Our most recent degree program is the BS in Environmental Science, approved in September 2015, and with the first set of new admits in Fall 2016. We already now have an approximately equal number of Geography BA majors and Environmental Science BS majors, and much of our effort recently has been on planning our curriculum offerings to support this new program. This document thus focuses on that new program, documenting its PLOs, corresponding course SLOs, and Assessment tools we’re initiating.

**B.S. Environmental Science Program Learning Objectives:**

The overarching Program Learning Objectives (PLO) for the B.S. in Environmental Science are broken into four areas, the first two related to areas of knowledge and the second two related to methods and skills. Students completing the degree...

1. will understand advanced concepts in a set of environmental science specialties selected from atmospheric systems, hydrology, earth surface processes, soils, water quality, and biotic systems, and will be able to relate these systems to one another and to human activities. They will understand the science behind water, soil and air quality, as well as the causes and effects of climate change. They will be able to trace and explain impacts of human activities on the natural world and their influence upon the sustainability of human activities and natural processes on our planet.

2. will understand concepts of human-environment relations, including resource management, conservation & restoration, and environmental perception, sustainability & justice. Students will know how to apply environmental science principles and analytical methods to environmental management problems, and will be able to interpret these systems in reports to environmental management agencies such as government agencies, environmental consulting firms or environmental NGOs.

3. will be able to apply advanced field and geographic information science (GIS and remote sensing from satellite and aerial imagery) methods to research environmental systems such as land cover change, invasive species, soil and stream channel erosion and sedimentation, watersheds, water quality, coastal and marine processes, or bioclimatic systems. They will be equipped with the mathematical (calculus and statistics) and scientific methods to effectively analyze environmental systems.

4. will be able to develop an effective research design applying field, geospatial and quantitative methods to an environmental science or management research question and to critically evaluate the results, in light of existing theory or observations.
**Environmental Science Student Learning Objectives:**

Specific and measurable Student Learning Objectives are listed below as well as the classes in which they are introduced (I), developed (D) or mastered (M) are provided in the table below.

### Student Learning Outcomes Matrix

<table>
<thead>
<tr>
<th>SLO</th>
<th>PLOs</th>
<th>ILOs</th>
<th>Classes in which SLO’s are introduced (I), developed (D) or mastered (M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Students will investigate environmental systems from an interdisciplinary perspective including interactions between systems and interactions with human activities</td>
<td>1</td>
<td>2, 5</td>
<td>GEOG 101, 160 (I) GEOG 312, 313, 314, 315, 316, 317 (D) GEOG 500, 644, 647 (M)</td>
</tr>
<tr>
<td>2. Students will critically evaluate environmental plans, and strategies as well as resource management practices with respect to environmental sustainability and social justice</td>
<td>2</td>
<td>1, 4</td>
<td>GEOG 102, 421 (I) GEOG 427, 500, 646, 648, 657 (D) GEOG 642, 646, 647, 648 (M)</td>
</tr>
<tr>
<td>3. Students will utilize GIScience techniques to investigate environmental questions</td>
<td>3</td>
<td>6</td>
<td>GEOG 101, 205 (I) GEOG 603, 610 (D) GEOG 611, 620, 621, 625, 629 (M)</td>
</tr>
<tr>
<td>4. Students will conduct field based sampling and/or observational studies, analyze results and critically evaluate the method</td>
<td>3</td>
<td>6</td>
<td>GEOG 101, 205, 160 (I) GEOG 312, 314, 317 (D) GEOG 602, 644 (M)</td>
</tr>
<tr>
<td>5. Students will design, conduct and report on independent research projects using appropriate and well developed methods</td>
<td>4</td>
<td>1, 4, 6</td>
<td>GEOG 101, 160, 205 (I) GEOG 312, 313, 314, 317, 644, 602 (D) GEOG 690 (M)</td>
</tr>
</tbody>
</table>
Assessment:
Assessment will take place with respect the institutional, programmatic and student learning outcomes detailed above. The following table provides the assessment tools for each SLO. In each case, assessment will be made of both a lower and upper division class each spring semester. These will be collected and evaluated by the Curriculum Committee, who will report results back to the associated faculty during the Fall Retreat. These will include the distribution of student scores for each of the SLOs, at both their early and developed stages of the degree. Analysis will also include assessment of changes over time, particularly following implementation of changes to the program. Following discussion of these findings, faculty will recommend ways to improve course content and/or course offerings.

**SLO 1:** 1st assessment in GEOG 101 based on evaluation of an exam question targeting the completeness of students’ understanding of global climate change. 2nd assessment in: GEOG 500 using rubric to examine completeness of students’ understanding of (a) biophysical impacts of climate change and (b) impacts on society and adaptation strategies. These are required components of their final research projects, which they apply to a unique region of the world.

**SLO 2:** 1st assessment in: GEOG 102 2nd assessment in GEOG 500 based on two written assignments (a) development of a strategic environmental plan and (b) critical assessment of human mitigation strategies for climate change.

**SLO 3:** 1st assessment in GEOG 603: Students will complete a term GIS project analyzing original data, culminating in a report and poster presentation.

**SLO 4:** 1st assessment in GEOG 101 based on field report of measurements made at Ocean Beach during class fieldtrip. 2nd assessment in GEOG 602 based on rubric for final research report focusing on (a) quality of experimental design relative to research objective, (b) the overall quality of the research, and (c) the quality of the presentation.

**SLO 5:** 1st assessed in GEOG 205 using students’ research proposal, on the quality of their research design. 2nd assessment in GEOG 690 using students culminating experience research project. Evaluation is recorded of quality of (a) research design and (b) implementation.