

**COVER SHEET**  
**OUTCOMES ASSESSMENT REPORT**  
**2007-2008**

**Natural Sciences**

**Environmental Geology**

**Bachelors of Science**

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**Department**

**Program (major or minor)**

**(Degree)**

**Jennifer Lindline**

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**Assessment Coordinator (Print)**

**Signature**

**Date**

**Jennifer Lindline**

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**Program Chair (Print)**

**Signature**

**Date**

**Program Starting Date; only needed if within the past three years: Fall 2003**  
**semester year**

## I. NEW MEXICO HIGHLANDS UNIVERSITY MISSION

NMHU is a diverse comprehensive university serving the global community by integrating education, research, public service, and economic development, while celebrating our distinctive New Mexico cultures and traditions. We achieve this through a University-wide commitment to quality student-centered education.

## II. ENVIRONMENTAL GEOLOGY PROGRAM GOALS

### Mission

The mission of the Environmental Geology Concentration Program at NMHU is to provide students with the specific skills needed to excel in a discrete field of study by:

- Providing a broad-based undergraduate education in the Liberal Arts and Sciences;
- Promoting study and quality research in the geological sciences; and
- Providing a superior learning experience for students through dedicated teaching, hands-on learning, research, and commitment to the individual student.

### Goals

Environmental Geology students will develop an understanding of the physical function, operation, hazards, and connectivity of Earth Systems. They will acquire the scientific knowledge, research aptitude, technical ability, and communication skills (both written and verbal) necessary for a professional career in the field of Environmental Geology at a nationally competitive level.

## III. 2007-2008 GEOLOGY COURSE OFFERINGS

### Fall 2007

GEOL 101	Survey of Earth Science	68 students
GEOL 330	Structural Geology	7 students
GEOL 375	Field Geology	3 students
GEOL 495	Senior Geology Applications	2 students
GEOL 499	Independent Research (Petronis)	2 students
GEOL 590	Independent Study (Petronis)	1 student

### Spring 2008

GEOL 101	Survey of Earth Science	45 students
GEOL 422	Ore Genesis	4 students
GEOL 432	Environmental Geochemistry	6 students
GEOL 435	NM Geologic Resources and Mining Law	6 students
GEOL 499	Independent Research (Lindline)	1 student
GEOL 610	NM Geologic Resources and Environmental Policy	4 students

III. STUDENT LEARNING OUTCOMES	IV. OUTCOMES ASSESSMENT
<ul style="list-style-type: none"> <li>Classify and identify geologic materials, including soils, minerals, and rocks.</li> </ul>	<ul style="list-style-type: none"> <li>40/53 students in Fall 07 GEOL 101 class and 30/45 students in Spring 08 GEOL 101 class earned <math>\geq 70\%</math> on lab midterm emphasizing hand specimen description and identification.</li> </ul>
<ul style="list-style-type: none"> <li>Read and critically evaluate relevant professional literature.</li> </ul>	<ul style="list-style-type: none"> <li>4/4 students in GEOL 422 earned <math>\geq 70\%</math> on their required term paper covering a New Mexico geologic resource.</li> </ul>
<ul style="list-style-type: none"> <li>Effectively communicate scientific ideas, information, and results, both verbally and in writing, that (1) demonstrate consistent logic; (2) are well organized; (3) state and defend a thesis; and (4) demonstrate competent use of language.</li> </ul>	<ul style="list-style-type: none"> <li>6/6 students in GEOL 435 and 4/4 students in GEOL 610 earned <math>\geq 75\%</math> on their required presentation on a current NM hard rock mining case.</li> </ul>
<ul style="list-style-type: none"> <li>Think critically.</li> </ul>	<ul style="list-style-type: none"> <li>7/7 students showed proficiency in geologic mapping, map interpretation, 3-point problem solving, and cross-sections construction and earned <math>\geq 70\%</math> for their course grade.</li> </ul>
<ul style="list-style-type: none"> <li>Competently use appropriate tools from geology, chemistry, physics, and mathematics to solve discipline-specific problems.</li> </ul>	<ul style="list-style-type: none"> <li>2/2 students earned A's on their senior capstone course. Both students used a variety of field and laboratory techniques to collect and analyze rock, soil and water data. Both students used Geographic Information Systems to further analyze and professionally present their data.</li> </ul>
<ul style="list-style-type: none"> <li>Competently use appropriate laboratory and field methods and instrumentation.</li> </ul>	<ul style="list-style-type: none"> <li>3/3 students in the GEOL 375 Field Course demonstrated proficiency in using a Bruton compass, Jacob staff, and hand-held GPS unit for field data collection. All students showed high abilities in stereographic projections, geologic mapping, cross-section construction, and report writing and earned A or B for their final grade.</li> <li>4 students participated in Independent Research or Independent Study with geology faculty. All 4 students aptly used geology laboratory instrumentation, including sample preparation equipment, the petrographic microscope, a cryogenic magnetometer, and a Kappa Bridge Susceptibility Meter. All 4 students demonstrated achievement in ethics, field methods, analytical instrument usage, problem-solving, and written and/or oral presentation of their work (see Section VI. Student Abstracts).</li> <li>2 students graduated with Environmental Geology degrees this year. Course exit surveys show high overall student satisfaction with the Environmental Geology Program. <ul style="list-style-type: none"> <li>Students were <b>very satisfied</b> with curriculum.</li> <li>Students were <b>very satisfied</b> with quality of intellectual challenge in the program.</li> <li>Students were <b>satisfied</b> to <b>very satisfied</b> with contact with faculty outside of classroom.</li> <li>Students were <b>very satisfied</b> with preparation</li> </ul> </li> </ul>

	for work or graduate school. - Students were <b>satisfied</b> to <b>very satisfied</b> with overall college experience.
<ul style="list-style-type: none"> <li>• Attain employment in geology, environmental science, or related fields and/or continue graduate studies.</li> </ul>	<ul style="list-style-type: none"> <li>• Both of the Environmental Geology graduates applied to and were accepted to graduate school (New Mexico Highlands University and New Mexico Tech).</li> </ul>

## V. REMARKS

Geology faculty has identified weak scientific paper writing, class absenteeism, and inattention to deadlines as on-going problems for some of the Environmental Geology majors. We are addressing this through the following measures:

**1. Improving scientific paper writing.** Instructors are requiring shorter but more frequent paper submissions. This will provide students with repeated opportunities in developing paper theses, gathering literature resources, synthesizing geologic information, and communicating their findings in writing. Faculty are also structuring timetables for paper milestones (topic approval, preliminary references, outline, etc.) and requiring submission of two to three drafts of the required term papers in order to keep students on a track for success.

**2. Improving class attendance.** Instructors are developing rigorous and uniform attendance policies.

Attendance Policy: According to NMHU Policy, there are no un-excused absences during any academic semester. However, it is understood that during times of illness, it may be necessary to miss a class. If you are sick and must miss class, please e-mail or call your instructor immediately to communicate your situation and receive the missed material. If you have a personal situation that prevents you from attending class (such as a university-sanctioned event, religious practice, or personal emergency), you provide written verification of your situation in addition to emailing or calling your instructor for the missed work. If you miss more than three classes or labs (collectively) your course grade will drop one full letter grade. If you miss five classes/labs (collectively), you will fail the course. If you miss a test without prior arrangements, you will be given an oral make-up examination.

**3. Improving student attention to deadlines.** Instructors are developing rigorous and uniform deadline policies.

Written Assignments: A number of written works will be assigned throughout the term. These assignments are due at the **beginning** of class on the date indicated. Part of professional life is meeting deadlines. **Late assignments will be penalized.** 10% of points will be deducted for assignments that are 24 hours late; 20% of points will be deducted for assignments that are 48 hours late, and 5% per day after that. You may resubmit a homework assignment for additional credit, though the maximum score attainable on resubmitted work is 85% of the assignment's original value.

- All material submitted for a grade must be typed (or word-processed).
- All material submitted for a grade should show a high degree of organization, clarity of thought, solid background knowledge, and a sense of the literate.
- Grammar, spelling, and style will be evaluated and counted towards your grade for all assignments.
- Direct quotes, ideas, or thoughts of another must be cited properly. Representation of another's work as your own is plagiarism and will not be accepted.

**VI. STUDENT ABSTRACTS** (\*denotes undergraduate student author; \*\* denotes graduate student author)

Lindline, J. and \*Ward, R., 2007, *The Geologic History of Pecos National Historical Monument*. Poster presentation at the annual Pecos Archeology Conference, Pecos, NM.

Lindline, J. and \*Trujillo, R., 2007, *The petrogenesis of Turkey Mountain dikes, Mora County, New Mexico, and their relationship to regional magmatism*. Poster presentation at the Annual Geological Society of America meeting, Denver, CO, Geological Society of America Abstracts with Programs, vol. 39, no. 6, p. 388-389.

Lindline, J. and \*Trujillo, R., 2008, *Comparison of volcanic-magmatic rocks of the Ocate and Raton-Clayton fields, Northeastern New Mexico, USA*. Poster presentation at the annual Volcanic and Magmatic Studies Group Meeting, Dublin, Ireland.

Petronis, M.S., O'Driscoll, B., Stevenson, C.T.E., \*Lowry, J.W., Reavy, R.J., and Geissman, J.W., 2008, *Anisotropy of magnetic susceptibility, petrography, and paleomagnetic data of the Ross of Mull Granite, NW Scotland: implications for the ascent and emplacement of a reversely-zoned intrusion*, Poster presentation at the annual Volcanic and Magmatic Studies Group Meeting, Dublin, Ireland.

\*Lowry, J.W., M.S. Petronis, B. O'Driscoll, J. W. Geissman, 2008, *A Palaeomagnetic baked contact test of a Permo-Carboniferous dyke in the Ross of Mull Granite, Isle of Mull, NW Scotland*, Poster presentation at the annual Volcanic and Magmatic Studies Group Meeting, Dublin, Ireland.

\*Garcia, L., Petronis, M.S., Lindline, J. and Geissman, J.W., 2008, *AMS data bearing on the deformational history of the Proterozoic basement in the Las Vegas Area, Southern Sangre de Cristo Mountains, New Mexico*. Poster presentation at the New Mexico Geological Society Annual Spring Conference, Socorro, NM.

Lindline, J. and \*\*Trevizo, R., 2008, *Preliminary petrologic analysis of Proterozoic Hermit's Peak Batholith orthogneisses, North-Central New Mexico*. Poster presentation at the New Mexico Geological Society Annual Spring Conference, Socorro, NM.