SOEST plans and practices addressing the Chancellor’s FY12 priorities

1) Student Retention and Graduation Rates

- The traditional culture of SOEST (characterized by excellence in research) has, under the current leadership, placed added emphasis on teaching at all levels, and community outreach/service. The Manoa assessment program has been embraced by SOEST faculty as a model for maximizing the learning opportunities we provide for students. SOEST degree-granting units, undergraduate and graduate advisers, and internship and mentoring programs have all identified learning objectives and identified assessment criteria. "Closing the Loop" and identifying assessment outcomes is now being engaged across the school.

- SOEST places a high value on offering the best learning opportunities to our students. This is evidenced in several ways: faculty (not lecturers) teach all courses and most class/sections are small to moderate in size. Faculty throughout the school are implementing active learning styles in the classroom such as clickers, group exercises, collaborative testing, an emphasis on field experiences, and interactive lecturing. Every undergraduate is encouraged to find faculty mentors and become involved in research. Because of the high level of external research and training grants within SOEST, many of these students are employed and do not need to find work outside of school. The Global Environmental Science (GES) program requires each of its 80 undergraduate majors to partner with a faculty member and write a senior research thesis as a requirement for graduation. Many of these faculty mentors are located outside of SOEST in programs across the campus. Geology and Geophysics has a 30-year database of student evaluations of faculty from every class. This student evaluation form is compiled by the unit secretary and used as the primary metric for teaching excellence in faculty applications for tenure, promotion and awards. The ECafe program has advised G&G that their evaluation form is preferable to the on-line option they offer. Having identified best practices of individual Departments, we are looking to implement them across the School, as appropriate.

- At SOEST, advising undergraduate students was formerly considered the responsibility of campus-level offices. Today, every academic unit within the School provides one-on-one advising to each undergraduate. The ratio of advisers to students is approximately 1-20, and we have implemented a stop on registration for the following semester if a student fails to meet with their adviser at least once each semester. Advising for advanced undergraduates is often shared between research faculty that employ and mentor undergraduates as student assistants, and the more formal adviser provided by the department. SOEST faculty have learned that the surest guarantee of a successful graduate student is to employ a talented undergraduate and shepherd them into a masters program. This has ripple effects throughout the undergraduate population that view our departments as fertile environments for professional development.

- Each SOEST academic unit maintains lists of student alumni, and communicates with them regularly. This database begins with exit interviews for each graduating student.
(graduate and undergraduate). Students meet as a group and one-on-one with unit support staff for confidential interviews. They are asked to comment in general and specific terms on their experience, their classes, the advising they received, specific teachers and classes, their perception of the administration of their department, the mentoring they received, and the general culture and attitude of their peer group. These answers are compiled (including all detail) and circulated to chairs, advisers, and SOEST administrators. As you might imagine, there are some direct and pointed comments about specific people. These do not sit in a dark file, rather, they are evaluated for constructive and accurate criticism, and applied in adjusting various aspects of our program. As a result of these interviews, department advisers have been replaced, specific faculty have received mentoring on their classroom performance, changes in curricula have been implemented and other adjustments have been instituted to improve the SOEST undergraduate experience.

- With regard to the timely graduation of undergraduates, we have identified, through exit interviews, that one barrier to progress are the poor learning opportunities offered in the annual calculus sequence on campus. As one alternative, we now advise students that it is possible to take their math from Kapiolani Community College, a program that our students report favorably on. In addition, two of our faculty are now teaching calculus sections for CNS – though this can’t be the long-term solution. Although we have seen some decrease in math as a barrier to timely graduation, as reported by students in their exit interviews, it also remains an issue with retention (see following).

- A significant issue with retention in the GES, G&G and Meteorology undergraduate programs, for all ethnicities, centers on the rigor of the programs, especially the mathematics requirements. The establishment by Dean Taylor of a SOEST undergraduate tutor in math and science has helped in this regard. There is also a fair amount of informal, peer mentoring in mathematics and basic science among the majors. Establishment of a more structured peer mentoring program is under consideration.

- The creation of SOEST and SHAPS in 1988 (and SHAPS’ subsequent split into Hawai‘inuiakea & SPAS) had the unintended consequence of barring their undergraduate courses (that had previously fulfilled course requirements of the four Colleges of Arts and Sciences) from fulfilling the in-College course requirements for over half Manoa’s students, thus disenfranchising them from the majority. This segregation, the associated decrease in course diversity and elective options and the increase in CNS teaching load, needs to be undone – but doing so is not in the hands of SOEST, Hawai‘inuiakea and SPAS faculty.
2) Native Hawaiian Advancement

-Mr. Kaipo Perez, a Ph.D. student of Dr. Paul Jokiel at HIMB, is one of the very few Native Hawaiian PhD students in the STEM disciplines at UHM.

- There have been 98 graduates since Global Environmental Science opened its doors in 1998. Five (roughly 5%) of those students are Native Hawaiian. Of our current student population of 81, 3 (roughly 4%) are Native Hawaiian. Efforts to increase the numbers of Native Hawaiian students will need to focus on recruitment as well as retention, as we have had a number of Native Hawaiians join GES only to later transfer out. Participation of SOEST in joint programs with the School for Hawaiian Knowledge, as well as active recruitment at the Community Colleges, are viewed as recruitment tools with the most potential benefit. GES was a major participant last year in an unfunded proposal to establish a NOAA Science Center whose foci were to increase Native Hawaiian students’ pursuit of science degrees and the integration of traditional cultural knowledge with scientific approaches to environmental issues surrounding climate change. We should continue to pursue such cooperative efforts. GES interactions with community colleges have been through individual contacts between the GES Chair and faculty at LCC, WCC, KCC, and HCC, with visits by the chair to LCC and KCC. Efforts should be made to increase the level of these interactions (and for G&G and Meteorology as well) with planning of regular information sessions to be held on all CC campuses. In addition, one version of a short video being made about SOEST will be narrated in Hawaiian for use at Hawaiian immersion charter schools.

-Another recruitment path is the HIMB Education Program, in partnership with the Pacific Center for Environmental Studies (PaCES) at the Windward Community College, that offers an intensive marine and environmental science summer training program for high school juniors and seniors. Although not restricted to Native Hawaiians, the program attracts many. We are most interested in students who have the greatest potential for benefiting from participation in this program, thus students exhibiting high interest and enthusiasm for the environment, even those who have exhibited low to moderate academic achievement while in high school, are encouraged to apply. The program, modeled after the DOE’s Summer Program for the Enhancement of Basic Education, provides a college-like experience for these students. The first few weeks of the program emphasizes classroom, laboratory, and field instruction in environmental science using facilities at Windward Community College and the Hawai’i Institute of Marine Biology. The latter half emphasizes the development and implementation of environmental science research projects by the students under the supervision of research mentors. These projects evaluate various aspects of how a watershed impacts the adjacent coral reef environment. Thus an ahupua’a, or ridge-to-reef, approach is embraced. Students complete a formal research paper describing their research. The end of the program culminates in a symposium in which the students present their research to a broader audience. The PaCES-HIMB summer program has funding from several foundations and private donors to run one more iteration next summer. Thereafter its future is uncertain.
The C-MORE Scholars Program provides underrepresented students majoring in an ocean or earth science-related field, particularly Native Hawaiians and Pacific Islanders, the opportunity to participate in a hands-on, closely mentored research experience. Three levels of awards are offered (trainee, intern, fellow), depending on the skill and knowledge level of the applicant. Students can advance through the ranks by participating for multiple years. Additional program components include a required orientation, monthly meetings that focus on professional skills development, and tutoring. Learn more about the students’ projects by visiting the scholars’ projects page.

-Laulima A Ike Pono
Scientists and educators at HIMB, the Dept. Oceanography and Paepae o He‘eia Fishpond on Oahu are working to develop a community-based partnership that seeks to integrate fundamental research on the biogeochemistry and ecology of Native Hawaiian Fishponds with community education and career training opportunities. The Laulima A Ike Pono (“working together for a collective vision”) project will build an inclusive, collaborative mechanism by which scientists work in a socially relevant context and community members obtain training in geoscience research and learn about career opportunities in the geosciences. By providing Native Hawaiians and Pacific Islanders opportunities to explore geosciences through community-based research internships, the project integrates modern scientific methodologies and technology with traditional knowledge and practices to create a holistic educational experience. Mentoring of interns in college and career pathways will be offered through workshops and discussion groups. The project also provides a framework for training young and established scientists in the integration of their research with local community and educational outreach programs.

-Hawaiian Newspaper Archive Initiative
As an outcome of EXCOM discussions concerning outreach and collaboration with the School of Hawaiian Knowledge, Tom Schroeder realized that JIMAR could follow up on an old idea and preliminary effort by the late Doak Cox to examine 19th century Hawaiian language newspapers for accounts of natural phenomena such as tsunamis and hurricanes which could help fill in historic records. He met with Dean Maenette Benham and Prof. Puakea Nogelmeier and they crafted a plan to support Puakea and students in development of a database of translated articles. JIMAR provided $50 K per year for 2 years. On learning that Sea Grant was supporting some similar efforts, the projects proceeded in concert. Over 4000 articles are now available, each with a distinct URL, from Hawaiian newspaper articles spanning 1834-1948. As word of this project grew, Pauline Chinn of the College of Education, inspired by conversations with the late Isabella Abbot, realized that these articles (in Hawaiian and English) could be useful in science teacher education and provide an encouragement to Hawaiian students. She, together with Puakea, Scott Rowland (G&G), Floyd McCoy (LCC), and Steven Businger (MET), developed an NSF proposal which would support the use of these articles in teacher education. The proposal has been funded and the 3-year project is now underway. New translations focusing on Hawaiian volcanoes, earthquakes, etc. (and searchable by place, date, type of event, source, author) will be shared in the future thanks to this Kahua A'o award.
3) Quality of Graduate Education

-The SOEST research and graduate education experience:
SOEST is a premier research unit and generates about one quarter of the extramural funding at UH Manoa. SOEST scientists and engineers are exploring new frontiers, from the depths of the Earth’s interior to the outer planets, and from ion probe studies of pre-solar grains to model forecasts of future climate. We live and work in a beautiful natural laboratory, with coral reefs and beaches fringing the only terrestrial ecosystem in the central north Pacific, one that is also home to the most active volcano on Earth. SOEST is leading advances in understanding the ocean, Earth and planets. We are uncovering the mysteries of the deep sea, characterizing our changing climate, discovering new organisms and nutrition pathways, and developing new means to protect our living marine resources. We are making discoveries that impact the health and resiliency of island communities. We provide expert perspectives on local and international events and share our findings with the public and policy makers. Through collaborations across disciplines and with industry partners, SOEST faculty are developing and applying technology to solve energy and resource issues, and foster a high tech economy. Our research and outreach promotes safe and sustainable use of the environment, especially in integrating alternative energy, smart growth and coastal community design. We offer a world-class education, with students trained on state-of-the art facilities and mentored in the field as well as the classroom by leading researchers. Nearly all SOEST graduate students are supported by assistantships. Scientists and students come from around the world to add to the rich diversity of cultures, languages and perspectives that creates a globally engaged SOEST community. The ~180 graduate students find it an exciting and rewarding place to be.

-SOEST graduate programs and advisers have identified learning objectives and assessment criteria and are now engaged in evaluating assessment outcomes. Sea Grant, in particular, has a long and exemplary record of tracking their student alumni’s careers. Interviews with employers of our students provide feedback on course content and program effectiveness.

-Ocean and Resources Engineering (ORE) internships with local industry provide practical training and contacts for future employment. The ORE capstone design project integrates the pre-program and the advanced-level program coursework into a major design experience and introduces students to non-technical issues commonly encountered by practicing engineers. The project simulates work in a consulting firm and prepares students for professional practice. For each class taught, ORE has clearly defined program objectives that have been fit into the overall goals of the program. Students and instructors are surveyed at the end of every semester to assess if program objectives are being met. As part of the ABET accreditation process, ORE keeps track of alumni through regular alumni surveys and seeks their input in our program as a means of assessing and improving the quality of our graduate education.
-Geology and Geophysics (G&G) graduate students have an annual meeting with the Dept. Chair and their advisor. Every semester students are required to have a meeting with their thesis/dissertation committees. Once per year all students meet with two members of the Department’s Graduate Studies Committee – without their advisor present. Together, these meetings provide multiple pathways for evaluating student progress and any barriers to same.

-G&G faculty are planning a new combination undergrad-graduate professional degree (MGeo) that aims to improve retention and graduation rates by providing a 5-year path to graduate with a B.S. + M.S.

-Oceanography graduate students are required to present an oral presentation at an annual event run by each of their three Divisions. The progress of each student is then discussed by Division faculty at a follow-on meeting.

-Oceanography has recently undertaken a major review of their graduate curriculum. Reorganization in the form of changes to the examination structure and core courses have been proposed and are under consideration by the faculty.

-Biological Oceanography and HIMB faculty, together with Biology/Zoology faculty, are in the final stages of planning a new joint CNS-SOEST graduate degree in Marine Biology.

-C-MORE offers Professional Development Training for graduate students and postdocs (see: http://cmore.soest.hawaii.edu/education/grads-postdocs/index.htm) to equip them with the skills and experiences needed to maximize their potential and succeed in their professional careers. Training modules include outreach (required) and options in leadership, proposal writing, science communication, diversity, teacher preparation, mentoring, and research exchange.

-Hawaii Natural Energy Inst. (HNEI) has developed and offers interdisciplinary capstone courses that benefit graduate students from the College of Engineering and are available to SOEST students.

-HNEI is proposing to fund PACE fellowships joint with the Shidler School of Business integrating engineers, business students and law to address critical state energy issues. This program will contribute to local workforce development while addressing state energy needs.

-HNEI provides graduate assistantships and supervises student graduate research in energy fields across multiple Colleges, including engineering, sciences, and economics.
4) COSEE Island Earth (Centers for Ocean Sciences Education Excellence)
This newly awarded NSF grant, under the direction of Judy Lemus at HIMB and with partners across SOEST, in the College of Education, Hawaiʻinuiakea, Dean of the Graduate School, and at Maui College, will impact all three priorities. Joining over a dozen mainland COSEEs (see http://www.cosee.net/), this new center will (1) establish a state-wide virtual hub to connect marine researchers with students and educators by providing opportunities for scientist participation in outreach and community participation in science; (2) enhance the science and ocean literacy of our island and visitor populations through collaborations with system-wide university students (Marine Option Program, Communicating Ocean Science for Informal Audiences), public libraries and museums, ocean-related tour operators, lifeguards and journalists (at sea); (3) connect modern research, traditional knowledge and ocean policy, including integrating concepts of place-based and culture-based ways of knowing in marine science and by partnering with Na Pua Noʻeau.