California State University, Fullerton
Department of Geological Sciences
Program Performance Review
Self-Study Document: SWOT Analysis
February 2006

II. SWOT Analysis

We have divided each of the SWOT components into three general areas – teaching, research, and departmental resources.

A. Strengths

a) Teaching Strengths

1. Tenure-track Faculty: Over the last seven years, the Department has hired seven new faculty who have brought new enthusiasm, vision, and vitality to the Department (total faculty = 11). This invigoration of our faculty promotes major recruitment and retention and has allowed us to update our curriculum.
2. Lecturer Faculty: The Department has a high quality (av. Student Rating 3.18 out of 4), dedicated group of part-time lecturers. These lecturers primarily teach lower-division courses that are entry points into the major (GEOL 101, 101L, 201) and promote the growth of our GE program. Some of our 18 lecturers teach the large-lecture upper-division GE courses (GEOL310T) and the teacher-training courses (GEOL102, 410).
3. Field and Hands-on Based Learning Environment: The Department maintains a curriculum that is grounded in field-based courses. For courses where field activities are not practical or warranted, hands-on lab type activities are used.
4. Long-term Course Scheduling, including a Nighttime Course Rotation: Commitment to keeping a 5-year course rotation in place facilitates student/faculty planning and provides access to a nighttime undergraduate core sequence once every three years. All graduate courses are offered at night to permit enrollment by working students.
5. Excellent Faculty – Student Relations: The Department maintains excellent ties with its students and tries to maintain these ties through Departmental interactions and involvement.
6. Teaching Opportunities through Research: All undergraduate and graduate students are required to perform research and complete a research thesis. This research serves as a primary teaching tool that forms a capstone to the educational experience.
7. Location and Access to Field Sites: The Department is located in a region that allows relatively easy access to local field sites for both class activities and student research opportunities.
8. Science Education: The Department provides key instruction for pre-service teachers (GEOL102, 410, 420), as well as mentoring and educational research opportunities for graduate science education (MATS) students.
9. Quality of Graduates: reportedly due largely to our field- and research-intensive curriculum, CSUF graduates have long been recognized as high quality employees; recognition of CSUF undergraduates as quality graduate students is rapidly increasing, leading to increased educational opportunities for our graduates.

b) Research Strengths

1. Faculty Commitment to Research: The new faculty hires have invigorated research directions and student opportunities throughout the Department. All faculty are committed to research that involves undergraduate and graduate students and that leads to peer-reviewed publications. This commitment to research has lead to heightened agendas and goals.
2. Student Involvement in Research: The Department encourages faculty-lead research that involves students at both undergraduate and graduate students who are encouraged to publish and present their research.
3. Breadth of Research: With the new faculty hires in the past seven years, the Department as a whole now has a wide range of research disciplines. These areas focus on understanding geologic processes and are aligned with the Department's goal of developing a program that is strong in Quaternary and applied geologic fields.
4. Proximity to Other Universities: CSUF is in an excellent location for collaborations with researchers and use of their facilities at nearby major research institutions. We are also in close proximity to world-class geologic field sites.
5. Only Orange County Geology Program: CSUF has the unique situation of being the only geology program in a densely populated, geologically diverse county.
6. Grant and Contract Success: The Department faculty members are successful at securing both intramural and extramural grants and contracts. Intramural grant success is buoyed by the continuing proposal opportunities offered by CSUF. These grants work well as seed money for larger extramural funding opportunities.

c) Departmental Resource Strengths

1. Staff and Technical Support: The Department has an effective and supportive staff. This staff, which includes both administrative and technical personnel, is a vital component of the Department.
2. Vehicle Accessibility: Currently, the Department effectively utilizes five vehicles for both teaching and research needs. Vehicle use is extremely important for the maintenance of our field-based program. The ease of use is partly maintained by State-paid gas.
3. Successful Alumni: Our alumni have been extremely successful in the local geologic industry. These alumni reflect on the quality of our program, but also act as a resource for job placement and internships for our students and as funding sources for students and other Department needs.
4. Professional Community Relations: Faculty members often give talks and act as a resource to the local and regional professional community. For example, they give talks to local geologic societies or serve as a resource for geologic disaster discussions (e.g. earthquakes, tsunamis, landslides).
5. Collegiality: The Department faculty, staff, and students maintain a collegiality that allows us to discuss issues and interact amicably.
6. Computing Facilities: The Department has a modern computing infrastructure including both a Mac and PC equipped classrooms and seven smart classrooms.
7. Providing Space for Students: Support of the Geology Club room and a graduate student office, and providing student access to classroom and research spaces after hours, helps create a safe, nuturing environment for students to meet and study.

B. Weaknesses

a) Teaching Weaknesses

1. Graduate Program: Our growing graduate program requires full-time faculty to teach courses in the graduate curriculum. This increased teaching responsibility reduces full-time faculty presence in the undergraduate and General Education classes (see #2 below), which may reduce teaching quality in all areas.
2. Geology Majors and Recruitment: We have too few geology majors (see Appendix). Students interested in Science, Technology and Math majors infrequently identify geology as a possible major or career opportunity.
3. Geology classes not accepted in other CNSM majors: A geology course is not required by any other CNSM major, meaning that students who identify themselves as future scientists are rarely exposed to the geosciences.
4. Timely Progress of Graduate Students: Several graduate students have not completed their degrees after beginning the program.

b) Research Weaknesses

1. Reputation of CSUs: CSUs typically have a lower perceived reputation for research than do the more research-intensive universities (i.e., UCs). This perception may put us at a disadvantage with respect to many competitive funding opportunities.
2. Recognition in CNSM and CSUF: The Department is one of the smaller departments in CNSM and CSUF. Thus, we receive lower recognition in a budget system that is based on FTEs.
3. National Recruitment of Graduate Students: The Department has attracted only ~10% of its graduate students from the national and international graduate pools. This low percentage may be attributable to the high cost of living, urban environment, or limited reputation of the Department.
4. Funding for TA/GAs: Funding for TA/GA positions is presently limited by the Department budget.
5. Low Admission Standards for Graduate Students: Initial admission requirements established by the Department were too low, resulting in admission of graduate students who were unable to complete their degree.
6. Absence of Laboratory Technicians: The Department presently does not have any laboratory technical assistants. This makes establishment/maintenance of consistent and complex laboratory facilities difficult.
7. Lack of Full-Time Chair: The Department presently operates with a part-time Chair position; however, the duties of Chair are year-round.
8. Start-Up Funding: Recent analysis by CNSM Dean Murray indicates that typical starting salaries and start-up packages offered by the Department are significantly lower than other CNSM departments and by other CSU geology departments.

c) Departmental Resource Weaknesses

1. Space and Infrastructure: The Department is a constant struggle for (1) sufficient QUALITY lab space for existing faculty, and (2) office and lab space for potential new-hires.

2. Budget Issues: Inconsistent, unpredictable, and complicated budget system makes year-to-year planning difficult. Budget allocation is highly dependent on non-major General Education courses.
3. Major Equipment: The Department has limited major analytical equipment. Major equipment often establishes and enhances research agendas and collaborations. However, this lack of equipment is offset by proximity to facilities in nearby institutions – see Strengths.
4. After-hours Workload: field-based teaching and research must typically be scheduled on weekends, making it difficult to staff weekend outreach events. Nighttime scheduling of undergraduate core courses (once per three years) and all graduate courses adds to workload stress for faculty and students.

C. Opportunities

a) Teaching Opportunities

1. Acquisition of the Orange County Paleontology Collections: The related opportunities for K-12, undergraduate and graduate teaching opportunities are numerous.
2. Cross-Discipline Courses in CNSM: Dean Murray has emphasized a need for cross-discipline courses. Since many geology faculty have graduate training in other CNSM fields (e.g. geophysics, geochemistry, paleontology), the Department occupies a unique position in that it could create cross-discipline courses with all other CNSM departments.
3. Links to Community Colleges: Establishing and maintaining connections with local community colleges presents a key opportunity to attract new majors.
4. K-12 Outreach: As the only CSU in Orange County, the Department has an opportunity to provide additional teaching resources to K-12 schools, thereby heightening awareness of geology as a career and major.
5. CSUF-Irvine: This new campus provides an opportunity for the Department to increase FTEs and expand our teaching-research-expertise presence in southern Orange County.

b) Research Opportunities

1. Acquisition of the Orange County Paleontology Collections: The potentially important collection should provide a numerous opportunities for paleontological research.
2. Faculty Growth: President Gordon's 2005-06 convocation outlined a goal of thirty (30) additional faculty searches over the next 5-years. The Department should be prepared to justify and obtain additional positions during this growth phase.
3. Research Consortiums: Development of interdepartmental research groups, as suggested by Dean Murray, could enhance research opportunities and directions.
4. Minority Serving University: CSUF is designated as a minority-serving institution, which creates greater opportunities for research funding.

c) Departmental Resource Opportunities

1. Acquisition of the Orange County Paleontology Collections: The collection could provide a level of visibility for the Department and create an opportunity for growth in both students and faculty.
2. Hosting GSA: The Department has volunteered to host the GSA Cordilleran Section Meeting in 2010. This activity would increase visibility among the professional community, within the University, and potentially attract new graduate students to the program. Expected attendance approximately 1000.
3. Growth of Department within CNSM: The Department must be proactive in the planning phase of the McCarthy Hall renovation in order to secure quality lab and office space. The Department must be at the forefront of offering interdepartmental courses.
4. Location: The Department must take advantage of its relationship with industry by establishing long-term scholarship-internship opportunities and obtaining equipment donations. The Department should seek to establish ties with the petroleum industry.
5. Employment Opportunities: local demand for geology graduates continues to outstrip the number of graduates, creating an extremely positive employment outlook for majors.

D. Threats

a) Teaching Threats

1. Low Number of Majors: The Department is presently recovering from a relative low in the number of geology majors. Further decrease in majors could result in canceled classes and lowered morale of faculty and students.
2. Increased Teaching Load: Pressure to further increase FTEs may reduce the quality of teaching at all levels.
3. Lack of Faculty Diversity: Absence of minority and limited number of female role models may lessen the connection with certain student populations.
4. Dependence on Part-Time Faculty: Loss of key part-time faculty would result in increased teaching load for other faculty and may reduce the quality of instruction.
5. Visibility and Presumed Significance of Earth Science Education: the continued absence of an AP test in geology and the recent decrease in UC system entrance credit for high school earth science classes continue to diminish the perceived importance of the geosciences as a major and career.

b) Research Threats

1. Lack of Quality Lab Space: Individual geology faculty are assigned research space ranging from 106 to 590 ft^2 (average = 347 ft^2), and new faculty have the impression that their spaces are significantly smaller than their CNSM colleagues. This year's hire (paleontologist) will be housed in a 100-ft^2 prep room attached to one of our teaching labs, until more appropriate space can be found or created. We have a lab space for next year's anticipated hire (a hydrogeochemist), but no office. With no retirements anticipated, we will be unable to recruit/house additional new faculty.
2. Low-Quality M.S. Students: Admitting M.S. students that fail to complete theses or publish quality peer-reviewed journal articles costs the Department unrecoverable resources and time.

3. Budget Pressures: Funding for equipment repair/replacement/acquisition, travel, new hire start-up, and modification of lab/teaching space already falls significantly short of necessary levels. A 2004-05 analysis by Dean Murray indicates that start-up packages for geologists are meager relative to those provided in other CNSM departments and in other CSU Geology departments.
4. Research Funding: A decrease in research funding levels would lower available research opportunities for faculty and students.
5. Contract Funding: A lack of agreement among faculty regarding the appropriate role of contract work in the faculty agenda produces significant frustration regarding the allotment of department resources and what constitutes the best service to our educational and research mission.
6. Time Commitments: Increasing teaching and service activities for each faculty member inhibits establishing and maintaining a viable, externally funded research program.

c) Departmental Resource Threats

1. Budget Pressures: current operating and computing expenses, vehicle repair/replacement, room modification and furniture replacement far exceed funding, requiring the redirection of FTES-generated funds from the employment of lecturers. In 2004-05 the Department pulled out of a budget deficit. Budgetary uncertainty and year-to-year changes in budget policy challenge long-term planning efforts.
2. Loss of Support for Vehicles: If the University changes the vehicle arrangements such that the Department would incur the cost of vehicle gasoline, the budgetary impact would be substantial and would negatively impact teaching and research efforts.
3. Increasing Cost of Living/Salary Ratio: Salaries are not keeping up with the cost of living in Orange County, thus hampering faculty recruitment and retention.
4. Loss of Connection to Professional Community: A decrease in support from professional geologic groups would impact our ability to recruit majors.
5. Loss of Staff: The present Department staff is efficient, effective and professional. A loss of one or more of these staff members could reduce efficiency, hurt recruitment of majors, research quality and quantity.
6. Full-Time Chair: Without a full-time chair, the Department may lose opportunities and stature relative to other departments within CNSM and CSUF.

E. Leverage

1. We can leverage the high quality of our recent faculty hires, our presence as the only geology program in Orange County, our nighttime course offerings, our relations with local community colleges, our commitment to hosting an important regional professional meeting in 2010, and the continued positive employment market to enhance the size and quality of our undergraduate and graduate programs.
2. We can leverage our future faculty growth with our recently expanded presence in science education to support paleontologic research and K-12 outreach using the Orange County paleontologic collections.
3. We can combine our long-term commitment to student-faculty research, our proven capability to obtain grant support, the diversity and quality of our students, and our

proximity to numerous research facilities and field sites, to leverage additional outside support and research opportunities.

4. We can leverage our alumni support and our faculty presence in the professional community to provide insight and input related to future Departmental growth, to identify job and graduate school opportunities for current students, and to develop better financial support for the Department.
5. We can leverage the interdisciplinary nature of the geosciences and the emphasis of our recent hires on surface processes, environments and hazards to help foster the growth of interdisciplinary research and education within CNSM.
6. We can leverage our increased participation in science education to help produce future Orange County teachers who appreciate the important role played by the geosciences, thus making a long-term investment in the improvement of public perception of the field and the recruitment of majors.

F. Vulnerability

1. The dependence of the Department budget on FTES earned from Department GE classes makes us extremely vulnerable to changes in the GE requirements.
2. The growing CSUF student population may not benefit from the quality of our program due to limited number of gender-ethnic role models on the faculty and the low visibility of the major among new and existing students.
3. The undergraduate major is time-, lab-, field-, unit- and research-intensive, producing excellently trained geologists, but scaring off many young undergraduates who are shopping for majors.
4. The growing faculty research program, combined with the low number of majors, results in lost research opportunities and productivity.
5. Our vehicles, computer labs and smart classrooms require ongoing investment to maintain.
6. Much of our current strength and growth depends upon the efforts of our amazing staff; the inability to recognize excellence with appropriate compensation makes the department vulnerable to staff attrition and subsequent lowered support/productivity.

G. Constraints

1. Continuation of the upward trend in research productivity and department visibility, and the future recruitment of high quality faculty, is in jeopardy because department growth (FTES, faculty) has not been matched by commensurate growth in support staff (including laboratory support and full-time Chair position), the amount of quality research and office space, and start-up funding.
2. Broad undergraduate and graduate curriculum and student-friendly scheduling (frequent nighttime and weekend assignments) exacts a toll on faculty moral and productivity that could best be balanced by improvements in research support and salaries.
3. The current dependence of our graduate program enrollment on part-time, nighttime students, the high-cost of living relative to the availability of support, and the urban environment, may combine to impede our ability to improve the quality of the graduate program, the matriculation rate, and the Department's future ability to recruit quality students.

H. Problems

1. The low--and decreasing--public awareness and perceived educational value of Earth science education (as measured by limited high school offerings, decreased UC admissions requirements, and lack of exposure of CSU science students) continues to impede the recruitment of majors and lessen our potential impact on the community.
2. The increasingly high expectations for quality teaching/research and student/funding quantity within the Department and university may combine with budget and workload pressures to hamper the fulfillment of our potential to be one of the top-rated geology departments in the CSU.