Program Assessment Report

Academic Year Assessed: July 1, 2022 – June 30, 2024

College: College of Agriculture

Department: Department of Land Resources and Environmental Sciences (LRES)

Submitted by: Robert K.D. Peterson, Department Head, LRES

Program(s) Assessed:

List all majors (including each option), minors, and certificates that are included in this assessment:

MS, Land Resources & Environmental Sciences

Professional MS, Land Resources & Environmental Sciences

MS, Entomology

MS, Land Rehabilitation

PhD, Ecology & Environmental Sciences

1. Past Assessment Summary

2022 Report: LRES has multiple levels of continuous assessment of attainment of learning outcomes. LRES has exceedingly low rates of withdrawal and failure-to-graduate for graduate students. LRES has low percentages of students who earn "B-" or lower grades in graduate courses.

LRES needs a formal mechanism for providing positive, constructive feedback from the instructor and peer teaching assistants to graduate teaching assistants. This can be partially remedied via annual reviews with graduate students.

We view the current low withdrawal and failure-to-graduate rates in all our programs as acceptable and believe the results indicate that our current multiple levels of review for each graduate student are appropriate. This is especially the case for the graduate student's graduate committee.

We will include passing-grade rates for the new required 1-cr course, LRES 593, for PhD students.

2. Action Research Question

Not applicable for this assessment of LRES graduate degree program learning outcomes.

3. Assessment Plan, Schedule, and Data Source.

a) Please provide a multi-year assessment schedule that will show when all program learning outcomes will be assessed, and by what criteria (data). (You may use the table provided, or you may delete and use a different format).

COMMON OUTCOMES FOR BOTH MS AND PHD DEGREES

ASSESSMENT PLANNING CHART					
PROGRAM LEARNING OUTCOME	2021-2022	2022-2023	2023-2024	2024-2025	***Data Source****
1. The student will successfully demonstrate disciplinary expertise* through completion of coursework appropriate to the individual student's master or doctoral program. * Because our MS and PhD students, and therefore degrees, are multidisciplinary, "disciplinary expertise" is defined as agreement by the graduate committee that the program of study and courses therein provide the student with the skills and knowledge necessary for mastery of the disciplinary area.	X	X	X		Passing grades in courses as indicated on the student's program of study.
2. The student will successfully demonstrate oral and written communication and presentation skills.	X	X	X		Successful completion of the required course, Seminar, LRES 594. The course is taken during the student's first year and is where the student's graduate research proposal is presented. It is a milestone event for thesis and dissertation students. Successful defense and completion of the thesis, as indicated by graduate committee assessment and consensus.

3. The student will successfully demonstrate problem-solving skills and critical thinking.	X	X	X		Successful defense and completion of the thesis, as indicated by graduate committee assessment and consensus.
4. The student will successfully demonstrate data collection abilities, quantitative reasoning, analytical synthesis, and decision making.	X	X	X		Successful defense and completion of the thesis, as indicated by graduate committee assessment and consensus. Publication of the thesis in peer-reviewed scientific/professional journals and/or present professionally, as indicated by major advisor annual productivity measures (Activity Insight)
5. The student will successfully demonstrate teaching experience. This addresses competencies such as leadership, conflict resolution, self-confidence, time management, and mentorship.	X	X	X		Teaching as a TA for one course is required. Feedback is from the instructor and peer TAs.

OUTCOMES UNIQUE TO MS DEGREES

ASSESSMENT PLANNING CHART					
PROGRAM LEARNING OUTCOME	2021-2022	2022-2023	2023-2024	2024-2025	***Data Source****
1. THESIS OPTION: The student will be trained to be a practicing scientist. On completion of the program, the student will be able to plan, conduct, analyze, and communicate their own scientific studies and will be able to assess the scientific merits of other studies.	X	X	X		Successful defense and completion of the thesis, as indicated by graduate committee assessment and consensus.
2. NON-THESIS OPTION: The student will be trained to	X	X	X		Passing grades in courses as indicated on

critically assess and analyze scientific information. On completion of the program, the student will be able to analyze, assess, synthesize, and communicate scientific information in the environmental sciences.					the student's program of study. Successful completion of the professional paper and its oral presentation (LRES 575).

OUTCOMES UNIQUE TO PHD DEGREE

ASSESSMENT PLANNING CHART					
PROGRAM LEARNING OUTCOME	2021-2022	2022-2023	2023-2024	2024-2025	***Data Source****
1. The student will develop expertise in a scientific discipline or sub-discipline. On completion of the program, the student will be an expert in their disciplinary topic.	X	X	X		Passing grades in courses as indicated on the student's program of study, including the required 1-cr LRES 593. Successful completion of the written comprehensive exam, as indicated by graduate committee assessment and consensus. Successful completion of the oral comprehensive exam, as indicated by graduate committee assessment and consensus. Successful defense and completion of the dissertation, as indicated by graduate committee assessment and consensus.

Data sources can be items such as randomly selected student essays or projects, specifically designed exam questions, student presentations or performances, or a final paper. Do not use course evaluations or surveys as primary sources for data collection.

b) What are the threshold values for which you demonstrate student achievement?

Threshold Values		
PROGRAM LEARNING OUTCOME	**Threshold Value**	**Data Source**
1. The student will successfully demonstrate disciplinary expertise through completion of coursework appropriate to the individual student's master or doctoral program.	Passing grades (≥ B) for courses as indicated on the student's program of study (≥ 85% of all students).	Grading records
2. The student will successfully demonstrate oral and written communication and presentation skills.	Passing grade (≥ B) for Seminar, LRES 594 (≥ 90% of all students). Successful completion and appropriate signatures on thesis or dissertation (≥ 90% of all students).	Grading records Department records
3. The student will successfully demonstrate problem-solving skills and critical thinking.	Passing grades (≥ B) for courses as indicated on the student's program of study (≥ 85% of all students). Successful completion and appropriate signatures on thesis or dissertation (≥ 90% of all students).	Grading records Department records
4. The student will successfully demonstrate data collection abilities, quantitative reasoning, analytical synthesis, and decision making.	Passing grades (≥ B) for courses as indicated on the student's program of study (≥ 85% of all students). Successful completion and appropriate signatures on thesis or dissertation (≥ 90% of all students).	Grading records Department records
5. The student will successfully demonstrate teaching experience. This addresses competencies such as leadership, conflict resolution, self-confidence, time management, and mentorship.	Positive, constructive feedback from the instructor and peer Teaching Assistants. Also, student evaluations.	Department records

2. What Was Done

a) Was the completed assessment consistent with the program's assessment plan?

X

Yes

No

b) If no, please explain.

c) How were data collected and analyzed? (Please include method of collection and sample size).

Data were collected by the student coordinators of LRES/LREO and checked for successful completion of all learning outcomes. The data were then forwarded to the Chair of the LRES Graduate Committee for evaluation and refinement in consultation with the LRES Graduate Curriculum Committee. The data were then shared with the Department Head. Faculty Success data were collected by the Department Head. Data collected were from 1-JUL-2022 to 30-JUN-2024.

d) Please provide a rubric that demonstrates how your data were evaluated.

The data on learning outcomes for graduate students in LRES were evaluated by the LRES Graduate Committee (committee chaired by Jane Mangold) and the Department Head, Bob Peterson. Given that each graduate student in LRES has a graduate supervisory committee, the committee and especially the primary advisor evaluate the learning outcomes with each student throughout the student's matriculation through the program. This outcomes assessment is done continuously via evaluation and feedback on grades in courses, oral and written presentations, critical thinking and data analysis, graduate committee meetings, annual review of academic progress forms, written drafts of thesis, professional paper, or dissertation, drafts of oral defense of thesis or dissertation, drafts of oral presentation of professional paper, and post-defense examination of thesis and dissertation. Additional data are viewed by the Department Head. Summary statistics were used and compared against threshold values. LRES has greater than 90% retention (with one exception below for PhD EES) and graduation rates. Because of the multiple levels of continuous assessment of attainment of learning outcomes for graduate students, we are satisfied with our assessment results.

Rubric for Program Learning Outcomes

Outcome	Outstanding	Excellent	Achieving	Needs Development
The student will successfully demonstrate disciplinary expertise through completion of coursework appropriate to the individual student's master or doctoral program.	Passing grades (≥ B) for courses as indicated on the student's program of study (≥ 90% of all students).	Passing grades (≥ B) for courses as indicated on the student's program of study (≥ 85% of all students).	Passing grades (≥ B) for courses as indicated on the student's program of study (≥ 80% of all students).	Passing grades (≥ B) for courses as indicated on the student's program of study (< 80% of all students).
The student will successfully demonstrate oral and written communication and presentation skills.	Passing grade (≥ B) for Seminar, LRES 594 (≥ 95% of all students). Successful completion and appropriate signatures on thesis or dissertation (≥ 95% of all students).	Passing grade (≥ B) for Seminar, LRES 594 (≥ 90% of all students). Successful completion and appropriate signatures on thesis or dissertation (≥ 90% of all students).	Passing grade (≥ B) for Seminar, LRES 594 (≥ 80% of all students). Successful completion and appropriate signatures on thesis or dissertation (≥ 80% of all students).	Passing grade (≥ B) for Seminar, LRES 594 (< 80% of all students). Successful completion and appropriate signatures on thesis or dissertation (< 80% of all students).
The student will successfully demonstrate problem-solving skills and critical thinking.	Passing grades (≥ B) for courses as indicated on the student's program of study (≥ 95% of all students). Successful completion and appropriate signatures on thesis or dissertation (≥ 95% of all students).	Passing grades (≥ B) for courses as indicated on the student's program of study (≥ 90% of all students). Successful completion and appropriate signatures on thesis or dissertation (≥ 90% of all students).	Passing grades (≥ B) for courses as indicated on the student's program of study (≥ 80% of all students). Successful completion and appropriate signatures on thesis or dissertation (≥ 80% of all students).	Passing grades (≥ B) for courses as indicated on the student's program of study (< 80% of all students). Successful completion and appropriate signatures on thesis or dissertation (< 80% of all students).
The student will successfully demonstrate data collection abilities, quantitative reasoning, analytical synthesis, and decision making.	Passing grades (≥ B) for courses as indicated on the student's program of study (≥ 90% of all students). Successful completion and appropriate	Passing grades (≥ B) for courses as indicated on the student's program of study (≥ 85% of all students). Successful completion and appropriate	Passing grades (≥ B) for courses as indicated on the student's program of study (≥ 80% of all students). Successful completion and appropriate signatures on	Passing grades (≥ B) for courses as indicated on the student's program of study (< 80% of all students). Successful completion and appropriate signatures on thesis

	signatures on thesis or dissertation (≥ 95% of all students).	signatures on thesis or dissertation (≥ 90% of all students).	thesis or dissertation (≥ 80% of all students).	or dissertation (< 80% of all students).
The student will successfully demonstrate teaching experience. This addresses competencies such as leadership, conflict resolution, self-confidence, time management, and mentorship.	Outstanding feedback from the instructor and peer Teaching Assistants. Also, student evaluations.	Positive, constructive feedback from the instructor and peer Teaching Assistants. Also, student evaluations.	Substantive, critical feedback from the instructor and peer Teaching Assistants showing a clear path to improving teaching. Also, student evaluations.	No or non-substantive, critical feedback from the instructor and peer Teaching Assistant. Also, student evaluations.

3. What Was Learned

a) Based on the analysis of the data, and compared to the threshold values established, what was learned from the assessment?

MS, Land Resources & Environmental Sciences: The two-year withdrawal rate was 7% (**93%** retention). All students graduated for a **100%** graduation rate (i.e., all who completed intent-to-graduate form). In addition, **86%** of students during the period earned a "B" or better in all courses. Note that "B-" grades are below our threshold for learning outcomes for our graduate students. All metrics exceeded our high, ambitious threshold values.

MS, Entomology (ENTO): The two-year withdrawal rate was 0% (**100%** retention). All students graduated, for a **100%** graduation rate (i.e., all who completed intent-to-graduate form). In addition, **100%** of students during the period earned a "B" or better in all courses, which is just below our threshold of 85%. Note that "B-" grades are below our threshold for learning outcomes for our graduate students. All metrics, except for grades, exceeded our high, ambitious threshold values.

MS, Land Rehabilitation (LNDA): The two-year withdrawal rate was 0% (**100%** retention). Four students graduated, for a **100%** graduation rate (i.e., all who completed intent-to-graduate form). In addition, **100%** of students during the period earned a "B" or better in all courses. Note that "B-" grades are below our threshold for learning outcomes for our graduate students. All metrics exceeded our high, ambitious threshold values.

Professional MS Program (LREO): The two-year withdrawal rate was 6% (**94%** retention) out of more than 200 students. The withdrawal rate of 6% cannot be extrapolated directly to the graduation rate because of timing and matriculation issues. The program had a **98%** graduation rate over the period (i.e., students earned a "B" or better on their professional paper course (LRES 575)). In addition, **97%** of students during the period earned a "B" or better in all courses. Note that "B-" grades are below our threshold for learning outcomes for our graduate students. All metrics exceeded our high, ambitious threshold values.

PhD, Ecology & Environmental Sciences (EES): The two-year withdrawal rate was 11% (**89%** retention). All but one PhD student passed their comprehensive written and oral exams in the review period. The

two-year comprehensive exam pass rate was 96**%**. The program had a **100%** graduation rate (i.e., all who completed intent-to-graduate form). In addition, **89%** of students during the period earned a "B" or better in all courses. Note that "B-" grades are below our threshold for learning outcomes for our graduate students. All metrics exceeded our high, ambitious threshold values.

In addition to the above, **100%** of LRES graduate students who took the required LRES 594 (Seminar) earned a "B" or better, exceeding our threshold of 90%. And, **100%** of PhD students in the EES program earned a "B" or better in the required LRES 593 (Grand Challenges in Ecology & Environmental Sciences).

Table. Summary of Assessment Outcomes. Threshold rates are in green parentheses.

Program	2-yr Retention (%)	Graduation Rate (%)	Students with at least "B" grade (%)	Students with at least "B" in LRES 594 (%)	Students with at least "B" in LRES 593 (%)	PhD Comprehensive Exams Pass Rate (%)
MS, LRES	93 (90)	100 (90)	86 (85)	100 (90)		NA
MS, ENTO	100 (90)	100 (90)	100 (85)	NA*		NA
MS, LNDA	100 (90)	100 (90)	100 (85)	100 (90)		NA
MS, LREO	94 (90)	98 (90)	97 (85)	NA		NA
PhD, EES	89 (90)	100 (90)	89 (85)	100 (90)	100 (90)	96 (90)

*NA = not applicable

b) What areas of strength in the program were identified?

LRES has multiple levels of continuous assessment of attainment of learning outcomes. LRES has exceedingly low rates of withdrawal and failure-to-graduate for graduate students. LRES has low percentages of students who earn "B-" or lower grades in graduate courses. Since the last report, LREO has had an increase in graduation rate (97 to 98%) and percentage of students with at least a "B" grade since the previous assessment (94 to 97%). It had a decrease in 2-yr retention (95 to 94%). MS LRES had a reduction in retention in 2-yr retention (97 to 93%), MS ENTO had an increase in 2-yr retention (91 to 100%) and students with at least a "B" grade (82 to 100%), PhD EES had a reduction in 2-yr retention (90 to 89%), reduction in students with at least a "B" grade (94 to 89%), and a reduction in PhD Comprehensive Exams Pass Rate (100 to 96%). All thresholds were exceeded except the 2-yr retention rate for PhD EES (89%; threshold = 90%).

c) What areas were identified that need improvement?

LRES is strongly encouraging faculty to complete annual reviews of academic program for graduate students, per direction and forms of The Graduate School (https://www.montana.edu/gradschool/forms.html). However, this review must be initiated by the student, which makes it challenging to obtain enough reviews to use for this assessment.

LRES needs a formal mechanism for providing positive, constructive feedback from the instructor and peer teaching assistants to graduate teaching assistants. This can be partially remedied via annual reviews with graduate students, but as discussed above, this is challenging.

4. How We Responded

a) Describe how "What Was Learned" was communicated to the department, or program faculty.

The results of the assessment will be presented to the Graduate Committee, which will then present it to the entire LRES faculty before the end of CY24.

b) How are the results of this assessment informing changes to enhance student learning in the program?

We view the current low withdrawal and failure-to-graduate rates in all our programs as acceptable and believe the results indicate that our current multiple levels of review for each graduate student are appropriate. This is especially the case for the graduate student's graduate committee.

c) If information outside of this assessment is informing programmatic change, please describe that.

5. Closing the Loop

a) In reviewing last year's report, what changes proposed were implemented and will be measured in future assessment reports?

We wanted to implement annual reviews of academic program for graduate students, but this was not done by enough students and faculty to inform an analysis. We also include passing-grade rates for the new required course, LRES 593, for PhD students. We include a rubric for evaluating program learning outcomes.

b. Have you seen a change in student learning based on other program adjustments made in the past? Please describe the adjustments made and subsequent changes in student learning.

No. It is challenging (and likely unnecessary) to see a change in student learning and make program adjustments when our metrics exceeded our high, ambitious threshold values. Moreover, our graduate programs do not have required curricula, *per se*, because of the multidisciplinary nature of our department, faculty, and students. Meeting program learning outcomes, therefore, is highly dependent on the graduate student's specialized courses and constant guidance from their graduate committee.