November 26, 2003

The School of Aquatic and Fishery Sciences
Response To The 10-Year Review Committee Report

At the outset, we would like to thank all members of the 10-Year Academic Review Committee (UW members Drs. Linda Chalker-Scott, Merrill Hille, and John Ferguson; external members Drs. Jim Kitchell and Ed Houde) for their very thorough analysis of the School, their time and patience to carefully review our Self-Study report, and their willingness to meet with so many members of the School of Aquatic and Fishery Sciences (SAFS) community. We are, of course, much appreciative of the positive tone of the report and their enthusiasm for SAFS' role within the UW, and high regard they accord the School among our peers. The School has come a long way since the last program review to improve our program overall, and expand our mission in education and research across a wider domain of Aquatic and Fishery Sciences. Given a natural degree of apprehension leading up to the site visit, we found the process and interaction with the Review Committee to be enlightening and enjoyable. We learned much from the questions they asked in person and posed in their report, and now address their questions and concerns in this reply. Subjects in this response are arrayed somewhat in accord with sequence and emphases within the Review Committee's own report: some of the major programmatic teaching areas that might benefit from new hires, certain SAFS research focus areas, graduate and undergraduate programs, and general comments and recommendations.

SUMMARY RESPONSE

The content and emphases within the report make clear that the Committee listened to a number of people within SAFS and captured an important cross-section of positive achievements, but also noted concerns about the level and relative weighting of resources and faculty within the School. As noted in the Self-Study report, SAFS has lost about 9 equivalent FTEs in the last 8 years (one new hire since the review). Over the same time, incremental reductions in the State budget (e.g. UIFs and mandated across-the-board reductions) have required that we make ever more efficient use of remaining resources to maintain high quality instruction and research support. We reallocated in ways that have actually improved our overall effectiveness, allowing us to serve increased course enrollments and numbers of declared majors. But now the Faculty and Staff are beginning to see that the success in our program growth strains our capacity in terms of funds and faculty/staff/graduate students to sustain programs as we grow.

Over the last 10 years, faculty SCH-teaching in formal courses has doubled, we supervise as many MS and PhD graduate students now (about 130) as we did 10 years ago when there were 9 more faculty, and inflation-adjusted G&C expenditures per faculty (as partial measure of research opportunities and support for student training) have increased over 60%. As course enrollments have climbed, sections have been added and our use of TAs has risen over 50% in the last 5-6 years, placing another strain on our budget.

Reflecting the trend in increased demand for TA's, the number of SAFS graduate students who serve as a TA during their careers has doubled in just 4 years to about 60% and 80% of MS and PhD students, respectively. Now more than ever, the Curriculum Committee and the Student Services program grapple with how to supply increased sections of very popular courses with the TA support needed, both in terms of people and salaries. Such increases in course enrollment, numbers of laboratory and computer lab sections and, in turn, the growing demand for TAs is

directly tied to significant increase in declared undergraduate majors from 50 in 1998 to 109 this Autumn quarter, 2003.

The Review Committee noted several opportunities and needs that SAFS, the College (COFS) and the UW Administration should consider to improve and strengthen educational and research programs based on new State faculty FTEs: 1) aquatic physiology; 2) the quantitative sciences curriculum (see comments below regarding the status of CQS) and; 3) a new Director of the Western Regional Aquaculture Center (WRAC) to continue rebuilding that dimension of our primary focus areas.

Further recommendations by the Review Committee with direct financial implications include: 1) development of a Marine Biology minor; 2) reconfiguration of the "Flagship" courses, making them mandatory for all undergraduate majors (would require more sections, TA's and operations funding) and; 3) underpinning of the Alaska Salmon Program to continue providing a unique experiential education for undergraduates, and research thesis topics for graduate students.

PROGRAM DIRECTIONS AND NEW FACULTY HIRES

As noted in the Self-Study report and stated by the Review Committee, the net loss of faculty has affected some areas of SAFS more than others. As broad categories, there is presently reduced teaching capacity in aquatic organismal biology (including physiology) and within our quantitative curriculum. In addition to traditional topics, there is growing demand for formal instruction and skills in new subject areas that are difficult to meet within the existing faculty. As an academic unit, SAFS sees great potential to provide instruction and research experiences in new courses, but to do so means compromises within the existing curriculum, increased number of alternate-year courses, and/or more funds paid to temporary instructors; we do not believe the latter is in our best long-term interest.

WRAC DIRECTOR

Through the efforts of Dean Nowell, we are very pleased to now be searching for a new Director of this program. A search committee chaired by Carolyn Friedman has worked with the Faculty and WRAC to define the nature and scope of duties, and an advertisement has been broadly distributed in the field to attract the best candidates. We hope to fill this position by next fall with a person who can provide some undergraduate teaching and supervise graduate students within an active research program. We expect this person will help in achieving new growth and leadership within the SAFS focus area of organismal sciences, which will not only be of great value to the School, but will also benefit the State of Washington aquaculture community.

AQUATIC PHYSIOLOGY

The Faculty view this area as one with great **strategic** benefit that warrants a request from SAFS to the UW Administration for a new faculty position. Both at the SAFS faculty retreat this September and in on-going meetings of the Curriculum Committee (CC) this fall quarter, there has been much discussion about the pervasive need for formal instruction of aquatic physiology at the UW, and the crucial importance of the subject among SAFS majors within the College. While physiology is taught in other programs, the emphasis is, for the most part, human and terrestrial organisms and is not taught in the context of the ecology, aquaculture, and conservation and management of aquatic organisms. At present, there are no aquatic physiology courses in Biology or in Oceanography, nor are there plans for such offerings. However, there is the distinct possibility that students majoring in

Biology in the Physiology track could take advantage of such a course. The stunning array of aquatic physiology embodied in adaptations of so many **aquatic species** from freshwater to hypersaline habitats, from shallow estuaries to abyssal depths should be an integral part of formal instruction across many majors. We predict that a research and teaching program in Aquatic physiology will be an essential component of many of the existing programs within the School and will itself seed many new research and educational opportunities. The Review Committee noted in their report that the "dearth of courses devoted to the study [of] whole organisms on the UW campus should serve as a wake-up call to life science departments and to the upper administration."

We envision a 300-level, 3/5 credit course in Aquatic Organismal Biology, with an emphasis in the comparative physiology of aquatic organisms. This class would become one of the three **flagship courses** that serve to channel students into related 400-level classes. The topic matter will be highly relevant to an array of 400 level classes in ecology, conservation and aquacultural sciences. We project that the class will achieve enrollment of about 50-70+ in the lecture section; lab space and TA constraints might hold lab sections to one or two of twenty students each.

At present, there are only 2 SAFS state supported faculty within the general area of "organismal" biology that would include physiology. These two faculty members already teach courses within the Biology Program and SAFS, including entry level Biology (a service course for future SAFS students), aquatic diseases and pathology, aquacultural sciences, and conservation genetics. We have no faculty member to teach aquatic physiology without terminating other important subjects in the curriculum. We therefore strongly support the view of the Review Committee, who correctly identified the need for a new faculty position tied to this subject, and believe that SAFS is the proper home for the course given our strengths in aquatic ecology and biology.

QUANTITATIVE SCIENCE PROGRAM AND CURRICULUM

The Review Committee noted, "…excellence in quantitative education …has been a hallmark of fisheries and allied sciences at the UW." Such excellence among faculty and the courses they teach has largely been associated with the Center for Quantitative Science (CQS), with origin and rich history in SAFS and College of Forest Resources (CFR). The Review Committee recommends return of CQS from the Office of Undergraduate Education (OUE) in order to re-establish an academic home that might better ensure long-term commitments to the CQS curriculum (QSCI courses). While the Faculty agrees with this concept, we see some challenges following initial discussions within SAFS and with CFR. We welcome ongoing planning that involves CFR and, most importantly, OUE in order to ascertain interest in transfer of CQS to an academic home, and the **level of support that might accompany such a transfer.**

Several important meetings have been held as follow-up to the Review Committee's recommendation: the first in September between some SAFS and CFR faculty (chaired by Loveday Conquest), next a meeting of the "Quantitative Fish Faculty", (QFF), an ad-hoc SAFS faculty committee organized by John Skalski who is a former CQS Director, and most recently between John Skalski and Bruce Bare of CFR. Major impression and beliefs include the following:

- Undergraduate majors in SAFS, CFR, Oceanography and Biology benefit from the content and focus of QSCI calculus and introductory statistics courses as taught by CQS faculty relative to those available in other programs like Math and Statistics.
- Most teaching of Calculus 291 and 292, and Stat 381 is presently done by CFR. SAFS provides one regular faculty for a quarter per year, and financially supports a lecturer for one

quarter (but this commitment is likely NOT sustainable for the long-term within our budget). Dr. Bare indicated to Dr. Skalski that CFR would be able to continue to provide faculty for the lower division teaching for another 4-5 years, but that hires beyond that time could likely reflect other priorities in CFR.

- SAFS tenure-track faculty cover a majority of upper division CQS courses and SAFS co-listed courses including 456, 458, 557, 558, 477 482, and 480. Additional upper division teaching has been provided by Dr. Andre Punt, a SAFS research faculty, supported by our state budget.
- It would be desirable to have a SAFS faculty member teach an additional section of QSCI 483 (linear regression) in winter quarter, following Dr. Conquest's QSCI 482 in autumn quarter. More emphasis on fisheries and other aquatic resource examples, expansion to include linear models for experimental design, and generalized linear models could be included in such a 483 offering. QSCI 480, the sampling course, has potential longevity with Drs. Skalski, Gallucci, and Gunderson all capable of teaching the class.
- There is strategic need for a **revised version of 381** to focus on **biometry** as better emphasis for SAFS majors and others in natural sciences, and growing demand for **spatial statistics/GIS** analytical capability.

In general, the Faculty believe that attrition of quantitative faculty is at the point of jeopardizing the ability of SAFS to maintain its reputation as a recognized center for quantitative fisheries instruction. The School has a long-standing reputation earned over generations of faculty, which will be lost if current staffing trends are not reversed, as noted by the Review Committee. We strongly believe that the new funding for a SAFS quantitative faculty hire is of immense strategic importance to provide a faculty member who has expertise in spatial statistics, multivariate analysis, and experimental design to broaden the scope of quantitative instruction at SAFS.

The addition of a new quantitative fisheries faculty in SAFS would help assure the continued teaching of the following courses for the next decade:

- FISH\QSCI 456-458 annually
- FISH 557-558 biannually
- QSCI 381, 482, and 483 annually
- QSCI 480 and at least one other upper level statistical specialty course annually or biannually
- New courses in multivariate and spatial/GIS analyses

Without the new hire and part-time support for Dr. Punt, the course offerings will, by necessity, be sporadic and therefore not in the best interest of our students. In addition to faculty attrition working against the "core" quantitative curriculum, many of those remaining faculty now teach very popular courses in other subjects that have grown in the general curriculum (e.g. FISH 101, 323, FISH/SMA 480, FHL Apprenticeship courses).

A significant uncertainty is the extent to which SAFS can unilaterally increase TA support if QSCI courses and sections therein increase. Virtually all TAs within CQS were moved to OUE at the time the program was transferred. While TA positions are assigned to some QSCI courses taught by SAFS faculty (e.g. 482), the School directly supports TAs for the 450 and 550-series. We would need to discuss with OUE (or the UW Central Administration) the extent of TA support for new sections of 381, 483 and others if enrollment grows and new courses are added in critical subject areas. There

is also belief that SAFS should reinstate a TA "statistical consultant" across the AY under the supervision of a faculty. This service was of immense benefit to students in previous years and would be valuable to provide again; but it adds to a growing TA salary pool, that may be further exacerbated if **SAFS elects to increase our TA and RA salaries in order to make them comparable to those in other UW science departments**.

MAJOR PROGRAMS HIGHLIGHTED BY THE REVIEW COMMITTEE

Marine Biology

The Committee recommends development of a marine biology minor. We agree that it would be a wise first step to coordinate departmental contributions on the basis of existing courses to create a minor in this popular field. A proposal for a minor is currently being developed by faculty in SAFS and the School of Oceanography that would incorporate currently available courses, require students to take at least one course from each of three units centrally involved in marine biology (SAFS, Oceanography, Biology), and require students to pursue independent research in marine biology. Ideally, the minor would be offered by each of the three units.

Of greater concern to SAFS and COFS is the present three-quarter Marine Biology Honors program that includes a general enrollment section fall quarter. This series of classes begins with a high enrollment section of about 130 students in the Fall Quarter (with an Honors-only section of 17-23 students), and continues with Honors courses in Winter and Spring Quarters. Funding for the initial three years (now in the 3rd year) has been provided by COFS (and participating units therein), the Honors Program, and Tools for Transformation. It is not at all clear what funding, if any, will be provided to continue the program. It is this program that would form the nucleus of a Marine Biology Minor. While teaching faculty salaries in this series may eventually be provided by the participating academic departments within COFS, we cannot sustain the other significant costs for: 1) a part-time lab coordinator; 2) five TA's and; 3) costs of field trips and supplies. SAFS will work with Dean Nowell and School of Oceanography to discuss the importance of the program to the UW community and request long-term funds for those needs above.

Alaska Salmon Program (ASP)

We remain committed to providing the summer UG experiential course based at the Alaska field camps. SAFS provides a significant share of annual operating costs that have increased as traditional external funds have decreased. Last year SAFS provided far more support for ASP than the fishing industry, and in fact now provides more support to the program than at any time in the recent past. The investment of SAFS' resources (personnel and direct departmental funds) and NSF grants has helped to build and up-grade much-needed facilities. Faculty principals have been successful in obtaining new facilities and research grants, but the School is still providing a much larger fraction of the annual operating costs and salaries than anticipated. There is, however, recent indication that historic sources of external funds from the fishing industry may increase, which would put the program on more stable footing. We believe that the ASP is important to the School and the University, and will continue to seek additional support for the program.

Freshwater Program
The Review Committee emphasized the importance of this aspect of SAFS as one of high public visibility and great importance relative to issues of watershed-riparian ecology, water and habitat quality, and growing user conflicts. At present, there are several faculty who make freshwater (FW) ecology a strong program within the School: Beauchamp, Karr, Naiman, Quinn, Schindler, Wissmar; and anticipated collaboration with Essington, Hilborn, Anderson, and Skalski on various topics. But as noted, three of these faculty are senior and once they retire, their positions are not programmed for return to SAFS. This concerns us and we will work to define ongoing curricular needs of high priority, track enrollments and gauge student interest in the subjects to build arguments for return of open positions in the future.

While there is not characterization of a "freshwater" program per se in the same manner as marine biology, we anticipate that synergy across faculty in SAFS, Civil Engineering and portions of CFR might provide the basis of a more cohesive structure to serve undergraduate interests in this area. SAFS faculty are encouraged to explore interest with colleagues in other departments to either group or define series of courses that better meet students' interests across this field. We have assigned teaching lab space in SAFS to serve a sequence of courses based around FW subjects, and hope to encourage capstones projects in this sector as well.

Estuaries and Marine Land-Water Margins
Although not noted by the review Committee, we take this opportunity to insert a field of interest to the Faculty as one of high importance to our teaching and research missions, but one that is sufficiently covered at this time. Students of Washington State who seek degrees at the UW are well served by courses in aquatic sciences across several departments. Instruction about aquatic systems and processes that structure and support biotic communities and, in turn, human societies to a great extent, are a critical dimension of several popular degree programs at the UW. There are excellent courses that cover lakes, rivers and riparian systems, stream ecology, nearshore-shelf systems and blue-water ocean domains. Conspicuously absent are lower and upper division courses that explicitly focus on estuaries/marine land-water margins where so many critical abiotic and biotic processes occur. Ocean 442 is an upper division course that addresses physical and some biological processes in Puget Sound. Needed is a course(s) on estuarine ecology that portrays biotic systems as structured by physical forcing and human activity, and conveys the critical connective role that estuaries play between land/watersheds and ocean shelves to transfer nutrients, serve as nurseries, provide a wide spectrum of "ecosystem services", and focus of human enterprise and recreation. This subject affords the opportunity to explore the concept of "subject-hires" between departments discussed below (see "Benefit of interdisciplinary coordination with other units"; The UG Program).

THE GRADUATE PROGRAM
Like the Review Committee, SAFS Faculty believes that this aspect of the School's educational mission is in much better shape than 10 years ago relative to advising, funding, reasonable time-to-degree, quality of students, and student attainment of their professional goals.

There remain issues to address this academic year as noted in the report:

- **Graduate Curriculum**: the Curriculum Committee (CC) has turned focus in this academic year to SAFS' graduate curriculum. We have essentially eliminated, do not teach, or else have modified the nature of many of the 500-level courses. More common now is the use of 400-level courses to provide access to both Graduate and senior UG students (in part to ensure good enrollment within higher division subjects).

- Related to this point are questions about the ongoing nature and frequency of the **"5-teens"** (2-credit 500 level courses that are a convenient way to cover subjects of timely interest). These "seminar" style courses are constrained in some ways and may need to be made more flexible in credits to accurately reflect the level of effort and nature of teaching in some cases (labs, papers, more in-depth lecturing). The CC is addressing some of these questions and includes membership of several graduate student representatives to help formulate a better program in this course series.

- **Computing skills and quantitative subjects** in general. This point has been covered previously. We are keenly aware of students' desire for higher-level training in subjects like spatial/GIS analyses, modeling, and computing tools to name a few. Again, SAFS believes that a new FTE hire in this area would be of immense benefit to our program and is a **strategic area of growth**.

- **Faculty teaching loads**: We are concerned that some students seem to feel there are disparate teaching loads because some faculty "avoid" teaching. We have moved concertedly in the last five years to increase enrollment in courses and eliminate those subjects no longer relevant to the degree programs. There will always be variable teaching loads across faculty, but at present it is much better balanced than previously. No faculty member dodges teaching, nor for the most part do they desire to give it up, but there are differences across 100 to 400-level courses, subjects and, to a certain extent, as imposed by faculty's individual teaching reputation. Important at this point in time is to ensure that a small fraction of the faculty do not carry for too long in their individual careers an inordinate load of SCHs in a few of the 200 and 300-level higher enrollment courses. We are working to establish an ethic of "shared" responsibility for lower division courses in subjects that many of us can teach, and so rotate people in/out over time.

- **Broad-based education**: The Faculty agree that this is desirable and believe that our degree structures enable us to achieve this to some extent (perhaps more so in the SAFS BS program). Within the limits of formal credit-course combinations, it requires a certain motivation on the student's part to take courses in different subjects beyond the required number of credit-hours, while beginning and completing thesis research in a reasonable (funded) period of time. Much of the broader subject area sought may be best provided through "5th-year" or "co-terminal" masters programs. We do share the Review Committee's sense that there is much to be gained in discussion and planning with other units like CFR, Biology, and PoE, for example. We suspect that a degree-program

realigned to provide broader-based graduate education will either include several units working in coordinated fashion to identify and adopt new curricular combinations to serve various interests, or proliferation of "certificate" programs that bundle pre-existing courses into certain emphases and skill-sets.

THE UNDERGRADUATE PROGRAM

We are very pleased that SAFS UG students made such a strong, positive impression on the Review Committee. Through hard work by the Student Services personnel and the CC to make the BS more relevant, we now attract high caliber students who are, for the most part, very self-motivated people. Some particular issues raised in the report:

- **Flagship Courses**: The CC will study and discuss with the faculty the recommendation that all three courses be required of majors, perhaps in the combination suggested as one required lecture-lab, and two as lecture only. Our immediate concern is this change would return to a higher number of required credits at the expense of course-credit flexibility in subjects at the 400-level. A good number of our students already take all three flagship courses. Additionally, this requirement would mandate additional resources not currently available as described earlier. Another issue is that two of the three current flagship courses are only offered for 5 credits, so there is no lecture-only section of 324 and 323.

- **FISH 210**: We have already made major changes in the scope and content of 210. It has been broadened from a narrower fish/fishery focus to now truly cover a cross-section of SAFS faculty research scientific disciplines and methods.

- **Aquatic Biology and Culture**: We will modify the ABC flagship that is presently a mix of basic biology and aquaculture to be "aquatic physiology" in emphasis. We again view this area as appropriate for a strategic hire to provide high enrollment instruction in this essential domain.

- **Capstone Experience**: This is a very important element of the SAFS BS degree and, at the same time, a very ambitious goal that the Faculty has set….both for the students and for individual faculty who provide the mentorship. As our number of majors grows, so too do the number of capstone subjects and programs we must provide. Concern now is whether we can achieve some reasonable balance of capstone students across faculty (rather than a majority assigned to relatively few faculty), do we need more central coordination (who? how much?), and means of support for those projects that simply cost money (supplies, travel, analyses, etc.). We are reviewing both the proposal and competitive funding processes to judge if any changes would better assign faculty and funds to capstone students.

- **Other new courses**: The Review Committee heard the desire for a number of new courses including marine mammal ecology, bird ecology, aquatic entomology, invert biology, and managed freshwater systems. This list presents a conundrum that the Faculty recognize: benefit of some **new** courses that 1) could be taught among existing faculty based on individual expertise but at the expense of some **existing** courses (unless

the Faculty go the unlikely route of adopting higher course-credit hour requirements while yet maintaining large research programs); 2) increased number of alternate year courses to expand subjects but make access difficult for some in the timeline of a typical SAFS major's career; 3) potential to internally compete for enrollment among SAFS majors that could lead to another era of low enrollment courses (but see the following point about interdisciplinary coordination) and/or; 4) **new faculty hires** to provide some of the new subjects. These conundrums raise another point in the report.

- **Benefit of interdisciplinary coordination with other relevant units**. We agree that this is wise, not only for the purpose of providing broad-based education as the Review Committee suggests, but also to better direct new hires based in subjects that our School could provide, but which are not yet available in other units (and vice versa). We suspect that the most relevant units that might hire in subjects of interest to SAFS are Biology, elements of CFR, Oceanography, and some topics derived from PoE. A fair degree of interaction and planning would be required to make "**subject-hires"** in SAFS work for other departments. For example, if we hired an aquatic entomologist, would CFR and Biology majors take the course? If not, then it is very important that SAFS weighs and prioritizes the need within our BS ahead of other subjects we might provide. In the long-term, we suspect the largest source of student enrollment within the existing college/departmental structure will come from Biology given the size of their UG pool. SAFS will gauge the need for teaching hires in new (or dormant but important) subject areas not only in terms of our own degrees, but also those of Biology relative to subjects within organismal and natural history sciences. SAFS' contribution to teaching subjects of common interest will continue as an overarching theme of aquatic biology and ecology.

RESEARCH SCIENTISTS AND WOT FACULTY

There may be some confusion of terms in the report. **Research scientists** are not, within SAFS, **research faculty.** The latter are full voting members of the faculty, hold PI-status, and are all members of the Graduate Faculty and able to supervise thesis research. Our externally funded "research scientists" comprise a very important group within the School, but are under the direction of faculty and supported by their funding. We do not intend to make these people members of the Graduate Faculty nor grant PI status. However, research scientists are sometimes members of a student's supervisory committee, and we value that role.

WOT faculty receive two months of state support/AY. In return, they are required to teach one 5-credit course per BIENNIUM, and generally participate in the governance of the School. This equates to 4 months of salary for each course taught, which is in keeping with salary-course combinations of regular teaching faculty. We are not aware of Oceanography's policy of paying 3 months to WOT faculty, but wonder if they require a greater teaching load.

WOMEN FACULTY

We strongly agree with the Review Committee's points regarding the importance of increasing the number of women faculty in SAFS. While three hires of tenure-track women in recent years establishes a very positive trend, their ratio among the faculty remains low. We will use all open faculty positions as an opportunity to attract top women candidates, and fully expect that they will be among those on short-lists for interviews. SAFS is proud of the high number of women graduate

students in our program over the last several years, and view this as evidence that growing pools of PhD-level women graduates in aquatic, fisheries, and other natural history sciences are available, and so increase the probability of new women faculty in our own department.

OUTREACH

This is an important aspect of our School's mission given the extent of public interest in so many of the disciplines and species we study. We will work to increase outreach in several ways:

- Participate in the annual COFS open house.

- Our staff advisers are active in the following ways:
    - Continue to visit high school marine biology and maritime programs.
    - Presentation to the National Association of Educational Consultants regarding COFS programs and opportunities.
    - Participate in the STEP Summer Program.
    - Provide knowledge and assistance to Native American Students on campus, learning about fisheries and forestry.
    - We just completed the 3rd annual "Environmental Opportunities Fair", a collaborative event where all UW students are invited to come learn about academic programs, internship and volunteer opportunities and career information.
    - In collaboration with the Seattle Aquarium, SAFS hosts an information event for their high school volunteers annually in which SAFS faculty present, facilitate presentations by graduate students at science fairs and other events at local elementary and junior high schools

- Teaching many desirable classes in the evening (e.g., Conquest's statistics class) or via long-distance (e.g., Horne's acoustics class) to make them accessible to agency staff and other interested persons.

- Arranging educational visits for ARCS donors, UW Regents, and other interested persons to the Alaska Salmon field camps.

- Fish Collection: Outreach activities at the UW Fish Collection focus on teaching the public the value of maintaining large natural history collections, both as a reference collection for researchers around the world, and as an educational resource for students and the general public. Visitors to the collection get the opportunity to see specimens of strange deep-sea fishes, along with those commonly caught in Puget Sound and in local lakes and rivers, as a way to demonstrate the immense diversity found among fishes. Some of our recent and on-going outreach activities include:

    - Approximately 12 tours a year, ranging from small K-6th grade home-school groups, to high school groups of 40 students, to senior citizen tour groups, in addition to tours given during the summer to incoming UW students.

- Partnership with the Odyssey Maritime Discovery Center on Pier 66, whereby students working in the Fish Collection host workshops at the Discovery Center, teaching children about the fishes of Puget Sound.

- Volunteer and employment opportunities for UW undergraduates, as well as local high school students.

Website (www.uwfishcollection.org) provides access to our specimen catalog, hosts a key to the families of Puget Sound fishes, and links to other ichthyological resources.

- Individual faculty research projects that incorporate citizens directly into the work (e.g. COASTT), or provide opportunity to meet with faculty scientists during the program (e.g. PNCERS);

- Special seminar series and workshops hosted within SAFS such as the Bevan Series and recent aquaculture advisory meetings and;

- Continued annual sponsorship of the Washington State Ocean Science Bowl (Orca Bowl) for high school students among other efforts.

While outreach is encouraged and supported, it is one of those activities in a department that is usually driven by individual faculty who are passionate about a subject and a constituency. One of our most public activities has been visits to the SAFS salmon pond and research hatchery by generations of school children tied to Seattle Public Utility's support of "Salmon in the Classroom" (SIC). Regrettably this program has not been activated this year for two financial reasons: Seattle Public Utilities withdrew funds this FY, and SAFS judged that we could no longer afford the annual TA coordinator given growing demands to provide TAs for actual courses. We will discuss the long-term fate of this program with SPU, which requires a different orientation if it is to continue: changing from a message that hatcheries can compensate for unwise human perturbation of the landscape and habitats, to one of conservation techniques to ensure survival of wild stocks.

COMMUNICATION AND ISOLATION

For the most part, we feel that there is good communication among people in SAFS. Our Administrator holds periodic meetings with the staff, and the Director participates in all-staff meetings twice each AY. It is telling that attendance at such meetings is often only a fraction of all staff, and so it is not apparent that staff collectively desire more frequent meetings. The subject of isolation in other buildings is a bit perplexing and neither a precise definition of the problem nor a solution is obvious. Everyone is encouraged to attend weekly seminars and stay for the social event following the seminar. Two other adjacent buildings that house some of the SAFS' program are so close that proximity should offer no impediment to people moving back and forth for conversations, business, and meetings. That aspect of SAFS farthest from the main building, indeed from campus, is the Columbia River Basin program housed downtown, and likely to remain there by preference of the faculty PIs. Again, all those staff are included in announcements and notices about events in the main building. The most remote on-campus location is our research hatchery, but it houses only two staff members, and regardless, the hatchery is not likely to be relocated.

SUMMARY OF FINANCIAL NEEDS

Several major recommendations made by the Review Committee, and others detailed in this response speak to great programmatic benefit if new resources are provided to SAFS. Our School will continue to be a leading national and international academic department for teaching and research across a wide spectrum of aquatic sciences with emphases in ecology, fisheries and other resource assessment and management, and organismal biology and culture. If we are to provide teaching capacity in these primary focus areas to meet growing student demand for the major, and serve broader campus needs, we ask the UW Administration to consider providing the following resources:

- New assistant professor nine-month FTE in aquatic physiology, one TA-quarter and partial start-up costs.

- New assistant professor nine-month FTE in quantitative sciences to cover multivariate and expanded spatial/GIS analyses, one TA-quarter (exclusive of CQS assignments) and partial start-up costs.

- Salary for a combined Marine Biology Lab coordinator and UG capstone coordinator (one person to enhance experiential education), and five TA-quarters for the marine biology series.

ALERT REGARDING NEAR-TERM FUTURE NEEDS LOOKING THREE YEARS FORWARD

- FW Ecology and Processes: The Faculty are concerned that as of the next retirement among senior faculty in this focus area, we will lack the capacity to teach critical subjects in FW biology and ecology as tied to physical-chemical processes.

- Estuarine/Land-Water Margins: The Faculty view this dimension as a critical subject area for teaching along the continuum of FW to Marine systems and communities therein.

10-YEAR STRATEGIC PLAN (AND HOW BIG CAN WE BE?)

We agree with the recommendation that the Faculty now look forward to a sense of what we want to be in the future. We suspect that, to a great degree, the future School will include many of the primary elements that define us now with respect to research domains and disciplines within the degrees. While there was, no doubt, a fair amount of "organizational planning and tactical actions" reflected in the 2000 Strategic Plan, the subsequent actions taken by the Faculty have moved the School in some very different directions from the era of more pervasive "fisheries" per se. What might have characterized a "future" SAFS five years ago is, in large measure, now realized in the present program, with some objectives yet to be achieved.

The time to hold a retreat given to this question of SAFS in the future might be next spring or late summer '04 when we have a new person in the WRAC Director position, and have made some internal decisions about faculty roles in the teaching program. Implicit in the question "who do we want to be in the future" posed by the Review Committee seem two other questions:

1. Presuming the School retains most of the major disciplines that exist now, what very different disciplines might we add, and how? Are they all formed from growth within SAFS, or perhaps some degree of merging with other campus units? This question raises the second that the Faculty have discussed in passing;

2. How big do we want to grow as a future Faculty and SAFS program? There is thought that beyond some threshold of membership, a larger number will motivate people to splinter into smaller interest groups for both intellectual convenience and, perhaps, belief that it provides better access to School resources. Our Faculty size now seems to provide a strong collective group-outlook for the most part. Senior faculty recall the "divisional" structure of old, and don't want that again to characterize the School.

If the future SAFS is significantly larger it will likely mean the addition of a major program(s) on top of existing ones, or blend of SAFS and allied portions of other academic units. We will consider this future carefully. But at the same time, we suspect the issue is larger than SAFS alone in charge of its fate. This larger issue may require future UW Administrative officers and deans to ask what broader structural changes might benefit the UW and degree programs in general. From Earth Initiatives to amalgamations of natural history/resource disciplines, there are probably bigger futures yet to decide, and SAFS will play a leading part.