February 11, 2019

AY 2017-2018 Annual Student Assessment Report

Bachelor of Science in Environmental Science

1. Program Overview

Faculty:

Eran Hood, Professor of Environmental Science
Lisa Hoferkamp, Professor of Chemistry
Sanjay Pyare, Associate Professor of Environmental Science
Jason Amundson, Associate Professor of Geophysics
Sonia Nagorski, Assistant Professor of Geology
Brian Buma, Assistant Professor of Forest Ecology (resigned from his position during summer 2018)
Allison Bidlack, Associate Research Professor of Environmental Science
Jason Fellman, Assistant Research Professor of Environmental Science

The B.S. Environmental Science provides students with rigorous interdisciplinary training in Earth science, chemistry, and ecology. Program graduates are well-prepared (i) for entry-level employment in resource agencies such as the Department of Environmental Conservation, the Department of Natural Resources, and the US Geological Survey and (ii) to enter graduate programs in Earth sciences and ecology. The ENVS degree uses the natural laboratory available to students in Southeast Alaska both through laboratories and hands-on field exercises and through guided research projects with program faculty. All program students are required to complete either an internship or an individual research project within the degree program.

The ENVS degree is closely aligned with the B.S. Geography and Environmental Resources (GEOG). These two degrees share a number of required courses, primarily in Earth sciences and geographic information systems. However, the two degrees are fundamentally different in their aims. The ENVS degree is focused on developing a rigorous, quantitative understanding of the physical, chemical, and ecological processes in Earth's surface and near-surface environments. This entails course work in chemistry, physics, Earth science (e.g. hydrology and physical geology), and biology. In contrast, the GEOG degree is focused on understanding Earth from a geographic perspective (both human and physical), with a focus on course work in spatial analysis (e.g. geography, geographic information systems, and remote sensing).

2. Program Student Learning Outcomes (SLOs)

By the time that they have completed their degree, students in the ENVS program can:

1. Describe the fundamental Earth system components, their organization, and how they interrelate,
2. Collect and quantitatively analyze environmental data,
3. Convey technical concepts in environmental science to other scientists and the public,
4. Explain how environmental science is incorporated into different professional fields,
5. Relate environmental science to broader societal issues and solutions, and
6. Conduct research in an environmental field and/or provide support for environmental resource management.

3. Assessment Strategy

Students are assessed on the first five learning outcomes based on specific assignments completed in classes that are required for the ENVS degree. Assessment of the sixth learning outcome is based on the number of ENVS students who successfully complete research and internship opportunities in a field related to their major. For learning outcomes 1-5, the specific assignments that are assessed for program students are detailed in the table below. Student performance for each learning outcome is rated by program faculty on a scale of 1-6. There are three categories within this range: 1-2 represents "Does Not Meet Expectations", 3-4 represents "Meets Expectations", and 5-6 represents "Exceeds Expectations". The sixth learning outcome is evaluated both quantitatively and qualitatively based on the number and type of student research and internship experiences in a given academic year.

		UAS Competencies								
Conceptual Basis for SLO	*SLO*	*Communication*	*Quantitative Skills*	*Information Literacy*	*Computer Literacy*	*Professional Behavior*	*Critical Thinking*	*Assessment Tool*	*Assessment Method*	*Course*
Knowledge	#1		X	X	X			Modeling Exercises	Evaluation of student comprehension of model outcomes relevant to Earth system processes	Earth's Climate System (ENVS S422) / Glaciology (ENVS S302)
Analysis	#2		X				X	Hydrology Lab	Evaluation of accuracy of data collection and depth of analysis	Hydrology (ENVS S312)
Communication	#3	X		X	X	X		GIS Research Project/Poster	Evaluation of how results of GIS analyses were presented and visualized	Intro. GIS (ENVS S338)
Application	#4	X				X		Presentations	Evaluation of student comprehension of presentations from practitioners	ENVS Seminar (ENVS S492)
Consequences	#5			X			X	Case Study	Evaluation of geoscience principles of natural hazards/resources; Grade distribution	Natural Hazards (ENVS S213) / Geological Resources and the Environment (ENVS S320)

4. Data Collected for Program Assessment During AY2017-18

Assessment of SLO #'s 1–5: Average score of students in courses listed in the table above over the past two years; AY17 was the first year that this scoring rubric was applied.

Student Learning Outcome	Average Student Score	
	AY17	AY18
#1	3.12	N/A*
#2	3.81	3.83
#3	4.57	3.89
#4	2.45	3.64
#5	4.08	3.92

*Based on performance in ENVS S302/S422, neither of which were offered due to sabbatical leave.

Student learning outcome 6 reflects a central tenant of the ENVS Program, which is to involve program students in hands-on research through faculty research projects and internships at local resource agencies.

Assessment of SLO #6: Headcount of students enrolled in internship and directed research courses. Credits received during summer are counted toward the following academic year.

SLO #6	AY14	AY15	AY16	AY17	AY18
ENVS S491 (internship)	4	2	3	1	4
ENVS S498 (research)	3	6	2	2	5

ENVS students continue to be involved in a wide variety of local research projects and internships and student participation rates in these opportunities remain steady. Student projects with ENVS faculty covered a wide variety of topics and developed skills that will benefit students looking to attend graduate school and get jobs in the environmental science field. Student projects included: modeling the impacts of glacier recession and vegetation succession on streamflow (Evan Carnahan), calibration of sensors for instream monitoring (Mollie Dwyer), research on the magnitude of organic drift in the Montana Creek watershed (Connor Johnson), water quality assessment of Duck Creek rehabilitation (Christin Shabadrang), impacts of flame retardants on marine fishes (Rachel Hennegan, Julia Merritt, and Milagro Darby). The projects are largely supported by faculty grants as well as through UAS URECA awards. ENVS faculty continue to be successful in bringing in external funds from a variety of state and federal agencies so we expect that students will continue to have ample opportunities to participate in research.

5. Evaluation of Data Collected During AY2017-18

ENVS students "meet expectations" in all student learning objectives. Scores for student learning outcome #4 ("explaining how environmental science is incorporated into different professional fields") significantly increased. This improvement is likely a direct result of changes to the Environmental Science Seminar (ENVS S492) that were made in response to feedback provided by previous program graduates, which suggested that faculty need to better highlight career opportunities in the environmental sciences. The seminar was redesigned to provide students with exposure to career opportunities in the environmental sciences. This seminar now involves having professionals from fields like environmental engineering, environmental consulting, and resource management interact closely with students and share aspects of their background, training, interests, and daily work environment.

6. Future Plans to Improve Student Learning

Many graduates of the ENVS program pursue technical careers that involve field work and analysis of field data. To provide students with more hands on learning experiences and better prepare them for future employment, we are working on developing more field oriented courses. We plan to offer two such courses during Spring 2019: a geology field trip to Death Valley National Park and a drone surveying course. In addition to providing students with experience with field methods and instrumentation, we anticipate that these courses will help to strengthen program camaraderie.

7. Additional Program Information

Exit Interview Information

We had one student graduate with a B.S. Environmental Science during AY2017-18. This student commented positively on faculty responsiveness and quality of instruction. As with other recent graduates, he appreciated the hands on skills that he gained during his studies (e.g., in GIS courses) and the opportunities to participate in internships and undergraduate research projects. He commented that he would have liked to be able to take more forestry and soil science courses.

Faculty productivity

Program faculty have had success procuring external funding and publishing peer-reviewed manuscripts, having been awarded $1.13M in research grants and publishing 16 peer-reviewed manuscripts in 2017. In addition, faculty were involved in a variety of service activities, including:

- Dr. Hoferkamp was faculty alliance chair in 2017-18.
- Dr. Hoferkamp has served on the UA-INBRE II & III Steering Committee and Management Advisory Committees since 2013.
- Dr. Nagorski served as faculty senator.
- Dr. Nagorski chaired the faculty Sustainability Committee
- Dr. Hood serves as the UAS representative for the Alaska Climate Adaptation Science Center.
- ENVS faculty have served on NSF review panels and regularly review NSF proposals.
- ENVS faculty regularly present public lectures, including for Evening at Egan, the Mendenhall Glacier Visitor Center's Fireside Lecture series, and Science for Alaska, as well as training sessions for local naturalists and tour guides.