Assessment of Student Learning Plan (ASLP)

2019-2020 Academic Year

Overview Information:

College CSTH

Department Environmental Science & Policy

Degree Program BA Environmental Planning & Policy, BS Environmental Science

Contact Person for the Assessment Plan: Dr. Robert Sanford

Current Date: May 14, 2020

List the date of the most recent academic program review/self-study: March 12, 2013

Program Assessment Plan Information:

Do you have a Formal Program Assessment Plan? Yes **X No**

If YES, please attach your Program Assessment Plan/Cycle, or indicate the link on your website: _____. Then, complete **Step 3** of this ASLP form (see **pages 4-5**) to describe how the assessment results were used for program improvement purposes.

If NO, your department/program does not have a Formal Assessment Plan (beyond this academic year), please complete all sections of this ASLP form.

*(Please see assessment website for an example/template of a 3-year assessment plan)

Mission Statement:

1. Provide your program's mission statement in the space below or provide a link to the statement from your program's webpage.

The primary mission of ESP is to provide an interdisciplinary environmental education experience that integrates science, policy and practice, and that will prepare students for employment, graduate school and professional certification in environmental science or environmental

policy/planning. We support this mission through faculty training and research and by offering degree concentrations and courses that integrate knowledge of the natural, physical, and earth sciences with awareness and understanding of institutional and community decision-making processes through the social sciences.

2. Briefly describe the ways in which your program's mission statement is aligned with the USM mission.

The University Mission Statement reads: "*The University of Southern Maine, northern New England's outstanding public, regional, comprehensive university, is dedicated to providing students with a high-quality, accessible, affordable education. Through its undergraduate, graduate, and professional programs, USM faculty members educate future leaders in the liberal arts and sciences, engineering and technology, health and social services, education, business, law, and public service. Distinguished for their teaching, research, scholarly publication, and creative activity, the faculty are committed to fostering a spirit of critical inquiry and civic participation. USM embraces academic freedom for students, faculty, and staff, and advocates diversity in all aspects of its campus life and academic work. It supports sustainable development, environmental stewardship, and community involvement. As a center for discovery, scholarship, and creativity, USM provides resources for the state, the nation, and the world..*"

ESP offers a BA in environmental planning & policy and a BS in environmental science. These degrees provide a basic STEM education, encourage critical thinking, and prepare students for workforce and graduate work. All students complete coursework that addresses civics; in addition to the general education core, all students take a course in basic environmental science lecture and laboratory (ESP 101, 102), Environmental Ecology lecture and lab (ESP 125 and ESP 126), Environmental Communication (ESP 203), Research and Analytical Methods (ESP 280) an internship (ESP 400), and Environmental Impact Assessment—a culminating capstone course (ESP 401). All students have additional research opportunities and are encouraged to present their results at the University's annual undergraduate symposium - Thinking Matters, in addition to other regional and national venues for civic engagement and for professional development.

Diversity, Equity, and Inclusion

If your program has diversity, equity, and inclusion related goals, or a diversity, equity, and inclusion statement; please provide a link to the statement and/or goals. Then, briefly describe any assessment activities related to your program statement/goals regarding diversity, equity, and inclusion.

Environmental justice is an important aspect of equity in the environmental sciences and environmental fields in general. Units in our introductory, intermediate, and capstone courses address environmental justice. We also actively reach out to recruit students from diverse backgrounds and identities. Members of the department have participated in federally funded grants to promote universal design and inclusivity in environmental education.

Assessment of Student Learning: Program Assessment Steps

Step 1: Program-level Student Learning Outcomes (SLO's)

a. Please provide the **URL** for your **program-level student learning outcomes** as published on your department's website: **ATTACHED**

b. Please provide the **URL** of your **curriculum assessment map** showing when your student learning outcomes are assessed and in which courses: **ATTACHED**

If your program's curriculum assessment map is **not** published, please complete the template (on page 6 of this document), and include it with your ASLP, or attach your own version. **ATTACHED**

c. Please list the program learning outcomes which were assessed since the submission of your last ASLP (May 2019).

ESP does not have a formal Student Learning Outcomes Assessment plan but it uses many components of one, including periodic tracking of graduate employment—perhaps an ultimate measure of success in and of itself. Our summative and formative assessments regularly include in-class activities, written and on-line quizzes, learning portfolios, final projects, oral presentations, two-minute questions, reflective memoranda, instructor observation, and group and individual reports.

We use the USM course evaluation forms and were early adopters of electronic course evaluations. At the discretion of individual faculty, we augment course evaluations with Student Assessment of Learning Gains (SALG, http://www.salgsite.org/). SALG is useful for formative and summative assessments. It is a free, on-line assessment tool of student perceptions of science learning. Faculty also use on-line surveys, portfolios, concept maps, reflection papers, minute papers, peer class observations, and a variety of other techniques.

Assessment and evaluation also occur through our curriculum design. For example, the senior capstone course, environmental impact assessment (ESP 401) acts as an assessment of the

student's ability to put together what he or she has learned in previous courses and apply that to a group project. They choose their area of emphasis and they choose their project. Each of the courses in the matrix provided in Step 1 builds student knowledge, skills, and abilities towards the outcomes or proficiencies for the respective academic ranking of freshman, sophomore, junior, and senior in the major.

We identify Student Learning Outcomes in our self-study and we have a general description of the two majors and the department on our website . https://usm.maine.edu/environmental-science

Step 2: Assessment Methods Selected and Implemented /Summary of Results

a. **Identify the assessment measures (evidence of student learning) that were used to determine whether students achieved the stated learning outcomes for the degree.** Please check all the measures used since the submission of your last ASLP (May 2019), on the chart below. Also indicate when you implemented the assessment activity.

Check Assessment Methods Used this Academic Year	***When Implemented***		
__Artistic Exhibition/Types of Performance	Fall	Spring	Summer
X Class assignments/Exams/Papers (completed in course)	**Fall**	**Spring**	**Summer**
X Capstone Project (written project, non-thesis paper)	Fall	**Spring**	Summer
__Comprehensive or licensure exam (created by external org)	Fall	Spring	Summer
__Exit Exam (created by department or program)	Fall	Spring	Summer
__Exit Interview (individual or indiv self-reports of outcomes)	Fall	Spring	Summer
__Employer meetings/discussions on student outcomes	Fall	Spring	Summer
__Focus Groups (self-reports of outcome attainment)	Fall	Spring	Summer
X Internship/Fieldwork (evaluations of performance)	**Fall**	**Spring**	**Summer**
X Oral Performance/conference presentation	**Fall**	**Spring**	Summer
X Portfolio of student work	**Fall**	**Spring**	Summer
X Reflection Essays (self-report of outcome achievement)	**Fall**	Spring	Summer
X Research Papers (used for course & program assessment)	**Fall**	**Spring**	Summer
__Supervisor/Employer Evaluation (performance outside of class)	Fall	Spring	Summer
X Student Survey information (student self-reports on outcomes)	**Fall**	**Spring**	Summer
__Thesis/Dissertation (used for course & program assessment)	Fall	Spring	Summer
X Other: please explain			

b. **Briefly describe the implementation process** (i.e. where were students assessed, what courses, what class levels, or any other specific details, etc).

ESP faculty mentor students in many ways--courses, laboratory research, partnerships with external units (internships, projects, research, consulting), graduate school planning, and in development of professional careers. Our approach to education and mentoring is that these are things that are not bounded by the classroom.

All majors complete an introductory orientation course, ESP 150 Field Immersion. The entire department faculty participates in delivering it, with one taking the lead as the instructor of record. We also hire two advanced students as teaching assistants, modeling our value for student learning. This course occurs in September – one long weekend, with an online component, and all freshmen and transfers take it. The course has two main objectives: set up the basis for building community and provide basic skill-sets (compass reading, tree identification, Map/GPS usage, canoe use) for out-door environmental education. After each offering, we debrief and decide what could be done to improve it. This debriefing is informed by the results of a survey given to the students at the end of the field session. ESP curriculum is designed to have students jump right into the major. From their very first course they are introduced to the concepts of community involvement, research, and collaboration.
These concepts or themes underlay the processes and outcomes in each course. By the end of the freshman year, the students have enough basic science so that they can choose more advanced courses in a variety of areas. BA and BS students continue to take classes together, building community, and reflecting the interdisciplinary nature of environmental science. Research Methods (ESP 280), for example, is a 4-credit lecture and laboratory sophomore course in which the students learn social science and physical/natural science research approaches, techniques, and tools. They collaborate on research that must meet the level of being presentable at USM's Thinking Matters. At the junior year, the students are more likely to differentiate on the basis of their major, but continue to come together for courses in environmental regulations, energy, and other areas. An internship gives them an opportunity to further explore an area of particular interest or to simply gain some practical workplace connections and experience. The internship program is a 3 credit course run by an internship coordinator/instructor. Presentation of internships on Internship Night (held every semester) is another way for advanced students to pass along their experience to newer students and to share among themselves and the faculty. The capstone course (ESP 401) launches the student into professional practice for their major. We have added the practice of inviting alumni to final presentations of the capstone. Within this overall framework lie the individual outcomes for each course in the majors. The checklist below is revised annually to best serve the needs of the outcome assessments. The table below the checklist shows outcomes from the syllabi for department courses.

Provide a brief summary (numerical or narrative) of your assessment results (e.g., . an illustration of the rubric-based scores, percentage of those who met the learning

outcome you assessed, number of students assessed and findings, copies of instruments or rubrics used, etc.)

c. **Provide a brief summary of what your program learned or concluded from the evidence you collected** (e.g., did your program meet the expected goal or benchmark, does the new knowledge raise additional questions, do you need to collect additional types of data, did you get insights about the assessment procedures or about teaching and learning in your program?, etc.)

We hold periodic curriculum review workshops to evaluate our curriculum, goals for each student year, and decide upon changes. We created an ESP 389 Teaching Practicum course to nurture student leadership abilities and to help prepare students to be competitive in obtaining graduate teaching assistantships,. This provides a mentored hand-on experience to help a student explore the role of teaching in the discipline, and leadership among their peers. We also participate in the Learning Assistant program.

After our 2013 self-study, we revised our course syllabi to ensure that all syllabi have concrete learning objectives that are measureable and assessable.

Step 3: Using the Assessment results to Improve Student Learning

a. Who interpreted or analyzed the results that were collected this past year? (check all that apply)

X Program instructors/faculty

__Faculty committee

__Ad hoc faculty group

X Dept Chair/Program Director/Dean

__Faculty advisor

__Students (assistants, interns)

__Other: please explain

b. How did they evaluate, analyze, or interpret those results? (check all that apply)

X Used a rubric or scoring guide(s) for an assignment, paper, etc.

X Scored exams/tests/quizzes

X Used professional judgments (no rubric or scoring guide)

X Compiled or reviewed survey results

__Reviewed qualitative methods (interviews, focus groups, open-ended responses)

__External organization scored/analyzed data (licensure, comp exams)

__ Other: please explain

c. Indicate how the program will use (or has used) the results (check all that apply):

x__ Assessment procedure change (student outcomes, curriculum map, rubric, evidence collected, sampling procedure, communications with faculty, etc.)

x__ Course changes (course content, courses offered, new course, pre-requisites, course requirements, etc.)

x__Course pedagogy changes (teaching)

__Personnel or resource allocation changes

__Program policy changes (admission requirements, student probation policies, course feedback forms, etc.)

__Student's out-of-course experiences (co-curricular requirements, program website, program handbook, student workshops, etc.)

x__Student Advising experiences (advisor-advisee relationship, communication of changes or expectations, etc.)

__Results indicated no action needed, students met expectations

__Other: please explain

d. Briefly explain each of the program changes/improvements indicated above.

We have made our advising more personal and more collaborative with professional advisors. We have increased the use of student peers in teaching/labs.

e. Indicate when the program improvements (noted above) will be implemented or if you already made program changes (e.g., during the summer months, beginning of the fall semester, etc.).

As a result of the Cornona Virus, our strategies have shifted to survival mode—create and nurture basic connections with students.

Other Assessment Activities: Briefly describe any additional assessment-related activities being done at the course level (e.g., common assignments and/or assignment rubrics for use across different sections of required courses, examining student progress in entry-level, capstone, or other courses, other assessment projects implemented by individual faculty, etc.)

As a result of Corona, we are actively engaged in discussions this summer about how our pedogies can be modified to meat course and year lezrning objectives despite constraints on teaching modalities.

No assessment activities: If your program did not engage in any assessment activities this past academic year, please explain, and please indicate what assistance you need.

Table 2. Environmental science courses and their primary outcomes for student learning	
Freshmen level Entering freshmen are immediately immersed in the major, with the opportunity to do community service, and group activities in courses and outside of courses. From the freshman level onward, students are provided opportunities to participate in research and to present the results at "Thinking Matters" (USM student research symposium), "Civic Matters," Maine Water Conference, and other venues.	
Course	**Outcome**
ESP 101 Fundamentals of Environmental Science (Lecture)	• Meet course science requirement • Introduce the major—basic environmental literacy
ESP 102 Fundamentals of Environmental Science (Laboratory)	• Be able to design and carry out a science experiment • Be able to gather environmental information from the field • Be able to write a professional environmental report on a lab experiment or field investigation
ESP 150 Field Immersion	• Be able to use a map and compass in the field • Be able to use a dichotomous key to identify a tree or water plant. • Be able to work as a group in the field • Be able to use a canoe to take water samples • Know your advisor and the Student Success Center
ESP 125 Introduction to Environmental Ecology (Lecture)	• Be able to describe interactions of organisms with their environment from an evolutionary and physiological perspective • Be able to demonstrate fundamental understanding of ecological principles and concepts as they relate environmental science, Systems Ecology, Population Ecology, Landscape Ecology, and Urban & Industrial Ecology • Write a literature review on a topic in environmental ecology
ESP 126 Introduction to Environmental Ecology (Lab)	Students should be able to demonstrate knowledge, skills, and abilities to conduct basic ecological research and interpret ecological data including: • *Demonstrate* a working knowledge of descriptive statistics and their use in ecological studies. • *Write* a formal scientific report • *Characterize* habitat and community types and assign a rarity ranking. • *Estimate* population density and characterize distribution • *Calculate* community diversity using Shannon and Simpson's indices • *Measure* tolerance and toxicity in daphnia • *Conduct* preliminary biomonitoring analysis of heavy metals using lichen • *Measure* community diversity of macro fauna in soils and leaf litter • *Collect* and interpret water quality data using common field technologies employed by ecologists and environmental scientists
ESP 197 Research Skills Lab (1 credit)	10-week, lab style course designed to develop students' study and research skills. Topics include literature searching, website evaluation, peer review, critical thinking, finding articles and books, plagiarism, proper citation, primary and secondary sources, and the writing process. Final project is a written literature review on a selected environmental topic. Prepares students for ESP 203.
ESP 199 Environmental Entomology	This experimental course introduced entomology from an ecosystem, applied perspective that addressed the practicality of invasive species management. It formed the basis for the future offering of entomology as a senior seminar or other regular course offering

Sophomore level At the sophomore level students continue content-based instruction in the major. Students are expected to be able to do guided research and receive course instruction to help them meet this expectation.	
Course	**Outcome**
ESP 200 Environmental Planning	• Learn basic terminology • Write an environmental plan for managing a tract of land • Use comprehensive planning, zoning, and regulations to evaluate local planning decisions
ESP 203 Environmental Communication	Students will be able to: • *Demonstrate* how basic environmental communication theory and its application shape the definition of environmental problems • *Identify* the influence of scientific, socio-economic, and political factors and the mass media in shaping the social construction of environmental problems • *Explain* how communication is used to persuade/dissuade audiences regarding environment problems and how the environment is used to manipulate audience perception • *Conduct* basic social science research within Environmental Communication to study an environmental problem of interest • *Develop* a news literacy
ESP 207 Atmosphere: Science, Climate, and Change	• Become a better consumer of scientific information about climate and atmosphere • Be able to participate in effective decision-making in government and public policy on environmental change
ESP 220 Introduction to Environmental Policy	Upon successful completion of this course, students will be able to: • *Define* an environmental problem • *Model* the symptoms and causes of an environmental problem • *Demonstrate* competency in conducting policy research to accurately define and solve an environmental problem using empirical data • *Develop* the ability to critically analyze the formulation, construction, development, and implementation of environmental policies
ESP 250 Soils & Land Use	• *Describe* soils in the field • *Analyze* soils for basic properties • *Read* a soils map & use data to formulate land use recommendations
ESP 260 Soil and Water Conservation Engineering	• To familiarize the student with techniques of estimation, remediation, and design used in soil and water conservation. • Provide the student with a broad appreciation of the natural forces at work and man's effect in the context of historical and geographical determinates. • Complete a group design project to scale; using a maximum of two-foot contours, geo-referenced with all reasonable mapping symbols, using predictive means design remediation with Best Management Practices (BMP's) that meet state and local conservation standards.
ESP 275 Energy Use and Societal Adaptation	Upon successful completion of this course, students will • understand traditional, modern, and future energy sources • understand energy consumption sectors in modern economies • understand energy technologies and environmental and social development impacts • acquire knowledge of functional and useful skills necessary for processing energy statistics and reports
ESP 280 Research and Analytical Methods	• *Define* an environmental problem suitable for research

	• *Construct* a testable hypothesis/research question • *Prepare* a literature review on a selected environmental problem • *Design* a valid method to test a hypothesis or answer a research question • *Conduct* research using the scientific method to test a hypothesis or answer a research question • *Develop* a sufficient research literacy to understand and explain peer-reviewed research articles • *Demonstrate* basic competency with lab and field-based analytical methods • *Create* a conference-ready poster or scientific paper on an environmental research topic

Junior level By the junior level we expect students to begin functioning as entering professionals. This is when they are encouraged to do their internship and continue work on career planning. Many juniors already have a year or more experience working in a professor's laboratory.	
Course	**Outcome**
ESP 303 Wetlands Ecology	At the end of this course you should be able to: • *Understand* the fundamental and interdependent roles of hydrology, biology and biochemical processes in shaping wetlands • *Distinguish* wetlands from other land forms in terms of their ecosystem function • *Describe* wetland types and classifications used throughout the world • *Speak* intelligently about Maine wetlands and wetland issues, such as Maine DOT's new wetlands mitigation bank and recent wetlands legislation • *Relate* a basic understanding of the art and science of wetland restoration and creation • *Find* and use online wetlands
ESP 305 Community Plan Workshop	Be able to design and carry out an independent environmental planning project that meets a public need. Examples include a revised land use plan, energy plan, playground design, housing project, new road, public park, nature trail. Be able to participate in an online peer community.
ESP 308 Global Environmental Problems and Sustainability	• *Summarize* the major global environmental problems and their impact on a sustainable future • *Compare* the traditional approach to solving environmental problems to the sustainability approach • *Select* the appropriate tools of sustainability to solve a problem • *Evaluate* the commitment of other nations toward a goal of sustainability • *Design* a project to promote sustainability on the USM Gorham Campus, which encompasses the three pillars of sustainability
ESP 311 Energy Efficiency I	The student will master basic principles of energy efficiency
ESP 313 Renewable Energy	Conduct realistic experiments in thermal imaging, particulate sampling, electricity consumption auditing. working with various renewable energy technologies, including solar PV cells, wind turbines, biofuels, hydro turbines, and geothermal heating systems. Students work in teams to analyze data and evaluate technologies under different conditions. Students are expected to analyze data, draw conclusions, and make relevant recommendations.
ESP 326/ECO 326 Environmental Economics (Cross-listed from the Economics department)	Be able to apply economic theory to current environmental problems.
ESP 327/ECO 327 Natural Resource Economics Cross-listed from the Economics department)	
ESP 340 Environmental Regulations	• *Outline* the major regulatory requirements for environmental quality and public health • *Demonstrate* competency in research by locating and citing state and federal rules and regulations • *Develop* a written analysis of the application of a federal and/or state rule or regulation to a particular circumstance
ESP 341 Limnology	• *Understand* properties of water and how they affect aquatic organisms • Demonstrate the process of lake stratification • *Illustrate* basic nutrient cycling in lakes

	• *Identify* common freshwater aquatic organisms (plants, insects, fish, zooplankton) • *Explain* and assess the basic components of lake and stream food webs • *Understand* feedbacks between physical, chemical and biological components • *Assess* lake trophic status based on lake characteristics • *Design, conduct, analyze and report* on an aquatic-based study • *Identify* important sources of information for aquatic systems
ESP 360 Water Quality Assessment and Control	• Understand the connections between water quality and aquatic ecosystem function • Understand the requirements of the Clean Water Act and how they apply to water districts and water users • Understand how the Maine Dept of Environmental Protection regulates and monitors water quality • Understand the chemistry and biological significance behind commonly used water quality tests • Practice good laboratory and field techniques, including quality control and record keeping • Practice thinking!
ESP 375 Environmental Risk Assessment and Management	• Comprehend and use the recognized framework for assessing risk of exposure to pollutants and contaminants for human health. • Prepare a quantitative human health risk assessment using Microsoft Excel. • Demonstrate basic competency with regards to understanding risk from natural hazards. • Demonstrate ability to assess community public health risks from environmental exposure. • Demonstrate understanding of the scientific, political, social, ethical, and economic dimensions of perceiving, communicating, and managing risk.

Senior level Seniors take a capstone course, ESP 401, in which they apply various previous courses to a large group project with multiple facets of content, writing, map and field work, analysis, & synthesis.	
Course	1. **Outcome**
ESP 400 Internship	Complete a professional experience related to a student's chosen option within the major. In addition to satisfactory work experience, provide an oral presentation and written report.
ESP 401 Environmental Impact Assessment & Lab	Be able to explain the EIA process and use it to promote more effective environmental projects. Be able to work as a team in preparing an environmental assessment and communicating the results orally and in writing a Phase I report.
ESP 412 Field Ecosystem	Course Learning Objectives are: • Describe and interpret the consequences of the flow of materials and energy through organisms and the physical environment. • Manipulate, graph and interpret large ecological data sets. • View and analyze problems from a systems thinking perspective
ESP 413 Forest Ecosystems	• Understand & describe the forest as an ecosystem • gain practical experience in collecting forest ecosystem data & present in forest management plan
ESP 417 Site Planning and Assessment	Practical experience in creating a site plan and designing solutions for one or more particular site problems such as drainage, parking, lighting, landscaping.
ESP 421 Natural Resource Policy	• *Define* a natural resource problem. • *Model* the symptoms and causes of a natural resource problem. • *Demonstrate* competency in conducting policy research to accurately define and solve a natural recourse problem using empirical data. • *Develop* the ability to critically analyze the formulation, construction, development, and implementation of natural resource policies.
ESP 445 Environmental Education and Interpretation	• Be able to explain and design lessons demonstrating an understanding of coastal environmental education and interpretation principles and concepts. • The student will be able to use dichotomous keys and field guides to identify flora and fauna common to the coastal environments of Southern Maine. • The student will demonstrate an understanding of how basic ecological and environmental science concepts apply to the creation and teaching of environmental education materials and their connection to the Maine Learning Results (http://www.maine.gov/education/lres/). • The student will be able to design technology enhanced environmental activities and curriculum that provide equitable learning opportunities for all students.
ESP 450 Research Practicum	Gain practical, hands-on skills by participating in an on-going faculty research project.
ESP 470 Solid Waste Planning and Policy	• *Demonstrate* understanding of the integrated management strategy for solid waste • *Develop* a plan to manage solid waste in accordance with the integrated solid waste management strategy • *Demonstrate* policy and planning competency for managing solid waste by incorporating the waste management hierarchy
ESP 475 Topics in Environmental Science/Senior Seminar	• Learn to appreciate and integrate often competing approaches to environmental science

	• Enhance your abilities in critical and creative thinking, communication, and collaboration • Hear from a wide variety of environmental leaders who will share their own perspective –from their own unique life stories on environmental leadership • How to conduct research through the case study approach Career Skills Development • Prepare a professional resume • Write a cover letter in response to a specific job advertisement Prepare for and participate in a mock interview
ESP 489 Grant Writing Seminar	Be able to write a competitive grant—applicable for agency personnel, private sector corporate world, and academics—in short, good for anyone.
Post Graduate The post-graduate experience is intended to facilitate a life-long connection to learning, to the environment, and to the department. ESP certificate programs are designed to serve both undergraduates and continuing education students. These programs focus on practical, marketable skills. Students in our certificate programs include retired military officers with master's degrees. Graduates have been hired to help teach courses in the department, receive opportunities to guest-lecture, and to attend ESP events, including the end-of-year banquet.	