

School of Geology

Prepared by the School of Geology Assessment Committee
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Executive Summary (full report available upon request)

Degree Program(s) Assessed	Assessment Methods	Number of Individuals Assessed
B.S.	> 2003 Student Performance in Capstone Course: Field Geology	8
	> 2004 Student Performance in Capstone Course: Field Geology	7
B.S.	> 2003 Performance on Area Concentration Achievement Test (ACAT) in Geology	5
	> 2004 Performance on Area Concentration Achievement Test (ACAT) in Geology	Not administered
B.S., M.S.	> 2003 School of Geology Student Exit Survey	3
	> 2004 School of Geology Student Exit Survey	In progress
B.S., M.S.	2003/2004 Time to Graduation and Retention Rates	67, 72
B.S., M.S.	Job Placement Survey	67, 72
B.S.	Office of University Assessment, 2004 Survey of Alumni - Undergraduate Programs	13
M.S.	Office of University Assessment, 2003 Survey of Alumni - Graduate Programs	13
M.S.	Graduate College and Office of University Assessment, 2002 Graduate Student Satisfaction Survey	8
M.S.	2004 Thesis Defense Outcomes	13

This table shows the assessment methods used and numbers of individuals assessed for the degree programs in the OSU School of Geology for the period July 2003 through June 2004. This report is consistent with the Outcomes Assessment Plan we developed in the Fall Semester 2001 with goals, measures of student performance, and procedures for how this information will be used to support existing strengths and respond to shortcomings.

Analysis and Findings

2003 Student Performance in Capstone Course: Field Geology (not reported last year)

All of our majors in Geology are required to enroll in Geol 3546, a five-week long Field Geology course. Students from geology programs at other universities also enroll for our course. This course represents a capstone course in that students are expected to demonstrate the knowledge of basic concepts and techniques (field and computer) in geology and apply them to achieve the following objectives:

- 1) Develop a good understanding of the geology in an area they have not worked before;
- 2) Interpret sedimentary environments based on field observations;
- 3) Solve stratigraphic and structural problems encountered in the field
- 4) Produce a correct and meaningful geologic map;
- 5) Interpret their own map and maps produced by others;
- 6) Write meaningful reports either from their own individual work or from data gathered by a team; and
- 7) Work in harmony with their peers.

In the summer 2003 course, 8 OSU Geology majors enrolled in the course. Seven of the OSU students earned a grade of B. The remaining OSU student received a grade of C. Fifteen students from other universities enrolled for Field Geology, 3 of whom earned a grade of A, 6 a grade of B, and 6 a grade of C. For the third year in a row, OSU students were slightly out-performed by students from other universities in that none of our students earned a grade of A. As noted in the 2003 report, the overall performance of the OSU students suggests that our majors are learning basic mapping skills but that we have room for improvement.

2004 Student Performance in Capstone Course: Field Geology

In the summer 2004 course, 7 OSU Geology majors enrolled in the course. Five of the OSU students earned a grade of A. The remaining two OSU students received a grade of B. Thirty-one students from eight other universities enrolled for Field Geology. Twelve of these students earned a grade of A, 18 a grade of B, and 1 a grade of C. For the first time in four years, the OSU students were either on par with or performed better than the students from the other universities. We are proud of this achievement. The improvement can be partly attributed to better correspondence between classroom instruction and the skills required in the field. The improvement can also be attributed to an overall increase in OSU student quality that has resulted from the Boone Pickens Scholars program. The Pickens program, which has recently been renewed for another five years, has helped us attract and retain better undergraduate students. We are also pleased with the growing popularity of the OSU Geology Field Camp, as witnessed by the growing number of enrollees from other universities. We attribute the growing popularity of the camp to our lower cost, the time length of the camp (five weeks), and to the quality of instruction (as documented in the student evaluations for the course). Funds obtained from University Assessment each year has also helped us better advertise the course and to purchase some needed equipment for the field station.

2003 ACAT in Geology (not reported last year)

The Area Concentration Achievement Test (ACAT) in Geology was administered to five graduating seniors in May 2003. Final results of the exam with comparisons to a nation-wide pool of graduating seniors who also took the exam was received by the School of Geology during the first week of July, 2003. This marked the second year in a row that we administered this exam to our graduating seniors.

All five students who took the exam are male and all five students completed their entire program at OSU. Three of the five students plan to pursue graduate studies and two of the students will not elect to attend graduate school. The scores are compared to a nationwide sample by using standardized scores with a mean score of 500 and a standard deviation of 100. These overall standard scores are based on a comparison of this year's scores with a five-year cumulative sample for each content area and for overall performance.

Area Tested	Standard Score	Percentile	Comparison Group Size
Geomorphology	513	55	111
Historical Geology	422	22	149
Paleontology	435	26	124
Mineralogy	478	41	158
Petrology	475	40	196
Physical Geology	517	57	134
Stratigraphy	504	52	183
Structural Geology	497	49	173
Oceanography	418	21	111
OVERALL SCORE	448	30	111

The results show that our students performed better than 30% (range: 21% to 57%) of those who took the exam around the country. In 2002, our students scored better than 48% of all students. In this sense, our 2003 student population was not as strong as our 2002 population. In terms of standard scores by subject area for the 2003 exam, the students performed from best to worst as follows: physical geology, geomorphology, stratigraphy, structure, mineralogy, petrology, paleontology, historical geology, and oceanography. Among these subject areas, none of the student scores showed a significant correlation (at $p = 0.05$) with their GPA in Geology. As can be interpreted from the above table, the performance of our students equaled or exceeded the national average in geomorphology, physical geology, stratigraphy, and

structural geology. The students performed below the national average in historical geology, paleontology, mineralogy, petrology, and oceanography. The poorest performance was in oceanography, which we do not teach.

As noted in last years report, the overall performance of our students on this exam could indicate that: 1) we need to improve teaching in the subject areas where students scored the lowest; and/or 2) the exam does not test student's knowledge of concepts that we believe are most important in each of the respective subject areas. Post-exam interviews with the students confirmed some observations made the previous year; the paleontology section of the exam covered a lot of material on vertebrate paleontology and dinosaurs. At present, this subject matter is not emphasized in OSU classes. Also, some of the questions were very specific to one or two certain fossil groups that are not those covered in classes (e.g., trilobites or brachiopods).

Dr. [REDACTED] has initiated the paperwork for a new course offering in vertebrate paleontology.

2004 ACAT in Geology

We did not administer the ACAT in May of 2004 because only one student was graduating from the School of Geology in May. Unfortunately, five other members of our current senior class required completion of our capstone course, Field Camp - GEOL 3546, in order to satisfy graduation requirements. After completion of field camp, these students did not return to campus in order to take the exam. As field camp is considered our capstone course, we felt that administering the ACAT to our seniors prior to completion of field camp would yield an incomplete measure of their geological knowledge.

We are not satisfied with the current exit exam arrangement. We continue to evaluate the ACAT and the timing of that exam relative to when the seniors are on campus. We are considering alternative means by which to best evaluate the knowledge of our graduating seniors.

2003 Student Exit Survey (not reported last year)

Because of poor response rate to our survey in 2002, we have changed the procedure by which we conduct our Student Exit Survey. We have adopted a two-pronged approach: 1) A graduation checklist for graduate students has been developed. This checklist is to be completed by the graduate student and the MS thesis advisor prior to clearance for graduation. The checklist requires that the student complete the exit survey. 2) Our exit survey is now digital and available as an email attachment. The survey is sent to all graduating seniors and graduate students on an "as needed" basis. In order to guarantee anonymity, the surveys are either emailed or sent by letter to the Office of University Assessment. The surveys are then forwarded as anonymous surveys to the School of Geology.

In 2003, we received three surveys back from graduate students. Though meager, this is an improvement over last year when we received only one survey back from our students. This year's survey indicates that our graduate students were neutral to very satisfied with our program. The surveys suggest that we need to be more sensitive to student concerns and that our academic standards should be increased. Another respondent suggested that our course content should be made more rigorous. Poor computing facilities were a unanimous bone of contention among the three students who completed the survey.

In 2004, the School of Geology upgraded our student computing facilities. We now have one of the better student computer labs on campus. In addition, through awarding of grants and contracts, the faculty continue to upgrade research computers throughout the department.

2004 Student Exit Survey

When the results of 2004 survey arrive and are compiled, the School of Geology faculty will discuss the results. As necessary, we will discuss changes to course content at faculty meetings. The 2004 survey results and our action plans will be summarized and discussed in our 2005 report. We expect to receive a larger number of surveys this year than last year.

Time to Graduation and Retention Rates

Since the Fall Semester of 1993, 67 students have completed their B.S. degree in Geology at OSU and 72 students have completed their M.S. degree in Geology (13 students in 2003/2004). The average time for completion of the B.S. degree was 2.4 years for transfer students (n = 19) and 5.1 years for those who entered OSU as freshmen (n = 37) (this estimate taken from 2002 report). These numbers for B.S. completion time have been consistent for several years in a row, though in the coming year we will work the

details of the time to completion more carefully. Inspection of past data reveals that the average time for completion of the M.S. degree was 3.0 years (range: 1-8 years). This year's M.S. students also required 3.0 years for completion of the degree on average. These trends are consistent with general trends at OSU.

During the 2003-2004 academic year, 15 new students declared geology their major field of study. During this period, the undergraduate program has grown from 39 to 54 declared majors (according to A&S records).

2004 Job Placement Survey

Since the Fall Semester of 1993, 67 students have completed their B.S. degree in Geology at OSU and 72 students have completed their M.S. degree in Geology. For 2003/2004, thirteen students completed their MS degree. Five of these students took employment with the petroleum industry and three students went on to work with environmental consulting firms. Five of our MS students are going on for a PhD degree at other institutions. The breakdown of employment since 1993 follows:

. . . (full report available upon request). . .

The placement of our graduating students reflects the tradition of the OSU School of Geology and the strong ties with the oil and gas industry developed by faculty over time. As the environmental geology focus continues to develop, we might expect a larger portion of our students to gain employment in that sector. However, with the rise in oil prices and an increasing demand for petroleum geoscientists, some of our B.S. and M.S. students who are currently working in the oil and gas industry as summer interns are being retained as part-time employees during the regular academic school year. It is noteworthy that a large portion of students graduating with a B.S. in geology decides to remain at OSU for advanced studies. However, the lack of a doctoral program causes the 20-40% of our M.S. students who seek a doctoral degree to look elsewhere. Similar to last year, the Geology faculty will meet in Fall Semester 2004 to discuss the results of the job placement survey and to decide what changes to the curriculum, if any, are necessary.

2004 Survey of Alumni of Undergraduate Programs (Supplied by University Assessment)

This survey was administered by phone and conducted by the OSU Bureau for Social Research. Respondents were asked 13 common questions. Respondents were asked an additional 15 questions developed by Geology. A total of 13 respondents were included in the 2004 study. The respondents graduated from OSU in the calendar years of 1998 and 2002.

. . . (full report available upon request). . .

Assessment Committee Comments

We are pleased with the results from this 2004 Survey of our Undergraduate Program. These survey results indicate that students who graduated in 2002 with a B.S. from OSU School of Geology are somewhat to very satisfied with the correspondence between their OSU training and important job-related skills. The 1998 graduates were less satisfied with their OSU preparation. This outcome suggests we as a faculty did a better job of preparing our students for the workplace in 2002 that we did in 1998. Our 2002 Survey (which contained feedback from 1996 and 2000 graduates and is discussed in last year's assessment report) indicated that the School of Geology was not supplying undergraduate students with adequate training in computers, technical writing, or in presentation skills. This 2004 Survey indicates a marked improvement of opinion from the 2002 Survey results with respect to these technical areas. The 2004 Survey also suggests that the department has significantly improved the quality of academic advising for undergraduates.

2003 Survey of Alumni of Graduate Programs (Supplied by University Assessment)

The results of a survey of graduate alumni are summarized below. The survey targeted alumni who received their degrees in 1997 and 2001. The survey was administered by phone and was conducted by the OSU Bureau for Social Research in February 2003. The Office of University Assessment prepared the report. Respondents were asked 15 common questions and 15 questions developed by the School of Geology.

. . . (full report available upon request). . .

Assessment Committee Comments

The above survey is very useful to the School of Geology because the survey contains a respectable number of graduates from our MS program. The job titles and range of job types are also fairly representative of our total alumni population. One important comment in the survey is that OSU needs to add a geophysics program to the School of Geology. We have addressed this need with the acquisition of the Pickens Chair in Geophysics and the hiring of Dr. [REDACTED] in the Fall Semester of 2003.

Another important observation is that all of the respondents view 1) technical writing, 2) data analysis, 3) experimental design, 4) computer skills, and 5) communication skills to be very important to their jobs. These skills are taught to varying degrees in most of our graduate level courses. However, we view the MS thesis as the vehicle by which the knowledge gained from these courses is actually applied. For this reason, we in the School of Geology will continue to emphasize the need for excellence in MS thesis research. A goal is that all MS thesis work is of sufficient quality to be submitted for publication in internationally peer-reviewed journals.

2002 Graduate Student Satisfaction Survey (Supplied by the Graduate College and the University Assessment)

The following summary was conducted to obtain feedback from graduate students about their educational experiences while enrolled in the Graduate College at OSU. A total of 908 OSU graduate students completed the survey. The response from geology graduate students (8) is summarized below. Please consult the original document for expanded survey results and for comparisons to the OSU graduate student population as a whole. The expanded survey results contain student opinions about the OSU campus climate and diversity, satisfaction with the graduate college, and discrimination.

. . . (full report available upon request). . .

Assessment Committee Comments

The above Graduate Student Satisfaction Survey is very useful to the School of Geology because the survey pinpoints some areas where we have made improvements since 2002 (new computing laboratories). The survey also indicates that we should make improvements to our process of graduate students advising. This topic is discussed below under Thesis Defense Outcome.

Thesis Defense Outcome

Thirteen students successfully defended their theses before a committee comprised of their advisor and at least two other faculty members. Revisions were required in all cases. Some students had major revisions but in most cases, revisions were minor. No student failed his/her thesis defense.

As a means to better manage the graduate student MS thesis process and to promote improved advising of graduate students, the School of Geology Graduate Committee, headed by Dr. [REDACTED], has instituted guidelines for use by MS students, the student's advisor, and thesis committee members. The guidelines cover topics concerned with 1) selection of the thesis committee, 2) thesis proposal preparation, 3) thesis committee meetings, and 4) calendar requirements for scheduling a thesis defense. Because of the large number of thesis defenses the past few years, coordination of thesis defenses with the availability of committee members has become more difficult. In some cases, faculty committees have had insufficient time to digest the MS thesis prior to a scheduled defense. The guidelines prepared by the Graduate Committee should help the department better manage the thesis process.

Our hope is that our improved thesis process will promote the quantity and quality of interactions among graduate students, thesis advisors, and thesis committees. By virtue of these interactions, the graduate students will become more engaged in the research endeavor. OSU and the School of Geology will benefit from this arrangement because an engaged graduate student has an improved chance of producing publishable research results.

Uses of Assessment Results

The following changes were implemented in the 2001-02 academic year in response to the 2001 Geology Assessment Outcomes Report:

- 1) Graduate students elected a representative who attended all Geology faculty meetings (except those involving personnel matters) in a non-voting capacity and was allowed to bring any grievances to the direct attention of all faculty.
- 2) The Graduate Committee in the School of Geology revised our brochure prepared for graduate students. Procedures and requirements were clarified.
- 3) Geology faculty strongly encouraged graduate students to attend professional meetings (e.g., regional GSA and AAPG meetings) and to present papers/posters of their thesis research. When appropriate, the Geology van was used to transport students to regional meetings. Grants and contracts were used to pay for student travel to more distant meetings.
- 4) The School of Geology encouraged graduate students to organize fall and spring off-campus social events.

- 5) Faculty encouraged all graduate students to attend the Fall Geology Colloquium.
- 6) Individual faculty were assigned to supervise TAs for our large introductory courses, Geol 1014 and Geol 1114.
- 7) The School of Geology enjoys great success in placing our graduating students in business, industry, government, as well as in advanced degree programs. We will continue to invite potential employers from business, industry, and government to visit our department, specifically to meet and interview students.

The following changes were implemented in the 2002-04 academic years in response to the 2002 and 2003 Geology Assessment Outcomes Report:

- 1) More field-based techniques were employed in the Sedimentology and Stratigraphy (GEOL 3034) class. This class is an important prerequisite for Field Geology (GEOL 3546).
- 2) We have installed new academic advisors for both the graduate and undergraduate programs because of student concerns with quality of advising. The attached surveys indicate that academic advising has improved substantially.
- 3) Dr. [REDACTED], hired to fill the Pickens Chair in Geophysics, has finished his first full academic year at OSU. Current students, faculty, and alumni of our B.S. and M.S. degree programs have recognized the long-standing need for geophysics at OSU. We are very proud of this accomplishment.
- 4) We have received confirmation that the Boone Pickens Scholarship Program (five scholarships) will continue for another four years. These scholarships (\$5000/year) for undergraduate majors, began in the Fall Semester of 2001. The quality of our undergraduate student population has improved each year since inception of this program. The continuation of the program for another four years will help the School of Geology maintain an atmosphere of continuous academic improvement. This Pickens program is now beginning to improve the quality of our graduate program as well (high-quality undergraduate students staying on for graduate work at OSU).
- 5) We increased the number of faculty funded-research projects in the 2002-2004. As a consequence, a greater number of graduate students were supported at a half time rather than the quarter time assistantship rate (FTE). The number of undergraduate students employed by the department research projects has also increased.
- 6) The Arthur Cleaves' family established the Cleaves Field Camp Scholarship in his honor. Each field camp season, two of our undergraduate students benefit from this endowment for the Cleaves' family.
- 7) Thanks to the help of the College of Arts and Sciences and an internal departmental committee headed by Dr [REDACTED], the OSU School of Geology now possesses one of the best student computer labs on campus. In addition, faculty research grants have facilitated the purchase of several high-end computers and work stations for use by students.
- 8) An electron microprobe (gift of Conoco-Phillips) was received by the department in 2002. Results from this high-end piece of analytical equipment have already been published in international journals (Dr. [REDACTED]). The microprobe is also being used for classroom instruction.

The School of Geology is responding to the results of our 2004 Outcomes Assessment Report (and previous years' reports) in the following manner:

- 1) Advising of graduate student thesis work will be improved through implementation of thesis research guidelines. The guidelines should help to formalize the thesis process. The new process will enable the graduate student, advisor, and thesis committee to become more engaged in the student's research progress. This should result in the generation of better quality research and more publishable results.
- 2) The School of Geology will attempt to continue our recent successes in obtaining grants so that graduate students (and faculty) will have more resources for conducting their research.
- 3) Devon Energy (and other companies) will be approached and asked to help OSU improve our research infrastructure (laboratories) and the level of our graduate student stipends.