ASSESSMENT REPORT
2018-2019

Environmental Geology **B.S.**
(Instructional Degree Program (Degree Level)

Environmental Science, Environmental Geology, and Water Resources
(Concentrations)

Geographic Information Systems
(Certificates)

Program Mission:
The mission of the Environmental Geology B.S. Program is to provide students with a rigorous, high-quality education in environmental geology and natural resources management with concentrations in Environmental Science, Environmental Geology, and Water Resources.

Student Learning Outcome 1:
Classify and identify earth materials, including soils, minerals, and rocks.

NMHU Traits Specifically Linked to Student Learning Outcome 1

- Mastery of Content Knowledge and Skills

First Means of Assessment for Outcome 1:
Earn ≥ 75% cumulative laboratory exercise grade from GEOL 202: Earth History. Laboratory series emphasizes hand specimen description and identification.

Summary of Data:

Number of Students Meeting Criterion:	3	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	3	Percent of Students Meeting Criterion:	100%

Second Means of Assessment for Outcome 1:
Earn ≥ 75% cumulative laboratory exercise grade from GEOL 325: Earth Materials. Laboratory series emphasizes hand specimen description and identification.

Summary of Data:

Number of Students Meeting Criterion:	7	Number of Students Not Meeting Criterion:	0

Total Number of Students Assessed:	7	Percent of Students Meeting Criterion:	100%

Interpretation of Results for Outcome 1:
A high percentage of geology students met the mineral and rock identification criterion. The Environmental Geology faculty recognizes the importance of field application of classroom knowledge and will continue to campaign for more budget monies and more dispensation of time to its faculty to develop and execute field experiences.

NOTE: GEOL 202 Instructor William Jaremko-Wright tirelessly plans and conducts 5+ field exercises in GEOL 202. This immersion of students in the natural geologic laboratory in the Las Vegas area undoubtedly factored into the high percentage of students meeting this learning objective.

Student Learning Outcome 2:
Read and evaluate relevant professional literature.

NMHU Traits Specifically Linked to Student Learning Outcome 2

- Critical and Reflective Thinking Skills

First Means of Assessment for Outcome 2:
Earn ≥ 75% on weekly journal article reading assignment summaries in GEOL 330: Structural Geology.

Summary of Data

Number of Students Meeting Criterion:	12	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	12	Percent of Students Meeting Criterion:	100%

Second Means of Assessment for Outcome 2:
Earn ≥ 75% on weekly reading assignment (newspaper articles, journal papers, book chapters) in-class summaries in GEOL 435: Clay Mineralogy.

Summary of Data:

Number of Students Meeting Criterion:	6	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	6	Percent of Students Meeting Criterion:	100%

Interpretation of Results for Outcome 2:

Environmental Geology majors do well (100% of students assessed meets expectations) with reading and reporting on advanced topics in geology. Geology faculty invests a considerable amount of time researching topics, identifying papers, and reading the materials in advance of the assignments. Scientific literacy has long been a hallmark of the Environmental Geology Program and continues to set the students apart from their peers.

Student Learning Outcome 3:

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.

NMHU Traits Specifically Linked to Student Learning Outcome 3

- Effective Communication Skills

First Means of Assessment for Outcome 3:

Earn ≥ 75% on collection of writing assignments in GEOL 330: Structural Geology that relay a student's viewpoints and demonstrate the student's understanding about natural resources management law and environmental policies.

Summary of Data:

Number of Students Meeting Criterion:	12	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	12	Percent of Students Meeting Criterion:	100%

Second Means of Assessment for Outcome 3:

Earn ≥ 75% in summary report on GEOL 435: Clay Mineralogy project.

Summary of Data

Number of Students Meeting Criterion:	6	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	6	Percent of Students Meeting Criterion:	100%

Interpretation of Results for Outcome 3:

Environmental Geology majors do well with communicating scientific ideas, information, and results. Geology faculty invests a considerable amount of time in structuring deadlines (submission of topic, preparing a detailed outline, submitting references and drafts, etc.) and

meeting regularly with students to review work and provide editorial improvements. This year's and longitudinal data indicate that consistent and structured academic support are key to student's writing success.

Student Learning Outcome 4:
Competently use appropriate tools from geology, chemistry, physics, and mathematics to solve discipline specific problems.

NMHU Traits Specifically Linked to Student Learning Outcome 4

- Mastery of Content Knowledge and Skills
- Critical and Reflective Thinking Skills
- Effective Use of Technology

First Means of Assessment for Outcome 4:
Earn ≥ 75% in course grade from GEOL 425: Geomorphology.

Summary of Data

Number of Students Meeting Criterion:	6	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	6	Percent of Students Meeting Criterion:	100%

Second Means of Assessment for Outcome 4:
Earn ≥ 75% in course grade from GEOL 435: Clay Mineralogy.

Summary of Data

Number of Students Meeting Criterion:	6	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	6	Percent of Students Meeting Criterion:	100%

Interpretation of Results for Outcome 4:
Environmental Geology majors do extremely well using and applying various tool and techniques (for example, total station data; well log data; gravity and magnetic survey data; remote sensing data; calculus, linear algebra, redox reactions, and buffering equations) to complete homework and laboratory exercises. The Environmental Geology Program will continue to use multivariate datasets and instruments from geology and from outside disciplines throughout the curriculum.

Student Learning Outcome 5:

Competently use appropriate laboratory and field methods and instrumentation.

NMHU Traits Specifically Linked to Student Learning Outcome 5

- Mastery of Content Knowledge and Skills
- Critical and Reflective Thinking Skills
- Effective Use of Technology

First Means of Assessment for Outcome 5:

Earn ≥ 75% in course grade from GEOL 495: Senior Geology Applications course demonstrating proficiency in using a Brunton compass, Jacob staff, and hand-held GPS unit for field data collection, as well as abilities in stereographic projections, geologic mapping, and report writing.

Summary of Data

Number of Students Meeting Criterion:	4	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	4	Percent of Students Meeting Criterion:	100%

Interpretation of Results for Outcome 5:

Environmental Geology seniors each earned grades of B or above in the Senior Applications course that included geologic mapping exercises, material synthesis, and resource management prescriptions. The Environmental Geology Program will continue to implement numerous field experiences, from afternoon outings to extended immersive learning experiences, and integrate field data collection, natural resources mapping (bedrock, soil, and water), and interpretation within the curriculum.

Student Learning Outcome 6:

Attain employment in geology, environmental science, or related fields and/or obtain admission to graduate school.

NMHU Traits Specifically Linked to Student Learning Outcome 6

- Mastery of Content Knowledge and Skills
- Critical and Reflective Thinking Skills
- Effective Communication Skills
- Effective Use of Technology

First Means of Assessment for Outcome 6:
All (100%) of graduates form the Environmental Geology Program will find placement in geology-related jobs or graduate school within 3 months of graduation.

Summary of Data

Number of Students Meeting Criterion:	2	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	2	Percent of Students Meeting Criterion:	100%

Interpretation of Results for Outcome 6:
The Environmental Geology Program boasts 100% placement in career paths or graduate programs of its students. In 2018-19, 2 students graduated from the program and went on to work at environmental consulting firms or enter Master's degree programs. The Environmental Geology faculty considers this an important measure of the success of its program. Students are well prepared for a career or advanced course work in the geosciences.

Assessment of Center Students:
(If your program is offered at one of the NNHU Centers, please contact OIER to have an analysis conducted for those students. If this does not apply to your program you can delete this section.)

N/A

Assessment of Online Students:
(If your program is offered online please contact OIER to have an analysis conducted for those students. If this does not apply to your program you can delete this section.)

N/A

Utilization of Results: (Indicate your plans for using the results in this report to improve your program. All programs are required to complete this section.)

Based upon the 2018-19 outcomes data as well as longitudinal data from the last 5+ years, student learning outcomes have been maintained at a consistently high level (100% for most student learning outcomes; >70% for all student learning outcomes) in the Environmental Geology Program. Academic proficiencies to continue to reinforce throughout the curriculum include written communication and applied mathematics. Content areas to reinforce are stream gaging, water sampling, and water quality analysis. The Environmental Geology faculty will carry on in examining course sequencing to

ensure introduction, reinforcement, and mastery of writing and mathematics skills throughout the Environmental Geology program of study.

Changes to Program Based on Results:

- *Implement a Senior Exit Survey to gain the students' perspective of their undergraduate experience and better assess student needs.*

- *Build guest speakers into the curriculum (water resources managers, economic geologists, hazard mitigation specialists, etc.) so that students see the application of geology to natural resources management and learn about career tracks.*

Retention Strategies

- *Add additional field trips throughout the curriculum to increase the time and context students have for seeing and identifying minerals and rocks, exploring natural resources management issues, and building and strengthening their academic proficiencies in environmental geology and natural resources management.*

- *Coordinate field and laboratory experiences among junior-, senior-, and/or graduate-level classes to build larger student cohorts and increase academic integration.*

- *Gain budgetary approval for a 3rd tenure-track geology faculty member to provide additional learning experiences, research opportunities, and individualized attention to Environmental Geology majors. The Environmental Geology Program has been asking specifically, in response to incoming student interests, regional needs, and career trends, for a permanent tenure-track faculty member with surface hydrology, water science, and water resources expertise. The faculty will continue this request in the hopes that with an additional faculty member, more time, effort, and talent can be directed towards student recruitment, retention, and completion. At this time, the Environmental Geology Program is threatened by a departmental reorganization that moves Natural Resources Management-Environmental Geology instructional programs (Water Resources and Geographic Information Systems) into a "Forestry Science Department." This proposed restructure will seriously impact the Environmental Geology Program's ability to teach its required classes and support students in meeting the program learning objectives.*