

2013 SOEST External Review: Dean's Office Response

UHM-level Recommendations

Recommendation 1: UHM should encourage the College of Arts and Sciences (CAS) to recommend that their undergraduates consider taking advantage of the introductory geology and meteorology courses offered in SOEST. This will potentially have a cascade of beneficial effects.

- The faculties in Geology and Geophysics (GG) and Meteorology (Met) have underused teaching capacity that can be utilized to good effect.
- The number of undergraduate majors in these disciplines will likely increase as many students are excited by their exposure to introductory courses.
- More GTA positions (augmenting the currently insufficient 5 in GG and 2 in Met) will be required, allowing larger graduate programs, which will in turn help address an important problem – insufficient numbers of students populating graduate courses.
- More graduate students will gain teaching experience, which will provide a competitive advantage in they end up applying for an academic position.

Response: The CAS recently removed their Breadth and Depth requirement, opening the way for more students to take SOEST u/grad courses. We now need to figure out how to take full advantage of this opportunity. We are taking, for instance, the following steps:

1. Our Director of Student Services is offering informational workshops on SOEST courses to the advisors in the CAS, HSHK and SPAS.
2. We will email UHM non-science majors to recommend they take SOEST GG, OCN, and MET courses to meet their DP requirement.
3. GG and MET are recruiting more majors.
4. We participate in the summer “Bridge into College” program offered to high school students entering Kapiolani Community College (KCC). The purpose of our involvement is to increase student awareness that SOEST is a viable destination.
5. SOEST graduate students with Hawaii backgrounds have formed a mentoring program for local and NH undergraduates including students at KCC wanting to major in SOEST programs after they graduate with their ASNS.
6. We will email UHM undergraduates with invitations to take SOEST courses in MATLAB programming (GG250) and Global Environmental Science (OCN310) and perhaps others.

We aim to increase our number of undergraduate majors, recognizing that this will take time and warrant more TA positions, as noted by the external reviewers. Of course, we are already in need of more TA positions. For instance, in Fall 2013, GG301 (Mineralogy) currently has 21 students enrolled – because of limitations on available microscopes, the lab should not have more than 12 students, so we should have another lab section but this is not possible due to the limited number of TA's. Likewise GG250 (Matlab programming) is "maxed out" at 20 students and does not have a TA at all. This course has an excellent reputation and is taken by majors from several other colleges. However, we cannot offer more sections due to lack of TA's.

We are also planning to revitalize our undergraduate course offering ORE 202 Ocean Technology – Man in the Sea and advertise it to the wider campus.

Recommendation 2: There is a pressing need for active communication between the administration of UHM and SOEST administrators and faculty/staff regarding building maintenance, equipment installation and the establishment of a more supportive culture at UHM (see #10 under SOEST-Specific Issues). At

the very least requests by senior faculty should be dealt with in a period of days not months, and commitments to incoming faculty should be honored. Failure to do so is squandering the considerable investment in intellectual capital; i.e. faculty. In short, the review team felt there was a real need to try to establish a sense of community in SOEST and that a productive start could focus on the shared challenges and responsibilities involving facilities.

and Recommendation 18: There are a number of approaches to generating more extensive communication in SOEST and the committee does not pretend to know the best ways to facilitate this important process. The Executive Committee of SOEST should initiate a SOEST-wide discussion that addresses this knotty issue. One example of a modest start to improving things would include presentations by each of the unit leaders during the biannual meetings the SOEST Dean calls to provide updates.

Response: Two important issues are highlighted in these recommendations: building R&M and equipment installation, and the level of active communication within SOEST.

The building of new, complex laboratories is an historical and ongoing challenge at UHM, particularly for research-intensive units such as SOEST. Maintaining and repairing air handling and environmental conditions in all buildings has also been a continual challenge; the recently completed (way over schedule) R&M of the Marine Science Building being a sore point brought to the attention of the reviewers by our Oceanographers.

SOEST has maintained a continual dialogue with upper administration to make them aware of these problems and to motivate more rapid reaction to faculty/staff/student needs. The replacement of the head of the campus-level Facilities Management Office (FMO) has yet to bear significant fruit in this arena, in part because FMO remains significantly understaffed. Implementation of the planned “zone management” of buildings by the VCAFO is eagerly awaited, in part to augment SOEST’s own building maintenance staff and foster local ownership and care.

Regarding building a sense of community and communications within SOEST: the fact that this issue was raised to the review team means that our efforts need to be continued with increased activity.

- 1) The Dean holds annual faculty meetings where faculty accomplishments, special research and teaching achievements, and a review of the "state of the school" are presented. Special-purpose retreats on topical issues are also organized. These meetings are typically well attended and the level of discussion is high. Additional meetings for the dozen unit heads to make presentations will be considered.
- 2) The Dean will visit a faculty meeting of each unit at least once per semester. This has been immediately implemented.
- 3) Day-long workshops are held for new students in the Fall semester to provide them with orientation and familiarize them with SOEST and UHM procedures.
- 4) SOEST hosts a “family and friends” luncheon on Commencement/graduation days that is well attended and that integrates parents, faculty, and students.
- 5) SOEST hosts a cohort of graduate student applicants in the early Spring that brings the best of our applicant pool to all SOEST units to the UHM campus for tours, meetings with potential faculty advisors, current students, and other activities including a day-long tour of Oahu.
- 6) The Deans office holds monthly "EXCOM" meetings with the heads of all units where issues, news, and other timely matters are discussed and jointly addressed. Minutes are published and disseminated by unit heads to individual faculty.
- 7) SOEST graduate students have established a mentoring program for NH and local undergraduate students in each of our departments, and for potential students at KCC.

- 8) SOEST graduate students have established a blog of their experiences as scientists:
<http://earthscigradblog.wordpress.com>
- 9) There are a number of community building events that occur in SOEST, and efforts have been increased recently in this regard.
 - a) SOEST/HIG has held a weekly "pau hana" for over 40 years that provides strong community benefits and interpersonal bonding. The Dean had an awning built in the HIG courtyard and tables/benches installed to foster informal gatherings over lunch and at other times.
 - b) Geology and Geophysics, Oceanography, and Meteorology units offer weekly talks by faculty and visiting researchers. Other SOEST units and the Dean's Office offer frequent, but irregular presentations. These are advertised to all SOEST personnel.
 - c) SOEST faculty frequently serve on student committees in other departments, attend talks in other units, collaborate on proposals and papers with faculty and students in other units, and share resources and expertise.
 - d) The SOEST open house is a biennial event that brings all staff, students, and faculty together to host over 6000 visitors in two days in the Fall semester.

Recommendation 3: If UHM cannot provide maintenance and installation services in a timely manner, it should consider either outsourcing them or permitting units that have the necessary funding to use outside contractors.

Response: Although we agree that outsourcing such services would be beneficial in many instances, we are also aware that the unions would not allow it.

Recommendation 4: Increase staffing in the Procurement Office to reduce (purchase and contract) delays.

Response: The iVCR and VCAFO have made the following recommendation to the Chancellor for consideration by the President:

- 1) Delegate procurement of goods and services from UH System to Manoa. Staff Manoa procurement office (under VCAFO) with 2-3 purchasing agents and one (embedded) contracts lawyer,
- 2) Leave CIP and major capital renovations at the System level (for now), and
- 3) Leave strategic sourcing (catalog buying) with System to maximize economies of scale.

SOEST also recommends keeping metrics on procurement delays (to expose bottlenecks).

Recommendation 5: To attract and retain the most promising graduate students it is necessary to increase both the minimum and maximum stipend levels.

Response: SOEST has led the Campus with respect to compensation for graduate students. Historically we paid entry-level MS students at Step 11 (new Step 9) and moved them up the ladder as milestones were reached (below). As our student compensation levels have risen, so too has UHM lifted its minimum standards. Recently, the Chancellor instituted increased maximum and minimum salaries for graduate students. All students within SOEST are already paid within these levels. We recognize the importance of competitive compensation of students to attracting top talent to the School, and have adjusted our GA salary levels upward following the Chancellors model to ensure competitive packages for students. Entering SOEST graduate students with a Bachelors degree are now paid at R-11 (\$24,912) and

eventually will work their way to R-14 (\$28,026) upon successful defense of a PhD thesis proposal.

SOEST guidelines for *minimum* graduate student salaries (many/most pay higher):

- a) R-11 Incoming students with Bachelors degree
- b) R-12 Incoming students with Masters degree,
 - a. Students who have passed qualifying exam, and
 - b. Students who are still working on a MS thesis and have defended their thesis proposal
- c) R-13 Students who have passed their PhD comprehensive exam
- d) R-14 Students who have defended their Ph.D. thesis proposal and are working on their thesis

Recommendation 6: To attract the best postdocs, it is necessary to include health benefits as part of their compensation packages. Further, UHM should consider a modification to their policies that will allow all post-doctoral fellows in SOEST to secure travel advances.

Response: There are three different types of postdoc positions in SOEST. Those hired as temporary RCUH employees or as UH BoR Asst. Researchers are entitled to the full range of health care, pre-tax medical and dependent care deductions, and other employment benefits (including tax-free travel compensation). The salaries of these employees are charged full fringe benefits and indirect costs in the grants that pay them.

The category being referred to by the external reviewers are postdocs on stipends. These are not employees – they are mentored trainees. As such, the grants that pay for them do not pay, and the individuals do not receive, fringe benefits, and their compensation is not subject to I/C. SOEST has now instituted a *minimum* compensation of \$55K for these individuals.. Even so, this is a minimum, and most units provide more. For example, the Department of Oceanography has reviewed the compensation of their twenty postdoctoral researchers. Three of these are salaried RCUH employees and 17 are on stipends. Excepting three outliers, the salaries range from \$50,800 to \$57,600 (average \$54,180) and the stipends from \$55,000 to \$66,000 (average \$59,183). The difference in the means of \$5K should be about enough for single persons on stipends to purchase health insurance. It appears that stipends have already been adjusted upward relative to salaries to allow for such purchase. An additional adjustment would be necessary for persons with dependents (\$10K vs \$5K). The Department considers that supporting postdoctoral researchers on stipends is an important option, and so is willing to work with UHM/SOEST in finding an optimal solution to funding their health insurance.

Finally, the VCR has researched past efforts to institute a campus-wide “post-doctoral fellowship” policy for UHM. A new policy has been developed that is a hybrid of past failed starts updated to current campus realities. The new policy will be announced in F13 with the goal of standardizing pay, fringe, and other aspects of post-doctoral studies.

Recommendation 7: Regular and mandatory training for faculty and staff should be instituted throughout SOEST so that inappropriate behavior can be identified and reported. Graduate student handbooks should specify the procedures for dealing with harassment and a respected ombudsperson should be installed in SOEST.

Response: Throughout the 2012/13 academic year, all graduate students, faculty, and staff within SOEST units were required to attend one of twelve SOEST training sessions taught by the UH Manoa Gender Equity Specialist, focused on sexual harassment, discrimination, and workplace violence. All new staff, faculty, and graduate students are required to attend such training within the first year of their arrival. Existing staff will be required to refresh their knowledge of the topics with focused training and discussion sessions.

All departments with the School also now include in their student handbooks information and resources addressing sexual harassment, discrimination, and workplace violence including University policies,

complaint procedures and points-of-contact, and general information to build issue awareness. In terms of potential allegations regarding sexual harassment and sexual violence, all SOEST employees are now on notice when allegations involve students.

The concept of installing an Ombudsperson within the School has been discussed internally and with the UH Manoa administration. There are differing opinions on the issue. On the one hand, the university Ombudsperson office was abolished several years ago. Furthermore, the UH Manoa Gender Equity Specialist has expressed the opinion that "...a well trained school is able to refer properly to my office as well as to other appropriate campus resources (counseling center, etc)." On the other hand, faculty in the Department of Oceanography point to the demise of the Ombudsperson office with regret, note that not all harassment is gender-related, and that campus resources are remote. The proposal for Schools/Departments to have their own point people to provide ombuds-type guidance to students also raises issues of training and legal responsibility.

This warrants a broader campus discussion. We note that UH Manoa is undergoing a Title IX review, and it is our hope that USDOE/OCR will provide campus guidance on this matter, as we believe any mechanism that would increase student (and employee) access to options and rights in a manner that preserves and respects victim autonomy and confidentiality is worth pursuing.

Recommendation 8: In consultation with all 12 units, SOEST should develop a fundraising plan that addresses the needs of all departments and research units. The University of Hawaii Foundation should provide at least one full-time development officer who will work with each of SOEST's Departments/Organized Research Units to build endowments that are critical for their respective units.

and Recommendation 9: Given the competitive and challenging funding environment that exists at this university, it is important that these educational outreach programs are highlighted and marketed to legislators. Further, there should be a coordinated effort in SOEST to approach foundations that could offer financial support for these excellent outreach programs. The third part to moving these efforts toward sustainability involves raising both private and corporate funds that are used to build an endowment that can provide long-term support for these distinctive programs.

Response: The inadequate size of the SOEST endowment and the lack of a dedicated UHF development officer are correctly noted. They reflect a failure to capitalize on the great potential of SOEST to partner with numerous entities. The School has not only a fundraising plan, but also newly hired staff (a Director of Strategic Initiatives and External Relations) to focus on external communications, relations, and development. However, we cannot implement our plan until UHF provides a Development Officer to work specifically with SOEST.

We hired last November a Director of Strategic Initiatives and External Relations. While this is a good first step in building personnel capacity for development, a single individual, with multiple responsibilities in the Dean's Office, cannot implement a nascent development initiative for the entire School without assistance from the UH Foundation. This position should be complemented by a Development Officer from the UH Foundation who can extend the reach of the Dean's Office through a successful partnership with UHF. These two individuals, working in concert with the Dean and UHF staff (esp. Corporate and Foundation Relations Team), can dedicate their attention to building relationships for long-term engagement with private, corporate, and foundation partners as part of a SOEST development plan that focuses on School-level and Unit-level fundraising goals.

While our professional peers know who we are, and we excel at communication of our success within the scientific community, the majority of the public within our home state do not know who we are, or what we do. The recent addition of a new PR specialist to the OVCR is helping in this regard. But more needs to be done, as SOEST, with its many older constituent units, has not succeeded in establishing a well-known and understood brand name. This remains budget and personnel limited. Milestones this year,

including the 25th anniversary of the School and 50th anniversaries of two Departments (Oceanography, Ocean and Resources Engineering) provide opportunities for broad public relations efforts.

Recommendation 10: A committee of interested faculty/personnel from each of SOEST's departments/ORUs should be appointed to focus on developing a plan to attract talented minority students to SOEST's graduate programs. The committee should also help develop a fundraising plan to endow several graduate fellowships to attract minority candidates. The hope is that this focused effort will not only attract minority students but also help position SOEST to capture multi-year funding from programs like NSF's Bridge to the Doctorate, that focus on minority graduate students. It is important to note that building endowments to support minority students will also position Hawaii to eventually attract long-term funding from the Sloan Foundation's minority program.

Response: SOEST places strong emphasis on identifying and recruiting a diverse community. We recognize that STEM fields are typically under-populated in the areas of gender and ethnic diversity. Coincident with SOEST development of a fundraising plan, the School will explore ways to fund endowment of minority graduate fellowships. We will additionally give consideration to the support of a minority post-doctoral fellowship as part of the annual SOEST Young Investigator Program (YIP) selection and award process. While the SOEST YIP does not address the committee's recommendation of graduate fellowships, the School takes the recommendation of minority students further, and applies it to post-doctoral researchers and faculty.

The UH System, along with over one dozen other institutions, is in its sixth year of the NSF-LSAMP funding, through a venture called the Islands of Opportunity Alliance (IOA). That Alliance, presently classified under NSF guidelines as a new alliance, is preparing to transition to a mid-level alliance. Bridge to the Doctorate funding is only available for senior-level alliances, which IOA is approximately 7-10 years away from achieving. SOEST has begun discussions with IOA on how best to increase SOEST student representation in IOA and opportunities for IOA students transferring from partner institutions for continued undergraduate or new graduate studies.

Recommendation 11: In view of its tremendous popularity with students, the Global Environmental Sciences (GES) program could serve as a model for enhancing the quality of other degree programs in the school and perhaps serve as a building block for designing an innovative five-year program leading to an MS that would provide students with a broad-based knowledge of environmental sciences, more specialized professional training and an individualized research experience in a supportive environment. Alternatively, an abridged version of the same curriculum might be offered as an undergraduate minor or as a basis for awarding a graduate certificate.

Response: The GES model works because students are connected to their major and a project they can call their own. The student's connection with both an academic advisor and a research advisor further supports and enhances their successes. However, faculty mentors are limited and repeated student mentoring can be taxing to faculty – especially when time spent on mentoring undergrads is disproportionately time-consuming compared to its weighting in periodic evaluations.

The GG program has developed a Professional Master of Geoscience (MGEO) degree that has been approved by the UH Board of Regents. It should be offered by the beginning of the 2014-2015 Academic year.

The GES program is in discussions with other units on campus to develop a MS degree in Environmental Policy, progress on this front is ongoing.

Dr. Schoonmaker of the GES program is working with faculty from the Economics Department in the initial planning stages for a BA degree in Global Environmental Policy. It is hoped that this new GEP degree program will interact strongly with the GES program, with team-taught courses and student

research opportunities integrating the social and physical sciences. We plan to work with College of Social Sciences to make this happen.

The university is currently in the process of developing plans for certificates and degrees in sustainability studies. Dr. Schoonmaker has been participating in these discussions. One developing plan is for a certificate providing social science content that would complement undergraduate BS degrees, including the GES degree. There would also be a science-based certificate designed for social science or humanities majors.

The 5-year Master's program was suggested by the Committee because they judged that many of the theses done by our students for the current GES B.S. degree were already near M.S. scope and quality, and that with an additional year would warrant the M.S. degree as well. This speaks to the high quality of our present program and its students.

A five-year GES B.S./M.S. program would include a thesis, effectively an expanded version of the present B.S. thesis, but some way would be needed to differentiate such a program clearly from our existing Oceanography M.S., which currently takes 3-4 years to complete following the Bachelor's degree. Our current M.S. students would doubtless be compared with GES graduates who earned an M.S. in the same Department in only one additional year—this could create inequality in our system. This new degree could be an M.S. in Global Environmental Science, rather than in Oceanography; perhaps this differentiation would be sufficient. Discussions in the past year have centered on the addition of a year of coursework that would prepare students for the workplace including topics such as GIS, environmental planning, resource management, environmental economics, and a choice of focused science courses covering areas such as soil science, hydrology, biofuels, and water quality. Such a degree would be very different from the current MS in Oceanography offered by the department.

Regarding a two-year version of GES: coursework in the present four-year program progresses from required Core Basic Sciences courses (39 credits), to required Core Derivative Sciences courses (11 credits), to required Foundation courses (18 credits), to elective Coupled Systems courses (≥ 12 credits). The major challenge in designing a two-year minor or certificate program is in choosing which of these levels is appropriate, for which students, depending on their background and major course of study. This will require considerable thought and analysis before a workable plan can be proposed.

Recommendation 12: We support the department's efforts to expand the appeal of both its undergraduate and graduate degree program in Meteorology, by changing the name from "Meteorology" to "Atmospheric Sciences." This would provide a means of encompassing topics in the arenas of weather and climate variability and enlisting the help of climate-oriented faculty in Oceanography who could share in the teaching of dynamics courses and the coverage of core climate-oriented topics.

Response: We will follow-through on this name change, which is fully supported by the faculty, and would require an equivalent change to the name of the degree. We have also started discussions within the school with regard to sharing resources in teaching courses and sponsoring graduate research in fluid dynamics.

Recommendation 13: Graduate programs in oceanography, meteorology, ocean and resources engineering, and geophysics often accept students with diverse academic backgrounds. The coursework for integrating such students into the discipline varies widely, but in general the review committee has concerns about the effectiveness of remedial courses. The department faculties are encouraged to weigh carefully how best to handle these transitions, judiciously ensuring that the students acquire the background needed for a career in the discipline while not overburdening them with extraneous coursework.

Response: GG has had a 2-semester course Accelerated Introduction to Geology I and II (GG 611-612). Oceanography requires all new students to take 4 foundations courses in oceanography. We are currently discussing how best to modify these courses to benefit our incoming graduate students. For specific needs, individual students are able to take directed reading/research (GG 699) with appropriate faculty members. This question of remedial coursework is especially serious in ORE because of ABET requirements for undergraduate engineering preparation.

Recommendation 14: SOEST should require its departments to develop and subsequently publish course schedules at least one year in advance, paying attention to the cadence of courses needed for timely graduation and that they adhere to the schedules to the extent possible. Course scheduling is an especially critical issue for graduate courses.

Response: The School agrees with this recommendation. Some units, GG being a good example, already have a five-year teaching plan, which is updated and published annually, that can serve as a model for other departments. We are implementing this recommendation in all departments during the upcoming academic year, with all AY14/15 course offerings and syllabi being published online no later than September, 2014, and subsequent years posted at the start of each academic year (example: AY 15/16 posted August '14, AY16/17 posted August '15).

Recommendation 15: Clear guidelines should be given to students who travel to professional meetings as to the procedures they should follow to avoid paying taxes on the legitimate reimbursements they receive for this travel.

Response: SOEST agrees and will implement this recommendation.

Recommendation 16: Department faculty should consider the option of making longer-term appointments of individuals with leadership potential within SOEST management and subsequently develop a set of goals for a person's tenure as chair/Director.

Response: As a result of the review, SOEST has implemented 4-year terms for chairs. At the start of each appointment period the Dean and Associate Deans meet with each chair to provide a review of key elements related to governance and to define expectations and provide training on key issues.

Recommendation 17: To maintain viable academic and research programs in the face of declining resources, SOEST faculty and other researchers will need to learn to work together as a team to a much greater extent than they have in the past. To this end, the Committee believes it is vital that SOEST faculty and staff undertake strategic planning activities centered around:

- Development of overall research priorities for SOEST;
- Curricular innovations designed to enhance the quality and attractiveness of SOEST's graduate and undergraduate degree programs and course offerings, cutting across departmental boundaries as needed to match disciplinary expertise with program needs and to ensure strong leadership; and
- New administrative arrangements designed to support and optimize the use of specialized facilities and technical staff.

Response: Beginning in 2014, the Dean will lead a School-wide strategic planning process, designed to bring existing unit-level strategic plans up to date and in-sync. Those individual unit plans will be tied to a larger School plan, which lays out a vision for research, education and outreach directions within the School and within the Campus. Particular attention will be paid towards interdisciplinary work that brings together units within the School on joint topics of societal significance. Potential cross-cutting curricula,

programs, faculty cluster hires, specialized facilities and staff will be part of the planning.

Recommendation 19: In order to facilitate the flow of hiring and contracts more personnel should be added in the realm of administrative support. Applying digital technology should reduce the use of paper files. The SOEST units that have their own funds should be allowed to negotiate salaries themselves.

Response: SOEST agrees that more staff are needed to facilitate administrative services. The introduction of digital technologies is (gradually) reducing the use of paper files. But the new financial system (KFS vs FMIS, and myGrant vs ORS Form 5) has added to workloads during the transition and learning periods. The number, and nature of that staff increase, will be explored in light of ongoing fiscal and position number constraints. Project-specific hires are usually made via the RCUH system that offers more flexibility and allows programs with their own funds to negotiate competitive salaries.

For administrative jobs that must be hired through the UH system, SOEST was approved to participate in a Pilot program designating us at the School level to make hiring and promotion decisions for level Band A and B hires. This will allow us more flexibility and should speed up the process.

Recommendation 20: Make training readily available for members of SOEST's financial staff, especially when procedures are changed. Technical personnel should be afforded opportunities for career advancement.

Response: UH is providing on-going training sessions for the field for learning/tips on how to use the newly implemented (July 2012) Kuali Financial System and eThORITY reporting system. RCUH has also increased available training to project users on their procurement system. RCUH is also in the process of updating its policies and procedures and are taking an active role in communicating with the field how they are addressing on-going issues.

SOEST has always encouraged and funded external training opportunities. The fiscal office attends various Management Concepts classes annually. In January 2013, the Manoa Chancellor announced availability of \$50,000 in support of APT employee's career and professional development program. SOEST administrative staff has taken advantage of this opportunity, with matching funds from the Deans Office.

Technical personnel *are* afforded opportunities for career advancement, and many have taken advantage of same.

2013 SOEST External Review

Response by Departments and Research Units

Department of Geology and Geophysics (GG)

Recommendation 1: Departmental faculty should consider the option of making longer-term appointments of individuals with leadership potential within SOEST management and subsequently develop a set of goals for a person's tenure as chair.

Response: GG Faculty will address this issue during the coming Academic Year.

Recommendation 2: The faculty should reconsider the graduate curriculum with an emphasis on ensuring some breadth in the fundamentals of the earth sciences and a regular cadence of courses.

Response: Several faculty members took a one-year course similar to that recommended at the beginning of their graduate careers and feel that implementing such a course would be a positive move for our graduate program. We will discuss this during the coming Academic Year.

Recommendation 3: There should be a focused effort to develop introductory course offerings that would attract more students from the College of Arts & Sciences.

Response: We agree, and are discussing potential new Intro level courses in addition to our regularly taught courses (in addition to 1-3 sections of GG 101):

GG 102 – Introduction to Global Change (offered alternate years)

GG103 – Geology of the Hawaiian Islands (offered alternate years)

GG 104 – Volcanoes in the Sea (offered alternate years)

GG 105 – Voyage through the solar system (offered every semester)

GG 106 – Humans and the environment (offered alternate years)

GG 130 – Geologic Hazards (offered alternate years)

The Review Committee also noted "A lack of coherence in the design scheduling and delivery of departmental courses offered to majors."

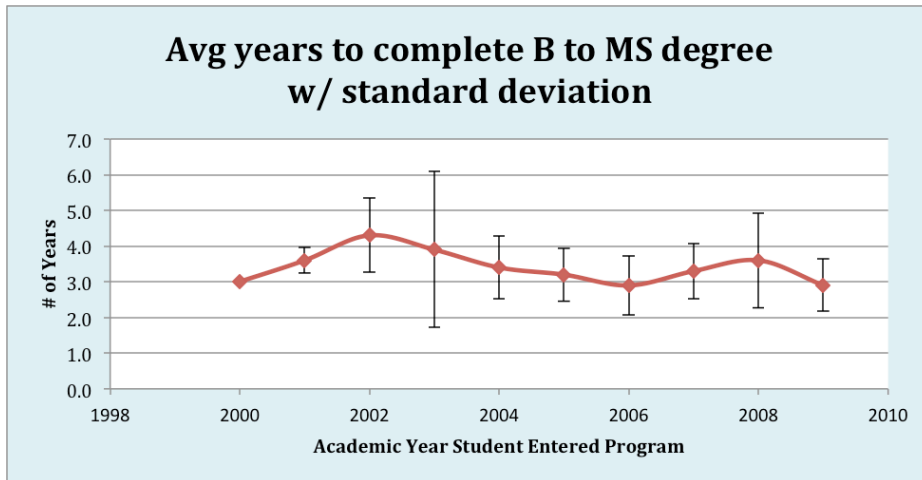
Response: This points to our need for a full-time Student Services Advisor. These duties are currently distributed between the SOEST Student Services Director (Leona Anthony) and the Volcanology Geochemistry Petrology Division secretary (Alison Houghton), which allows long-term planning of courses to "fall through the cracks." A full-time SSA would be able to work with the faculty to assure coherence in the course schedules and would be able to track student progress more efficiently.

Department of Oceanography

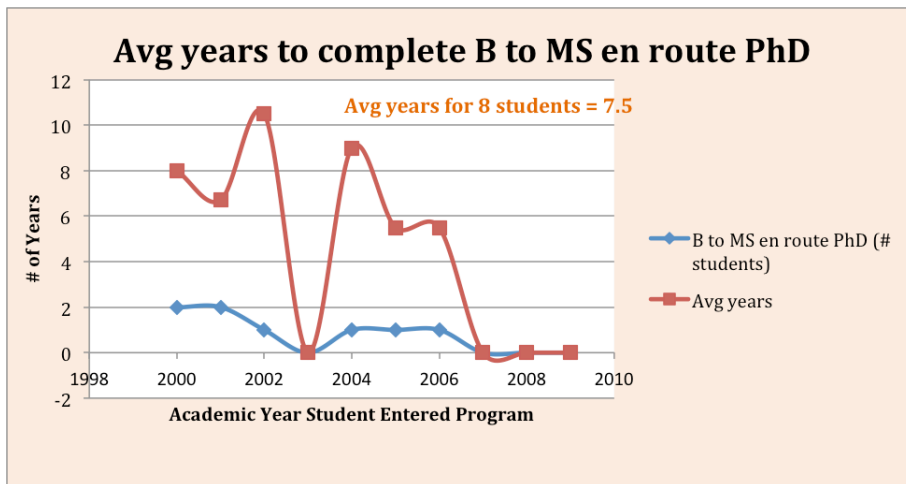
Recommendation 1: Graduate students find that time to degree completion is a source of frustration. Graduate students report that burden of coursework is excessive and Department does not give credit for relevant coursework or experience elsewhere. Eight required courses for M.S. students, plus thesis: no wonder it takes 3-4 years to finish.

Review the course load for graduate students and consider a waiver of requirements when disciplinary competence is evident.

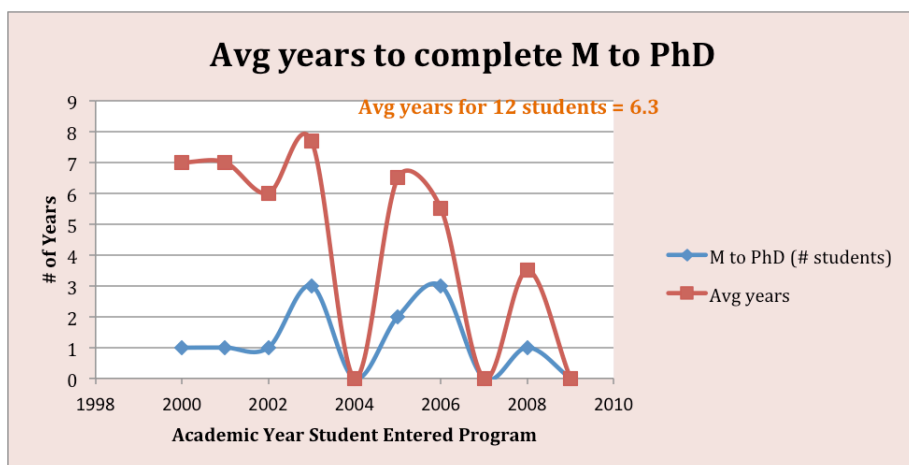
Response: A compilation of time-to-degree data for our 79 M.S. graduates who started in 2000-2009 (below) shows that it does, indeed, take 3-4 years (3.4 ± 1.0 , $1-\sigma$) to complete an M.S. in Oceanography:



Nine students who entered the Department with Bachelor's degrees earned a Ph.D. during this same period, taking 5.5-10.5 years from their B.S./B.A., averaging 7.5 years, a number that is quite typical for an oceanography doctorate at our peer institutions as well as at UHM. The difficulty of scheduling oceanographic fieldwork at sea typically adds a year toward degree compared with other sciences requiring fieldwork, in which field areas are generally more accessible.



The twelve students who entered Oceanography during 2000-2009 with a Master's degree already in hand reflect a more serious problem. These students took 3.5-8 years from their entry into our program to finish their Ph.D., averaging 6.3 years:



Whereas the time to Ph.D. from a Bachelor's degree of 7.5 years is typical for our field, we have been aware for some time that our time to the M.S. is excessive. The Ph.D. completion time for students who entered our Department with a Master's degree is especially excessive.

More than two years ago we began to take steps to ameliorate this situation, by forming two ad-hoc committees, one to recommend changes to the examination structure leading to the Ph.D. and the other to recommend changes to our required core courses.

The first committee, tasked with recommending changes to the examination structure, has just finished its work and its recommendations have been approved by a vote of the Faculty in June, 2013. We are combining our former two examinations, a Ph.D. Qualifying Exam and a Comprehensive Exam, to only one, called the Comprehensive Examination. We have also set stringent timelines for the taking of this exam, which we plan to monitor closely, to further ensure timely student progress.

The second committee, tasked with recommending changes to our required core courses, is still working and should make formal recommendations no later than September, 2013. It is expected to propose cutting our set of core courses, required of all graduate students whether M.S. or Ph.D. candidates, from the current four courses (12 credits) (Geological Oceanography, Physical O., Chemical O., Biological O.) to two courses (6 credits) that would cover these four subdisciplines in a more cursory but better integrated fashion.

Beyond these changes already in progress, it is clear we need to look at our total course requirements as well. These presently include eight formal courses (24 credits), a requirement that is the same for M.S. and Ph.D. candidates, whether they already have a Master's degree or not. The Department will investigate whether this requirement should be reduced for M.S. candidates and for Ph.D. candidates who enter our program with a Master's degree from another institution.

We do give credit for previous coursework and experience. For coursework, the student is required to complete a waiver request form (available online) to obtain approval from the instructor of the UH version of the course. This is frequently done and the majority of requests are granted. Nonetheless, we will look at this whole process to see whether it has placed an undue burden on students.

Recommendation 2: Some advisers are lax regarding committee meetings. Ensure students meet with committees as required to make adequate progress.

Response: We have always regarded the relationship between a graduate student and his/her thesis committee as a partnership. We expect the student to schedule a meeting with their committee each semester, but we also expect the committee chair to make sure this happens. A meeting summary form is signed by the student and all committee members after each such meeting and is filed with the

Department Graduate Education Specialist. The Department thus has records of such meetings, but we have not moved aggressively when such meetings have not occurred. We will now begin to do so, by notifying the student and all members of the committee within a month of the time the meeting should have taken place that they must now meet as soon as possible, and that we will continue to contact them until they do.

Recommendation 3: Retirements have left critical gaps in the graduate education program that need to be addressed, especially in atmospheric chemistry. Find replacements for these faculty as soon as possible. Develop a vision and strategic planning process that cuts across research divisions and provides a realistic roadmap for the Department's future. Request that the Chair engage the Dean in the planning process so that administrative efforts on the part of the faculty are not viewed as "time wasted".

Response: Oceanography has not gone through a strategic planning exercise since 2006, although the individual divisions have kept up to date their prioritized lists of research foci for new faculty hires. An atmospheric chemist is certainly high among these priorities; we are also conferring with the Meteorology Department (soon to be Atmospheric Sciences) regarding this issue. We have collected these lists of faculty specializations and will use them as a basis for a new strategic plan. We are discussing whether a one-day off-campus retreat is the best way to discuss and formulate this new plan.

Oceanography has also just posted national/international ads for two new tenure-track faculty positions in Marine Geochemistry, with expected start dates of 1 August 2014. Atmospheric Chemistry is one of the designated areas of interest.

Recommendation 4: Uncertainty in gaining new positions, the poor condition of buildings, lack of janitorial services, and lack of transparency in how funds and positions are allocated have all contributed to low morale among Oceanography Faculty. Frustration is mounting and may result in loss of key faculty. This is a serious issue that must be addressed on multiple fronts. Upgrade and repair facilities as soon as possible. Make faculty aware of the schedule of upgrades so they do not feel in the dark.

Response: UHM is undergoing a difficult time financially and so janitorial services have been cut substantially in the Marine Science Building (MSB). We have made an arrangement with the janitors such that trash is only picked up from offices every other day, in exchange for more frequent sweeping of the hallways. A special trashcan has been placed on each floor for food waste, which is picked up daily. Unfortunately, this has not been completely effective. The rest rooms and other common areas still remain underserviced. This leads to unsanitary working conditions. MSB needs additional janitorial support.

MSB has been undergoing substantial repairs to infrastructure that are long overdue. An exterior paint job became a major repair effort when it was discovered how badly the concrete had deteriorated as a result of too many years of "deferred maintenance". The air conditioning system in MSB is being completely refurbished, windows have been rebuilt, and all stairway doors have been replaced.

Life in MSB has been disrupted for many months now, although we have made every effort to minimize the inconvenience and to keep personnel informed about what repairs will be carried out when. The work is on schedule to be completed by the end of this summer, although there are some concerns about the quality of this work. Efforts to improve our facilities must continue, though the department has limited resources to deal with this issue by itself. We will try to work with the Dean's office and the UH Facilities Department on janitorial and maintenance issues.

Recommendation 5: Lead a Faculty meeting to answer questions, provide narrative on school and campus issues, and present thoughts on future hires.

Response: The new Department Chair, Mike Mottl, held such a meeting on June 12, in which he presented the Department budget in some detail and discussed the recent trend of Faculty hires and what it implies for the future. He also passed on to the Faculty detailed information about the SOEST and UHM budgets that had been provided by Dean Taylor at the previous week's EXCOM meeting.

Department of Atmospheric Sciences (Meteorology - MET)

Meteorology faculty have met and discussed the actions that should be taken to address the April 2013 external review comments. A weekend strategic special planning session was held that focused on the need to improve the culture and morale of the department with regard to servicing students, especially undergraduates, and to achieve excellence in teaching by emphasizing *learning* and mapping student learning outcomes.

In general, MET faculty appreciate the constructive criticisms and suggestions provided by the review team for the areas that need to be improved. Considerable efforts will need to be applied by ALL MET faculty in response to the review in order to reinvigorate a strong academic undergraduate program and to better our graduate programs as well.

The review team proposed a number of preliminary specific ideas about improving the program, curriculum, and student advising (etc.). The faculty is currently formulating concrete action plans, which are detailed below.

1. A department-wide retreat was held to discuss issues and formulate answers. Discussed response to issues raised by external review, touched upon the 5-year plan.
2. Improve the culture. For example, a student coffee place has been set up more formally and the students use it a lot. Faculty attend seminars and department events, and a general attitude of being more inclusive and welcoming to students is emerging.
3. Made a plan to upgrade the facilities and SOEST Dean has agreed to fund \$30K.
4. Established an undergraduate advising and recruiting committee chaired by Steven Businger and members include two young faculty (Jennifer, Mike) and Gary Barnes. Starting to address issues related to undergraduate advising. Mission is to quickly fix the undergraduate advising problems. I do not think the undergraduate issue is difficult to fix given the strength of this committee. Main future target is recurring students. This is not an easy task. But they have already started to think.
5. Reformed the curriculum committee, chaired by Duane Stevens. Jennifer and Mike (possibly Dave Chen) are members. Started to address the issues related to curriculum, which is not too hard to fix. But the more important mission is that the committee will draft multi-track program curriculums to attract more student enrollment; a major task in the future plan. Dave Chen has proposed a 3+2 program for BS plus MS.
6. Graduate students survey has been done and Gary Barnes has analyzed the results. This will improve the course offering plan and student advising.
7. Organizing an "International workshop on Tropical weather and Climate" at Honolulu Oct 9-11 2013. This is an important event to promote the Department's tropical meteorology research and international linkage. Prof. Tim Li took the lead.
8. Planning a "Takio Murakami memorial symposium" to honor our Emeritus Late professor Murakami. This will be at Honolulu in July 2014 and is an international conference. The theme is tropical meteorology and monsoon. The activity is targeted to enhance international linkage and provide a forum for frontier research issues. I am leading this organization along with Jun Matsumoto from Japan and an

international committee.

9. Chinese issue, a two-side issue that have to be dealt with. Chinese faculty are strong in research but relatively weak in teaching. Their oriental linkage is a strong plus and perhaps unique. We are exploring the funding opportunity vigorously for IPRC: Feifei, Tim Li, and myself are involved.

10. Compilation of Alumni list by one of the staff. This has not been done properly previously. Expect to accomplished in a few weeks.

11. Last but most important. I discussed with SOEST Dean about the department leader. I recommend Gary or Steven to take over.

Below is a brief summary of our response to major review comments based on discussions with some faculty members and the Chair's personal opinions.

Recommendation 1: High seniority: This is an excellent time to begin strategic planning and thinking of the future. We note with dismay, that there are few, if any, faculty who are able and willing to take on responsibilities of chair. However, a new chair will begin soon.

Response: MET faculty retreat held in late August 2013 discussed strategic planning for the future direction, hiring priorities, reinvigorating undergraduate program, review and improve the curricula for both undergraduate and graduate programs, department procedures for handling student concerns, and synergies in curricula and academic program implementation. These are especially needed in the climate and environmental science area, Other charges from the Dean and agenda items proposed by the faculty were included.

The faculty has met and discussed this issue. Some disagree with the above review statement, but as a chair I see it as a real issue. The current chair wants to step down because he has to deal with a considerable number of committed duties on international and national committees and to manage the largest research group/extramural funding in the department besides teaching. However, he has agreed to serve 1 more year.

Recommendation 2: Undergraduate teaching: Decreasing numbers of majors.

Response: We have looked at our enrollment in the last 5 years. From 2008 to 2012, the numbers are 28, 25, 20, 19, and 21. We need to further find out the reason why the recent three years' enrollment is lower. We will explore venues for recruiting local and mainland US undergraduate in met/atmospheric major including multiple track options and possible joint programs etc.

If we focus on graduation rather than enrollment, our undergraduate program has improved notably: During 2007-2012 we have 31 BS graduates with an averaged exit GPA of 3.47 compared to 18 graduates with averaged exit GPA of 2.43 in the five years preceding.

Recommendation 3: There is concern that students do not come to faculty for advising. SOEST staff has filled this gap because of break in student/faculty communication.

Response: We realize that there is a serious break in student/faculty communication. Traditionally, one of our faculty members was designated as UG chair/advisor who is primarily responsible for communicating/advising UG students. In the past 3 years, our UG chair has not communicated well with students due partly to lack of experience and partly frequent travel. We appreciate Leona's assistance. The Department chair designated an inexperienced UG advisor. The problem will be fixed by appointing several UG advisors (to share the load) who will receive training in student advising.

Recommendation 4: Curriculum, grad and UG, available to students are very thin.

Response: We need to carefully revisit and improve our curriculum, however, “very thin” may be an exaggeration; the main problem is imbalance. We have strong curriculum in atmospheric and climate dynamics, and tropical and synoptic meteorology, but the atmospheric physics courses were weak because of lack of expertise (the only atmospheric physics teacher was Dr. Philips who left in 2011). With the two new hires, this situation has been considerably improved. Both Bell and Small are offering new courses in Atmospheric Physics. Now, we have a more balanced curriculum than ever before.

We need to improve cross listings of graduate/undergraduate courses with OCN and other programs. In addition, it is suggested that the Dean may appoint a joint task force to explore synergies with regard to curricula and academic program implementation, especially in the climate area, such as climate and environment.

Recommendation 5: UG program is “marginal” in satisfying National Weather Service certification.

Response: The faculty believes that our UG program does satisfy requirements for NWS certification, and we host the NWS Honolulu Office. But we will review it again.

Recommendation 6 No courses in atmospheric chemistry, few in dynamics.

Response: Our diminished ability to teach atmospheric chemistry is due to a prior Dean decision of letting atmospheric chemistry faculty all reside in OCN and they both since retired. This has to be resolved at the level beyond the department.

Recommendation 7: One or two instructors are so bad that students are unwilling to register for those classes.

Response: True. But what is the best way to handle this? The faculty who has poor performance on teaching does not do research either. Our system must have an effective measure to resolve this problem and effectively utilize the post tenure review.

Recommendation 8: Students have problems understanding the diction of instructors.

Response: We need to identify who this is. Suggest requiring language training.

Recommendation 9: Students want more opportunity for research, reluctant to partner with faculty.

Response: This should be improved, as we have the resources. Faculty need to proactively approach UG students, understand their desire and spend time on training them.

Recommendation 10: Graduate and undergraduate students cite poor course choices including:

- 1) Lack of regular offerings of Advanced Synoptic Meteorology;
- 2) Statistics course should focus more on meteorology topics, less on basic math;
- 3) Few and irregular meetings of students with committees;
- 4) Lack of attention in scheduling of courses, no notice of future scheduling;
- 5) Lack of coherence in courses taught by more than one instructor.

Response: The above problems are, to large extent, severe issues the faculty has to address and improve. Item 2) should be taken care of by individual instructors, but other problems are common to many faculty

members such as 3), 4), and 5). Our service to UG needs to be improved in many aspects. This will be one of the foci for faculty retreat discussion.

Greater improvements in faculty involvement with undergraduates at all stages of the MET major are needed.

Recommendation 11: MET faculty are not devoting sufficient time to the academic programs as they should.

Response: This attitude problem is a key to resolve issues listed in the item directly above. Some faculty members did well but others did not. Meetings among department members have reinvigorated a desire to put more effort into teaching. A focus on achieving excellence in education is rising within the department.

Recommendation 12: Only two TA's available and these go to MS students.

Response: Our G-fund has been deficient. Over the past three years we have to use NWS fellowship to support TAs.

Recommendation 13: Faculty should hold a retreat to discuss several issues including: strategic planning for the future; hiring priorities; curriculum issues with focus on up-to-date and coherent curriculum for both grad and UG programs; department procedure to handle student concerns regarding; course scheduling; advising; faculty guidance; student –faculty interaction and mentoring; re-emphasis on student learning; explore synergies with PO faculty for curricula and programming

Response: We will certainly discuss all these issues thoroughly at future faculty retreats. We shall develop a concrete plan for immediate actions and for fulfilling long-term goals.

Hawaii Institute of Geophysics and Planetology (HIGP)

HIGP Faculty had one comment about the SOEST Self Study. Despite the Review Committee's generally favorable comments about the Institute, there was one paragraph on Page 22 of the Report that we disagreed with.

Recommendation 1: A question was raised about clarifying the role of marine geology (MGG) in an oceanographic institute. While the review team appreciates the important role of this discipline, it is our understanding that the HIGP strategic plan focuses on developing new instrumentation and methods for conducting MGG studies, and that the marine geology research may be more properly focused in GG.

Response: Faculty within HIGP work in many overlapping inter-disciplinary fields, with a focus on Earth and Planetary Science topics. MGG faculty within HIGP carry out entrepreneurial research with industry, U.S. and foreign agencies, and private foundations and thus complement and expand on the research in GG. Marine geology and geophysics remains an integral discipline within the legislatively defined Institute's mandate. HIGP's MGG faculty develop and use a variety of instrumentation to address state and national needs and through scientific publications bring awareness of these capabilities to the broader community. As national funding trends permit, it is expected that the MGG component of the Institute should increase.

Hawaii Institute of Marine Biology (HIMB)

Recommendation 1: Several young, non-tenure track faculty at HIMB have voiced concerns that restrictions on privileges at other UHM units preclude them from participation in SOEST graduate education efforts. They are asking that some arrangements be made with Oceanography and/or Marine Biology so that they can be awarded graduate faculty status.

Response: In the new Marine Biology program, one HIMB faculty does have graduate faculty status. Since this is a new program and we are working with the Graduate Council in developing policies for graduate faculty status, the acceptance of the non-tenure track faculty has not been finalized.

Recommendation 2: HIMB should receive immediate additional support for repair and renovation.

Recommendation 3: HIMB should receive facility support from main campus, as it is a UHM unit charged on campus indirect cost rates.

Response: The HIMB faculty members were unanimous in their comments regarding the review panel's recommendation for increased facilities support from the overall UH system, and "most importantly, return of overhead to the unit and to the PIs that generate it." The stance of the Deans office that HIMB received the same return of overhead as any other unit (25%) is unsupported by the fact that we must pay for most of our facility support out of that, whereas other units on campus do not. So, I think we strongly support the two recommendations as stated:

Out of indirect costs returned, HIMB pays for its own:

1. Janitorial service
2. Security service
3. Landscape gardening service
4. Sewage and water and electricity
5. Garbage removal
6. Transportation (boat costs and van service for parking)
7. Courier for mail delivery from main campus
8. Internet connectivity and service

Note from Dean: I have not edited the HIMB response – even though it neglects to acknowledge the historical base of S-fund support (not RTRF) for operations. Nevertheless, that base support has not been increased in the last decade, during which time utility costs have more than tripled.

Hawaii Undersea Research Laboratory (HURL)

The External program review noted HURL to be an effective and internationally renowned program. The review also noted that HURL was periodically externally reviewed by NOAA evaluators. HURL last had a very successful national review and recertification in February, 2010.

Recommendation 1: The SOEST Program Review had three recommendations for HURL. The first involved funding. HURL is currently funded by NOAA, through early 2014. The recommendation was that HURL develop plans for future funding beyond this point given the uncertainty of NOAA funding.

Response: HURL strongly agrees with this recommendation and has implemented it. HURL is developing plans to diversify funding. Two approaches have been taken. The first is to lower existing costs with a view to making HURL dive options available to a wider range of paying users. The major

way this was done was to bring back into service our submersible launch, recovery and transport vehicle (LRT) and have its ownership transferred from NOAA to the University of Hawaii after the vessel's recertification by the American Bureau of Shipping (ABS). The cost of a dive using the submersible support vessel KOK was approaching \$40,000/day. The cost of the same dive using the LRT is about \$15,000. The one disadvantage is that LRT operations can only easily be done locally, considerably restricting remote operations.

HURL has reduced salary obligations by providing HURL assets and employees for the use of other UH programs at cost. For example, HURL obtained a grant from the U.S. Department of Energy through HNEI to investigate the use of the Makai Pier as a test site for alternate energy equipment. This was successful. HURL set up special facilities, developed a proposal and circulated it to all potential SOEST and engineering users then set up a revolving account to handle support from other programs using the Makai Pier and HURL staff. This has brought in half a dozen paying users. A similar arrangement was made using the HURL data/video department.

The second part of HURL's plan to diversify its revenue stream involves contacting a range of potential users to make them aware of the additional capabilities HURL now offers. Specifically, these new assets are the LRT to lower per dive cost and the ROV to go to 6000m, a much deeper depth capability than the current 2000m offered by the submersibles. As soon as we have the current operational dive season behind us showing the LRT and ROV in action rather than just as projections, we will definitely have peaked the interest of a number of users who are watching current operations. These include various NOAA groups in the Pacific including NOAA Fisheries, NOAA Sanctuaries and Monuments, NOAA Marine Archeology and the Office of Ocean Exploration and Research taking over from our former parent, the National Undersea Research Program. There are also engineering programs such as the Natural Energy Lab of Hawaii, future Ocean Thermal Energy Conversion operations, the deep water power cable and marine mineral companies and governments planning for manganese nodule mining in the Clarion-Clipperton zone to the south of Hawaii.

Recommendation 2: The second SOEST program review recommendation concerned program destabilization as a result of the move of marine facilities from Snug Harbor to pier 35. This is a major move and one that could potentially be highly disruptive to HURL operations.

Response: In order to minimize these disruptions, HURL personnel have served on many design and coordination committees and HURL has actively participated in all phases of move planning. While HURL is not looking forward to the move, we are confident both that our needs are understood and that they can be met.

Recommendation 3: The third SOEST program review recommendation was that a plan be developed for a new way to organize science at HURL.

Response: Traditionally HURL had prepared a request for proposals (RFP) and the best-reviewed proposals were awarded dives by a review panel convened periodically. This method, favored by the National Undersea Research Program (NURP), has fallen by the wayside with the demise of NURP and it is unlikely that HURL will conduct an RFP in the near future.

HURL now is focused on Ocean Exploration missions and is operating in the mode of a NOAA Cooperative Institute where science is arranged between partners. In this model, HURL will develop scientific partnerships with outside groups and package expeditions based on team plans. This does not present a challenge to HURL. We did this for the major 5-month 2005 expedition we organized to the Keramadec Arc in the South Pacific with 10 partner institutions. This new science plan was the basis of our successful 2013 proposal to NOAA's Office of Ocean Exploration and Research. While the new method of establishing scientific partners requires some outreach by us, we are actively doing this, have

done it in the past, enjoy it and welcome the new mode of doing business. We do not view this as a threat but rather as an exciting opportunity.

In summary, HURL largely agrees with the SOEST external reviewer's findings. We had independently noted the threats and opportunities brought forward by the reviewers. We have developed viable plans to address them and are actively working our plans.

International Pacific Research Center (IPRC)

IPRC welcomes the Review team's assessment that "[IPRC's] research program continues to be of the highest quality" and that IPRC's presence has been a benefit for the participating departments within SOEST.

Recommendation 1: The Review team noted the changing international environment in which IPRC functions and did identify the major challenge at IPRC, namely maintaining a base of funding to ensure that critical administrative and research support can continue.

Response: At the IPRC level we are trying our best to diversify our sources of funding from external sources. We would certainly welcome any support the School and the Mānoa campus could provide in the future.

Hawaii Sea Grant College Program

The University of Hawaii Sea Grant College Program wishes to thank the review team for its strongly positive review. To be noted as the top Sea Grant College Program in the nation is an honor and a responsibility that the entire program will take seriously. As has been recommended by the review committee, UH Sea Grant is committed to continuing along the path that has led to three consecutive superb evaluations over the last ten years.

Joint Institute for Marine and Atmospheric Research (JIMAR)

Recommendation 1: To facilitate continuing interaction between JIMAR staff and NOAA scientists housed on the Ford Island campus and UHM faculty and students it will be necessary to retain a suite of offices to house short term visitors, including some foreign nationals who will not be able to be housed at Ford Island.

Response: The JIMAR director will discuss space options with the MSB space committee and Dean Taylor in an effort to accommodate JIMAR RCUH employees who 1) may have access issues at the NOAA Ford Island facility (i.e., non-US citizens), and/or 2) require a place to work on campus as part of their JIMAR related research.

Center for Microbial Oceanography: Research and Education (CMORE)

We are honored to be grouped with HIGP and HNEI as 'visionary, entrepreneurial institutes that are extending technological boundaries and significantly advancing research in their disciplines.' Unfortunately C-MORE does not yet have the ORU status of the other two and we hope that can be addressed in the next year so that we can maximize our impact.

We appreciate the favorable comments and general support of our research, education and outreach activities. We agree with the recommendation for continued SOEST, UHM and UH Foundation support for C-MORE as the NSF support ends in 2016.

Department of Ocean Resources and Engineering

ORE acknowledges the overall positive review of the Department. While there was only one formal recommendation (below), there are several comments that we address.

Review Team Comment: The faculty members are doing interesting research of value to Hawaii and have an adequate record of research publications.

Response: The department is actually quite productive in terms of publications. If the HURL faculty (who are S faculty in any case and whose publications are counted with ORE) are not counted in and allowance is made for new faculty just starting up, the department publication numbers should be divided by 4 or 5 instead of 8 in which case the productivity looks high rather than just adequate.

Review Team Comment: Because the department lacks an undergraduate program, there is only one MS and one PhD GTA so there is little opportunity for graduate students to have teaching experience. If the department had an undergraduate program, it would be a feeder into the graduate program, create opportunities for more GTAs, and create an opportunity to expand the department's coverage in a field that is so vital to the state of Hawaii.

Response: This suggestion to start an ORE undergraduate program is a topic worthy of serious investigation. It would bring to ORE more TA's as well as faculty (probably 3 more would be needed) and would definitely fill the need for more engineers in the Hawaii market (at the moment all ORE graduates are getting jobs and the Hawaii ocean engineering market is routinely taking twice the number of graduates that ORE is providing). It would provide more undergraduate STEM classes in SOEST. It might be a way to stimulate more interest in engineering in the local high school population (as ocean engineering has an undying link in the minds of high school students with surfing, waves, beaches, canoes and boats - all things dearly loved). Cost, the need for support from the College of Engineering, and the effect on ABET accreditation are not insignificant factors to consider. It is something that could be instituted over a few years by adding one new undergraduate course every year until a full roster was available. We have a course on the books to start with - ORE 202 - Man and the Sea.

Review Team Comment: Since the Look Lab was closed in the late 1990s, the department has lacked an experimental hydraulics lab (e.g., wave flume) for teaching and research. As a result, students and faculty have to travel elsewhere to test their computer-created models. Remarkably, ORE is the only ocean engineering department in the country without an experimental laboratory. One Ph.D. student observed that "We are ocean engineers but don't have ocean engineering equipment."

The university also lacks a High-Bay Staging Area on campus for assembling and testing large pieces of equipment to be deployed at sea. Both of these could be shared facilities with the College of Engineering. It is recommended that the department work with the Deans of SOEST and the College of Engineering to establish these laboratory facilities.

Response: While we do not have our own wave tank (and the old one at Look Lab was actually very difficult to use even when operational through the mid 1990's) we do have access to the civil engineering hydraulics lab, Kilo Nalu, three faculty labs (Howe, Nosal, and the new faculty member (previously

Pawlak's lab) and the HURL Makai Pier facilities with open ocean access. Taken together these are reasonable facilities although underutilized by the students. Because Holmes Hall renovation has been put on hold yet again, it is not effective to try to obtain hi-bay area there in the short term.

Review Team Comment: Weakness in mathematics of incoming graduate students has been a perpetual problem. Starting in September, the department will have a required math course taught by one of its own faculty members who is an applied mathematician. The courses in the Department of Mathematics are deemed to be too theoretical.

Response: We have added the requirement that students take one advanced mathematics class.

Recommendation 1: Efforts should be made to consolidate ORE students and faculty within the Holmes building and upgrade facilities and office space to provide an appropriate working environment.

Response: While it is unfortunate that all the student offices are not in one place, this is hardly a disaster and is true of most departments at the university. In fact most department do not have office space for every student wanting it - we do.

Hawaii Natural Energy Institute

Recognizing the overall positive nature of the feedback for HNEI, the external review provided three recommendations for the Institute that are heavily influenced and controlled to a large extent by the University.

Recommendation 1: Work with the Dean to consolidate labs into a single building with, if necessary, renovated space.

Response: While a single site would be ideal, realities of space make this very difficult. However, at this time HNEI cannot locate staff working in same technical areas or even on the same projects in proximity to each other. To continue to be effective, HNEI does need additional space in blocks to allow interaction among faculty and with staff.

Recommendation 2: Try again to create a Department of Chemical Engineering, perhaps within an existing engineering department.

Response: As stated in the External Review, there have been at least three failed attempts to institute a Department of Chemical Engineering or a ChE program within another department. As a result, this has not been a high priority with HNEI. However, with the current transitions of senior administrators on campus and the continuing need for this skill set in local industry, we would recommend another effort to establish a ChE degree at the graduate level.

Recommendation 3: Be more diligent in applying for patents. If the university cannot accommodate an increased demand, HNEI should consider hiring its own patent officer.

Response: HNEI researchers are frustrated with the bottlenecks created by the Office of Technology Transfer and Economic Development (OTTED) with patenting and technology transfer to industry. This is not a statement about the quality or efforts of the personnel there but rather the lack of staffing in the office. HNEI would prefer to have a viable OTTED and believe it is critically important if innovation is to be a UH focus but lacking that, HNEI is considering hiring outside counsel to address HNEI needs.

Recommendation 4: As a means of generating additional funding, HNEI should consider spinning off businesses from mature projects with high societal relevance/demand.

Response: Spinning off businesses for commercial development of technology developed at HNEI/UH is a sound idea. While HNEI would be willing to explore options to strengthen innovation, this is not our preferred route for operation of HNEI's research endeavors. We feel that there are many unanswered questions and issues associated with that path, including the potential loss of funding that could result if we were viewed as a competitor, not a neutral body.
