Annual Program Assessment Report

Academic Year: AY18

Department: LRES

Program(s) Assessed:
Indicate all majors, minors, certificates and/or options that are included in this assessment:

Majors/Minors/Certificate	Options
Environmental Science undergraduate degree	Environmental Sciences, Environmental Biology, Geospatial & Environmental Analysis, Land Rehabilitation, Soil & Water Sciences

Annual Assessment Process

1. Data are collected as defined by Assessment Plan
2. Population or unbiased samples of collected assignments are scored by at least two faculty members using scoring rubrics to ensure inter-rater reliability.
3. Areas where the acceptable performance threshold has not been met are highlighted.
4. The scores are presented at a program/unit faculty meeting for assessment.
5. The faculty reviews the assessment results, and responds accordingly.
    a. If an acceptable performance threshold **has not been met**, possible responses:
        o Gather additional data to verify or refute the result.
        o Identify potential curriculum changes to try to address the problem
        o Change the acceptable performance threshold, reassess
        o Choose a different assignment to assess the outcome
    b. If acceptable performance threshold **has been met**, possible responses:
        o Faculty may reconsider thresholds
        o Evaluate the rubric to assure outcomes meet student skill level (example – classes with differing learning outcomes based on student level)
        o Use Bloom's Taxonomy to consider stronger learning outcomes
        o Choose a different assignment to assess the outcome

6. **Demonstrate the impact of the assessment response in next assessment cycle.**
7. Submit Assessment reports annually to report assessment activities and results by program. The report deadline is September 15th.

1. What Was Done

a) What learning outcomes were reviewed? (Please include the description of the learning outcomes from assessment plan)

Our graduates are expected to demonstrate measurable improvements across the following five ULOs. Our graduates will have:

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1. An understanding of core theoretical principles and applications in evolutionary, ecological and physical environmental sciences.

2. Ability to access, read, and critically assess the quality and source of environmental information.

3. Knowledge of the theory and practice of data analysis in environmental sciences, including statistical analysis, model building, and graphical presentation of data.

4. The ability to write and present scientific material effectively.

5. An understanding of the ethical implications of conducting and applying environmental science.

Over the last two years, LRES has developed a formal Undergraduate Learning Outcomes (ULO) Assessment Protocol to improve both student performance as well as contribute to broader MSU institutional benchmarks. We have evaluated four out of five of our ULOs.

AY 2018 Assessment *- In academic year 2018,* **we assessed Outcomes 2 and 4** *by evaluating the responses of LRES Majors to specific questions on in-class exams in our Fall Capstone course (ENSC 499R; Zabinski) and our Spring course "Plants in the Environment" (ENSC 201; Trowbridge).*

b) Include planning table – inform if there are changes to the assessment plan.
Over a three-year cycle each of the Learning Outcomes will be assessed:

Outcome	Cycle One	Cycle Two
1	2017-18	2019-20
2	2018-19	2020-21
3	2018-19	2020-21
4	2018-19	2020-21
5	2017-18	2019-21

During Fall term of each academic year (AY) the LRES Outcomes Assessment committee works with the entire LRES faculty to identify specific assignments in courses that can be used to demonstrate student proficiency related to each outcome to be assessed that academic year. Samples of student work on identified assignments were collected for assessment by the LRES Outcomes Assessment committee.

2. What Data Were Collected

a) What was collected to assess learning outcomes listed above? (If multiple programs/minors are included, please indicate if different criteria was used).

Responses from LRES Majors to specific questions on written assignment (ENSC 499R) and in-class presentation (ENSC 210) were collected

b) How were data collected?

By instructors

NOTE: Student names must not be included in data collection. Totals of successful completions, manner of assessment (publications, thesis/dissertation, or qualifying exam) may be presented in table format if they apply to learning outcomes.

3. Explain how Data Were Analyzed

a) Explain the assessment process. Who participated in the process, the nature of the rubric utilized (or other norming methods), and the threshold outcome desired.

Course: *_ENSC 201 Plants in the Environment_* ***Semester:*** *Spg2018* ***Evaluator:*** *Amy Trowbridge_* *- Approach: Students were randomly put into five groups (five to six students per group) and asked to read a specific scientific paper related to the topic being covered in class that week. They had two weeks to prepare and present a 20-30-minute group oral presentation on the major points and conclusions of the paper followed by a ten-minute discussion that they were expected to lead/facilitate with the rest of the class. All students were required to read each paper (even if not presenting) and provide 2-3 questions or critiques they had regarding the manuscript for participation points and as a way to stimulate discussion. Each group oral presentation (n=5) was assessed for learning outcome #2&4 listed above.*

Course: *___ENSC 499R LRES Capstone___* ***Semester:*** *Fall 2017__* ***Evaluator:*** *__Catherine Zabinski - Approach: 13 papers were randomly selected from the ENSC 499R final paper assignment, and each of those papers was assessed for Learning Outcome #2&4 above.*

4. What Was Learned

a) Results:

Course: *_ENSC 201 Plants in the Environment__* ***Semester:*** *Spg2018_* ***Evaluator:*** *Amy Trowbridge_* **LO: 2 -** *The mean, standard deviation, and the range of responses for each of the objectives is listed below:*

	Mean	SD	Range
Extract major points	*3.6*	*0.55*	*3 - 4*
Understand importance/context	*2.6*	*0.55*	*2 - 3*
Formulate logical critiques	*2.4*	*0.89*	*1 - 3*
Explain graphs and figures	*2.8*	*1.3*	*1 - 4*
Provide insightful questions	*2.8*	*0.84*	*2 - 4*
Determine pitfalls/overstated conclusions	*2.2*	*0.84*	*1 - 3*

The means for each of the objectives ranged from 2.2 to 3.6, all being at or above the threshold for "performed but with poor execution." Half of the objectives ranged from a score of 1 to 3-4 suggesting that some groups (individuals) are highly capable of critically assessing the literature, explaining and understanding graphs, as well as identifying overstated conclusions in papers even at the 200-level while others are severely lacking in these skills. This variability in individual effort and performance is one of the challenges to grading group reports, and because this was the first time using this format in the class, we decided to give all students full credit for the assignment toward their final grade, but still provided them with qualitative feedback and quantitative scores on the presentation. Students were not asked to access literature, but were rather assigned a paper of my choosing. In the future, I think it would be useful to spend some time at the library introducing them to the ways in which they can find and read journal articles, but also spend a class period introducing students to the proper format of a scientific paper, what is required for each section, and how to think more critically about the work presented. Another option to consider is to assess them (per Learning Outcome #2) by having them individually access, read, and answer ~10 questions on a paper of their choosing. Other insights I gained from this excise include the following: 1) Students were eager for the skills needed to comprehend and critique the literature (students asked if there were specific courses available on scientific reading/writing/communicating). 2) Over the course of these discussions the students became more comfortable offering critiques of different aspects of the papers. I think this was largely due to the fact that they initially believed that whatever is written/published is some sort of ultimate truth that they couldn't debate. It's important that students realize early on that experiments are not perfect (and not all papers are well written or good!), we cannot test everything, and how individual research projects fit into telling a bigger story or answering broader questions in ecology. 3) I observed that most students can give a very general idea of what trends/relationships figures are demonstrating (they read axes, legends, lines, etc.), but I was surprised by their inability to then summarize what the findings actually mean. I will try to incorporate more of this type of work into this course and I think it will be even more useful to find simple ways for the students themselves to generate some of the data and graphs (in excel).

Course: ____*ENSC 499R LRES Capstone*____ **Semester:** *Fall 2017*___**Evaluator:** ___*Catherine Zabinski -*
The mean, standard deviation, and the range of responses for each of the objectives is listed below:

	<u>Mean</u>	<u>SD</u>	<u>Range</u>
Appropriate paper structure	*3.0*	*0.96*	*1 - 4*
Incorporation of primary literature	*2.8*	*1.1*	*1 - 4*
Appropriate use of data to advance arguments	*3.1*	*0.8*	*2 to 4*
Logical use of facts to structure arguments	*3.4*	*0.6*	*2 to 4*
Citation of sources, and appropriate sources used	*2.9*	*1.2*	*1 to 4*

The means for the each of the objectives was above our threshold level. One point for LRES faculty to consider is that individual student performance on 3 out of 5 of the objectives ranged from 1 to 4. A portion of the papers, 5 of 13, were written at a high level, and students scored 4's across all the objectives. Likewise, there were papers that scored 1 or 2 for each of the objectives. It would be worth considering how our students access scientific literature. During the capstone course, students have one class session early in the semester in the library with a workshop on research methods to access peer-reviewed literature. They are required to list 5 references relevant to their topic. If by the end of

the semester, those or other references are not incorporated into their papers (how you receive a score of a 1), it suggests that a portion of our students are not accessing information from peer-reviewed literature. Regardless of whether they intend to continue with graduate studies, and perhaps maybe especially if they do not intend to continue their education, we should be training future resource professionals to be proficient with accessing information from peer-reviewed literature. Students scoring 1 or 2 on "Incorporation of primarily literature (5 of 13), and Citation of sources, appropriate sources used (7 of 13) are perhaps less likely to incorporate scientific knowledge into management practices.

b) Describe how results were communicated to the department and used to develop plans for improvement.

The results of the assessment will be presented to the LRES faculty annually. Any curriculum changes needed to improve student proficiency on a Learning Outcome will be implemented the following year. We subscribe to the bidirectional value of integrating assessment into the curriculum to improve both student and institutional performance (NILOA 2016).

5. How We Responded
a) Based on assessment, are there any curricular plans for the following year? (Such as plans for measurable improvements, or realignment of learning outcomes).

We were hoping to identify additional R courses already in our curriculum and formally assign them 'R' designations; however, were told to hold off as Core was still being discussed.

b) When will the changes be next assessed? NA, other than we have regularized assessment annually, starting in the fall to target courses/outcomes to be evaluated.

6. Closing the Loop
a) Do any of the outcomes this year represent improvements based on assessment from previous years (show multi-year use of progress). Not yet, but during Fall term of each academic year (AY) the LRES Outcomes Assessment committee works with the entire LRES faculty to identify specific assignments in courses that can be used to demonstrate student proficiency related to each outcome to be assessed that academic year. These discussions have led to the goal of re-working LO #5 to be more relevant to the courses we teach.

Submit report to programassessment@montana.edu