Name of the Program:  Department of Oceanography

Program as used in this prioritization process can be a specialization, section, division, field of study, center, degree program, etc. unit head, in collaboration with others as appropriate, must determine the level of analysis required.

How long has the program existed:  Since 1962 (47 years)

Department:  Department of Oceanography

The program would fall under which of the following Vice Chancellor’s offices?

- [ ] Academic Affairs
- X Research and Graduate Education
- [ ] Student Services
- [ ] Administration, Finance and Operations

How does the program fit into the larger administrative unit? (Describe in two or three sentences.)

The School of Ocean and Earth Science and Technology (SOEST) is a multidisciplinary school, consisting of four academic departments, three research institutes and other units conducting research and teaching about the Ocean, Earth and Planets. The Department of Oceanography conducts research and educational activities covering marine, coastal, estuarine, and global environmental science. It is thus an essential part of the SOEST mission to provide “an integrated, comprehensive, and sustained system of Earth observation, research, and education”.

Briefly describe the program (no more than half a page):

The Department currently has 39 tenure-track faculty, along with 19 other faculty; 42 have graduate faculty status. An additional 14 UHM faculty from outside the Department also have graduate faculty status in Oceanography. The collective research expertise and programs of these faculty provide a broad diversity of knowledge and research opportunities for students. The program presently offers a B.S. in Global Environmental Science, a M.S. in Oceanography (Plan A only) and a Ph.D. in Oceanography. The Department currently has 60 undergraduate students from 6 countries, and 68 graduate students from 16 countries.

Department scientists study the processes that shape and control the modern, past, and future ocean, with an emphasis on interdisciplinary investigations. Research in the department covers almost all areas of Oceanography. The department emphasizes basic research, but many research projects are relevant to applied problems and societal concerns such as the fate of “greenhouse” gases, climate prediction, ecological impacts of ozone depletion and coastal urbanization, mechanisms of pollutant transport and cycling, and fisheries recruitment. The interdisciplinary nature of these and other problems fosters strong collaborative interactions among biologists, geochemists and physicists in the Department and School, across the university, and at other institutions.

The Department receives ca. $25 million per year in external research funding. Major sources of funding include the National Science Foundation, the Office of Naval Research, the National Oceanic and Atmospheric Administration (including Sea Grant, JIMAR and HURL), the National Aeronautics and Space Administration, and the Gordon and Betty Moore Foundation.
### RESEARCH - Department of Oceanography

#### CENTRALITY AND ALIGNMENT: Max Score = 28

<table>
<thead>
<tr>
<th>Metric</th>
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<tbody>
<tr>
<td><strong>UHM Vision/WASC Alignment</strong></td>
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<tr>
<td>UHM vision (Hawaiian, Asia-Pacific, natural environment)</td>
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<tr>
<td>Global research leader</td>
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<tr>
<td>Advancing area of strength identified in the institutional proposa</td>
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<tr>
<td><strong>Land-Sea-Space Grant</strong></td>
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<td>Addressing an area expected in a land/sea/space institution</td>
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#### EXTERNAL DEMAND: Continued

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<tr>
<th>Metric</th>
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<tr>
<td><strong>Partnerships</strong></td>
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<tr>
<td>Partnerships with key external stakeholders</td>
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<tr>
<td>Partnerships with native Hawaiian communities</td>
<td>3</td>
<td></td>
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<tr>
<td>Work used by corporate/business interests</td>
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<td>Work used by government interests</td>
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#### INTERNAL DEMAND: Max Score = 28

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<td><strong>Reliance of Others</strong></td>
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<tr>
<td>Collaboration with faculty/staff from other units</td>
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<tr>
<td>Symposia/workshops/seminars value/attendance</td>
<td>4</td>
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<tr>
<td>Experiential Learning/research opportunities for students</td>
<td>4</td>
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<tr>
<td><strong>Facilities and Services</strong></td>
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<tr>
<td>Use of facilities, tools/labs by other units</td>
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<tr>
<td><strong>Enhance Research</strong></td>
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<tr>
<td>Opportunities for faculty/staff in other units</td>
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<td></td>
</tr>
<tr>
<td>Supports graduate students and postdocs</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Generate new areas of academic expertise at UHM</td>
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#### QUALITY/INTEGRITY: Max Score = 44

<table>
<thead>
<tr>
<th>Metric</th>
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<tbody>
<tr>
<td><strong>Quality Activities</strong></td>
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<tr>
<td>Demand for training and public service work</td>
<td>4</td>
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<tr>
<td>Accountability metrics routinely used in self review</td>
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<tr>
<td><strong>Quality Facilities</strong></td>
<td></td>
<td></td>
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<tr>
<td>Good plan for adequate investment in facilities</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Facilities and equipment availability and condition</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Quality Research</strong></td>
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<td></td>
</tr>
<tr>
<td>Obtaining highly competitive contracts/grants</td>
<td>4</td>
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<tr>
<td>Research with prestigious natl/intn universities</td>
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<td></td>
</tr>
<tr>
<td>Positive impact on UHM research reputation</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Quality Faculty/Staff</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Awarded external academic recognition</td>
<td>4</td>
<td></td>
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<tr>
<td>Jointly author publications with natl/internat scholars</td>
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<td></td>
</tr>
<tr>
<td>Faculty/staff publish high number of reviewed papers</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Steady increase in number of citations</td>
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#### CRITICAL MASS: Max Score = 16

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<tr>
<th>Metric</th>
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<tr>
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<tr>
<td>National/international recognition</td>
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<tr>
<td><strong>Fundamental Trends</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increasing award amounts and number of contracts/grants</td>
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</tr>
<tr>
<td><strong>Faculty/Staff Size</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adequacy of staff associated with ORU</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Ability to Deliver</strong></td>
<td></td>
<td></td>
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<tr>
<td>Staff expertise adequate to meet program needs</td>
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<tr>
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<td></td>
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<tr>
<td>Current trends show demand for research</td>
<td>4</td>
<td></td>
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<tr>
<td>Call on staff to provide expert opinions in past 3 yrs</td>
<td>3</td>
<td></td>
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<tr>
<td>Policy impact on state/nation</td>
<td>4</td>
<td></td>
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<tr>
<td>Increase in economic well-being of state/nation</td>
<td>3</td>
<td></td>
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<tr>
<td>Enriching training and public service</td>
<td>4</td>
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<tr>
<td>Responding to scientific needs of state/nation</td>
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<tr>
<td>Work has resulted in products with external demand</td>
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Additional Text Information on Rubrics

Centrality/Alignment
The Oceanography Dept. is a major contributor to Manoa’s efforts to be a “premier research institution” (UHM Strategic Plan) and is the campus leader in the study of marine sciences, which is identified as an “area of strength” for UHM in the WASC institutional proposal; this is reflected in both our extramural funding record and our national ranking (discussed below). We are also active in a wide range of research activities related to Sea Grant and Space Grant initiatives. Researchers in Oceanography are regularly called to provide scientific expertise to the state and nation on topics covering nearly the entire gamut of oceanographic concerns, and our research provides continuing insight into the marine environment which is of critical importance to our state and nation. Similarly, our educational activities, both on and off campus, help educate citizens in the complexity and dynamics of our oceans. For example, our Science of the Sea course (OCN 201) is taken by over 15% of all undergraduates at Manoa. Finally, the Manoa Strategic Plan includes a focus on undergraduate research; our undergraduate program is one of only a few degree programs on campus that require a senior thesis.

Quality/Integrity
Research programs within the department emphasize basic research, but many are relevant to applied problems and societal concerns such as the fate of “greenhouse” gases, climate prediction, ecological impacts of ozone depletion and coastal urbanization, mechanisms of pollutant transport and cycling, and fisheries recruitment. The department’s research involves many collaborations with leading marine scientists and institutions throughout the world.

Oceanography faculty and staff have well-established international reputations and have received numerous awards from leading scientific organizations, as well as appointments to key editorships and science panels. There has been a steady increase in literature citations, with ca. 6400 citations to journal articles with Oceanography authors in 2002, and ca. 11,500 in 2008. The Department is ranked in the Faculty Scholarly Productivity Index as second nationally in “Oceanography - Physical Science”, and fourth nationally in “Marine Sciences”. Oceanography is highly successful in obtaining competitive grants: total extramural research funding has continuously increased from $5.3 M in 2002 to $22 M in 2008 (not including funding by Oceanography faculty associated with the IPRC). Such external support has allowed the development and maintenance of a wide range of leading-edge scientific facilities, such as the HURL submersibles, state-of-the-art numerical ocean models, etc.

Critical Mass
We are recognized internationally as a leader in oceanographic research. The Department currently has 39 tenure-track faculty, along with 19 other faculty and 10 postdocs, and has adequate staff numbers, expertise, and support to be highly competitive. An additional 14 UHM faculty from outside the Department, and 9 researchers from outside UHM, also have graduate faculty status in Oceanography. Oceanography currently has 60 undergraduate students from 6 countries, and 68 graduate students from 16 countries.

External Demand
“The Department of Oceanography conducts innovative research and education programs that enhance our understanding of the ocean, and address 21st century challenges and opportunities for Hawaii and the blue planet.” This mission statement encapsulates how we provide value to the state and nation through world-class scientific inquiry and instruction.

With global environmental change recognized as a key challenge facing humanity, we can expect continued strong demand for our research. Oceanography faculty are routinely asked to provide opinions as reviewers for major professional journals and granting agencies, and as participants on science panels, government advisory panels, etc. The authorships of the research papers we publish indicate clearly the large number of national and international collaborators we work with.

Oceanography faculty have been substantially engaged in national efforts to develop and sustain an Integrated Ocean Observing System, especially its regional implementation for Hawaii and the Pacific. New regional observational infrastructure, such as long-ranging autonomous underwater vehicles, surface current mapping HF radars, and regional data-assimilating ocean models, not only will provide essential information to State and Federal agencies, but will also provide opportunities for education and training to develop the future ocean observing workforce.
Finally, there is widespread interest in environmental issues within the native Hawaiian community. Our undergraduate program taps into this interest by actively recruiting students of Hawaiian ancestry through presentations to high school groups such as Na Pua Noeau and Gear Up, targeted summer courses, and close interaction with CMORE and the CMORE Scholars Program. Our efforts to promote student success, including regular academic advising, faculty- mentored research, and a SOEST-sponsored tutor aid in retention of recruited Hawaiian students. The current GES cohort is 5% native Hawaiian.

Internal Demand
Oceanography faculty have numerous productive collaborations with UHM colleagues in departments including Biology, Botany, Economics, EECB, Geography, Geology & Geophysics, Information and Computer Science, Meteorology, Microbiology, Ocean & Resource Engineering, Philosophy, and Zoology. These collaborations result in numerous research proposals, projects and publications every year. We organize or assist a large number of workshops, symposia, and seminars that attract wide participation from across UHM, as well as from external colleagues, and our state-of-the-art facilities are used by researchers from across UHM. Similarly, new academic areas of expertise have grown from our research, with a variety of new courses being offered to the Manoa community. In addition, Oceanography undergraduate courses are required by majors in the College of Education, the College of Natural Sciences, and Interdisciplinary Studies, as well as other SOEST majors.

A significant fraction of the extramural funding awarded to Oceanography faculty goes towards supporting postdocs and graduate students. Notably, nearly all graduate students are supported by RAs or TAs, and virtually all of our undergraduates receive support for their required Senior Thesis research, with many receiving Student Assistantships during their final years. Currently there are 10 postdoctoral fellows in the department. Oceanography currently has 60 undergraduate students from 6 countries, and 68 graduate students from 16 countries.

Costs/Revenue Generation (Productivity)
With a large amount of extramural funding and only moderate State funding, Oceanography generates much more revenue than it receives from General Funds. Our scientific facilities are nearly completely supported by external funds, and we have been successful in acquiring and maintaining state-of-the-art infrastructure. External support is currently over $22 M per year, or $570,000 per tenure-track faculty member per year, a value that exceeds that of most units at UHM. This translates to an external-support / salary ratio of 4.8 for tenure-track faculty.

Our General Fund support is almost entirely used for faculty salaries. Our operating and administrative expenses are low; for example, several of our key administrative staff are paid from sources other than General Funds. Moreover, our external support is dominated by funding agencies that pay the full on-campus overhead rate.

Specialized Niche/Competitive Advantage
By virtue of its scientific breadth, ideal location, highly talented and productive faculty/staff, and integrated and interdisciplinary scientific and educational foci, the Oceanography Dept. plays a unique, valuable role in the global oceanographic community, while addressing important needs of Hawaii. Our faculty and staff have received extensive national and international recognition, and maintain numerous national/international collaborations. For example, the reputations of Oceanography and Meteorology at UHM were key reasons why the Japanese government helped establish the International Pacific Research Center (IPRC) at UHM. Moreover, our focus on interdisciplinary, cutting-edge research gives us a clear advantage in attracting top-quality students, postdocs, faculty and research staff. Similarly, our strong undergraduate curriculum, with its integrated focus on undergraduate research and cross-disciplinary, global understanding, makes us a useful model for other Manoa departments making the transition to student-focused undergraduate learning.