

Academic Program Review Report

Department of Geology

California State University, Sacramento

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Table of Contents	Page
I. Introduction	3
II. Commendations to the Department	4
III. Recommendations to the Department	7
IV. Recommendations to the College	9
V. Recommendations to the Provost and University	11
VI. Recommendation to the Faculty Senate	12
VII. Program Review Narrative	13
VIII. Attachments	21

Introduction:

The Department of Geology performed a self-study following the focused inquiry option during the fall 2008 semester. The final self-study report was submitted spring 2009. Following this submission, the standard program review procedures were followed including department review by an internal program review team comprised of CSUS faculty, followed by a review from an external review team comprised of a Geology faculty member from CSU Fresno and a member of the California Geological Survey. The internal program review team reviewed the department's self-study report, met with the chair, toured the department facilities, met with Geology faculty separately from the department chair, and met with students separate from faculty in order to evaluate the program and form its recommendations. The external review team toured the department and campus, and interviewed the chair, faculty and staff, undergraduate and graduate students, the college Dean, and USGS staff during their two day visit to the campus. The external review team submitted their final review report and recommendations in the fall 2009. Unfortunately, the final internal review team report was not submitted, which has resulted in a substantial delay in the completion of the department's six year review. The Department of Geology was faultless in this delay. Considering the significant time lapse between the department's self-study and the internal and external team review, it is not unreasonable to expect changes to have occurred in the department, its programs, and its circumstances during this time. As a result, in addition to considering the original review program review materials it was deemed prudent to solicit additional relevant current information in order to provide a review reflective of the current program. The additional current information was obtained from Susan Crawford's interviews with the chair, the department faculty, and undergraduate and graduate students. Additionally, Chair Evans provided a supplemental document highlighting the pertinent changes to the department and program since the original review in 2009, which has been included as an attachment to this report. The latest Fact Book was utilized for current department information. This report was prepared considering the original review materials, the thorough and thoughtful external reviewers' report, and the current materials.

Commendations to the Department:

1) The department is commended for providing exceptionally high quality education programs to its undergraduate students.

This is a commendation enthusiastically supported by the external review team comprised of members with particular expertise in university level geology curriculum. The positive outpouring of student opinion regarding the department, faculty, and curriculum supports this commendation. The extent of positive student feedback was particularly impressive given the current climate of increased fees and reduced services on the university campus. Geology students are extremely proud of their department and major.

2) The department is commended for preparing an outstanding initial self-study report containing important and appropriate focused inquiry topics. The department is further commended for its efforts in assisting with the program review.

Of particularly noteworthiness is the extreme patience the department exercised in dealing with the circumstances that caused the unfortunate delay in the in the initial review process and its willingness to provide the extra materials and input necessary to complete the review after the extensive delay.

3) The department is commended for utilizing its assessment plan to identify program strengths and areas in need of improvement. The department is further commended for thoughtful utilization of assessment results in the development of its revised BS degree program.

4) The department is commended for the well-designed revisions to its undergraduate program that reduced the number of units required of the BS degree while increasing student course flexibility to better permit a tailoring to individual student goals and interests in geology.

The revised improved curriculum permits a tailoring to individual student goals and interests in geology. It is student centered and well thought out. Students unanimously provided positive feedback regarding the newly implemented elective based major.

5) The department is commended for its dedication to improving its assessment plan and assessment tools in order to better evaluate student learning in its programs.

The department's revision of its undergraduate BS degree in Geology illuminated a need to modify its assessment plan and practices. The department has been quick to begin work on these revisions.

6) The department faculty is commended for their dedication and hard work to improve and maintain outstanding geology programs while fully participating as members of the college and university.

Despite being severely understaffed with full-time faculty, the department is managing to function as a first rate geology department. The department chair and the department faculty should be commended for shouldering the extra workload this requires of individuals.

7) The department is commended for building and maintaining a collegial environment that is respectful of the varied interests of individual faculty members.

This commendation is a stark improvement from the last program review when the department was plagued by internal friction. In fact, this was considered one of the largest concerns of the faculty during the last review. At the time of this review, all sense of tension seems absent. The department chair particularly deserves commendation for establishing a drastically improved professional environment within the department. The strong sense of community was apparent during the faculty interview portion of the review.

8) The department is commended for its dedication to faculty scholarship and research.

The faculty is productive in these activities showing multiple professional presentations each year. The faculty are respectful and supportive of the varied scholarship interests of their colleagues. The faculty enthusiastically involves undergraduate and graduate students in their research activities. Faculty are committed in seeking external funding to help support research activities.

9) The department is commended for its efforts in reaching out and connecting with the professional and regional community.

The dedication to maintaining communication with the outside professional geologic community benefits students seeking internship and post graduation opportunities. The department additionally gains important feedback from this community that assists in program assessment.

10) The department is commended for its interest and efforts in maintaining relationships with alumni.

Alumni survey data was utilized for program improvement. Since a significant proportion of Geology graduates remain employed in the field of geology, alumni opinion and suggestions for program improvement are both appropriate and useful. The department clearly understands this.

11) The department chair is commended for his dedication as an advocate for the department programs.

Of particular noteworthiness is the chair's hard work in determining a mechanism to preserve the Geology master's program when the threat of program postponement became probable. Chair Evans realized that a temporary postponement of the program could likely result in the eventual program termination. The graduate program is greatly valued by both faculty and students. The

relocation of the program to the college of continuing education was a solid strategic solution to preserve an outstanding and practically useful master's degree program.

12) The department is commended for its commitment to maintaining the graduate master's program in Geology despite non-unanimous faculty opinion regarding the program modification and relocation to the College of Continuing Education.

Clearly, the faculty understands the importance of the master's degree to the regional postgraduate professional community and to its current students seeking the professional opportunities only obtainable through graduate work in the discipline.

Recommendations to the Department:

1) The department should vigorously pursue approval to hire full-time tenure track faculty in the sub-specialty areas of geology where the recent loss of faculty is negatively impacting the programs and causing workload pressures on other faculty.

The thoughtful analysis by the external review team, stating that the current number of full-time faculty is significantly lower than the vast majority of geology programs of equal or even smaller student population, strongly supports this recommendation. Interview with department faculty determined that this is the number one concern and problem within the department. Current faculty feel overburdened covering committee and department work since there are so few bodies to share the responsibilities. This in itself would limit the amount of time remaining for faculty to spend on scholarly pursuits, curricular updating, working with research students, pursuing external funding, and other opportunities for professional and university interest. Additionally, the lack of expert faculty in critical areas of geology ultimately leaves courses taught by faculty with limited experience with the material. This in itself damages the strength of the outstanding programs. The hire of part-time faculty in these areas is only a temporary solution to relieve immediate pressure to cover courses and should not be viewed as a long-term solution. The department is in critical need of more full-time tenure track faculty in order to continue program improvement and to continue involvement in college, university, and

community service activities without imposing unfair workload assignments and commitments on existing faculty. The proposed hires should be carefully selected to meet the most pressing needs of the department.

2) The department should identify appropriate assessment tools and collect data to assess the impacts of its newly developed undergraduate BS program in geology.

Since the curriculum is fairly new, having few students matriculated through entirely, the department should collect data to evaluate the impacts on graduation rates, retention, student knowledge, and student satisfaction in its next assessment report and program review.

3) The department should assess the overall impacts related to moving its graduate program to continuing education and determine the merit of this decision.

The internal and external review teams both found great value in the offering of graduate education in geology. The department should be commended for its commitment to maintaining its graduate program despite extremely unfavorable circumstances. The department's modification of the program, moving it to continued education and modification to focus on hydrogeology, was a bold and courageous move. As this change was in part imposed upon the department under the fear of losing the program, an assessment of this move and the impact on the faculty and graduate population should be a continued part of serious examination and should be a major element of the department's assessment activities.

4) The department should assess student abilities and confidence in technical writing assignments.

Although the department recently increased the technical writing elements of its undergraduate program, the students expressed a desire for more pointed direction on the nuts and bolts of technical writing for geologic and scientific venues. The department should look further into these student desires and identify ways to meet these needs.

5) The department should vigorously seek to increase its acquisition and access to more analytical equipment.

Both faculty and students expressed limitations for non-field-based research activities based upon limited analytical facilities. Gaining more access to USGS equipment and pushing for internal and external funding to increase on-campus analytical capabilities would strengthen an already outstanding geology program. The external review team echoes this recommendation. Faculty should be encouraged to write external grants to assist in these acquisitions. Although currently with the department so understaffed, this may be an unrealistic recommendation until new hires are in place.

6) The department should seek to improve the condition of field trip vans.

Both students and faculty expressed concern over the condition of the current vans used to transport students and faculty on field trips. If this is a safety consideration, it should be immediately brought to the attention of appropriate administrators for action.

7) The department should seek to improve communication with the college Dean.

Discussions with the department and faculty on this topic are troubling and need attention. The external review team's comments echo this need. In the current climate of limited budgets and potential looming reductions, open and honest communication becomes more critical. The department needs to openly and honestly express its concerns and offer potential solutions for improvement.

Recommendations to the College:

1) The college should support new faculty hires in geology as a high priority.

The fact that the last faculty search failed and that a re-opened search was not approved, along with recent additional retirements in the department, is causing critical problems for an otherwise strong and engaged department. The lack of full-time faculty has become the greatest threat to the quality of this program going into its next program review.

2) The college and university administration should give ample leeway in its evaluation of the department's graduate program given its radical change and move to the College of Continuing Education.

Given that the program change and move was somewhat in response to potential program loss resulting from budgetary decisions at the college level, and not entirely supported by the department faculty, it will take a transition time to fine tune the program itself and assess if it is the right fit for the department and the regional geology graduate population. The college and university should understand the challenges involved in this process and offer the geology department the time necessary to work through this prior to evaluation of the program.

3) The Dean's office should foster improved communication with the department and its faculty.

Both the internal review team and the external review team identified less than ideal communication with the college administration as problematic. The department gives the impression of feeling vulnerable as a small department with its needs poorly understood at the college level. As a result, the level of departmental trust in the college administration has been compromised. The college Dean should initiate the appropriate conversations to facilitate improvement in this area. It is hoped that this can be easily remedied (see recommendation 7 above).

4) The college should be supportive in the department's need for increased access to analytical facilities.

Although the current budget climate does not facilitate open purchase of expensive equipment, faculty should be somehow encouraged and supported in seeking external support for such equipment. Additionally, the college should help facilitate a more open working relationship with the USGS staff and perhaps work out a mechanism to gain access to some of the agency's useful equipment. Of course this should be done in consult with interested faculty.

5) The college should look into the conditions of the field trip vans and evaluate the student concerns regarding these vehicles.

Since the vans represent equipment utilized by several college departments, the Dean's office should be appraised regularly of any concerns and find quick remedy when deemed advisable.

6) The college should support the scholarship and research interests of faculty. Current college-level research support programs may not be structured ideally for faculty participation. For example, the summer SURE award grants to facilitate undergraduate research opportunities may be better suited for faculty participation with some minor modifications in its guidelines for use. Faculty support of grant writing should also be provided whenever possible, and mechanisms to fund this support should be a priority for the college.

Recommendations to the Provost and the University:

1) The university should provide support so that the department can hire the full-time faculty it needs to continue functioning as an outstanding department and contributor to its college and the university.

2) The university should provide more support for faculty research scholarship and support faculty solicitation for external funding.

3) The university should support the department's need for improved analytical equipment.

4) The university should provide the department time and support for the evaluation of the recent graduate program relocation to the College of Continuing Education.

This move was performed very quickly as a response to budgetary pressure and will require some time for the department to smooth out the details of the transition. The graduate program evaluation should be postponed while the department works through the details of this transition and is able to perform suitable assessment.

Recommendation to the Faculty Senate:

Based upon this program review and the self-study performed by the Department of Geology, the review team recommends that all degree programs and minors in the Department of Geology be approved for six years from the date of Senate approval.

Program Review Report: Department of Geology

The department's focused inquiry posed three questions for departmental self-study:

- 1) How well does the content and the structure of the curriculum train students to solve geologic problems?
- 2) How well does the content and structure of the curriculum meet the workforce needs of California?
- 3) How well does the structure of the programs meet the needs of the faculty to maintain fulfilling professional lives?

The first two questions are directly focused upon the undergraduate curriculum, and can be treated together. In its self-study of the curriculum effectiveness, the department examined student performance in the summer field camp, a major requirement of the BS degree, and the results from course exit exams (administered in junior and senior level courses) querying specific knowledge areas identified as essential to the discipline.

The department determined that its students perform significantly above average in the field camp requirement (3.5/4.0), which supports the effectiveness of the program. The program's strong emphasis on mapping and field work produces students who can utilize these skills to solve geologic problems in remote situations. Student performance on the course exit exams were varied and illuminated specific areas in need of curriculum revision. On a positive side note, the performance on these course exit exams was utilized to administer personal advising for students showing major deficiencies in particular areas. The ability to identify and personally advise students in need of assistance is an enormous advantage of a major with manageable faculty/student ratios.

Given that the discipline of geology is a licensed profession in California and most other states (focused inquiry report), student's electing to enter the workforce upon graduation must pass the

professional exams prior to employment. As a result, the curriculum should adequately expose students to areas represented on this exam. In their self-study, the department performed a comparison of areas covered in their curriculum with specific question content on the Geologist in Training (GIT) exam. This is the exam graduates take shortly after graduation, prior to employment as a geologist. In most areas, the curriculum correlates with the content of the GIT with a few exceptions. The exercise comparing the curriculum to exam content was useful in designing the new undergraduate curriculum.

Undergraduate Program:

Student performance in field camp requirements support that the Geology program offers a high quality and rigorous program that is comparable to high quality geology programs at peer CSU and other US universities. The courses and field experiences offered meet or exceed those at these institutions. The program prepares students for a career or graduate study in geology or a closely related field. The vast majority of students graduating with a degree in geology, particularly the BS degree, is employed in the field of geology or have opted to continue their studies in geology based graduate studies.

Student Perception of Programs:

Students are overwhelmingly positive regarding the new curriculum. They particularly value the increased flexibility, allowing their degree to be more personally tailored to their career and educational goals through an increased use of an elective course model. Students continue to appreciate and value the “hands-on” and field component aspects of the program, which is appropriate for a discipline in the physical sciences. Students stated that they were most often able to enroll in their major courses when needed, but complained about the unavailability of GE courses. Although there is a lack of analytical equipment in the department, the students did not seem to notice. Perhaps the current course offerings have been well designed not to rely on this type of equipment and as a result, it is not missed by the students. However, one must question whether an increase in the acquisition or access to more analytical instrumentation might strengthen the program. When directly queried about equipment resources for curriculum support, the students overwhelmingly agreed that the vans for field trips were in very bad shape

and in need of replacement. When asked about ideas to improve the curriculum, many students expressed the desire to have more fundamental instruction in technical writing. Although they generally agreed that there was an increase in the writing components in their major courses, they felt that more direct instruction on “how to write technically” would be very helpful. They would also like to gain writing intensive credit in the courses that required significant writing components. Susan Crawford discussed this with the faculty during her faculty meeting that followed the student interview. Although faculty initially seemed surprised to learn that students still felt a bit lost with respect to technical writing, they were quick to ponder remedies. This responsiveness to their majors is one of the strongest attributes of the department. In fact, when the students were asked to characterize the department, they were quick to exclaim “It is the best department on campus!” They admire and appreciate the faculty and their “open door policies.” Several mentioned the “homey” feel of the department. When asked what could be improved, they mentioned more targeted career fairs and that the department should recruit majors more heavily so that more students could experience such a great college department and major. It would not be an understatement to say that they prize their choice of major, and feel genuine affection for their department and its faculty.

Faculty Perception of Curriculum:

The undergraduate curriculum changes were supported by geology faculty consensus and unified commitment to improving the program. However, the new curriculum is demanding on faculty teaching in specific sub-disciplines. It also requires some faculty to take on the large GE courses and often have three to four different course preps per semester. This is likely more of a symptom of a department in desperate need of full-time faculty hires and much less to do with the curriculum change itself. In fact, the external review team points out very explicitly that the Department of Geology at Sacramento State is one of the largest with respect to number of majors in the CSU system, but is also characterized as one with the lowest number of full-time faculty. The faculty echoes the desperate need for more full-time tenure track faculty, stating it as the number one issue in the department.

Graduate Program:

At the time of the initial program review, the Department of Geology had a relatively new master's program. This program was healthy for a smaller department with six new students beginning in 2007. The program focused upon the applied nature of geology with a specific strength in the area of hydrogeology. The program size left little room for an extensive offering of elective courses. Faculty at this point in time indicated that they would embrace the opportunity to teach graduate courses in their subspecialty areas if available. However, the opportunity to do this was not feasible due to the fact that faculty teaching time was taken up teaching the undergraduate majors and GE courses. This was considered unfortunate by the external review team and the internal review team at the time of the initial review since it meant that some graduate students were unable to take advanced coursework in their specific area of interest and thesis area. An expansion of the department in terms of faculty hires would have helped the situation significantly. Students at this point were extremely positive regarding the program even with its limited variety of offerings. They stated a clear understanding that the extra coursework and "hands-on" experiences with research would serve them well in progressing in their careers. However, they also expressed the desire for a fuller course offering in terms of electives, but understood the barriers involved given the department size. The external review team echoed the student's evaluation of the master's degree stating that it is "impossible to be over qualified for any job in geology." The master's degree in geology is often a requirement for some professional careers.

During the lapse between the initial program review and this updated review, a significant change occurred in the Geology graduate program with its move last year (2010-2011) to the College of Continuing Education and the deliberate shift to a hydrogeology program. Although the department had previously contemplated the idea of moving the program, it was ultimately decided that the expense to students in this format would be much too great and that the focus on hydrogeology would not support the research and teaching areas of the full department. The decision to focus upon hydrogeology stemmed from the fact that it is a popular graduate degree with working professionals in the sub-discipline. The ultimate decision to move the program last year appears to be more of a survival strategy than a deliberate department decision. In the budget crisis of the past few years, the department was administratively denied permission to

admit new students for two consecutive years. This left enrollment in graduate courses too small to be maintained and seriously threatened the survival of the graduate program itself. The decision to move the program to the College of Continuing Education was the only viable option left to the department who clearly valued its graduate program. Discussions with faculty clearly show that this was not considered the ideal option, with some faculty clearly opposed to the change. These faculty members feel that the new program is more of a professional master's degree that only serves a narrow population of students interested in advanced study in geology. Discussion with students echoed this sentiment, stating that the traditional program, even with its limitations, served a fuller diversity of student and faculty interests. It is unfortunate that the department was compelled to make a drastic move that was more reactive to outside pressures than intentional and not fully supported by its faculty.

It will be interesting to see how the newly housed program fares and if faculty support for it increases. The strength of the new program is its popularity with working students who can afford the extra expense of the program in continuing education and the fact that it was built upon the area of greatest strength in the pre-existing program.

Faculty Professional Lives:

The third question in the department's self-study examined "How well does the structure of the Geology programs meet the needs of the faculty to maintain fulfilling professional lives?" In order to address this question, the department's self-study queried each faculty member's satisfaction in the areas of teaching, scholarship, and service. The analysis on the department level showed four faculty members had a strong desire to dedicate more of their time to scholarship activities, feeling that the current teaching loads presented significant challenges to professional scholarship. One faculty member was content with their current balance in the three areas and one faculty member expressed the desire to shift the proportions of community, department and university service activities. A beneficial outcome of this internal study was that in some cases a strategic shift of activities between faculty members could facilitate a more desirable balance for the individuals involved. Since this survey took place as part of the original department self-study and significant reductions in assigned time allocation have

occurred over the past few years across the university, it would be interesting for the department to revisit this question with its faculty in the new climate.

Despite having faculty desiring a shift in the proportions of their professional workload responsibilities, the self-study shows that all of the Geology faculty are productive in their professional lives as they personally define themselves, whether in traditional scholarship, or the scholarship of teaching, or service activities. For a small department, the production of 5-7 professional abstracts associated with presentations or publications is commendable. The department is clearly effective in facilitating productive faculty professional lives.

Although not part of the department's original self-study, an area of concern was identified by both the external and internal review teams during the faculty interview portions of the reviews. The department faculty feels a dire need for improved communication with the college Dean. The faculty overwhelmingly felt that the lack of understanding of department circumstances and goals was problematic. This in turn can have an influence on the professional life satisfaction. In Susan Crawford's recent interview with faculty, she queried regarding any progress in this area and learned that faculty felt little improvement. Some stated that they felt some vulnerability as one of the smaller departments in the college, particularly in the challenging university budget climate. The reader is directed to the external review team's discussion on this topic since they had the opportunity to discuss the situation with the department and college dean. It is hoped that a concerted effort by both the department and the Dean can improve this situation.

Program Assessment

The Geology self-study report included its Assessment Report from the 2007-2008 academic year. In this report, the department discusses plans for a revision to its assessment plan based upon the curriculum revisions planned and now fully implemented. The most current assessment report (2011) is included as an attachment to this report. In this latest report and the most pertinent to a discussion of the department's current assessment plan status, there is considerable discussion regarding the assessment plan revisions. Now that the BS program revisions are completed and fully implemented, the department is turning its attention toward

assessment plan revisions to better evaluate the new program. The learning outcomes stated in this report include:

- 1) Student mastery of fundamental geologic concepts.
- 2) Student proficiency in solving geologic problems.
- 3) Student proficiency in geologic mapping.
- 4) Student proficiency in technical and scientific writing.

These stated learning outcomes are appropriate for a scientific / technical program where content knowledge, application of this knowledge in a novel scientific setting and effective written communication in the scientific genre are all essential components. The department is now working on identifying and developing the appropriate assessment tools to collect data for student learning assessment. Most recently they have explored the use of a standardized exam to collect data on student content knowledge. An appropriate exam, the Fundamental of Geology licensing exam, would seem an ideal choice. However, it is becoming clear that this may not be a viable option since students must be graduated to take the exam and the cost is prohibitive at \$400 per exam. In its place, the department is currently collecting data from Student Knowledge Inventory (SKI) home written exams that were administered in junior and senior level courses. The exam queries student knowledge of basic geologic concepts.

In order to evaluate learning outcome number two, student problem solving skills, the department collected student field reports from an introductory field geology course with planned full faculty review at the department's fall retreat. The outcome of this exercise should be available in the department's next assessment report.

Student writing is assessed using a common rubric for all courses across the curriculum. The department has implemented a common policy of responding to student first drafts. The department is finding that the use of the common rubric enables instructors to provide better feedback.

In conclusion, the department's assessment plan and practices are currently in a state of revision and modification due to the recent changes to the program. The department has identified appropriate learning outcomes and is now identifying the correct assessment tools to collect meaningful data. The department is clearly engaged and committed to formulating a good assessment program that can provide useful information regarding student learning. It may take a little time to come up with a polished assessment plan that can meet the department's needs. Assessment is almost always a work in progress. The Department of Geology has shown that it utilizes its assessment results to influence appropriate course and program changes.