SAFS PhD (Current Student)
	Smith, Michael C		Forestry PhD (Current Student)
Gunderson, Don	McDermott, Susanne	2003	Doctor of Philosophy (AFS)
	Hutchinson, Charles	2004	Master of Science (AFS)
	Matta, Mary	2006	Master of Science (AFS)
	Hayden-Spear, Jessica	2006	Master of Science (AFS)
	Lowry, Nicholas	2007	Doctor of Philosophy (AFS)
Hauser, Lorenz Hilborn, Ray	Lin, Jocelyn	2012	Doctor of Philosophy (AFS)
Hauser, Lorenz	Franks, James	2006	Master of Science (AFS)
	Mitchell, Danielle	2006	Master of Science (AFS)
	Cunningham, Kathryn	2007	Master of Science (AFS)
	Lin, Jocelyn	2007	Master of Science (AFS)
	Creelman, Elizabeth	2010	Master of Science (AFS)

Major Professor	Student Name	Degree Earned Year	Degree
Hauser, Lorenz	Hess, Maureen	2010	Master of Science (AFS)
	Schwenke, Piper	2012	Master of Science (AFS)
	Peterson, Daniel	2012	Master of Science (AFS)
	O'Brien, Shannon		SAFS PhD (Current Student)
	Ostberg, Carl		SAFS PhD (Current Student)
Herwig, Russell	Marshall, Cynthia S	2003	Master of Science (AFS)
	Defawe, Rose M	2003	Master of Science (AFS)
	Perrins, Jake C	2004	Master of Science (AFS)
	Fraser, Whitney	2005	Master of Science (AFS)
	Purcell, Maureen	2005	Doctor of Philosophy (AFS)
	Adams, Nicolaus	2006	Master of Science (AFS)
	Nielsen, Bryan C	2006	Master of Science (AFS)
	Baxter, Anne E	2010	Master of Science (AFS)
Hilborn, Ray Quinn, Thomas	Cunningham, Curry		SAFS M.S. (Current Student)
Hilborn, Ray	Hendrix, Albert Noble	2003	Doctor of Philosophy (AFS)
	Chasco, Brandon	2004	Master of Science (AFS)
	Branch, Trevor	2004	Doctor of Philosophy (AFS)
	Minte-Vera, Carolina	2004	Doctor of Philosophy (AFS)
	Brauner, Jody	2004	Doctor of Philosophy (AFS)
	Flynn, Lucy	2005	Master of Science (AFS)
	Stewart, Ian	2006	Doctor of Philosophy (AFS)
	Ward, Eric	2006	Doctor of Philosophy (AFS)
	Westly, Peter	2007	Master of Science (AFS)
	McGilliard, Carey	2007	Master of Science (AFS)
	Simmons, Ryan	2009	Master of Science (AFS)
	Dougherty, Dawn	2009	Master of Science (QERM)
	Sethi, Suresh	2010	Doctor of Philosophy (AFS)
	Valero, Juan	2011	Doctor of Philosophy (AFS)
	Gutierrez, Nicolas	2011	Doctor of Philosophy (AFS)
	McGilliard, Carey	2012	Doctor of Philosophy (AFS)
	Stachura, Megan		SAFS M.S. (Current Student)
	Vert-Pre, Katyana		SAFS M.S. (Current Student)
	Hicks, Allan C		SAFS PhD (Current Student)
	Ono, Kotaro		SAFS PhD (Current Student)
Horne, John	Hazen, Elliott L	2003	Master of Science (AFS)
	Henderson, Mark J	2005	Master of Science (AFS)
	Nealson, Patrick A	2007	Master of Science (AFS)
	Burgos, Julian M	2008	Doctor of Philosophy (AFS)
	Adam, Patrick M	2009	Master of Science (AFS)
	Atwood, Elizabeth	2010	Master of Science (QERM)
	Urmy, Samuel	2012	Master of Science (AFS)

Major Professor	Student Name	Degree Earned Year	Degree
Horne, John	Barbeaux, Steven J	2012	Doctor of Philosophy (AFS)
	Williams, Kresimir	2013	Doctor of Philosophy (AFS)
	Jacques, Dale A		SAFS M.S. (Current Student)
	Fraser, Ian E		QERM M.S. (Current Student)
	McGowan, David W		SAFS PhD (Current Student)
	Phillips, Elizabeth M		SAFS PhD (Current Student)
Horne, John Hunt, George	Runnells, Emily S		SAFS M.S. (Current Student)
Horne, Punt Punt, André	Kotwicki, Stan		SAFS PhD (Current Student)
Horner-Devine, Claire	Silver, Jessica	2009	Master of Science (AFS)
	Lange, Rachel K		SAFS M.S. (Current Student)
Horner-Devine, Claire Schindler, Daniel	Jankowski Giefer, Kathijo		SAFS PhD (Current Student)
Karr, James	Rice, Casimir	2007	Doctor of Philosophy (AFS)
Laidre, Kristin	MacIntyre, Kalyn		SAFS M.S. (Current Student)
	Hauser, Donna		SAFS PhD (Current Student)
Mantua, Nate	Beetz, Jessica	2009	Master of Science (AFS)
	Atcheson, Margaret	2010	Master of Science (AFS)
	Fournier, Wyatt	2011	Master of Science (AFS)
	Sadorus, Lauri	2012	Master of Science (AFS)
Mantua, Nate Quinn, Thomas	Hernandez, Daniel		SAFS M.S. (Current Student)
Miles, Ed	Thummachua, Smith	2003	Doctor of Philosophy (AFS)
Miller, Bruce	Cooper, Daniel	2003	Master of Science (AFS)
	Gregg, Jacob L	2003	Master of Science (AFS)
	Nelson, Mark	2004	Master of Science (AFS)
	Weis,Lucie	2004	Master of Science (AFS)
	Britt, Lyle	2009	Doctor of Philosophy (AFS)
Naiman, Robert	Latterell, Joshua	2005	Doctor of Philosophy (AFS)
	Drake, Deanne	2005	Doctor of Philosophy (AFS)
	Bechtold, James	2007	Doctor of Philosophy (AFS)
	Stolnack, Scott	2008	Master of Science (AFS)
	Perkin, Elizabeth	2009	Master of Science (AFS)
Naish, Kerry	McClelland, Erin	2004	Master of Science (AFS)
	Dauer, Michael	2007	Master of Science (AFS)
	Eldridge, William	2007	Doctor of Philosophy (AFS)
	McClelland, Erin	2008	Doctor of Philosophy (AFS)
	Sjostrom, Teresa E		SAFS M.S. (Current Student)
	Waters, Charles D		SAFS M.S. (Current Student)
	Brieuc, Marine S		SAFS PhD (Current Student)
	Drinan, Daniel P		SAFS PhD (Current Student)

Major Professor	Student Name	Degree Earned Year	Degree
Naish, Kerry	Kodama, Miyako		SAFS PhD (Current Student)
Olden, Julian	Mims, Meryl	2010	Master of Science (AFS)
	Larson, Eric	2011	Doctor of Philosophy (AFS)
	Kuehne, Lauren	2012	Master of Science (AFS)
	Pool, Thomas	2012	Doctor of Philosophy (AFS)
	Fritschie, Keith		SAFS M.S. (Current Student)
	Gibson, Polly		SAFS M.S. (Current Student)
	Twardochleb, Laura		SAFS M.S. (Current Student)
	Lawrence, David J		SAFS PhD (Current Student)
	Mims, Meryl		SAFS PhD (Current Student)
Parrish, Julia	Dietrich, Kimberly	2003	Master of Science (AFS)
	Speckman, Suzann	2004	Doctor of Philosophy (AFS)
	Smith, Joanna	2008	Doctor of Philosophy (AFS)
	Hamel, Nathalie	2009	Doctor of Philosophy (AFS)
	Schrimpf, Michael	2011	Master of Science (AFS)
	Stienessen, Sarah		SAFS PhD (Current Student)
Parrish, Julia Punt, André	Zador, Stephani	2007	Doctor of Philosophy (AFS)
Pietsch, Ted	Dodd, Kathryn Aubrey	2003	Master of Science (AFS)
	Garrett, Daniel	2005	Master of Science (AFS)
	Jorgensen, Elaina M	2005	Master of Science (AFS)
	Woods, Pamela	2005	Master of Science (AFS)
	Cooksey, Michael	2006	Master of Science (AFS)
	Hoff, Gerlad R	2007	Doctor of Philosophy (AFS)
	Roje, Dawn	2009	Master of Science (AFS)
	Arnold, Rachel J	2010	Master of Science (AFS)
	Kenaley, Christopher P	2010	Doctor of Philosophy (AFS)
	Degnin, Michelle E		SAFS M.S. (Current Student)
	Swihart, Jessica		SAFS M.S. (Current Student)
	Arnold, Rachel J		SAFS PhD (Current Student)
	Harris, Jeremy		SAFS PhD (Current Student)
Punt, André VanBlaricom, Glenn	Boyd, Charlotte	2012	Doctor of Philosophy (AFS)
Punt, André	Fay, Gavin	2004	Master of Science (AFS)
	A'Mar, Teresa	2004	Master of Science (QERM)
	Towel, Rod	2007	Master of Science (QERM)
	Haltuch, Melissa	2008	Doctor of Philosophy (AFS)
	Cope, John	2009	Doctor of Philosophy (AFS)
	Brandon, John	2009	Doctor of Philosophy (AFS)
	A'Mar, Teresa	2009	Doctor of Philosophy (QERM)
	Garrison, Tommy	2010	Master of Science (QERM)
	Kinzey, Doug	2010	Doctor of Philosophy (AFS)
	Wetzel, Chantel	2011	Master of Science (AFS)

Major Professor	Student Name	Degree Earned Year	Degree
Punt, André	Thorson, James	2011	Doctor of Philosophy (AFS)
	Fay, Gavin	2012	Doctor of Philosophy (AFS)
	Poljak, Dusanka	2013	Master of Science (AFS)
	Hurtado Ferro, Felipe		SAFS PhD (Current Student)
	Stingle, Kelli		SAFS PhD (Current Student)
	Wetzel, Chantel		SAFS PhD (Current Student)
	Szuwalski, Cody		SAFS PhD (Current Student)
	Spies, Ingrid		QERM PhD (Current Student)
Quinn, Tom	Buck, Greg	2003	Master of Science (AFS)
	Boatright, Chris	2003	Master of Science (AFS)
	Dickerson, Bobette	2003	Doctor of Philosophy (AFS)
	McLean, Jennifer	2003	Doctor of Philosophy (AFS)
	Newell, Jenny	2005	Master of Science (AFS)
	Erickson, Michael	2005	Master of Science (AFS)
	Seamons, Todd	2005	Doctor of Philosophy (AFS)
	Abrey, Caryn	2005	Doctor of Philosophy (AFS)
	Anderson, Joseph	2006	Master of Science (AFS)
	Rich, Harry	2006	Master of Science (AFS)
	Carlson, Stephanie	2006	Doctor of Philosophy (AFS)
	Kendall, Neala	2007	Master of Science (AFS)
	Denton, Keith	2008	Master of Science (AFS)
	Doctor, Katy	2008	Master of Science (AFS)
	Havey, Michelle	2008	Master of Science (AFS)
	Chamberlin, Joshua	2009	Master of Science (AFS)
	Pess, George	2009	Doctor of Philosophy (AFS)
	Jaecks, Troy	2010	Master of Science (AFS)
	Buehrens, Thomas	2011	Master of Science (AFS)
	Anderson, Joseph	2011	Doctor of Philosophy (AFS)
	Kendall, Neala	2011	Doctor of Philosophy (AFS)
	Woods, Pamela	2011	Doctor of Philosophy (AFS)
	Hernandez, Daniel		SAFS M.S. (Current Student)
	Rohde, Jessica A		SAFS M.S. (Current Student)
	Wittouck, Jon		SAFS M.S. (Current Student)
	Thornton, Emily		SAFS M.S. (Current Student)
	Bond, Morgan		SAFS PhD (Current Student)
	Goetz, Frederick A		SAFS PhD (Current Student)
	Hovel, Rachel A		SAFS PhD (Current Student)
Roberts, Steven	Ellis, Claire		SAFS M.S. (Current Student)
	Immerman, Douglas		SAFS M.S. (Current Student)
	Jasonowicz, Andrew		SAFS M.S. (Current Student)
	Gavery, Mackenzie R		SAFS PhD (Current Student)
	Timmins-Schiffman, Emma		SAFS PhD (Current Student)

Major Professor	Student Name	Degree Earned Year	Degree
Roberts, StevenJ Seeb, James	Storer, Caroline G	2012	Master of Science (AFS)
Schindler, Daniel	Scheuerell, Jennifer	2004	Master of Science (AFS)
	Palen, Wendy	2005	Doctor of Philosophy (Zoology)
	Stanley, Amanda	2005	Doctor of Philosophy (Zoology)
	Moore, Jonathan	2006	Doctor of Philosophy (Zoology)
	Tallis, Heather	2006	Doctor of Philosophy (Zoology)
	Francis, Tessa	2009	Doctor of Philosophy (Biology)
	Ruff, Casey	2010	Master of Science (AFS)
	Carter, Jackie	2010	Master of Science (AFS)
	Rogers, Lauren	2010	Doctor of Philosophy (AFS)
	Baker, Matthew	2011	Doctor of Philosophy (AFS)
	Johnson, Susan	2011	Doctor of Philosophy (AFS)
	Armstrong, Jonathan	2012	Doctor of Philosophy (AFS)
	Griffiths, Jennifer	2012	Doctor of Philosophy (AFS)
	Bentley, Kale T		SAFS M.S. (Current Student)
	Cline, Timothy		SAFS M.S. (Current Student)
	Davis, Emily A		SAFS M.S. (Current Student)
	Smits, Adrianne		SAFS M.S. (Current Student)
	Lisi, Peter J		SAFS PhD (Current Student)
	Walsworth, Timothy E		SAFS PhD (Current Student)
Sebens, Ken	Galloway, Aaron W		SAFS PhD (Current Student)
Seeb, James	McGlaughlun, Molly	2010	Master of Science (AFS)
	Young, Sewall Foster		SAFS PhD (Current Student)
Seeb, Lisa	Ackerman, Mike	2010	Master of Science (AFS)
	Petrou, Eleni	2012	Master of Science (AFS)
	Jones, Marissa		SAFS M.S. (Current Student)
	Larson, Wesley A		SAFS PhD (Current Student)
Seeb, James Seeb, Lisa	Smith, Matthew	2010	Master of Science (AFS)
Sibley, Tom	Burton, Karl	2003	Master of Science (AFS)
Simenstad, Si	Sobocinski, Kathryn	2003	Master of Science (AFS)
	Heatwole, Danielle	2004	Master of Science (AFS)
	Lott, Mary-Austill	2004	Master of Science (AFS)
	Bieber, Alisa	2005	Master of Science (AFS)
	Gray, Ayesha L	2005	Doctor of Philosophy (AFS)
	Anderson, Greer	2006	Master of Science (AFS)
	Howe, Emily R	2006	Master of Science (AFS)
	Spilseth, Sarah	2008	Master of Science (AFS)
	Ramirez, Mary	2008	Master of Science (AFS)
	Young, Carl	2009	Master of Science (AFS)
	Craig, Bethany	2010	Master of Science (AFS)

Major Professor	Student Name	Degree Earned Year	Degree
Simenstad, Si	Johnson, Laura	2010	Master of Science (AFS)
	Kramer-Wilt, Errin	2010	Master of Science (AFS)
	Goff, Maureen	2010	Master of Science (AFS)
	Eaton, Christopher	2010	Master of Science (AFS)
	Heerhartz, Sarah	2010	Master of Science (AFS)
	Ono, Kotaro	2010	Master of Science (AFS)
	Seghesio, Erin	2011	Master of Science (AFS)
	Sosik, Elizabeth	2012	Master of Science (AFS)
	Dusek Jennings, Eva D	2012	Doctor of Philosophy (AFS)
	Howe, Emily	2012	Doctor of Philosophy (AFS)
	David, Aaron T		SAFS M.S. (Current Student)
	Goertler, Pascale A L		SAFS M.S. (Current Student)
	Jones, Brittany		SAFS M.S. (Current Student)
	Munsch, Stuart H		SAFS M.S. (Current Student)
	Heerhartz, Sarah		SAFS PhD (Current Student)
Skalski, John	Miller, Tim	2005	Doctor of Philosophy (QERM)
	Buchanan, Rebecca	2005	Doctor of Philosophy (QERM)
	Ashbrook, Charmane	2008	Master of Science (AFS)
	Broms, Kristin M	2008	Master of Science (QERM)
	Parsons, Amber S	2009	Master of Science (QERM)
	Perry, Russell	2010	Doctor of Philosophy (AFS)
	Gast, Chris	2012	Doctor of Philosophy (QERM)
	Pope, Adam C		QERM M.S. (Current Student)
Summers, Adam	Bizzare, Joesph J		SAFS PhD (Current Student)
Swartzman, Gordon	Winter, Andreas	2005	Doctor of Philosophy (AFS)
Utter, Fred	Canino, Michael	2003	Doctor of Philosophy (AFS)
	Vadopalas, Brent	2003	Doctor of Philosophy (AFS)
VanBlaricom, Glenn	Bradford, Amanda	2003	Master of Science (AFS)
	Laidre, Kristin	2003	Doctor of Philosophy (AFS)
	Chambers, Melinda	2004	Master of Science (AFS)
	Wang, Susan	2005	Master of Science (AFS)
	Erickson, Aleta	2005	Master of Science (AFS)
	Agness, Alison	2006	Master of Science (AFS)
	Hauser, Donna	2006	Master of Science (AFS)
	Hoberecht (Litzky), Laura	2006	Doctor of Philosophy (AFS)
	London, Josh	2006	Doctor of Philosophy (AFS)
	Zerbini, Alexandre	2006	Doctor of Philosophy (AFS)
	Elfes, Cristiane	2008	Master of Science (AFS)
	Lander, Michelle	2008	Doctor of Philosophy (AFS)
	Mongillo, Teresa	2009	Master of Science (AFS)
	Sterling, Jeremy	2009	Doctor of Philosophy (AFS)
	Suydam, Robert	2009	Doctor of Philosophy (AFS)

Major Professor	Student Name	Degree Earned Year	Degree
VanBlaricom, Glenn	Smith, Heather	2009	Doctor of Philosophy (AFS)
	Price, Jennifer	2011	Master of Science (AFS)
	Bradford, Amanda	2011	Doctor of Philosophy (AFS)
	Orr, Anthony	2011	Doctor of Philosophy (AFS)
	Blaud, Brianna		SAFS M.S. (Current Student)
	Houghton, Juliana		SAFS M.S. (Current Student)
	McPeek, Kathleen		SAFS M.S. (Current Student)
	Triggs, Lisa		SAFS M.S. (Current Student)
Wissmar, Bob	Bennett, Todd	2006	Master of Science (AFS)
	Strange, Joshua	2011	Doctor of Philosophy (AFS)
	Timm, Raymond		SAFS PhD (Current Student)
Young, Graham	Rohrbach Larissa	2009	Master of Science (AFS)
	Bruner, Amanda	2010	Master of Science (AFS)
	Forsgren, Kristy	2010	Doctor of Philosophy (AFS)
	Curles, Erica		SAFS M.S. (Current Student)
	Harding, Louisa B		SAFS M.S. (Current Student)
	Monson, Christopher		SAFS M.S. (Current Student)
	Tillotson, Abby E		SAFS M.S. (Current Student)

APPENDIX C.2
ACTIVE, ADJUNCT, EMERITUS, AND AFFILIATE FACULTY

ACTIVE FACULTY

Name	**Rank**	**Affiliation with Other UW** Units
Anderson, Christopher	Associate Professor	QERM, Economics
Anderson, James J.	Research Professor	QERM
Armstrong, David A.	Professor	
Beauchamp, David A.	Professor (Coop)	
Branch, Trevor A.	Assistant Professor	QERM
Conquest, Loveday L.	Professor	QERM, School of Environmental and Forest Sciences
Essington, Timothy E.	Associate Professor	QERM
Friedman, Carolyn	Professor	
Gallucci, Vincent	Professor	QERM, Canadian Studies Center, Marine Affairs
Grue, Christian E.	Associate Professor (Coop)	School of Environmental and Forest Sciences
Hauser, Lorenz	Associate Professor	
Herwig, Russell P.	Research Associate Professor	Microbiology
Hilborn, Ray	Professor	QERM
Holtgrieve, Gordon	Assistant Professor[1]	
Horne, John K.	Professor	QERM
Horner-Devine, M. Claire	Assistant Professor[2]	
Hunt, George L. Jr.	Research Professor	
Laidre, Kristin	Assistant Professor WOT	Applied Physics Laboratory
Mantua, Nathan	Associate Professor WOT[2]	
Naish, Kerry-Ann	Associate Professor	
Olden, Julian D.	Associate Professor	
Parrish, Julia	Professor	Biology, Marine Affairs
Pietsch, Theodore W.	Professor	Burke Museum of Natural History and Culture, Museology
Punt, Andre E.	Professor	QERM
Quinn, Thomas P.	Professor	
Roberts, Steven B.	Assistant Professor	QERM
Schindler, Daniel E.	Professor	Biology
Sebens, Kenneth P.	Professor	Biology, Friday Harbor Labs
Seeb, Jim E.	Research Professor	
Seeb, Lisa W.	Research Professor	
Simenstad, Charles A.	Research Professor	
Skalski, John R.	Professor	QERM, School of Environmental and Forest Sciences
Summers, Adam P.	Professor	Biology, Friday Harbor Labs
VanBlaricom, Glenn R.	Professor (Coop)	School of Environmental and Forest Sciences
Young, Graham	Professor	

1 – Started in September 2013
2 – Resigned during 2013

Full CVs are available at http://fish.washington.edu/research/faculty_profiles.html

ACTIVE EMERITUS FACULTY

Name	Rank
Chew, Kenneth	Professor Emeritus
Erickson, Al	Professor Emeritus
Francis, Robert C.	Professor Emeritus
Gunderson, Donald R.	Professor Emeritus
Karr, James	Professor Emeritus
Mathews, Stephen	Professor Emeritus
Miller, Bruce S.	Professor Emeritus
Naiman, Robert J.	Professor Emeritus
Pigott, George	Professor Emeritus
Plisetskaya, Erika	Research Professor Emeritus
Swartzman, Gordon L.	Research Professor Emeritus
Taub, Frieda B.	Professor Emeritus
Wissmar, Robert C.	Professor Emeritus

ADJUNCT FACULTY

Name	Rank	Affiliation with Other UW Units
Keister, Julie	Adjunct Assistant Professor	Oceanography
Bolton, Susan M.	Adjunct Professor	Environmental and Forest Resources
Klinger, Terrie	Adjunct Associate Professor	Marine and Environmental Affairs
Leschine, Thomas L.	Adjunct Professor	Marine and Environmental Affairs
Miller, Marc	Adjunct Professor	Marine and Environmental Affairs
Ruesink, Jennifer L.	Adjunct Associate Professor	Biology

AFFILIATE FACULTY

Name	Rank	Affiliation
Noren, Dawn	Affiliate Assistant Professor	NOAA
Aydin, Kerim	Affiliate Assistant Professor	NOAA
Bailey, Kevin	Affiliate Professor	NOAA
Bengtson, John	Affiliate Associate Professor	NOAA
Bentzen, Paul	Affiliate Associate Professor	Dalhousie University
Bilby, Robert	Affiliate Professor	Weyerhaeuser
Bisson, Peter	Affiliate Professor	US F&W Service
Bottom, Daniel	Affiliate Professor	NOAA
Brodeur, Rick	Affiliate Associate Professor	NOAA
Buckley, Raymond	Affiliate Assistant Professor	Aldabra Marine Program
Canino, Mike	Affiliate Associate Professor	NOAA
Clark, William	Affiliate Assistant Professor	Retired
Clarke, Elizabeth	Affiliate Professor	NOAA
Davis, Jonathan	Affiliate Associate Professor	Puget Sound Restoration Fund
Dickhoff, Walton	Affiliate Professor	NOAA
Dorn, Martin	Affiliate Associate Professor	NOAA
Duffy-Anderson, Janet	Affiliate Assistant Professor	NOAA
Elliott, Diane	Affiliate Associate Professor	USGS
Elston, Ralph	Affiliate Professor	AquaTechnics
Ferguson, John	Affiliate Assistant Professor	Anchor QEA
Fowler, Charles	Affiliate Professor	NOAA
Hanson, Brad	Affiliate Assistant Professor	NOAA
Hard, Jeff	Affiliate Associate Professor	NOAA
Hare, Steven	Affiliate Associate Professor	IPHC
Helser, Thomas	Affiliate Associate Professor	NOAA
Hendrix, Noble	Affiliate Assistant Professor	Private Consultant
Hershberger, Paul	Affiliate Assistant Professor	USGS
Holland, Daniel	Affiliate Professor	NOAA
Hollowed, Anne	Affiliate Associate Professor	NOAA
Holmes, Elizabeth	Affiliate Associate Professor	NOAA
Ianelli, James	Affiliate Professor	NOAA
Karp, Bill	Affiliate Professor	NOAA
Kurath, Gael	Affiliate Associate Professor	USGS
Leaman, Bruce	Affiliate Professor	IPHC
Livingston, Patricia	Affiliate Associate Professor	NOAA
Mantua, Nathan	Affiliate Professor	NOAA
Matarese-Kiernan, Ann	Affiliate Associate Professor	NOAA
Melvin, Edward	Affiliate Associate Professor	WA Sea Grant
Methot, Rick	Affiliate Professor	NOAA
Moore, Sue	Affiliate Professor	NOAA
Orensanz, Jose	Affiliate Professor	CENPAT, Argentina
Orr, James	Affiliate Associate Professor	NOAA
Pess, George	Affiliate Assistant Professor	NOAA
Piatt, John	Affiliate Professor	USGS
Roni, Phil	Affiliate Associate Professor	NOAA
Scheuerell, Mark	Affiliate Assistant Professor	NOAA

AFFILIATE FACULTY (continued)

Name	Rank	Affiliation
Steele, Elizabeth	Affiliate Assistant Professor	NOAA
Stein, John	Affiliate Professor	NOAA
Stevenson, Duane	Affiliate Assistant Professor	NOAA
Stewart, Ian	Affiliate Assistant Professor	IPHC
Strom, Mark	Affiliate Associate Professor	NOAA
Swanson, Penny	Affiliate Professor	NOAA
Thom, Ron	Affiliate Associate Professor	Pacific Northwest National Laboratory
Trainer, Vera	Affiliate Associate Professor	NOAA
Utter, Fred	Affiliate Professor	Retired
Varanasi, Usha	Affiliate Professor	Retired
Wade, Paul	Affiliate Professor	NOAA
Waples, Robyn	Affiliate Professor	NOAA
Warheit, Ken	Affiliate Associate Professor	WA Department of Fish & Wildlife
Williams, John	Affiliate Professor	Retired
Winans, Gary	Affiliate Associate Professor	NOAA
Winton, James	Affiliate Professor	USGS
Zabel, Richard	Affiliate Associate Professor	NOAA

APPENDIX C.3

COMMITTEE MEMBERSHIP

School Committees

Aquatic Facilities
Young – *chair*
Beauchamp
Grue
Stout
Wittouck

Awards
Quinn – *chair* (2013-)
Hilborn (2013-)
Hunt (2013-)
Punt (2013-)
Young (2013-)

Chew Professorship
Friedman – *co-chair*
Young – *co-chair*
Roberts

Computing
Roberts - *chair*
Horne
Olden
Parker
Punt
Seeb, L.
Stout

Curriculum
Naish - *chair*
Beauchamp
Branch
Essington (*for fall*)
Friedman
Laidre
Punt - *EO*
Roberts
Scherer
Schindler

Graduation
Scherer – *chair*
Anderson, C (13-14)
Friedman (13-16)
Roberts (13-16)

IACUC
Grue (13-16)

Marine Biology Minor
Friedman

Promotion and Tenure
Pietsch – *chair*
Armstrong
Friedman
Hilborn
Quinn

RASC
Essington – *chair*
Hauser
Holtgrieve
Horne
Pietsch
Punt
Seeb, L.
Simenstad

School Council
Schindler – *chair* (12-15)
Essington – *EO*
Hauser (12-15)
Hunt (13-16) – *alternative*
Naish
Punt – *EO*
Quinn (13-16)
Seeb, J. (11-14)

Website
Essington – *EO*
Espe
Fox
Olden
Rhodes
Roberts
Roshan
Stout

2013 Fall Seminars
Beauchamp
Roberts
Seeb, L.

2014 Winter Seminars
Anderson, C
Laidre
Naish

2014 Spring Seminars
Hauser
Schindler

College & UW Committees

College Council

Pietsch
Anderson - *alternate*
Roberts – *alternate*

Curriculum

Naish – *chair*
Gallucci - *QSci*

Curriculum Working groups

Marine Biology

Essington
Friedman

Chemistry

Young

Arctic Minor

Gallucci

Diversity

Holtgrieve (2013-)

Faculty Senate

N/A

The Bevan Series On Sustainable Fisheries

Free Public Lectures on the Past, Present, and Future of Marine Resources

The annual harvest of fin and shellfish from the world's ocean represents the largest wild biomass utilized by humans. Can the oceans continue to support our needs, or are we literally eating ourselves out of existence?

Human impacts, from harvest to habitat degradation to introduced species, have had profound effects on marine and freshwater ecosystems, many of which we are only just discovering. Can we limit ourselves? Should we? Most importantly, can we move beyond assigning blame and work towards ecologically, socially and politically tenable solutions?

The *Bevan Series on Sustainable Fisheries* examines the multifaceted concept of sustainability as it applies to our past, present and future use of marine resources. Authoritative speakers from Australia to Scotland will address a range of cutting edge topics — from what genetic techniques can tell us to redefining stock assessment for the 21st century.

Join us for 10 informative lectures and take your place at the leading edge of marine conservation.

4:30 p.m., Thursday, January 9 – March 13, 2003

Fishery Sciences Auditorium, University of Washington
1122 Boat Street NE, Seattle, WA 98105

9-Jan
Andre Punt
Associate Professor, SAFS, University of Washington
Bayesian Methods, Species Interactions, & MPAs: Fisheries Stock Assessment in th New Century

16-Jan
Larry Crowder
Stephen B. Toth Professor of Marine Biology, Duke University
Shifting Gears: Impacts of Bycatch from Populations to Ecosystems

23-Jan
Chris Glass
Director of Marine Fisheries, Manomet Center for Conservation Sciences
Bycatch or "Bye Catch"? Behaviorally-based Bycatch Reduction

30-Jan
Daniel Pauly
Professor of Fisheries, University of British Columbia
Global Impacts of Fisheries on Marine Ecosystems: Results from the Sea Around Us Project

6-Feb
Trysh Stone
Fisheries Manager, Australian Fisheries Management Authority
Shrimp Tales: Has Co-Management Improved the Australian Prawn Fishery?

13-Feb
Robert Furness
Professor of Biology, University of Glasgow
How Many Fish Should We Leave in the Sea for Top Predators?

20-Feb
David Philipp
Senior Scientist, Illinois Natural History Survey
Supplemental Fish Stocking - Demographic Benefit or Genetic Disaster?

27-Feb
Steve Palumbi
Professor of Biology, Stanford University
What Genetics Tells Us About Populations, Conservation and Sustainable Fishing

6-Mar
Michael K. Orbach
Director, Coastal Environmental Management Program and Marine Laboratory, Duke University
The Success of Fisheries Management

13-Mar
Felicia Coleman
Program Director, Institute for Fishery Resource Ecology, Florida State University
Goliath Groupers: Fishing versus Protection

For more information contact: Julia K. Parrish, 206.221.5787 or email jparrish@u.washington.edu

www.wsg.washington.edu, http://courses.washington.edu/susfish/

Bevan Series on Sustainable Fisheries is made possible by generous contributions from Tanya Bevan, NMFS Alaska Fisheries Science Center, the University of Washington School of Aquatic and Fishery Sciences, Washington Sea Grant Program and private don

Free Public Lectures on the Past, Present, and Future of Marine Resources

Fishing Rights or Fishing Wrongs?

The Bevan Series On Sustainable Fisheries

What is the solution to the race for fish, declining catches, and dwindling stocks? Can incentive-based market forces help correct the problem? Individual fishing quotas, transferable quotas, community development quotas, and cooperatives are all on the table with the reauthorization of the Sustainable Fisheries Act. But who owns the fish? The public or quota-holding individuals? Rights-based fishery management has been successful in New Zealand, Australia, Iceland, South Africa, and the US. Or has it? Does rights-based management work for all fisheries and socioeconomic situations or just some?

Fishing Rights or Fishing Wrongs? will be an in-depth and provocative analysis of these timely issues. Speakers with expertise in biology, fisheries management, economics, law, policy, and anthropology will compare and contrast concepts, opinions, and case studies as the Bevan Series sets the stage for future use of rights-based fishery management in the US.

Thursday, Friday — April 29 - 30, 2004

9:00 a.m. - 5:30 p.m.
Fishery Sciences Auditorium, University of Washington
1122 Boat Street NE, Seattle, WA 98105

For more information:
Kate Litle
206.221.5935
kalitle@u.washington.edu

http://courses.washington.edu/susfish/

DAY 1

Who Owns the Fish?

Daniel Bromley
Anderson-Bascom Professor of Applied Economics, University of Wisconsin
Purging the Frontier from Our Mind: Rescuing Fisheries Policy from Incoherence

Alison Rieser
Professor, University of Maine School of Law
Rights-Based Fisheries Management and the Emerging Ecosystem Approach

Rögnvaldur Hannesson
Professor, The Norwegian School of Economics and Business Administration
Rights-Based Fishing: Use Rights versus Property Rights to Fish

Panel: Power, Privilege, and Poverty: The Socio-Economics of Fishing Rights

Local Scenarios, From Alaska to California

Joseph Sullivan
Partner, Mundt MacGregor LLP
From the Bering Sea to the Gulf of Alaska: Harvesting Shares and Co-ops

Peter Leipzig
Executive Director, Fishermen's Marketing Association
The Pacific Groundfish Fishery's Road to Rationalization

Rod Fujita
Scientist, Oceans Program, Environmental Defense
Financing the Transition to Rights-Based Management: An Investment in the Future

Tony DeFalco
West Coast Organizer, Marine Fish Conservation Network
The Environmental, Public Trust, and Socioeconomic Costs of IFQ Programs

Panel: Allocation: Who Wins and Who Loses?

Reception to follow

DAY 2

Lessons from Afar: International Rights-Based Management

Ragnar Arnason
Professor of Economics, University of Iceland
Property Rights in Fisheries: Iceland's Experience with ITQs

Margot Sachse
Principal Investigator, Alternative Management Strategies Project, Australian Fisheries Management Authority
Fisheries Property Rights Down Under: The Australian Experience

Les Clark
Consultant, Ray Research
Rights-Based Fishery Management: Some Developing Country Experience

Juan Carlos Castilla
Professor, Pontificia Universidad Catolica de Chile
More Than One Bag for the World Fishery Crisis: Lessons from Artisanal Shellfisheries in Latin America

Panel: Political Realities of Rights-Based Management

Do Individuals Matter? The Role of the Community

Shankar Aswani
Associate Professor of Anthropology, University of California Santa Barbara
Customary Sea Tenure in Oceania as a Case of Rights-Based Fishery Management: Does it Work?

William Rodgers Jr.
Professor, University of Washington Law School
First in Time, First in Right? Indian Tribes and the Fisheries

Michael Orbach
Professor of Marine Affairs and Policy, Duke University
Crawfish in the Keys and Our Evolving Oceans Ethos

Panel: Where Do We Go From Here?

Concluding Remarks

Ray Hilborn
Professor of Aquatic and Fishery Sciences, University of Washington
Learning from Experience? Profitability, Sustainability, and US Fisheries

The Bevan Series on Sustainable Fisheries is made possible by generous contributions from Tanya Bevan, NOAA Fisheries' Alaska Fisheries Science Center and Northwest Fisheries Science Center, the University of Washington School of Aquatic and Fishery Sciences, Washington Sea Grant Program, the fishing industry, Whole Foods Market and private donors.

Produced by Washington Sea Grant Program

The Bevan Series On Sustainable Fisheries

What is sustainability and can it be achieved?

Can humans continue to extract fishery resources at the present rate? Can we manage our other actions that threaten coastal marine ecosystems? Should we let market forces do the job? What about top-down versus bottom-up regulation? *The Bevan Series on Sustainable Fisheries* examines the concept of sustainability as it applies to the past, present, and future use of marine resources.

Join us

For 10 informative lectures by internationally recognized speakers and take your place at the leading edge of marine conservation.

When?

6 January–10 March, 2005
Thursdays at 4:30pm

Where?

Fishery Sciences Auditorium
1122 NE Boat Street
University of Washington

For more information, contact:
Julia K. Parrish
206-221-5787
jparrish@u.washington.edu
courses.washington.edu/susfish

6 January
Andy Rosenberg
Professor, Natural Resources Policy and Management, University of New Hampshire
Is Ecosystem-Based Management Really About Fisheries?

13 January
Daniel Schindler
Associate Professor, School of Aquatic and Fishery Sciences, University of Washington
Would We Recognize a Sustainable Fishery If We Saw One? A Case Study of Bristol Bay

20 January
David Reid
Group Leader, Fish Distribution and Behaviour Group, Fisheries Research Services, Marine Laboratory, Aberdeen
Schools, Clusters, and Sustainability: Acoustic Studies of Fish

27 January
Francisco Chavez
Senior Scientist, Monterey Bay Aquarium Research Institute
Ocean Variability, Climate Change, and Sustainable Marine Resources

3 February
David Agnew
Principal Research Fellow, Renewable Resources Assessment Group, Imperial College
Illegal, Unregulated, and Unreported Fishing in the Antarctic—Are We Winning?

10 February
Gunnar Knapp
Professor of Economics, University of Alaska
Implications of Aquaculture for Wild Fisheries: The Case of Alaska Wild Salmon

17 February
Nancy Rabalais
Professor, Louisiana Universities Marine Consortium
Dead Zones: Causes and Consequences

24 February
Yvonne Sadovy
Professor, Department of Ecology and Biodiversity, The University of Hong Kong
Reef Fish Fisheries: The Good, the Bad, and the Unsustainable

3 March
Ellen Pikitch
Professor of Marine Biology and Fisheries, Univ. of Miami Rosenstiel School; Executive Director, Pew Institute for Ocean Science
From Fringe to Fixture: The Increasing Presence of Conservation Organizations in Fisheries Management

10 March
Patrick Christie
Assistant Professor, School of Marine Affairs and Jackson School of International Studies, University of Washington
Confused Goals and Contested Outcomes: MPAs in Southeast Asia

Funding for the series is generously provided by Tanya Bevan, friends of Don Bevan, Washington Sea Grant, the UW School of Aquatic & Fishery Sciences, the NOAA Alaska Fisheries Science Center, and the UW Program on the Environment.

Photo: Melissa Haltuch

What is sustainability and can it be achieved?

Photo: Ivonne Ortiz

The Bevan Series On Sustainable Fisheries

Join us

FREE PUBLIC lectures
by internationally
recognized experts

When?

5 January–9 March, 2006
Thursdays at 4:30 pm
Reception to follow

Where?

Fishery Sciences Auditorium
1122 NE Boat Street
University of Washington

For more information,
contact: Julia K. Parrish
206-221-5787
jparrish@u.washington.edu
courses.washington.edu/susfish

10 weeks, 10 opinions

5 January
David Fluharty
Wakefield Professor of Ocean and Fishery Sciences, University of Washington
Backing into the Ecosystem: Is NOAA Getting it Right?

12 January
Timothy McClanahan
Senior Conservation Zoologist, Wildlife Conservation Society
Achieving Sustainability in Coral Reef Fisheries

19 January
Andrew Read
Rachel Carson Chair of Marine Conservation Biology, Duke University Marine Laboratory
By-Catches of Marine Mammals: Causes, Consequences, and Solutions

26 January
John Post
Professor of Biology, University of Calgary
The Invisible Collapse of Recreational Fisheries: Patterns, Processes, and Prognosis

2 February
Jeffrey Hutchings
Canada Research Chair in Marine Conservation and Biodiversity, Dalhousie University
Life History Correlates of the Collapse, Recovery, and Biodiversity of Marine Fishes

9 February
Paul Dayton
Professor, Scripps Institute of Oceanography
Ecological Ratchets and Ecosystem Resilience

16 February
Kevin Stokes
Chief Scientist, New Zealand Seafood Industry Council
Property Rights and Ecosystem Management: An Industry Perspective

23 February
Tundi Agardy
Executive Director, Sound Seas
NGOs: Taking the Lead in Moving Marine Fisheries toward Sustainability, in Unexpected Ways

2 March
Ana Parma
Research Scientist, Centro Nacional Patagónico
Southern Blues: The Challenge of Managing by Consensus to Sustain an International Tuna Fishery

9 March
Patricia Cochran
Executive Director, Alaska Native Science Commission
The Use and Application of Traditional Knowledge to Sustainable Fisheries

Funding for the Series is generously provided by Tanya Bevan, friends of Don Bevan, the UW School of Aquatic & Fishery Sciences, the NOAA Alaska Fisheries Science Center, the At-Sea Processors Association, and the UW Program on the Environment.

Free Public Lectures on the Past, Present, and Future of Marine Resources

The Bevan Series On Sustainable Fisheries

4-Jan **Timothy Essington**
Assistant Professor of Aquatic and Fishery Sciences, University of Washington
Fishing Through Marine Food Webs and the Need for Multi-Species Fisheries Management

11-Jan **Gordon Kruse**
Professor of Fisheries and Ocean Sciences, University of Alaska Fairbanks
Global Warming vs. All-You-Can-Eat Crab Legs: Are Alaskan Crabs in Hot Water?

18-Jan **Mary Ruckelshaus**
Team Leader, Salmon Risk Evaluation Group, NWFSC, NOAA Fisheries
Getting Real About Ecosystem-Scale Approaches to Management in the Puget Sound Basin

25-Jan **Fikret Berkes**
Professor of Natural Resources, Canadian Research Chair, University of Manitoba
Roving Bandits, Sequential Exploitation and Adaptive Co-Management

1-Feb **Lobo Orensanz**
Research Scientist, CENPAT/CONICET Argentina
Small is Difficult: On the Odds of Providing Support for the Management of Artisanal Fisheries.

8-Feb **Chris Grieve**
Associate Director, Marine Stewardship Council
Is Ecolabelling Contributing to the Sustainable Fisheries Quest? A Marine Stewardship Council Story

15-Feb **Greg Donovan**
Head of Science, International Whaling Commission
A Recipe for Bowhead Whaling Management. What Role Does Science Play in the Mix?

22-Feb **Jack Stanford**
Jessie M. Bierman Professor of Ecology, University of Montana
Sustaining Wild Salmon: Lessons from the Russian Far East

1-Mar **David Festa**
Oceans Program Director, Environmental Defense
Carrots and Sticks — Market-based Approaches to Transforming Fisheries

8-Mar **Fran Ulmer**
Director of the Institute of Social and Economic Research, University of Alaska Anchorage
Alaska Fisheries Management: The Intersection of Science, Politics and Economics

4:30 p.m., Thursdays
January 4 – March 8, 2007
Fishery Sciences Auditorium

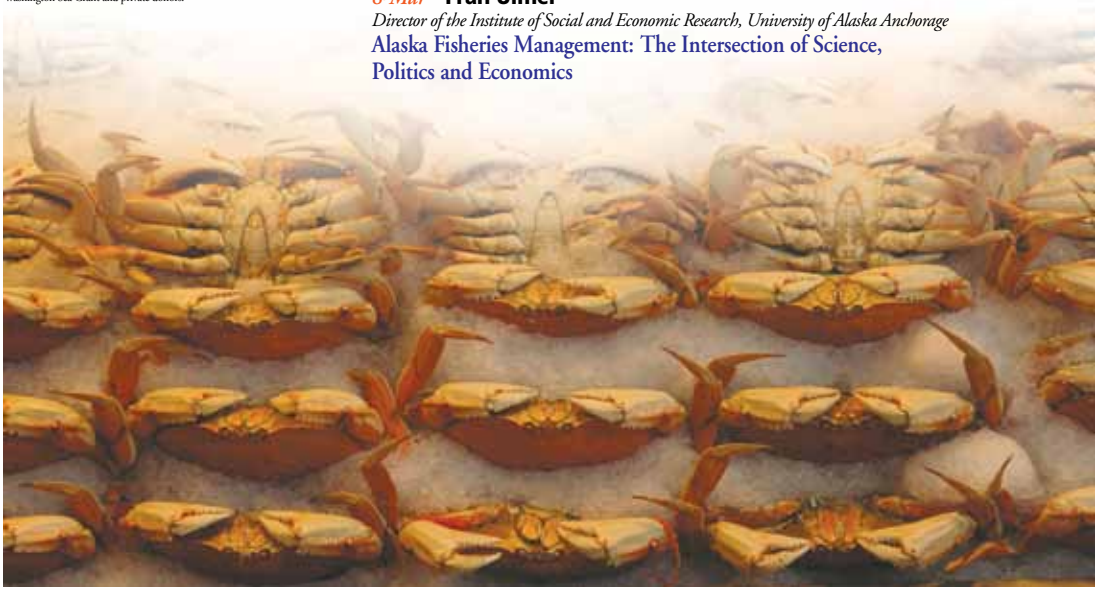
University of Washington
1122 Boat Street NE
Seattle, WA 98105

For more information contact:
Julia K. Parrish, 206.221.5787 or email jparrish@u.washington.edu

courses.washington.edu/susfish/

wsg.washington.edu

The Bevan Series on Sustainable Fisheries is made possible by generous contributions from Tanya Bevan, NMFS Alaska Fisheries Science Center, the University of Washington School of Aquatic & Fishery Sciences, Washington Sea Grant and private donors.



What is sustainability and can it be achieved?

Photo: Ed Melvin

The Bevan Series On Sustainable Fisheries

Join us

FREE PUBLIC lectures
by internationally
recognized experts

When?

10 January–13 March, 2008
Thursdays at 4:30 pm
Reception to follow

Where?

Fishery Sciences Auditorium
1122 NE Boat Street
University of Washington

For more information,
contact: Julia K. Parrish
206-221-5787
jparrish@u.washington.edu
courses.washington.edu/susfish

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10 weeks, 10 opinions

10 January
John Reynolds
Professor and Tom Buell Leadership Chair in Salmon Conservation Department of Biological Sciences, Simon Fraser University
Ecology of extinction risk in fishes

17 January
Steve Gaines
Director, Marine Science Institute, UC Santa Barbara
Can marine reserves benefit fisheries

24 January
James Ianelli
Research Biologist, Resource Ecology & Fisheries Management, Alaska Sciences Center, NOAA Fisheries
Navigating the windfalls and pitfalls of sustainability: Bering Sea pollock

31 January
Steve Murawski
Director, Scientific Programs, and Chief Science Advisor, NOAA Fisheries
The myths and realities of ecosystem-based management

7 February
Laura Singer
Chief Convening Officer, Gulf of Maine Research Institutee
Rules of engagement: Scientists, industry, and fishery managers in New England

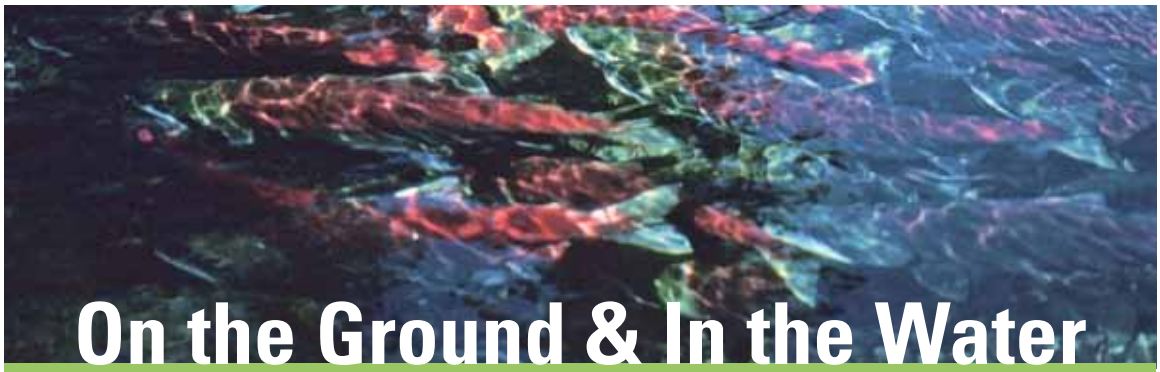
14 February
Cathy Roheim
Professor, Environmental and Natural Resource Economics, University of Rhode Island
Effectiveness of market-based measures in promoting sustainable fisheries: The role of corporate social responsibility

21 February
Jeremy Prince
Director, Biospherics P/L, and Adjunct Associate Professor, Murdoch University, Australia
The barefoot ecologist's toolbox—Rescaling fisheries assessment and management

28 February
Boris Worm
Assistant Professor, Biology Department, Dalhousie University, Canada
Ecosystem effects of fishing large marine predators

6 March
Pierre Fréon
Fishery Ecologist, Institute for Research and Development, France, and Director, Upwelling Ecosystem Program
Sustainable exploitation of small pelagic fish challenged by environmental and ecosystem change

13 March
Phil Levin
Ecosystems & Climate Team Leader, Northwest Fisheries Science Center, NOAA Fisheries
From ecology to ecosystem management: Practical realities on the West Coast



On the Ground & In the Water

ECOSYSTEM-BASED FISHERIES MANAGEMENT IN PRACTICE

The Bevan Series On Sustainable Fisheries

Can fisheries management be improved through an ecosystem-based approach? How can we better incorporate ecosystem principles into fisheries management? What are the barriers, and where have there been successes? This two-day symposium will feature internationally recognized experts in fisheries science, policy and law discussing practical ways to overcome challenges in implementing ecosystem-based fisheries management.

Join us

FREE PUBLIC symposium featuring internationally recognized experts

When?

30 April–1 May, 2009
9:00 am–6:00 pm

Where?

Fishery Sciences Auditorium
1122 NE Boat Street
University of Washington

For more information
http://fish.washington.edu/Bevan09
Tim Essington, 206-616-3698
essing@u.washington.edu
André Punt, 206-221-6319
aepunt@u.washington.edu

Funding for the Series is generously provided by Tanya Bevan, friends of Don Bevan, the UW School of Aquatic & Fishery Sciences and the NOAA Alaska Fisheries Science Center.

To request disability accommodations contact the University of Washington Disability Services Office at least 10 days in advance of the event: 206-543-6450; 206-685-7264 (fax); 206-543-6452 (TTY); or dso@u.washington. edu (email)

THURSDAY, APRIL 30

Keynote—Jake Rice
Director of Advice and Assessment for the Canadian Department of Fisheries and Oceans
Making an ecosystem approach work in fisheries: After the revolution you actually have to govern well

THEME: Tools for ecosystem-based fisheries management (EBFM): Applications and experiences

Andrew Constable
Program Leader, Australian Antarctic Division, Australia
Emerging approaches for ecosystem-based management on forage species, taking account of the need for recovery of top predators

Villy Christensen
Associate Professor, Fisheries Centre, University of British Columbia
Quantitative support tools to implement EBFM

Anne Hollowed
Senior Scientist, Alaska Fisheries Science Center, NOAA–Fisheries
An assessment of fisheries management strategies in Alaska relative to the goals of ecosystem approaches to management

Rosie Hurst
Principal Scientist, Fisheries, National Institute of Water and Atmospheric Research, Ltd., New Zealand
Steps towards EBFM in New Zealand fisheries

Simon Jennings
Lead Scientist, Environment and Ecosystems Division, Centre for Environment, Fisheries and Aquaculture Science, Lowestoft
Progress towards an ecosystem approach to fisheries in Europe

Jason Link
Research Fishery Biologist, Northeast Fisheries Science Center, NOAA–Fisheries
Implementing EBFM in the US Atlantic

Frank Parrish
Research Fishery Biologist, Pacific Islands Fisheries Science Center, NOAA–Fisheries
Identifying themes and goals for EBFM in the Hawaiian archipelagic marine ecosystem research plan.

Tony Smith
EBFM Research Stream Leader, CSIRO, Australia
Tools to support EBFM and their implementation in Australia

Lisa Wooninck
Regional Resource Protection Specialist, NOAA Monterey Bay National Marine Sanctuary
MPAs and ecosystem-based fisheries management: Issues of scale, perspective, and coordination

FRIDAY, MAY 1

THEME: Who's in charge here? Overcoming regulatory barriers to implementation

Jim Cowan
Professor, Department of Oceanography and Coastal Sciences, Louisiana State University
Emerging from Baird's shadow: Challenges to implementation of ecosystem-based fisheries management

Diana Evans
Fisheries Analyst, North Pacific Fisheries Management Council
Shifting baselines, constant focus: Integrating an ecosystem approach into everyday management

David Fluharty
Associate Professor, School of Marine Affairs, University of Washington
What takes so long to implement ecosystem-based fisheries management in the US?

Donald McIsaac
Executive Director, Pacific Fishery Management Council
Ecosystem-based fisheries management at the Pacific Fishery Management Council: Perspectives from the front line

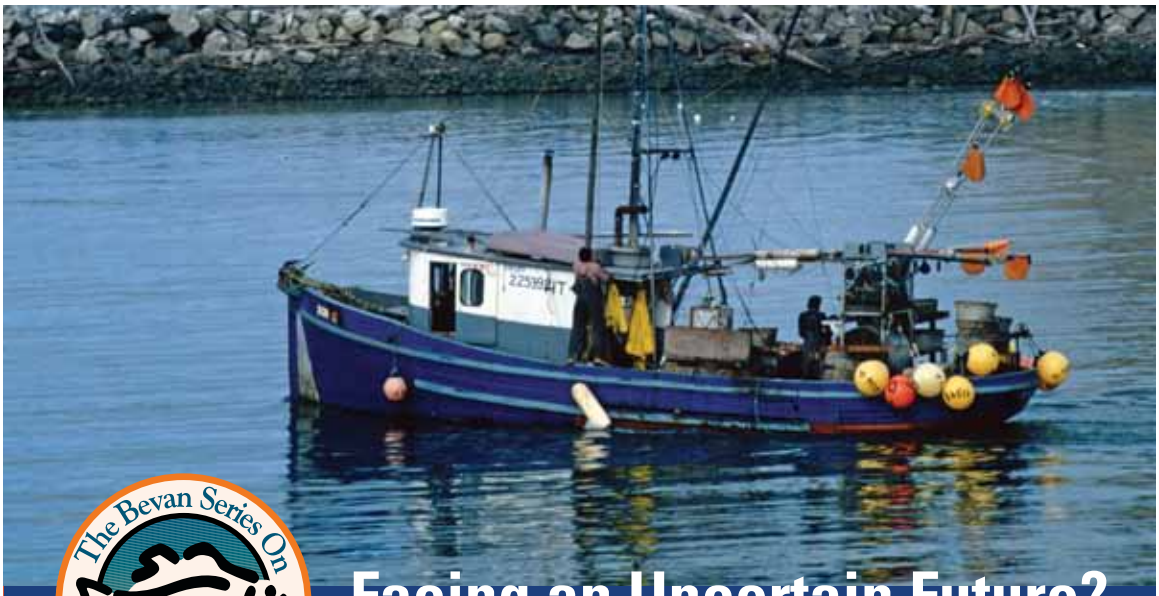
Nick Rayns
General Manager, Fisheries Management Branch, Australian Fisheries Management Authority
Policy, risk, and money: Ecosystem-based fisheries management in Australian fisheries

THEME: Communities and governance: Social, research, and legal systems for ecosystem-based fisheries management (EBFM)

Selina Heppell
Associate Professor, Department of Fisheries and Wildlife, Oregon State University
Scaling up, scaling down: Linking community-based stewardship to the needs of fishery management

Mary Ruckelshaus
Team Leader, Salmon Risk Evaluation Group, Northwest Fisheries Science Center, NOAA–Fisheries
Applying ecosystem-based management in Puget Sound: Including the human element

Closing Remarks—Ray Hilborn
Professor, School of Aquatic and Fishery Sciences, University of Washington
The future of EBFM and fisheries management



The Bevan Series On Sustainable Fisheries

Facing an Uncertain Future?

10 weeks, 10 opinions

Join us

FREE PUBLIC symposium featuring internationally recognized experts

When?

7 January–11 March, 2010
Thursdays at 4:30 pm
Reception to follow

Where?

Fishery Sciences Auditorium
1122 NE Boat Street
University of Washington

For more information
contact: Julia K. Parrish
206-221-5787
jparrish@u.washington.edu
courses.washington.edu/susfish

Funding for the Series is generously provided by Tanya Bevan, friends of Don Bevan, the UW School of Aquatic and Fishery Sciences, and NOAA's Alaska Fisheries Science Center and Northwest Fisheries Science Center.

7 January
Jim Winton
Chief, Fish Health Section, USGS Western Fisheries Research Center
Beyond fishery management? Climate change and disease

14 January
George Rose
Professor, Fisheries and Marine Institute, Memorial University
Facing the Grand Banks fisheries: Myths and sustainability

21 January
David Allan
Professor, School of Natural Resources and Environment, The University of Michigan
Protection strategies for fresh-water fisheries and ecosystems

28 January
Andrew Trites
Professor and Director, Marine Mammal Research Unit, University of British Columbia
Steller sea lions and groundfish fisheries in Alaska: Can the two co-exist?

11 February
Barry Gold
Marine Conservation Initiative Lead, Gordon and Betty Moore Foundation
Leverage points and incentives in shaping sustainable fisheries: The role of environmental foundations

18 February
Julia Baum
Joint NCEAS Postdoctoral Associate and Marine Science and Technology Foundation Fellow, University of California, Santa Barbara
In hot water: Consequences of escalating shark exploitation

25 February
Mike Rubino
Manager, NOAA Aquaculture Program
Is aquaculture a sustainable use of the sea?

4 March
Pamela Mace
Chief Scientist, Ministry of Fisheries, Wellington, New Zealand
Defining "endangered" under the Convention for Intrnational Trade in Endangered Species (CITES): Are marine species "special"?

11 March
Josh Eagle
Associate Professor of Law, University of South Carolina
The history of the marine conservation movement, 1990-2010

To request disability accommodations contact the University of Washington Disability Services Office at least 10 days in advance of the event: 206-543-6450; 206-685-7264 (fax); 206-543-6452 (TTY); or dso@u.washington. edu (email)

Ocean Acidification

The Bevan Series On Sustainable Fisheries

Effects on Fisheries and Oceans

10 WEEKS, 10 OPINIONS

Join us

FREE PUBLIC symposium featuring internationally recognized experts

When?

6 January–10 March, 2011
Thursdays at 4:30 pm
Reception to follow

Where?

Fishery Sciences Auditorium
1122 NE Boat Street
University of Washington

For more information contact:
Trevor A. Branch
206-221-0776
tbranch@uw.edu
courses.washington.edu/susfish

Funding for the Series is generously provided by Tanya Bevan, friends of Don Bevan, the UW School of Aquatic and Fishery Sciences, and NOAA's Alaska Fisheries Science Center and Northwest Fisheries Science Center.

6 January
Richard Feely
Senior Scientist, NOAA Pacific Marine Environmental Laboratory
Ocean Acidification: Global Warming's Evil Twin

13 January
John Smol
Professor and Canada Research Chair in Environmental Change, Department of Biology, Queens University
Lessons Learned from Acidification in Freshwater Ecosystems

20 January
Miyoko Sakashita
Oceans Director, Center for Biological Diversity
Curbing Carbon Pollution—Legal Solutions

27 January
Scott Doney
Senior Scientist, Woods Hole Oceanographic Institution
Do the Dollars Make Cents? Economic Impacts of Acidification on Fisheries

10 February
Brad Warren
Director, Productive Oceans Partnership, a program of the Sustainable Fisheries Partnership
Souring Oceans, Dissolving Shellfish, and the Cure for Cowardly Lions

17 February
Brian Baird
Former US Congressman
Can an Acerbic Congress Deal with Acidic Oceans?

22 February
Philip Munday
Professor, ARC Centre of Excellence for Coral Reef Studies, School of Marine and Tropical Biology, James Cook University, Australia
Behavioral and Ecological Consequences of Acidification on Fish

24 February
Gretchen Hofmann
Professor, Department of Ecology, Evolution and Marine Biology, UC Santa Barbara
Individual Species Responses to Acidifying Oceans: Migrate, Acclimate, Adapt, or Die

3 March
Sven Huseby & Barbara Ettinger
Producer and Director, "A Sea Change"
Science, Media, and Messaging

10 March
Rod Wilson
Professor, Integrative Animal Physiology, College of Life and Environmental Sciences, University of Exeter, UK
Can Fish Fight Back? Carbonate Production in an Acidic Ocean

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Photo: National Oceanic and Atmospheric Administration

Frontiers in Fisheries

Where sustainability meets reality

10 WEEKS, 10 OPINIONS

The Bevan Series On Sustainable Fisheries

Join us

FREE PUBLIC symposium featuring internationally recognized experts

When?

5 January—8 March, 2012
Thursdays at 4:30 pm
Reception to follow

Where?

Fishery Sciences Auditorium
1122 NE Boat Street
University of Washington

For more information contact:
Trevor A. Branch
206-221-0776
tbranch@uw.edu
courses.washington.edu/susfish

Funding for the Series is generously provided by Tanya Bevan, friends of Don Bevan, the UW School of Aquatic and Fishery Sciences, and NOAA's Alaska Fisheries Science Center and Northwest Fisheries Science Center.

5 January
David Armstrong
Director, School of Aquatic and Fishery Sciences, University of Washington
Claws, causes, climate, and corps: A cavalcade of true crab sagas

12 January
Steven Cooke
Associate Professor and Canada Research Chair in Fish Ecology and Conservation Physiology, Department of Biology, Carleton University, Canada
Global recreational fisheries: Status, issues, and opportunities

19 January
Susan Jackson
President, ISSF (International Seafood Sustainability Foundation)
Why can't we be friends? Scientists, industry, and non-profits working together to improve tuna management

26 January
Martin Pastoors
Reader in Marine Policy at Van Hall Larenstein, University of Applied Sciences, The Netherlands
Breaking the paradigms in European fisheries management

2 February
Nicholas Dulvy
Professor and Canada Research Chair in Marine Biodiversity and Conservation, Earth to Ocean Research Group, Simon Fraser University, Canada
Saving Nemo: The science of marine extinctions

9 February
Nancy Baron
Director of Science Outreach, COMPASS (Communication Partnership for Science and the Sea) and Lead Communications Trainer, Leopold Leadership Program
The risks and rewards of communicating your science

16 February
Rudy Kloser
Senior Research Scientist, Team Leader Deepwater Ecosystems Status and Predictions, CSIRO (Commonwealth Scientific and Industrial Research Organisation), Australia
Sound advice: Acoustical insights into deepwater fisheries and ecosystems

23 February
Steven Campana
Chief Scientist, Canadian Shark Research Laboratory, Bedford Institute of Oceanography, Canada
Large sharks tracked with satellite tags reveal their secret hideaways

1 March
David Schindler
Killam Memorial Professor of Ecology, Department of Biological Sciences, University of Alberta, Canada
The Canadian oil sands: Economic savior or environmental disaster?

8 March
Keith Sainsbury
Professor, Institute of Marine and Antarctic Studies, University of Tasmania, Australia
New frontiers in fisheries management: The Australian approach

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APPENDIX C.5

FACULTY SERVICE

COMMITTEE AND PANEL MEMBERSHIPS

National / International

Acoustical Society of America, Acoustical Oceanography Technical Committee
American Institute of Biological Sciences National Review Panel, Steller Sea Lion Research Program
Bering Ecosystem Study Science Steering Committee (Chair)
Bering Sea Interagency Working Group
CALFED Science Program Independent Review Panel
California State Lands Commission Ballast Water Technology Advisory Panel
CAMEO Scientific Steering Committee (Chair)
Canadian Aquatic Invasive Species Network Committee on Environmental niche modeling to match invasion habitats between North America and Europe
Center for Environmental Law and Policy (Board member)
Center for Independent Experts review of Bering Sea Crab Economic Data Reports (Chair)
Commission for the Conservation of Southern Bluefin Tuna Scientific Committee
Delta Science Program Independent Review Panel on the on the Long-term Operations Opinions
Environmental Law Institute Committee on Assessing Gaps and Needs for Invasive Species Management in a Changing Climate
EPA Environmental Technology Verification (ETV) Ballast Water Treatment Technology Panel
EPA Science Advisory Board's Ecological Processes and Effects Committee
FAO Panel on Fish Identification Tools for Biodiversity and Fishery Assessments (Chair)
Gulf of Maine Research Institute Science Advisory Committee
ICES-FAO Working Group on Fishing Technology and Fish Behavior and Fisheries Acoustics Science and Technology (co-chair)
IEEE Oceans Committee on Enabling Technologies for Ecological Studies of Aquatic Organisms: Zooplankton to Whales (co-chair)
International Union for the Conservation of Nature Western Gray Whale Advisory Panel
International Union for the Conservation of Nature Red List Standard and Petitions Subcommittee
International Union of Biological Sciences Steering Committee on Reproductive Biology in Aquaculture Program
International Whaling Commission Scientific Committee
International Whaling Commission Committee to review the JARPN II Japanese Scientific Whaling Program
JW Jones Ecological Research Center/ RW Woodruff Foundation Scientific Advisory Committee
Louisiana Coastal Protection and Restoration Authority Integrated Planning Team
Louisiana Technical Advisory Committee on Predictive Models
Maine Atlantic Salmon Commission Advisory Panel
Marine Stewardship Council Technical Advisory Board
NOAA-CSCOR Grant Review Panel
NOAA National Marine Sanctuary Program, Expert Panel for Development of a System-wide Monitoring Program
NOAA Science Advisory Board Ecosystem Science and Management Working Group
NRSP-Aquagenomics Community PAG Workshop Program Committee
National Center for Ecological Analysis and Synthesis Science Advisory Board (Board member)
National Center for Ecological Analysis and Synthesis Committee on Assessing the Future Research Needs for the USGS Aquatic GAP Program
National Center for Ecological Analysis and Synthesis Committee on Can Eco-labeling Drive Conservation and Sustainable Harvesting of Marine fisheries?
National Center for Ecological Analysis and Synthesis Committee on Effects of Climate Change on Pacific Salmon and their Fisheries

National Center for Ecological Analysis and Synthesis Committee on Evaluating Responses of Freshwater Ecosystems to Experimental Water Management
National Center for Ecological Analysis and Synthesis, Committee on Finding Common Ground in Marine Conservation and Management (co-Chair)
National Center for Ecological Analysis and Synthesis Committee on Machine Learning for the Environment
National Marine Fisheries Service Working Group on Integrating MPAs with Traditional Fishery Science and Management
North Pacific Anadromous Fish Commission Committee on Scientific Research and Statistics, Bering/Aleutian Salmon International Survey
North Pacific Anadromous Fish Commission Committee on Scientific Research and Statistics, Working Group on Stock Identification (Chair)
North Pacific Anadromous Fish Commission Pacific Rim Database Genetic Database (co-Chair)
National Research Council Committee on Best Practices for Shellfish Mariculture and a Scientific Review of Ecological Effects in Drake's Estero, Pt. Reyes National Seashore, California
National Research Council Committee on the Evaluation of the Drakes Bay Oyster Company Special Use Permit DEIS and Peer Review
National Research Council Committee on Evaluating the Effectiveness of Stock Rebuilding Plans of the 2006 Fishery Conservation and Management Reauthorization Act
National Research Council Committee on Sustainable Water and Environmental Management in the California Bay-Delta
National Research Council Committee on the Evaluation of the Drakes Bay Oyster Company Special Use Permit DEIS and Peer Review
National Research Council Committee on the Ecological Risk Assessment under FIFRA and ESA
National Research Council Panel on Cooperative Research in the National Marine Fisheries Service (Chair)
National Research Council Post Doctoral Fellow Program
National Science Foundation Coastal SEES Panel member
National Science Foundation, Evolutionary Processes Cluster
National Science Foundation Long-Term Ecological Research, Palmer (Antarctica) LTER Review Panel
National Science Foundation Panel on Instrument Development for Biological Research
National Science Foundation Physiological and Structural Systems Cluster
National Science Foundation Quantitative Spatial Ecology, Evolution, Environment IGERT Executive Assessment Board
National Sea Grant National Marine Aquaculture Initiative Preproposal Review Panel
National Sea Grant Population Dynamics Fellowship Review Panel
National Sea Grant Program Healthy Coastal Ecosystem Focus Team
National Socio-Environmental Synthesis Center (NSF synthesis center, University of Maryland), External Advisory Board
National Technical Review Committee, Louisiana Coastal Area (LCA), US Army Corps of Engineers and State of Louisiana
PICES Committee on Climate Forcing and Marine Ecosystem
Presidents Commission on Policy Scientific Advisory Board
Puerto Rico Sea Grant Review Panel
Restore America's Estuaries National Program Committee
Rhode Island Marine Fisheries Council
San Francisco Bay Salt Pond Project, California Coastal Conservancy
Science Advisory Team, Marine Life Protection Act, California
Sea Resources National Scientific Advisory Panel
Smithsonian Environmental Research Center, Advisory Committee
Study of Ecosystem Arctic Change Science Steering Committee
US Aquaculture Society and American Fisheries Society Fish Culture Section Working group on the National Assessment of Aquaculture Trends at Academic Institutions in the United States
USDA-NIFA Regional Aquaculture Centers National Coordinating Committee

USDA Molluscan Broodstock Program Review Panel
Western and Central Pacific Fisheries Organization Independent Review of 2011 Bigeye Tuna Assessment (Chair)
World Animal Health Organization Ad Hoc Group on the OIE List of Aquatic Animal Diseases – Mollusc Team
World Bank, Global Partnership for Oceans, Blue Ribbon Panel

NE Pacific

Alaska Sea Life Center Science Advisory Committee
Arctic-Yukon-Kuskokwim Chinook Salmon Expert Panel, AYK Sustainable Salmon Initiative (Co-chair)
Arctic-Yukon-Kuskokwim Scientific Technical Committee (AYK-STC) for the AYK Sustainable Salmon Initiative.
Environmental Law Institute, Science Advisor Panel on Wetland Mitigation Performance Standards
Long Live the Kings (Board of Directors)
NOAA/DFO Independent Review of Chinook Salmon Fishery Impacts on Killer Whales (Chair)
NOAA ESA Black Abalone Critical Habitat Assessment Team
NOAA ESA Black Abalone Recovery Team (Chair and member)
NOAA ESA Black Abalone Status Review Panel (Chair)
NOAA National Marine Fisheries Service Salmon Life Cycle Models Review Panel
North Pacific Fishery Management Council Crab Plan Team
North Pacific Fishery Management Council Scientific and Statistical Committee
North Pacific Research Board Advisory Panel for Development of an Implementation Plan, Bering Sea Integrated Ecosystem Research Program
North Pacific Research Board Ecosystem Modeling Committee
North Pacific Research Board Science Panel
Pacific Estuarine Ecosystem Indicator Research Consortium (PEEIR) Science Advisory Committee
Pacific Fishery Management Council Review of the Canadian Swept-Area Trawl Survey (Chair)
Pacific Fishery Management Council Scientific and Statistical Committee
Pacific Salmon Commission Chinook Technical Committee
Pacific Salmon Commission Logistic Committee, Workshop on Application of Genetic Stock Identification Methods to Management of Ocean Salmon Fisheries
Pacific Salmon Commission Panel on Fraser River Sockeye declines
Western Alaska Salmon Stock Identification Program
Western Association of Marine Laboratories Directors Committee

Regional/State

Elwha River Restoration Program Review Panel
Governor's Blue Ribbon Panel on Ocean Acidification
Independent Science Advisory Board, Columbia River Basin Food Web Review
Lake Washington Ship Canal Water Quality Science Panel
Lake Washington Sockeye Hatchery, Adaptive Management Plan Technical Working Group
Lower Columbia River Estuary Program Scientific Working Group
Northwest Power and Conservation Council Independent Scientific Advisory Board
Pacific Aquaculture Caucus (Board member)
Puget Sound Partnership Core Working Group
San Juan County Marine Resources Committee
San Juan County Science Subcommittee
San Juan County Technical Advisory Group
Seattle Aquarium Research Center for Conservation and Husbandry Advisory Committee
Seattle Public Utilities Cedar River Habitat Conservation Plan Oversight Committee
State of Washington Ballast Water Work Group
US Ocean Observatory Initiative Coastal and Global Nodes Technical Evaluation Team

Washington Department of Ecology Instream Flow / Viable Salmonid Population Science Group
Washington Department of Fish and Wildlife Marine Protected Areas Work Group
Washington Department of Fish and Wildlife Washington State Aquatic Nuisance Species Group
Washington Department of Natural Resources ESA Compliance Science Panel
Washington State Hatchery Scientific Review Group

ORGANIZATIONS/SOCIETY SPONSORSHIPS

2nd National Conference on Ecosystem Restoration (Program and Steering committees)
3rd Biennial CALFED Bay-Delta Program Science Conference (Session organizer/Chair)
3rd National Conference on Ecosystem Restoration (Program, steering and plenary committees)
4th National Conference on Ecosystem Restoration (Program committee)
5th Restore America's Estuaries Conference (Program committee)
15th Biennial Conference on the Biology of Marine Mammals, Greensboro, North Carolina (Session chair)
17th Biennial Conference on the Biology of Marine Mammals, Cape Town, South Africa (Session chair)
22nd Annual Meeting, Society for Conservation Biology, Chattanooga, Tennessee (Session co-chair)
61st Annual Joint Meeting, Pacific Coast Section of the National Shellfisheries Association and Pacific Coast Shellfish Growers Association (Session chair)
Acoustical Society of America bi-annual meeting (Program committee and session co-chair)
Acoustical Society of America/American Fisheries Society Symposium on Acoustic Challenges in Ecosystem Assessment (Symposium organizer and co-chair)
American Fisheries Society Annual Meeting (Symposium organizer)
American Fisheries Society Symposium on Conservation Genetics and Genomics in Fisheries (Organizing committee)
American Fisheries Society Symposium on Larval Dispersal, Population Connectivity and the Management of Marine Species (Symposium organizer)
American Fisheries Society Symposium on the Evolution and Ecology of biocomplexity as a key to Fisheries Sustainability
American Ornithological Union (Symposium organizer)
Annual Meeting of the American Society of Ichthyologists and Herpetologists (Local committee)
ASLO 2009 Annual Meeting (Session co-chair)
EcoNorth Symposium (Science steering committee)
Ecosystem Studies of Sub-Arctic Seas Workshop on Comparisons of Climate Impact on Four Sub-Arctic Seas (Co-convenor)
Ecosystem Studies of Sub-Arctic Seas Annual Meeting (Co-convenor)
Ecosystem Studies of Sub-Arctic Seas Science Steering Group (Co-chair)
Estuarine & Coastal Sciences Association Local Meeting Symposium, Lisbon, Portugal (Session Organizer/chair)
Estuarine Research Federation Biennial Meeting (Co-chair, Scientific Program Committee)
GLOBEC 3rd Open Science Meeting on Ecosystem structure, function and forcing (Co-convenor)
GLOBEC Symposium on Climate Variability and Sub-Arctic Marine Ecosystems (Co-convenor)
ICES / PICES FACTS Symposium on Forage Fish Interactions (Co-convenor)
ICES Annual Science Conference symposium on Effects of Environmental Changes on the Biology, Physiology, and Behaviour of Pelagic Fish.
IEEE Swarm Intelligent Systems Conference (Program committee)
International Congress of Ecology (Symposium Organizer)
Marine Resource Economics Foundation (President)
PICES Sustainable Aquaculture Symposium (Co-convenor)
Pacific Coast Shellfish Grower Association Annual Meeting (Organizer and moderator)
SNP III (Co-organizer)
Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) (Local organizing committee)
Workshop on The role of Sea Ice in Sub-Arctic Marine Ecosystems (Organizer)

Yale University, Climate and Energy Institute Managing Species for Regulating the Carbon Cycle Workshop (Organizing committee)

POSTS IN PROFESSIONAL ORGANIZATIONS

Acoustical Society of America Acoustic Challenges in Ecosystem Assessment (Symposium organizer and co-chair)
Acoustical Society of America Clarence S. Clay Memorial Session (Organizing Committee and co-chair)
American Fisheries Society Resource Policy Committee
American Society of Ichthyologists and Herpetologists (Board of Governors)
Ecological Society of America Aquatics Section (Chair)
Ecological Society of America Rapid Response Team
Estuarine Coastal Sciences Association (Council member)
ICES Study Group on Vessel Avoidance in Fish (Co-chair)
International Society of Vertebrate Morphology (Executive Committee member)
National Shellfisheries Association (Executive Committee member)
Pan American Marine Biotechnology Association (Board of Directors)
SeaDoc Society Science Advisory Committee
Society for Conservation Biology (Board of Directors)
Society for Conservation Biology, Marine Section (President 2006 and Board of Directors 2004-2007)
Society for Integrative and Comparative Biology (Executive Committee member)
Society for Marine Mammalogy (Board of Governors)
Society for Marine Mammalogy Education Committee (Chair)
Society for Marine Mammalogy Membership Committee (Chair)
Society for Marine Mammalogy Pacific Northwest Regional Student Chapter (co-founder)

JOURNAL EDITORSHIPS / EDITORIAL BOARD MEMBERSHIPS

Advances in Marine Fish and Fisheries Genetics (Guest Editor)
American Society of Ichthyologists and Herpetologists (Guest Editor)
Animal Biotelemetry
Animal Conservation
Biology Letters
Canadian Journal of Fisheries and Aquatic Sciences
Conservation Biology
Conservation Biology (Guest Editor)
Ecological Applications
Ecological Applications (Assigning Editor)
Ecological Applications (Guest Editor)
Ecological Monographs
Ecology
Ecology of Freshwater Fish
Ecosphere (Guest Editor)
Ecosystems
Encyclopaedia of Puget Sound
Endangered Species Research (Guest Editor)
Environmental Microbiology
Estuaries and Coasts
Fish and Fisheries
Fish and Fisheries (Guest Editor)
Fisheries Research
Fisheries Research (Guest Editor)
Frontiers in Aquatic Physiology
Frontiers in Ecology and the Environment
Global Ecology and Biogeography

ICES Journal of Marine Science
ICES Journal of Marine Science (Guest Editor)
Ideas in Ecology and Evolution
Integrative and Comparative Biology
Journal of Applied Ecology
Journal of Fish Biology
Journal of Fish Biology (Guest Editor)
Journal of Heredity
Marine and Coastal Fisheries
Marine Ecology Progress Series (Guest Editor)
Microbial Ecology
Molecular Ecology Resources (Guest Editor)
Multidisciplinary Journal of Microbial Ecology
Natural Resource Modeling
New Zealand Journal of Marine and Freshwater Research
North American Journal of Fishery Management
Population Ecology
Proceedings of the National Academy of Sciences (Guest Editor)
Progress in Oceanography (Guest Editor)
Quarterly Review of Biology
Reviews in Fish Biology and Fisheries
Revue Paralia
San Francisco Estuary and Watershed Science
Science Magazine
The Open Fish Science Journal
Transaction of the American Fisheries Society

EXPERT TESTIMONY & ADVISING

Alaska Dept. of Fish and Game hearing on the status and assessment of Alaska Chinook salmon
Bay-Delta Ecosystem Restoration Program
California Bay Delta Conservation Plan (BCDP) Scientific Advisory Panel
Canadian National Recovery Strategy for Sea Otters (*Enhydra lutris*) Technical Review Panel
Environmental Protection Agency on potential effects of mining on Bristol Bay fisheries and wildlife
New Mexico Interstate Stream Commission Upper Gila River Science Forum
NOAA Stock Assessment Review (STAR) Panel for Pacific Hake Assessment
Rhode Island Department of Environmental Management Sector Pilot Program Community Workshop
Royal Society of Canada Panel on Climate Change and Ocean Biodiversity
US Congressional Briefing Portfolio effects in commercial fisheries
US Ocean Observatory Initiative external expert on Coastal and Global Scale Nodes, technical Evaluation Team
USFWS Expert Panel on Marbled Murrelets
Washington State House of Representatives, Select Committee on Hood Canal
Washington State Senate, Natural Resources, Ocean, and Recreation Committee, Geoduck Clam Aquaculture
Washington State Shorelines Hearings Board

PEER REVIEW

Scientific Journals

Acta Biomaterialia
African Journal of Marine Science
American Economic Review
Animal Behaviour
Aquaculture

Aquatic Biology
Aquatic Living Resources
Aquatic Mammals
Arctic
Australian Journal of Agricultural and Resource Economics
Behaviour
Biology letters
Bioinspiration and Biomimetics
Biological Conservation
Biology of Reproduction
Biotropica
Bulletin of Marine Science
Canadian Journal of Fisheries and Aquatic Sciences
Canadian Journal of Zoology
Conservation Biology
Conservation Genetics
Continental Shelf Research
Deep-Sea Research II
Demographic Research
Demography
Diseases of Aquatic Organisms
Ecology
Ecology of Freshwater Fish
Ecology Letters
Ecological Applications
Ecological Economics
Ecological Engineering
Ecological Modelling
Ecological Research
Economic Inquiry
Ecosystems
Endangered Species Research
Endocrinology
Environmental Biology of Fishes
Environmental and Resource Economics
Environmental Review
Estuarine, Coastal and Shelf Science
Estuaries and Coasts
Experimental Economics
Evolution
Evolutionary Applications
Fish and Fisheries
Fisheries Oceanography
Fisheries Research
Fishery Bulletin
Frontiers in Ecology and the Environment
General and Comparative Endocrinology
Genetics
Global Change Biology
Heredity
ICES Journal of Marine Science
Indian Journal of Geo-Marine Science
International Journal of Ecology
Journal of Applied Ecology
Journal of Biogeography

Journal of Cetacean Research and Management
Journal of Environmental Economics and Management
Journal of Environmental Management
Journal of Experimental Marine Biology and Ecology
Journal of Fish Biology
Journal of Heredity
Journal of Mammalogy
Journal of Marine Systems
Journal of Morphology
Journal of Shellfish Research
Journal of Structural Biology
Journal of Theoretical Ecology
Journal of Theoretical Population Ecology
Journal of the Royal Society Interface - Interface Focus
Limnology and Oceanography
Maine Aquaculture
Marine Biology
Marine Ecology Progress Series
Marine and Freshwater Research
Marine and Coastal Fisheries
Marine Mammal Science
Marine Ornithology
Methods in Ecology and Evolution
Molecular Ecology
NPAFC Bulletin
NAMMCO Scientific Publications
Nature
North American Journal of Fisheries Management
Northwest Naturalist
Northwest Science
Oecologia
Polar Biology
PLOS Biology
PLOS ONE
Proceedings of the National Academy of Sciences, USA
Proceedings of the Royal Society B
Progress in Oceanography
Reviews in Fisheries Science
River Research and Application
San Francisco Estuary and Watershed Science
Science
Spixiana: Zeitschrift für Zoologie
Stanford Journal of Law, Science, and Policy
Transactions of American Fisheries Society
Transportation Research Part A
Zoo Biology
Zoologia

Funding agencies

Alaska Department of Fish and Game Division of Sportfish
Alaska Department of Fish and Game Western Alaska Salmon Stock Identification Program
Alaska Sea Grant Program
Alaska Sustainable Salmon Fund
Army Corps of Engineers
Australian Antarctic Division

Australian Marine Mammal Centre
Austrian Science Fund
Bay-Delta Science Program
Bonneville Power Administration
Bureau of Ocean and Energy Management
California Sea Grant Program
City of Seattle
Coastal Restoration and Enhancement through Science and Technology
Connecticut Sea Grant Program
Department of Energy
Exxon Valdez Trustee Council
FRB Fondation pour la Recherche sur la Biodiversité (France)
FWO -Belgian NS
Georgia Sea Grant Program
Gordon and Betty Moore Foundation
Great Lakes Fishery Commission
Gulf (of Alaska) Ecosystem Monitoring Program, *Exxon Valdez* Trustee Council
New Jersey Agricultural Experiment Station
Hudson River Foundation
Icelandic Research Fund
International Polar Year (Netherlands)
ISF-Israeli NSF
King County
McArthur Foundation
Maine Sea Grant Program
Maryland Sea Grant Program
Mellon Foundation
Mississippi-Alabama Sea Grant Program
National Environment Research Council
National Estuarine Research Reserve Program
National Fish and Wildlife Federation
National Fund for Scientific and Technological Development (Chile)
National Geographic and the Waitt Foundation
National Marine Fisheries Service
National Research Foundation (South Africa)
National Sea Grant
National Science and Engineering Research Council (NSERC)
National Science Foundation
New Hampshire Sea Grant Program
New Jersey Sea Grant Program
North Carolina Sea Grant Program
NOAA
NOAA National Undersea Research Program
NOAA Saltonstal Kennedy Program
NOAA Young Investigator Grants
North Pacific Research Board
North Pacific Universities Marine Mammal Research Consortium
Office of Naval Research
Oregon Sea Grant Program
Pacific Salmon Commission Southern Endowment Fund
Pacific Salmon Commission US Chinook Technical Committee
Pew Foundation
Puerto Rico Sea Grant
RANNIS Icelandic Research Fund
Research Council of Norway Centers of Excellence Program

Rhode Island Research Alliance Collaborative Grant
Rhode Island Sea Grant Program
Rufford Maurice Liang Foundation (UK)
Rutgers University
SeaDoc Society
Shota Rustavelli-Georgian NSF
Texas Sea Grant Program
United States Department of Agriculture
US Army Research Office
US Fish and Wildlife Service
UW Royalty Research Fund
Virginia Sea Grant Program
Washington Department of Fish and Wildlife
Washington Sea Grant Program
Washington State Recreation and Conservation Office
Wild Fish Conservancy

INVITED PRESENTATIONS

Major Universities

Arizona State University
Duke University
Evergreen State University
Far East National University (Vladivostok, Russia)
Griffith University (Queensland, Australia)
Hokkaido University
Kansas State University
Montana State University
National Taiwan University
Old Dominion University
Oregon State University
Penn State University
Portland State University
Rutgers University
Scripps Institution of Oceanography
Simon Fraser University
Southern Illinois University
Stanford University
Technical University of Denmark
Texas A&M University
Texas State University
Tulane University
UC Berkeley
UC Davis
UC Irvine
UC Santa Cruz
Umea University
University of Alaska Fairbanks
University of Alaska Juneau
University of Alberta

University of Bangor
University of Bologna
University of British Columbia
University of Connecticut, Storrs
University of Illinois
University of Montana
University of New England
University of Oregon
University of South Florida
University of Southern California
University of Stockholm
University of Tokyo
University of Toronto
University of Victoria
University of Vienna
Uppsala University
Utah State University
Victoria University (New Zealand)
Washington State University
Western Washington University
Yale University

Keynote addresses at National/International meetings

4th Sea Otter Conservation Conference, Seattle 2005
10th National Stock Assessment Workshop
24th Annual NAFO meeting, Santiago de Compostela, 11-13 September 2002
5th World Fisheries Congress
6th International Sandy Beach Conference, Port Elizabeth, South Africa
73rd Annual Seafood Processors Workshop
2004 World Congress on Natural Resource Modeling
2012 Alaska Chinook symposium. Understanding Abundance and Productivity Trends of Chinook Salmon in Alaska, Anchorage, Alaska, October 22 - 23
AIFRB 50th Anniversary Symposium, Future of Fisheries Science in North America. Seattle WA, Feb 13-15, 2007
Alaska Forum on the Environment, Anchorage, AK
American Association of Geographers annual meeting, Seattle, WA.
American Fisheries Society, Montana Chapter.
Canadian Aquatic Invasive Species Network
Canadian Conference for Fisheries Research
CIGENE, Oslo, Norway
Comparative Ecodynamics in the Aleutian and Kuril Islands: A GHEA synthesis workshop, Seattle
Congress of the Iberian Association of Limnology
Conservation and Management of Forage Fish Symposium,
Eastern Pacific Ocean Conference (EPOC) 2006
Elwha River Science Symposium, Peninsula College
Environmental Defense Oceans Day

Farm Foundation Roundtable
Fisheries Council of Canada
Fishery Society of the British Isles Conference
Gilbert Ichthyological Society
Gordon Research Conference - Biomineralization
ICES Annual Science Conference
ICES Symposium on Fish Behavior Exploited Systesm
ICES Symposium on Fisheries Management Strategies
International Fish Meal and Fish Oil Producers, Istanbul Turkey
International Sea Turtle Symposium
International Statistical Ecology Conference 2012
Lake Tahoe research consortium. Incline Village, CA.
Laskeek Bay Conservation Society 20th Anniversary Symposium
National Association of Marine Educators Annual Meeting
National Ecosystem Modeling Workshop II
NDSU - Darwin Day Celebration
NOAA-organized meeting, Six Decades of Fishery Genetics
Northwest Association of Marine Educators Annual Meeting
Pacific Coast Shellfish Growers Association
Pacific Estuarine Research Society Annual Meeting
Pacific Seabird Group and Taiwan Eco-environmental conservation
Petrus Artedi Tercentennial: Symposium on Systematic Ichthyology
Portland State University
Probability and Statistics Conference, Univ. of Maryland Baltimore County
Selectivity: Theory, Estimation, and Application in Fishery Stock Assessment Models
Society for the Protection of Old Fishes
State of the Salmon Conference 2005
Sustainability Fisheries Partnership Annual Meeting
Swedish Academy of Sciences
The Groundfish Forum
TIDE [Tidal River Development] Kick-Off Conference
U.S. Coast Guard Academy Conference on Leadership in the Arctic
University Professional and Continuing Education Association Western Regional Conference
USGS Workshop on Habitat and Fish Modeling in the Columbia Basin
Wakefield Symposium, Alaska, 2009
Water Bodies in Europe: Integrative (WISER) Final Conference
West Coast Shellfish Growers Association
Western Alaska Science and Management Symposium
Western Aquatic Plant Management Conference
Whitman College Brode Lecture
Workshop Hematodinium associated diseases: research status and future directions
Workshop on Feedback and Dynamics in Nature. Grace Hopper Celebration of Women in Computing
World Wetland Day Conference

MAJOR AWARDS/HONORS

COFS / Co-Env

College of Ocean and Fishery Sciences Professor of Marine Mammal Studies
Distinguished Teaching Award (4)
Dorothy T. Gilbert Professor of Ocean and Fishery Sciences
Harriet Bullitt Chair of Conservation
Lowell A. and Frankie L. Wakefield Professor of Ocean and Fishery Sciences
Outstanding Community Impact Award
Outstanding Researcher Award (3)
Undergraduate Teaching Award (1)

UW

Distinguished Graduate Mentor Award
Distinguished Teaching Award (2 during 2003-present; 5 in total)

Fellows

American Academy of Arts and Sciences
American Association for the Advancement of Science (2)
American Ornithologist's Union (2)
American Statistical Association
California Academy of Sciences
Leopold Leadership (2)
Pew Marine Conservation
Royal Society of Canada
The Linnean Society of London
Washington State Academy of Sciences (3)

APPENDIX C.6

SUMMARY OF SUPERVISORY COMMITTEES CHAIRED

	Graduated Students					Current Students					
Faculty	**MS**		**PhD**			**MS**		**PhD**			**Grand**
Current Faculty	**SAFS**	**Non-SAFS**	**SAFS**	**Non-SAFS**	**Total**	**SAFS**	**Non-SAFS**	**SAFS**	**Non-SAFS**	**Total**	**Total**
Anderson, Chris	0	0	0	0	0	0	0	2	0	2	2
Anderson, Jim	3	4	2	3	12	0	1	2	1	4	16
Armstrong, David	1	0	2	1	4	0	0	0	0	0	4
Beauchamp, Dave	7	0	5	0	12	4	0	3	0	7	19
Branch, Trevor	0	0	0	0	0	1	2	0	0	3	3
Conquest, Loveday	7	3	0	0	10	1	0	0	1	2	12
Essington, Tim	6	0	4	0	10	3	2	1	0	6	16
Friedman, Carolyn	6.5	0	2.5	0	9	1	0	1.5	0	2.5	11.5
Gallucci, Vincent	4	3	1	1	9	0	0	0	1	1	10
Grue, Christian	5	2	2	1	10	1	0	3	1	5	15
Hauser, Lorenz	7.5	0	0.5	0	8	0	0	2	0	2	10
Herwig, Russell	7	0	1.5	0	8.5	0	0	0	0	0	8.5
Hilborn, Ray	5.5	1	10.5	0	17	2.5	0	2	0	4.5	21.5
Horne, John	5	1	3	0	9	1.5	1	2.5	0	5	14
Horner-Devine, Claire	1	0	0	0	1	1	0	0.5	0	1.5	2.5
Hunt, George	0	0	0	0	0	0.5	0	0	0	0.5	0.5
Laidre, Kristin	0	0	0	0	0	1	0	1	0	2	2
Mantua, Nate	4	0	0	0	4	0.5	0	0	0	0.5	4.5
Naish, Kerry	2	0	2	0	4	2	0	3	0	5	9
Olden, Julian	2	0	2	0	4	3	0	2	0	5	9
Parrish, Julia	2	0	3.5	0	5.5	0	0	1	0	1	6.5
Pietsch, Ted	7	0	2	0	9	2	0	2	0	4	13
Punt, Andre	3	3	7	1	14	0	0	4.5	1	5.5	19.5
Quinn, Tom	13	0	9	0	22	5	0	3	0	8	30
Roberts, Steven	1	0	0	0	1	3	0	2.5	0	5.5	6.5
Schindler, Daniel	3	0	5	5	13	4	0	2.5	0	6.5	19.5
Sebens, Ken	0	0	0	0	0	0	0	1	0	1	1
Seeb, James	2	0	0	0	2	0	0	1	0	1	3
Seeb, Lisa	2.5	0	0	0	2.5	2	0	0	0	2	4.5
Simenstad, Si	18	0	3	0	21	4	0	1	0	5	26
Skalski, John	1	2	1	3	7	0	1	0	0	1	8
Summers, Adam	0	0	0	0	0	0	0	1	0	1	1
Vanblaricom, Glenn	9	0	10.5	0	19.5	4	0	0	0	4	23.5
Young, Graham	2	0	1	0	3	4	0	0	0	4	7
Other Faculty											
Bentzen, Paul	0	0	1	0	1	0	0	0	0	0	1
Dickhoff, Walt	1	0	3	0	4	0	0	0	0	0	4
Francis, Robert	1	0	6	1	8	0	0	0	0	0	8
Gunderson, Don	3	0	2	0	5	0	0	0	0	0	5
Karr, James	0	0	1	0	1	0	0	0	0	0	1
Miles, Ed	0	0	1	0	1	0	0	0	0	0	1
Miller, Bruce	4	0	1	0	5	0	0	0	0	0	5
Naiman, Robert	2	0	3	0	5	0	0	0	0	0	5
Sibley, Tom	1	0	0	0	1	0	0	0	0	0	1
Swartzman, Gordon	0	0	1	0	1	0	0	0	0	0	1
Utter, Fred	0	0	2	0	2	0	0	0	0	0	2
Wissmar, Bob	1	0	1	0	2	0	0	1	0	1	3
Grand Total	**150**	**19**	**102**	**16**	**287**	**51**	**7**	**46**	**5**	**109**	**396**

APPENDIX C.7

HISTORICAL FACULTY COUNT

Faculty	Category	Year									
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Chris Anderson	TT										1.000
David Armstrong	TT	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Trevor Branch	TT									1.000	1.000
Loveday Conquest	TT	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Tim Essington	TT	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Robert Francis	TT	1.000	1.000	1.000	1.000						
Carolyn Friedman	TT	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Vincent Gallucci	TT	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Donald Gunderson	TT	1.000	1.000	1.000	1.000	1.000					
Lorenz Hauser	TT	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Ray Hilborn	TT	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
John Horne	TT							0.667	0.667	0.667	0.667
Claire Horner-Divine	TT					0.667	0.667	0.667	0.667	0.667	0.667
James Karr	TT	0.667	0.667	0.667							
Robert Naiman	TT	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Kerry Naish	TT	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Julian Olden	TT					1.000	1.000	1.000	1.000	1.000	1.000
Julia Parrish	TT	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Theodore Pietsch	TT	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Andre Punt	TT	0.667	0.667	0.667	0.667	0.667	0.667	0.667	0.667	0.667	0.667
Thomas Quinn	TT	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Steven Roberts	TT					1.000	1.000	1.000	1.000	1.000	1.000
Ken Sebens	TT								0.000	0.000	0.000
Daniel Schindler	TT	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
John Skalski	TT	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Adam Summers	TT	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083
Graham Young	TT		0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
David Beauchamp	COOP	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Christian Grue	COOP	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Glen VanBlaricom	COOP	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Walton Dickhoff	WOT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Robert Wissmar	WOT	1.000	1.000	1.000	1.000						
Nate Mantua	WOT							0.222	0.222	0.222	0.334
Kristin Laidre	WOT										0.333

Faculty	Category	Year									
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
James Anderson	RF	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Russel Herwig	RF	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
John Horne	RF	1.000	1.000	1.000	1.000	1.000	1.000				
James Seeb	RF						1.000	1.000	1.000	1.000	1.000
Lisa Seeb	RF						1.000	1.000	1.000	1.000	1.000
Charles Simenstad	RF	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
George Hunt	RF			1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
TT FTE		**17.414**	**17.914**	**17.914**	**17.247**	**18.914**	**17.914**	**18.581**	**18.581**	**19.581**	**20.580**
Total Faculty Count		27	28	29	28	29	30	31	32	33	35