HSU Academic Department Report - Geology
October 10, 2008 - Program Prioritization

The departmental reports provide context for the academic programs administered by the department, and will be considered in conjunction with the program reports for final program ranking. This report is to be completed by October 10. Use 12-point Times New Roman with 1.5 line spacing.

I. Departmental History, Mission, and Goals

Insert the department mission statement and the department goals. In addition, provide a brief (2 page limit) overview of the departmental history with emphasis on the last 5 years.

MISSION

The central mission of the Department of Geology is to provide a rigorous, comprehensive and up-to-date geologic education, which allows students to develop scientific thinking skills with particular emphasis on field-based research and active geologic processes and to develop a scientific understanding of the interactions between human activities and geology.

GOALS

1) Provide an earth systems approach to geologic education that fosters critical thinking and the ability to make informed decisions on scientific issues in our society.

2) Provide students with a strong field-based education that incorporates the evolution of the Earth and its biota, and the classification of geologic patterns and materials at varied temporal and spatial scales.

3) Provide students the technical competence to collect, process, and interpret scientific data.

4) Train students in the communication of scientific information using written, oral, graphic and electronic forms.

5) Provide a sufficiently broad and rigorous background with depth and currency in at least one area of specialization to allow students to enter professional careers or to pursue graduate studies in the earth sciences.

6) Allow students to formulate, conduct and present the results of an independent research project that contributes to the field. (Bachelor of Science degree only)

HISTORY

The Geology Department was founded in 1968 and quickly established a reputation for rigor and field experience. HSU geology students are known for being able to think on their feet, to handle things they have never seen before and are in great demand by consulting companies, engineering firms, government agencies and oil and mineral exploration firms. The department grew rapidly during the 1970's until it reached 11.5 faculty (9 tenure-track) and 257 undergraduate majors in 1982. Beginning in 1983, the demand for geologists declined nationwide due to collapse of petroleum and mineral prices and mergers of large oil companies. Humboldt was able to maintain a larger undergraduate program than most institutions because of its reputation and location. Since 1987 the number of undergraduate geology majors has ranged between 50 and 75, averaging around 62. Until last year, this made us the largest undergraduate geology program in the state. The continued high quality of our program is reflected in the success of our graduates in prestigious graduate programs (e.g., Caltech, Berkeley, Washington, Colorado, Oregon, Arizona) and in the demand for our graduates from consulting firms and government agencies. Our students find employment primarily in government, geotechnical, and environmental consulting.

The department currently offers three undergraduate degree programs, a BA, a BS (identical to the BA with the addition of a senior thesis) and a Geoscience BA, intended to prepare students for careers in teaching geoscience at the junior high or high school level.

In 1984, the department initiated a graduate program – the Geology Option of the Environmental Systems Graduate Program. In the 24 years of its existence, 72 students have earned MS degrees. The number of active graduate students has ranged from a high of 10 -12 per year to the current number of 4 - 6. As with our undergraduate program, the graduate program quickly established a reputation for providing excellent education, and our students have been very successful in prestigious Ph.D programs and are actively recruited by consulting firms and government agencies.

Despite its modest number of faculty, over its history the Geology Department has had two Outstanding Professors (Longshore, Burke) and three Scholars of the Year (Aalto, Carver, Dengler) and one McCrone Promising Faculty Scholar (Schwab). Most of the current faculty were hired between 1975 and 1985; only one of our faculty is younger than 50. Six of the current faculty are full professors and two are associate professors. There are currently no assistant professors or part time faculty. The past decade has been marked by retirement and continual retrenchment in response to reduced university budgets. As of the end of 2008, four tenured and one temporary faculty will have retired, and we have

been permitted only two replacements. In the next five years it is likely that there will be three faculty retirements.

The department has developed an excellent institutional reputation with other universities for the quality of our students' preparation, and especially their involvement in faculty and independent research. Faculty from other institutions see our students participating in professional field trips and presenting at large national and regional meetings.

II. Departmental Faculty and Staff

Geology Dept Instructors -- AY Average Count of Appointments facpos_GEOL report generated: 22-FEB-08						
Appt Category	**AY 02/03**	**AY 03/04**	**AY 04/05**	**AY 05/06**	**AY 06/07**	**AY 07/08**
Lecturer	1	0	0	1	2	1
Assist Prof	2	2	2	2	1	0
Assoc Prof	0	0	0	0	1	1
Professor	6	7	7	5	5	5
Volunteer	3	2	1	1	2	2
Total	**12**	**11**	**10**	**9**	**10**	**8**

Geology AY average FTEF (time base totals) facpos_GEOL report generated: 22-FEB-08						
Appt Category	**AY 02/03**	**AY 03/04**	**AY 04/05**	**AY 05/06**	**AY 06/07**	**AY 07/08**
Lecturer	.50	.00	.00	.44	.84	.30
Assist Prof	2.00	2.00	2.00	2.00	1.00	.00
Assoc Prof	.00	.00	.00	.00	.50	1.00
Professor	5.50	6.50	6.00	5.00	5.00	5.00
Volunteer	.42	.14	.39	.39	.09	.09
Total	**8.42**	**8.64**	**8.39**	**7.82**	**7.42**	**6.39**

Geology department release/assigned time facpos_GEOL report generated: 22-FEB-08						
Assignment Description	**AY 02/03**	**AY 03/04**	**AY 04/05**	**AY 05/06**	**AY 06/07**	**AY 07/08**
Excess Enrollment (=>75)	.38	.40	.40	.23	.37	.20
New Preparations	.00	.03	.00	.00	.10	.00
Non-Traditional Instruction	.00	.26	.00	.00	.00	.00
Special Instr Programs	.00	.00	.00	.40	.40	.20
Dept Chair AY, Leaders/Dir.	.18	.18	.18	.18	.18	.18
Dept Chair - 12mo	.13	.13	.13	.13	.13	.13
Other State Funds	.00	.00	.00	.20	.00	.00
Grant: Academic	.00	.00	.00	.00	.23	.13
Total	**.69**	**1.00**	**.71**	**1.13**	**1.41**	**.84**

Personnel (At least .5 FTE)

Name	**Position**	**Description of Specialty and Key Contributions (no more than 100 words per person)**
Ken Aalto	Professor	**Stratigraphy** Teaches two key classes for undergraduate majors (Stratigraphy and Sedimentation, Field Camp), general education Geology of California, and several specialization courses. Supervises bachelor's and master's thesis students. Conducts research on Franciscan, Klamath Mountain, and Tertiary rocks of Northern California, and history of geologic exploration of the West and Pacific Northwest. Fully retiring at end of Fall 2008 semester.
Bud Burke	Professor	**Geomorphology and Soils** Teaches two key classes for undergraduate majors (General Geology, Geomorphology) and two key graduate classes (Quaternary Stratigraphy, Quaternary Geology Field Methods), as well as several general education courses and undergraduate and graduate-level specialization courses. Supervises bachelor's and master's thesis students. Conducts paleoclimatic and paleotectonic studies using soil geomorphology, stratigraphy, and relative dating of Quaternary deposits in the western US, New Zealand, China, Kyrgyzstan, and Mongolia.
Susan Cashman	Professor	**Structural Geology** Teaches two key classes for undergraduate majors (General Geology, Structural Geology), one graduate level class (Advanced Structural Geology), and several general education classes. Supervises bachelor's and master's thesis students, including providing financial support for some students through grant funding. Research on deformation at convergent plate margins and fault zone microstructures have earned her national and international recognition for assessing earthquake hazards.
Lori Dengler	Professor	**Geophysics, natural hazards, earthquake & tsunami mitigation** Teaches general education classes, and two geophysics specialization classes. Directs Humboldt Earthquake Education Center. Extensively involved in earthquake and tsunami education and outreach.

		Supervises bachelor's and master's thesis students. Conducts research on earthquake and tsunami hazards and participates in national and international tsunami mitigation efforts.
Mark Hemphill-Haley	Associate Professor	**Tectonics, Paleoseismology, Seismic Hazards** Teaches courses for lower- and upper-division general education program and key geology major (Geomorphology, Field Methods, Field Camp) and graduate courses (Quaternary Tectonics, Quaternary Field Methods), as well as specialization courses. Supervises senior and master's theses. Conducts local, regional and global research regarding seismic potential of active faults. Oversees operation of department GIS laboratory and high-resolution survey equipment.
Andre Lehre	Professor	**Quantitative Geomorphology and Hydrology** Teaches three key classes for undergraduate majors (General Geology, Geomorphology, Field Methods), two key classes in graduate program (Fluvial Processes, Hillslope Processes), and several undergraduate and graduate specialization courses, including Hydrogeology. Supervises geology bachelor's and master's thesis research and serves on Watershed Management master's committees. Geology Option coordinator for Environmental Systems Graduate Program. Conducts research on sediment budgets, sediment transport, and effects of gravel mining on channels. Advises County and agencies on gravel mining.
William Miller	Professor	**Paleontology** Teaches two key undergraduate courses (Invertebrate Paleontology, General Geology), as well as a specialization courses (Paleoecology), general education courses (Fossils, Life & Evolution, Dynamic Earth) and workshops for teachers. Research specialties include invertebrate paleozoology, paleoecology, ichnology, and evolutionary theory. Supervises graduate and undergraduate research projects related to paleontology.
Brandon Schwab	Associate Professor	**Experimental Petrology** Teaches four key undergraduate courses (Mineralogy, Petrography, General Geology, Field Camp), one key graduate class (Quaternary

		Geology Field Methods), and a variety of general education and specialization courses. Helps to maintain and repair analytical equipment in the department. Assembled and is in charge of the experimental petrology laboratory for high-temperature and pressure research on Earth materials—one of the only such facilities in the country focused on undergraduate research. Supervises senior and master's theses. Conducts research on mineral composition and phase stability in the upper mantle.

III. Recruitment and Retention

Describe any specific actions (other than HOP or similar standard efforts) the department has taken to recruit and/or retain students, particularly diversity students and/or students who are underrepresented in your discipline. What have been the results of those actions?

- Annual "Pizza & Geology" night for College of the Redwoods students
- Annual student letter writing campaign (current students write letters to their high school/community college teachers about the strength of the HSU geology program
- Geology faculty and students frequently give talks in regional high schools and participate in outreach activities such as Expanding Your Horizons and CR's Science Night.
- Alumni newsletters included Department brochures and a request to disseminate information about the geology program.
- We have been very successful at attracting transfer students from CR, but have no data on the success of other outreach efforts.

Note: women comprise about 42% of majors in the HSU geology program; nationwide they are 35 - 40%. Hispanics are 7% of our majors, nationwide they are 5%. No blacks self-identified; nationwide they are 2% of geology majors. The earth sciences attract the smallest proportion of students of color of all the sciences.

IV. Learning, Curriculum, and Assessment.

List the student learning outcomes for your academic programs. Then for each learning outcome that has been assessed, provide a summary paragraph that includes the methodology and results of the assessment.

Learning Outcomes:

The first number of each item in the list below refers to the department goal (listed in section I above) with which this learning outcome is associated.

1.1 Recognize, appreciate and communicate scientific uncertainty

1.2 Use, formulate and test multiple working hypotheses based on the scientific method

1.3 Understand the consequences of human activities on the environment

1.4 Understand the availability, utilization and conservation of earth resources

2.1 Understand geologic time, evolution and global processes

2.2 Recognize how long-term processes and evolution affects the global earth system

3.1 Classify and identify geologic materials at the microscopic, hand sample and field scales create, read and interpret geologic maps and cross sections

3.2 Visualize and describe subsurface structures and processes in 3 dimensions

3.3 Recognize and use fossil groups

3.4 Recognize and describe the crustal processes that create landforms

4.1 Effectively communicate scientific ideas and results verbally

4.2 Effectively communicate scientific ideas and results in writing

4.3 Locate and access and use appropriate sources and data from both electronic and traditional resources

5.1 Gain employment and/or admission to graduate studies in the earth sciences

5.2 Demonstrate depth and breadth of knowledge and currency in one or more advanced specialty fields (area of specialization)

6.1 Formulate a research problem and carry out independent laboratory-field investigations

6.2 Prepare a written thesis and present the results orally

Assessment:

In 2007 we assessed outcome 5.1, "Students can gain employment and/or admission to graduate studies in the earth sciences." Our primary measurement of our success at attaining this goal is the percentage of HSU geology undergraduates who have attained jobs in a geology field and/or attended graduate school. In spring semester 2007, the Geology Department sent a newsletter and a survey request to alumni. We received 81 responses. Of the 75 who received undergraduate degrees prior to 2005, 36 (46%) had attended some graduate school and 30 (40%) received at least a MA/MS degree. This compares very favorably with the most recent American Geological Institute (AGI) study which found for 2000 that nationwide, 23% of students acquiring BA or BS degrees in

earth sciences went on to graduate programs. Furthermore, 61 (89%) currently have jobs in earth-science related fields and 69 (92%) worked in an earth-science related job at some point in their careers. The nation-wide average in 2000 according to AGI was that 60% of US undergraduate earth science students attain jobs in an earth science-related field. In addition to job and graduate school experience, the survey also polled alumni about the rigor, breadth and quality of the program, rated on a scale of 0 (worst) to 5 (best). Responses from alumni were overwhelmingly positive, averaging 4.5 to 4.9 and show little variation among the decades. The standard deviation among the response was small – ranging between 0.3 and 0.9. From this sample of HSU geology alumni there is a high degree of satisfaction with the program. This is reinforced by the comments respondents included on their surveys

In 2008 we assessed outcomes 6.1 "Formulate a research problem and carry out independent laboratory-field investigations" and 6.2 "Prepare a written thesis and present the results orally". Students who choose to pursue a Bachelor of Science in Geology must complete a senior thesis. They conduct independent research under the supervision of a thesis advisor, write a first and final draft of their findings and give an oral presentation to the faculty and anyone else who chooses to attend. In spring 2008, the Geology faculty developed a rubric to assess the quality of these independent research projects. At each senior thesis presentation in the Spring term 2008, all faculty, including adjuncts, but excluding the thesis advisor, were asked to complete the rubric, rating each category as to whether it exceeded expectations (3), met expectations (2) or was below expectations (1). Faculty also had the option of adding additional comments. Only three students completed senior thesis projects in the 2007 – 2008 academic year. One of the presentations was superior and generally exceeded expectations, one generally met expectations, and one was deficient. This was too small a sample size to adequately assess the effectiveness of the independent research goal of our Bachelor of Science Program. As a result of these results, we have agreed to:

1) Continue the assessment of thesis projects on a continuous basis to develop a larger sample size.

2) While results among faculty were generally similar for a particular student, there were some cases where the assessed values were very different. There is a need to discuss our criteria among the faculty to develop a consensus on what is expected.

Relatively few faculty assessed the written theses. The primary reason for this is that students don't turn in their written thesis until too close to the deadline and faculty do not have adequate time read them. We recommend firmer deadlines and more communication between students and their advisors to meet these deadlines.