

Assessment Plan for BS in Wildlife and Natural Resources

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Program Mission:

The Biology Program provides the biological component of the liberal arts education. We promote student understanding of biological concepts relevant to the individual and society, and foster an appreciation of scientific inquiry. Biology is an integral subject for other majors' requirements and the Biology department is committed to fulfilling these service courses and general education for other departments.

The major of wildlife and natural resources leads to a Bachelor of Science (BS) Degree. In addition, supporting courses and general education courses in biology are available to meet a wide range of interests, backgrounds and needs. The Wildlife and Natural Resources Program emphasizes an understanding of fish and wildlife ecology and management with practical skills obtained during laboratory and field exercises. Graduates are prepared for positions with state and federal agencies, tribal departments, and conservation organizations or higher academic degrees. Carefully supervised career planning is provided to all students.

Program Goals

- To provide students with the necessary background to successfully pursue graduate study towards a professional career in wildlife and natural resources;
- To prepare students upon graduation to enter field positions in government or private industry; and,
- To supply students with the necessary coursework to obtain professional certification as associate fishery or wildlife biologists.

Upon completion of the BS in Wildlife and Natural Resources, students will have achieved the following student learning outcomes as stated in the University Catalog:

SLO 1: Students will develop a broad-based knowledge of concepts and terminology in organismal, and ecological biology.

SLO 2: Students will know the taxonomy, ecology and natural history of flora and fauna in southern Colorado and the desert southwest.

SLO 3: Students will know the principles and concepts of fish and wildlife science and how they are combined with human dimensions to make informed decisions on difficult management issues.

SLO 4: Students will develop skills in reading and interpreting the scientific literature and in presenting a synthesis of it accurately in oral and written form.

SLO 5: Students will demonstrate critical thinking and problem solving skills using experimental design and the scientific process.

Program goals for SLOs are as follows:

SLO 1: 75% of students will score above the 50% nationally on the organismal and ecological portions of the MFAT exam

SLO 2: 75% of students will score higher than 70% on taxonomy exams administered in taxonomy courses.

SLO 3: 75% of students will be scored proficient using a rubric designed to evaluate final projects in WANR 401 and WANR 402.

SLO 4: 75% of students will be scored proficient using a rubric designed to evaluate literature review in WANR 401, WANR 402 or taxonomy courses.

SLO 5: 75% of students will be scored proficient on their final presentation in BIOL 493.

Curriculum:

The curriculum for the wildlife and natural resources program offers Aquatic and Terrestrial emphasis areas, with curriculum for each meeting the certification requirements of the American Fisheries Society (AFS) or The Wildlife Society (TWS), respectively. The curriculum includes broad training in organismal biology and ecology, as well as a focus on wildlife and/or fisheries management.

Table 1: Course Map for BS in WANR

| SLO | BIOL 171 | BIOL 181 | BIOL 182 | BIOL 201 | BIOL 202 | BIOL 352 | WANR 302 | WANR 303 | WANR 304 | WANR 401 or WANR 402 | Taxonomy | BIOL 493 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------------------|----------|----------|
| SLO 1: Students will develop a broad-based knowledge of concepts and terminology in organismal, and ecological biology. | | I | I | D | D | D | | | | M | M | M |
| SLO 2: Students will know the taxonomy, ecology and natural history of flora and fauna in southern Colorado and the desert southwest. | | I | | D | D | | | | | | M | |
| SLO 3: Students will know the principles and concepts of fish and wildlife science and how they are combined with human dimensions to make informed decisions on difficult management issues. | | | | | | | I | D | D | M | | |
| SLO 4: Students will develop skills in reading and interpreting the scientific literature and in presenting a synthesis of it accurately in oral and written form. | | | | I | I | D | | | | D | D | M |
| SLO 5: Students will demonstrate critical thinking and problem solving skills using experimental design and the scientific process. | | I | I | D | D | | | | | | | M |

I=introduction, D=development, M=mastery, Taxonomy courses include BIOL 479, BIOL 481, BIOL 482, BIOL 483, BIOL 484, BIOL 485.

Assessment:

SLO 1: To assess knowledge of organismal and ecological biology we will administer the GRE to each class of First Year Seminar (BIOL 171) for baseline assessment and administer the GRE and MFAT exam to each class of Senior Seminar (BIOL 493). For each of these exams, only the organismal and ecological portions will be considered. The MFAT in particular is divided into Cell Biology, Molecular Biology and Genetics, Organismal Biology, and Population Biology, Evolution and Ecology. The first two will not be considered as they are not extensively covered in the WANR curriculum. Our goal is to have 75% of our senior students score at or above 50% of National percentile on the on both the Organismal Biology portion and Population Biology, Evolution and Ecology portion of the MFAT exam.

SLO 2: Knowledge of local flora and fauna will be measured in taxonomy classes (BIOL 479 Ichthyology, BIOL 481 Entomology, BIOL 482 Herpetology, BIOL 483 Mammalogy, BIOL 484 Ornithology, BIOL 485 Plant Taxonomy). All of these courses include taxonomy exams that focus on identification of local species. The raw score on these exams will be used to assess student knowledge of local species. Our goal for 75% of students to score 70% or better on these exams. Exams will be graded and copied by faculty teaching the courses and supplied to the program director.

SLO 3: Assessment of fisheries and wildlife management will occur in the 400 level wildlife courses, WANR 401 (Fisheries Science) and WANR 402 (Management of Endangered Species). Each of these classes culminate in a final project

involving management science. These projects will be assessed by faculty using a rubric (to be developed). Our goal is to have 75% of students achieve an average score of proficient on these rubrics.

SLO 4. Interpretation of scientific literature will be assessed twice, once during the second year in Botany (BIOL 201) or Zoology (BIOL 202) and again in Senior Seminar (BIOL 493). A rubric will be developed to assess proficiency at reading, interpreting, and presenting scientific literature. Our goal is to have at 75% of our senior students be at Proficient level.

SLO 5. Critical thinking and problem skills will be assessed in College Biology I (BIOL 181 Lab) and in Senior Seminar (BIOL 493) using a rubric (Appendix 1). In College Biology Lab (BIOL 181L) the second full scientific paper will be evaluated by the instructor. In Senior Seminar, the capstone research proposal will be evaluated by the entire faculty. Our goal is to have 75% of our students in BIOL 493 receive an average score of proficient from the faculty.

The Wildlife and Natural Resources Program Coordinator or the Biology Department Chair will be responsible for collecting and tabulating all assessment results. Average assessment scores for each SLO will be presented to the department yearly at the convocation meeting. The biology department as a whole will decide on action based on assessment scores, such as adjustments to the WANR curriculum, changes in content of required coursework, etc.

Biology MS Program Assessment Plan Summary

Date Submitted: 5/24/19

For Academic Years:19/20


| Student Learning Outcome | Measure description (direct or indirect?) | Timeline or cycle |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| SLO 1: Students will develop a broad-based knowledge of concepts and terminology in organismal, and ecological biology. | MFAT Exam: Will be administered in BIOL 493, Senior Seminar. | Annually |
| | Selected Biology GRE exam questions. Will be administered in BIOL 171 and again in BIOL 493 | Annually |
| SLO 2: Students will know the taxonomy, ecology and natural history of flora and fauna in southern Colorado and the desert southwest. | Taxonomy Exams: Administered as a part of BIOL 479, 481, 482, 483, 484, and 485. | Annually |
| SLO 3: Students will know the principles and concepts of fish and wildlife science and how they are combined with human dimensions to make informed decisions on difficult management issues. | Management Rubric: Final projects in WANR 401 and WANR 402 will be assessed using a rubric designed by faculty (TBD) | Every other year starting 19-20 |
| SLO 4: Students will develop skills in reading and interpreting the scientific literature and in presenting a synthesis of it accurately in oral and written form. | Literature Rubric: Administered in BIOL 201 or BIOL 202 on literature review. | Every other year starting 20-21 |
| | Literature Rubric: Administered in BIOL 493 on capstone project. | Every other year starting 20-21 |
| SLO 5: Students will demonstrate critical thinking and problem solving skills using experimental design and the scientific process. | Scientific Method Rubric: Rubric (Appendix 1) will be used to evaluate student papers in BIOL 181L | Annually starting 19-20 |
| | Scientific Method Rubric: Rubric (Appendix 1) will be used to evaluate senior capstone project in BIOL 493 | Annually starting 19-20 |
| Expected level of student proficiency (definition and percentage) | 75% of students will be proficient as measured by 50 th percentile on the MFAT, 70% on taxonomy exams, and average score of proficient on rubrics. | |

Appendix 1

SLO4: Students will demonstrate critical thinking and problem solving skills using experimental design and the scientific method

BS in Biology Program assessment rubric

| | Excellent | Proficient | Developmental | Ineffective |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Review of Literature | Extensive review of the literature; Clear connection between literature and the research question and/or hypothesis | Review of Literature; demonstrates basic understanding of how previous literature interacts with proposal | Review of literature incomplete; lacks complete understanding of how previous literature interacts with proposal | Review of Literature lacking, poor understanding of how previous literature interacts with proposal |
| Research Questions and/or Hypothesis | Hypothesis clearly stated; clearly communicates variables and controls | Hypothesis stated; communicates variables and controls | Hypothesis poorly stated; partial or incomplete explanation of variables and controls | Hypothesis not stated; no discussion of variables and controls |
| Proposed Experimental Aims | Aims test the hypothesis | Aims mostly test the hypothesis | Aims partially test the hypothesis | Aims do not adequately test the hypothesis |
| Proposed Materials and Methods | Methods appropriately test the aims ; justified choice of variables and controls; adequate sample size; superb and clearly communicated experimental design; correct and valid statistical analysis | Methods test most of the aims; questionable choice of variables and controls; sample size questionable; adequately communicated experimental design; statistical analysis meets minimum standards for validity | Methods poorly test the aims; dubious choice of variables and controls; insufficient sample size; partial or incomplete communication of experimental design; questionable or incomplete statistical analysis | Methods fail to test the aims; poor choice of variables and controls; sample size is deficient; poorly communicated experimental design; invalid or missing statistical analysis |
| Interpretation of the Expected Results | Relates all expected results back to aims and hypothesis; communicates significance of proposed results; appropriate comparisons to literature; proposed experiment extends knowledge in field; additional hypotheses generated | Relates some results back to aims and hypothesis; significance of results implied but not clearly stated; partial comparisons to literature; proposed experiment extends knowledge in field additional hypotheses implied | Results poorly linked to aims and hypothesis; weak communication of significance of results; little comparison to literature; proposed experiment insufficiently adds knowledge in field; no future direction generated | Results not linked to aims and hypothesis; does not communicate significance of results; no comparison to literature; proposed experiment merely repeats previous work; no future direction generated |

|  BS in Biology | | | | |
|----------------------------------------------------------------------------------------------------------|------------------|-------------------|----------------------|--------------------|
| | Excellent | Proficient | Developmental | Ineffective |
| Review of Literature | | | | |
| Research Questions and/or Hypothesis | | | | |
| Proposed Experimental Aims | | | | |
| Proposed Materials and Methods | | | | |
| Interpretation of the Expected Results | | | | |

Date _____

Academic year _____

Semester _____