EXECUTIVE SUMMARY
WSU Department of Geosciences
Self-Study Document, Fall 2012

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The following is a summary of the self-study document, highlighting important points. For complete information, please refer to the full, self-study document itself.

Mission Statement:

Last update: 1/17/12

The mission of the Department of Geosciences is to provide quality undergraduate education in the sciences concerned with the Earth. We seek to provide an enriched learning environment through extensive interaction between faculty and students, with an emphasis on field studies and technology-enhanced data collection and analysis. The Department offers programs in geology, applied environmental geosciences, Earth science teaching, and geospatial analysis that provide students with the essential knowledge and skills needed to qualify them for employment or graduate education. The Department also contributes to the broader mission of the University by providing general education courses that enhance student awareness, appreciation, and understanding of the physical environment and the scientific process, as well as the relevance and role of the geosciences in the world today. In order to promote faculty vitality, increase scientific knowledge, and engage students in the scientific process, the Department encourages faculty to engage in basic and applied research. Faculty members also provide professional expertise in the geosciences to the community, local schools, and government agencies. We seek to continue building a solid base of personnel and facilities to maintain high quality, up-to-date programs that meet the educational needs of our various constituencies.

Curriculum:

The Department of Geosciences provides undergraduate education in geology and geospatial methodologies (remote sensing and geographic information science) for students wishing to complete the following degrees: Bachelor of Science in Geology; Bachelor of Arts in Geology; Bachelor of Science in Applied Environmental Geoscience; and Bachelor of Science in Earth Science Teaching. The department supports other degree programs on campus by providing minor programs of study in geology, Earth science teaching, and geospatial analysis, and geoscience emphasis areas for students pursuing a Bachelor of Integrated Studies (BIS). An institutional certificate in geomatics (applied mapping sciences) is also offered. The department also provides service courses for other majors and minors, including the Bachelor of Science in Construction Management Technology (CMT Department, College of Applied Sciences & Technology), Bachelor of Science in Geography (Geography Department, College of Social and Behavioral Sciences), Environmental Studies Minor (interdisciplinary), and the Urban and Regional Planning Emphasis (College of Social and Behavioral Sciences). Lastly, the Department of Geosciences supports the broader mission of the University by providing physical-science general-education courses for all students and by engaging the local community through geoscience-related outreach activities and responses to public inquiries.

Unique features of the department's programs include the integration of a traditional geology curriculum with course work in the emerging field of geospatial technologies at the undergraduate level, an emphasis on field-based learning, robust support for undergraduate research, and a cost-effective summer field camp for geology majors. We are particularly proud of our accomplishments in the area of undergraduate research. In the past five years, 26 students associated with the Department of Geosciences (majors and minors) participated in undergraduate research projects, resulting in 20 presentations at major scientific conferences.

Two substantial curricular changes have been implemented since the 2007. First, all of the secondary education majors across campus were evaluated and revised during the 2006-2007 academic year, with the new requirements taking effect Fall Semester 2007. The Department of Teacher Education, with substantial input from the content departments, changed the requirements for licensure to 24 credit hours delivered in course blocks over 2 semesters (previously 31 credit hours delivered over 3 semesters), substantially streamlining the secondary education degrees. The credit-hour reduction on the education side allowed the College of Science to develop two upper-division courses (GEO 3570 – Foundations of Science Education & GEO 4570 – Secondary School Science Teaching Methods) specifically focused on science pedagogies.

The second curricular changed involved all the Bachelor of Arts degrees across campus. Prior to the 2011-2012 academic year, the requirements for most BA degrees were basically the same as those for the corresponding Bachelor of Science degree, with the additional requirement of competency in a foreign language. A subcommittee of the university-level Curriculum Committee studied this issue and had every department reexamine its BA and BS degrees in comparison to national norms. The Department of Geosciences took this opportunity to revise its Bachelor of Arts in Geology, reducing the required credit hours in both required geoscience courses and required science support courses and providing more flexibility in the choice of electives. We think our new BA degree is an excellent "liberal arts & sciences degree for the 21st century" and would be excellent undergraduate preparation for pre-law, pre-business, and pre-military students.

Student Learning Outcomes and Assessment:

The Department of Geosciences has developed a set of nine (9) department-level learning outcomes that are common to its 4 bachelor's degree programs and a curriculum grid that identifies the various courses for majors that address and comprehensively assess these learning outcomes. For most of the courses and learning outcomes, we are just beginning to collect assessment data as on Fall Semester 2012, but we have developed a comprehensive assessment plan for each course in the curriculum grid.

A similar plan has been put in place for the department's five (5) physical science (PS) general education courses, which are expected to meet eight (8) general education learning outcomes. The collection of assessment data for the general education courses will be coordinated with the Physical Science Assessment Group's work on behalf of the parent General Education Improvement & Assessment Committee (standing committee of Faculty Senate).

Academic Advising:

Students declaring a major in geosciences have an initial meeting with the department chair to discuss general goals and to go over the various degree programs offered by the department. A separate file is created for each major, minor, or BIS student, and is updated until graduation; these files are also maintained after graduation. The department secretary works with the chair to "declare" the student's major within *CatTracks*, the University's e-transcript and degree-evaluation platform. Students are also assigned to different advisors depending on their major/minor. Most students meet with their advisor at least once a year to check progress and to develop a program of study for each semester or academic year until graduation.

We collect information about advising effectiveness by asking questions on the frequency and quality of advising during exit interviews with graduating seniors. These exit interviews indicate that graduates met regularly (at least annually) with a department advisor, and are very satisfied overall with the quality of the advising they received. We think having every regular faculty member involved in advising is a real plus – as the work load is shared and every geoscience major and minor has the opportunity to build a strong, one-on-one relationship with a faculty member. Geoscience students commonly list their advisor as a reference on job applications and/or ask them to write letters of recommendation. The department's advising system was a notable strength of the program identified during its most recent program review (2007-2008).

Faculty:

The department currently has 6 full-time, tenure-track (regular) faculty, and 4 adjunct instructors that teach part time on a regular basis, with a combined full-time-equivalent faculty (FTE) that has varied from 7.8 to 8.6 over the last 5 years. The regular faculty members are a senior group, with a combined 130 years of teaching experience. There likely will be two (2) retirements within the next 5 years. At present, all the tenure-track faculty are male; three (3) of the adjunct instructors are male, one (1) is female. All of the faculty, tenure-track and adjunct, are Euro-Americans (White), with one regular faculty also being Hispanic. Diversity has been a criterion for past hires, and efforts will be made to increase faculty diversity with future hires.

All full-time faculty members hold a PhD in the geosciences and have earned tenure within the College of Science. All of the adjunct instructors have an advanced degree in the geosciences, along with extensive teaching and applied science (industry/regulatory) experience.

Program Support:

The department has adequate office-management support in the form of a three-quarter-time (0.75 FTE) secretary (Appendix C). The FTE level was increased from 0.60 when a new secretary was hired in August 2012. Both students and faculty have benefited from the increase in work hours for this position, as secretarial support is available for a longer period of the work day.

Since our last program review, the College of Science has hired a computing specialist to provide computer and IT support for all the departments in the college. This position has been a great

benefit to the Department of Geosciences in that this person is able to assist Dr. Hernandez in maintaining computer hardware and software in the department's GIS/remote-sensing lab -- a very time-consuming task.

However, the department does not have a lab manager/ curator/instructor position, which requires faculty to spend substantial time preparing labs, for both lower- and upper-division courses, and dealing with field-trip logistics. This staffing inadequacy was also recognized by the external reviewers during our last program review (2007-2008). Looking forward, such a position would be very beneficial as we plan for a move to a new building for the College of Science. Such a position could provide vital assistance in preparing the department's various teaching collections (minerals, rocks, fossils, maps, and air photos) for the move and helping to organize the collections in our new space.

We also see the need for a college-level lab technician, as the college continues to upgrade its analytical capabilities through the acquisition of high-end equipment, such as the SEM and AFM. This equipment is shared among the various departments and requires a substantial commitment to basic operations and maintenance. Such a position could act to support the analytical needs of all the departments in the college, and would be a key resource for students wishing to use the equipment for undergraduate research.

As we are anticipating 2 faculty retirements within the next 5 years, we think that it is imperative that the department be able to conduct national searches for new faculty members at the time our senior faculty formally announce their retirements. The retirements on the horizon will provide the department an opportunity to examine the possibility of new directions and disciplinary specialties, with the goal of improving our various degree programs and better preparing our graduates to live, work, and learn in the 21st century. In addition, the number of geoscience majors has increased 32% since 2007 (63 majors in 2007-2008; 83 majors in Fall 2012). If the growth in geoscience majors continues at this rate, an increase in the number of regular faculty may soon be warranted.

The department currently has an adequate annual budget to meet very basic needs. Over the last 5 years, the department annual budget, excluding faculty and staff salaries, has remained approximately $20,000, which has been used mostly to cover general operating expenses (e.g. phones, copying, office supplies), pay hourly wages, partly support travel (much of travel has been covered by grants), and partly support equipment/software purchase/maintenance. Private donations, exclusive of scholarships, have been used to help purchase equipment and defray student expenses associated with field trips. The department collects student fees totaling about $4000 per year for introductory labs (GEO 1065 and 1115) and for computer-intensive geospatial classes (GEO 4210, 4220, 3400, 4400). These funds are used to replace and improve lab supplies for the large-enrollment introductory labs, and to help cover computer/hardware expenses and software licensing in the geospatial classes. Covering on-going software licensing costs remains a challenge. Weber State University supports a vigorous and well-funded Office of Undergraduate Research. Students apply on a competitive basis for research funding for the academic year and/or summers. Geosciences students have received over $10,000 in total funding from this source since 2007. The College of Science has a liaison in the Development Office who

we work with to obtain donations and cultivate ties with alumni and friends of the department. In 2011 the department received a very generous donation from Norman and Barbara Tanner which will provide two $5000 scholarships per year, for five years, to exemplary students majoring in the geosciences. The department also receives more than $10,000 annually from additional sources for other scholarships, which typically has allowed us to support five to ten majors during each academic year.

Relations with External Community:

We have extensive contacts with governmental agencies, including the Utah Geological Survey, U.S. Geological Survey, National Forest Service, Weber Basin Water Conservancy District, and county/city planning groups. Faculty members have undertaken a number of collaborative projects with these agencies, and faculty serve on outside committees, such as the Weber County Health Department Advisory Committee and the Utah State Mapping Advisory Committee. One faculty has a major grant from the National Park Service to conduct a paleontological survey of Bryce Canyon, which has employed many students. We have also developed contacts with geotechnical and mining-service firms who provide feedback on performance of graduates they hire.

We support GIS applications across the campus, including managing a site license for ArcGIS that is used by multiple academic programs, Stewart Library, and Facilities Management. One faculty heads the local GIS Users Group and provides training sessions on GIS to interested faculty.

The department supports K-12 education in the community. We have been closely involved with the Center for Science and Math Education (CSME) in the past, with one faculty serving on the steering committee for the center and specifically focused on Earth science teaching. However, CSME is currently without a director and maintaining a minimal level of activity due to lack of funding. One faculty member is currently serving on a college committee charged with improving STEM recruitment and retention. Faculty have been actively involved with the Utah Science Olympiad, the annual Ritchie Science & Engineering Fair hosted by WSU, MESA program, giving lectures in the public schools, and offering summer workshops for in-service teachers. One faculty member served on a committee, sponsored by the Utah State Office of Education, that substantially revised the curriculum for Utah's 9th-grade Earth Science course.

Geoscience faculty members are actively involved in a number of professional organizations and service to the geoscience community. Faculty have chaired sessions and led field trips at professional meetings, served as judges for outstanding publication awards, and regularly serve as reviewers for a number of geoscience journals. Geoscience faculty are also called upon to review grants proposals and serve on thesis committees for graduate students at other colleges and universities.

Student, Faculty, Contract/Adjunct Faculty and Staff Statistics:

Appendix A: Student and Faculty Statistical Summary

	2007-08	2008-09	2009-10	2010-11	2011-12
Student Credit Hours Total	4,652	4,386	4,676	5,338	5,034
Student FTE Total	155.07	146.20	155.87	177.93	167.80
Student Majors					
Geosciences	63	57	54	74	78
Program Graduates					
Bachelor's Degrees	11	12	2	10	4
Institutional Certificates	1	1	4	1	1
Student Demographic Profile	**63**	**57**	**54**	**74**	**78**
Female	29	26	23	31	26
Male	34	31	31	43	52
Faculty FTE Total	**8.34**	**7.81**	**8.17**	**8.56**	**NA**
Adjunct FTE	2.56	2.25	2.06	2.45	NA
Contract FTE	5.78	5.56	6.11	6.11	NA
Student/Faculty Ratio	**18.59**	**18.72**	**19.08**	**20.79**	**NA**

Note: Data provided by Institutional Research

Appendix B: Contract/Adjunct Faculty Profile

Name	Gender	Ethnicity	Rank	Tenure Status	Highest Degree	Years of Teaching	Areas of Expertise
Jeffrey G. Eaton	M	Euro-American	Professor	tenured, 7/1/02	PhD	22	paleontology, stratigraphy, sedimentology
Richard L. Ford	M	Euro-American	Professor	tenured, 7/1/05	PhD	20	geomorphology, Earth science education
Michael W. Hernandez	M	Euro-American (Hispanic)	Associate Professor	tenured, 7/1/11	PhD	12	remote sensing, GIS, geologic hazards
Marek Matyjasik	M	Euro-American	Professor	tenured, 7/1/04	PhD	17	hydrogeology, environmental geology
James R. Wilson	M	Euro-American	Professor	tenured, 7/1/87	PhD	37	mineralogy, environmental geology
W. Adolph Yonkee	M	Euro-American	Professor	tenured, 7/1/97	PhD	22	structural geology, petrology, geochemistry
Helen K. Barker	F	Euro-American	Adjunct	NA	MS	25	general geology
Thomas R. Herret	M	Euro-American	Adjunct	NA	MS	18	meteorology
David C. Larsen	M	Euro-American	Adjunct	NA	MS	8	general geology
Gregory B. Nielsen	M	Euro-American	Adjunct	NA	PhD	13	general geology

Appendix C: Staff Profile

Name	Gender	Ethnicity	Job Title	Years of Employment	Areas of Expertise
Marianne Bischoff	Female	Euro-American	Secretary II	less than 1	office management

Appendix D: Financial Analysis Summary

Department: GEOSCIENCES	2007-08	2008-09	2009-10	2010-11	2011-12
Undergraduate					
Instructional Costs	$619,931	$654,917	$691,530	$663,926	$655,071
Support Costs					
Other Costs					
Total Expense	$619,931	$654,917	$691,530	$663,926	$655,071
Graduate					
Instructional Costs					
Support Costs					
Other Costs					
Total Expense					

Note: Data provided by Provost's Office

Results of Previous Program Reviews:

Problem Identified	Action Taken	Progress (since 2007-2008)
Issue 1—Staffing: The program would be greatly assisted by the hiring of a computer technician to address the needs of the GEAR Lab and to assist faculty w/computer-aided instruction.	Previous 5-Year Program Review:	
	Year 1 Action Taken:	No progress due to budget constraints
	Year 2 Action Taken:	same
	Year 3 Action Taken:	same
	Year 4 Action taken:	COS hires a part-time IT professional
Issue 2—Space: Any future growth in faculty or acquisition of new equipment will require additional space. Priority should be given to planning and funding a building for the College of Science.	Previous 5-Year Program Review:	
	Year 1 Action Taken:	No action
	Year 2 Action Taken:	SEM installed in remodeled room
	Year 3 Action Taken:	GEO faculty member serves on COS preliminary-planning committee for new building
	Year 4 Action taken:	WSU continues to make its case for new science building
Issue 3—Equipment & Maintenance: The routine and time-consuming duties related to laboratory instruction fall exclusively to the faculty. Priority should be given to hiring a lab manager.	Previous 5-Year Program Review:	
	Year 1 Action Taken:	No progress due to budget constraints
	Year 2 Action Taken:	same
	Year 3 Action Taken:	same
	Year 4 Action taken:	same

Program Strengths Identified During the Previous Program Review (2007-2008):

1. **Faculty:** The program clearly has well qualified, dedicated, productive, and collegial faculty who ably balance teaching with research and service.
2. **Students & Advising:** The department's students enjoy success performing research, participating in internships, find employment, and in graduate programs. The advising of majors is a strength of the department and an important part of the close student-faculty interaction in the department.
3. **Curriculum:** The program successfully integrates traditional geology with geospatial analysis, environmental applications, close student-faculty interaction, numerous field experiences, modern technology, and laboratory work.

Information Regarding Current Review Team Members:

1. Dr. Danny Horns -- 801.863.8582 -- hornsda@uvu.edu
Professor of Earth Science and Associate Dean
College of Science and Health
Utah Valley University
800 West University Parkway
Orem, UT 84058

Danny Horns was instrumental in leading the growth of the Earth Science Department at UVU as they transitioned from 2-year school to 4-year state college to university. He has managed a department during a period of rapid change and could help us as we plan for our role/place in the new science building.

2. Dr. Scott Linneman -- 360.650.7202 -- scott.linneman@wwu.edu
Professor of Geology and Science Education
Science, Mathematics, and Technology Education (SMATE)
Western Washington University
516 High St.
Bellingham, WA 98225-9155

Scott Linneman's expertise in Earth science pedagogy and the preparation of future science teachers will be of benefit as we consider potential curricular changes and what our role could be in a revitalized CSME.

3. Mr. Keith T. Weber -- 208.282.5802 -- webekeit@isu.edu
Director
Idaho State University GIS Training and Research Center
921 S. 8th Avenue, Stop 8104
Pocatello, ID 83209-8104

Keith Weber's experience in developing and directing an interdisciplinary GIS center at Idaho State will offer an important perspective as we consider the future of GIS in our department and college.

4. Mr. Grant Willis -- 801.537-3355 -- grantwillis@utah.gov
Senior Geologist and Program Manager
Geologic Mapping Program
Utah Geological Survey
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As many of our graduates find employment with various local government agencies (USGS, USFS, UGS, county, city), we think Grant Willis could help us think about how we might better prepare our graduates for entry-level positions that only require a bachelor's degree.