

ASSESSMENT REPORT 2020 - 2021

Forestry
(Instructional Degree Program)

B.S.
(Degree Level)

Program Mission:

Forestry is the application of scientific principles to the management of forest resources, including non-wood products. The mission of the Forestry Program at NMHU is to engage in teaching, research, and service in forestry and related disciplines. The Department promotes the understanding and sustainable management of ecosystems for the benefit of human and non-human communities while seeking to improve equity and diversity within the forestry profession.

The undergraduate Forestry degree program is designed to educate well-rounded, technologically proficient, and ecologically aware forest managers, providing them with a background sufficient to enable them to support the continued health, integrity, and use of forests for the benefit of society. Being part of a Hispanic Serving Institution (HSI), the Forestry program seeks to address the needs of underrepresented students in the forestry profession.

Student Learning Outcome 1:

Effectively describe and implement the process of scientific inquiry.

NMHU Traits Specifically Linked to Student Learning Outcome 1:

- Mastery of Content Knowledge and Skills
- Critical and Reflective Thinking Skills
- Effective Communication Skills

First Means of Assessment for Outcome 1 (SLO1a):

Design an experiment to examine an ecological question in FORS 2020 (Terrestrial Ecology) and present this proposal to the class. Students must receive a grade of 70% or higher to be considered passing in this outcome.

Summary of Data:

Number of Students Meeting Criterion:	8	Number of Students Not Meeting Criterion:	2
Total Number of Students Assessed:	10	Percentage of Students Meeting Criterion:	80%

Second Means of Assessment for Outcome 1 (SLO1b):

Successfully design and describe the application of experimental design to a natural resource management problem. This design will be developed and presented in FORS 4920 (Applied Forestry Research). Students must receive a grade of 70% or higher to be considered passing in

this outcome.

Summary of Data:

Number of Students Meeting Criterion:	11	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	11	Percentage of Students Meeting Criterion:	100%

Third Means of Assessment for Outcome 1 (SLO1c):

Final grade of B or better in FORS 3100 (Mensuration and Biometrics)

Summary of Data:

Number of Students Meeting Criterion:	9	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	9	Percentage of Students Meeting Criterion:	100%

Interpretation of Results for Outcome 1:

The program saw no significant change in outcomes for SLO1a and SLO1b relative to 2018-19 outcomes. Although SLO1a could be slightly lower than the previous reported year (80% vs 84-85%) this metric is acceptable particularly considering that the class was taught in Spring 2021, during COVID-19 times, in which experimental courses with a lab component have been impacted more intensely due to the distant learning tools. There was an improvement in outcomes for SLO1c relative to 2018-2019, with 100% meeting the criterion this year compared to 40% the previous reported year.

Overall, students are meeting the Forestry Program’s expectations for Student Learning Outcome 1.

Student Learning Outcome 2:

Effectively communicate scientific and resource management ideas, information, and results, as well as standards of professional ethics, both verbally and in writing, in a way that (1) demonstrates consistent logic; (2) is well organized; (3) states and defends a thesis; and (4) demonstrates competent use of language.

NMHU Traits Specifically Linked to Student Learning Outcome 2:

- Mastery of Content Knowledge and Skills
- Critical and Reflective Thinking Skills
- Effective Communication Skills

First Means of Assessment for Outcome 2 (SLO2a):

Present the results of the capstone project to the FORS 4920 Senior Research Project class. A passing grade for this measure is >70%.

Summary of Data:

Number of Students Meeting Criterion:	11	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	11	Percentage of Students Meeting Criterion:	100%

Second Means of Assessment for Outcome 2 (SLO2b):

Grade on final exam in Natural Resource Economics (FORS 3300) which requires a comprehensive analysis and presentation of a complicated natural resource valuation and decision problem involving forestry resources. A passing grade for this measure is >70%.

Summary of Data:

Number of Students Meeting Criterion:	13	Number of Students Not Meeting Criterion:	2
Total Number of Students Assessed:	15	Percentage of Students Meeting Criterion:	87%

Third Means of Assessment for Outcome 2 (SLO2c):

Final grade of B or better in Professional Ethics (FORS 4260).

Summary of Data:

Number of Students Meeting Criterion:	7	Number of Students Not Meeting Criterion:	5
Total Number of Students Assessed:	12	Percentage of Students Meeting Criterion:	58%

Interpretation of Results for Outcome 2:

Values of SLO1a have not changed at respect of last year, and the fact that all students passed the metric for SLO2a makes us question about its efficiency of this SLO. However, it is also true that all the students in the capstone class demonstrated consistent logic and use of language. There has been a positive improvement in the SLO2b, having 87% of students meeting the criterion with respect to last year (69%). As with last year, learning outcomes associated with SLO2c suggest that we are not meeting our objectives. Unfortunately, this looks a tendency from the last 2 SLO Assessment Reports in our program, since this year a smaller percentage of students met the criterion with respect to 2018-19 (64%) or 2017-18 (92%). Despite it is true that our students may find difficulties to effectively communicate and defend a thesis, this class had too much turnover in the last years. The faculty member giving the course has changed three times during the last three years. The course material was not the same as the previous year and the grading styles likely differed between the professors. For this reason, we do not evaluate the large decrease in students meeting the criterion as cause for much concern, but we will be able to make a better analysis based on more consistent data next year, since Dr. Falkoswki is now teaching the class for the second time. Overall, students are meeting the expectations of Student Learning Outcome 2.

Student Learning Outcome 3:

Effective use of technology by competently using appropriate tools from forestry and its various sub-disciplines.

NMHU Traits Specifically Linked to Student Learning Outcome 3:

- Critical and Reflective Thinking Skills
- Effective Use of Technology

First Means of Assessment for Outcome 3 (SLO3a):

Demonstrated competence in using basic measuring instruments in an introductory field-based course (FORS 2010, Forestry Field Practices). Final grade in course of C or better.

Summary of Data:

Number of Students Meeting Criterion:	8	Number of Students Not Meeting Criterion:	3
Total Number of Students Assessed:	11	Percentage of Students Meeting Criterion:	73%

Second Means of Assessment for Outcome 3 (SLO3b):

Demonstrated competence in using forest measuring instruments in an intermediate field-based course (FORS 3100, Mensuration and Biometrics). Grade in a hands-on practicum exercise of B or better and a final grade in the course of C or better.

Summary of Data:

Number of Students Meeting Criterion:	--	Number of Students Not Meeting Criterion:	--
Total Number of Students Assessed:	--	Percentage of Students Meeting Criterion:	--

Interpretation of Results for Outcome 3:

Results for SLO3a have been clearly deteriorated at respect of last report (73% vs 100%). It is a reality that demonstrated competence in using basic measuring instruments has been negatively affected by the distance learning. Despite the introductory field-based course (FORS 2010, Forestry Field Practices) having some in person component in Fall 2020, students needed to use the instruments and materials by themselves (with the help of some videos and visual material) as well as data collection, development of the reports and data analysis. We are not surprised that hands-on activity skills have been negatively affected during this COVID –19 years.

Outcomes for SLO3b were not assessed due to COVID-19; the lab was online, and it was not possible to demonstrate competence in using forest measuring instruments in an intermediate field-based course (FORS 3100, Mensuration and Biometrics). Therefore, there was not a hands-on practicum exercise to evaluate.

Overall, students are meeting the Forestry Program’s expectations for Student Learning Outcome 3.

Student Learning Outcome 4:

Mastery of Forestry knowledge and skills.

NMHU Traits Specifically Linked to Student Learning Outcome 4:

- Mastery of Content Knowledge and Skills
- Critical and Reflective Thinking Skills
- Effective Communication Skills

First Means of Assessment for Outcome 4 (SLO4a):

Take a final comprehensive Forestry Exit Exam that includes questions from the four SAF core competency areas. A passing grade will be 70%. This exam will not impact student graduation but will be used for assessment purposes and will provide students the opportunity to provide feedback on the Forestry Program to Faculty. This Exit Exam will be accompanied by a debriefing with graduating students.

Summary of Data:

Number of Students Meeting Criterion:	11	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	11	Percentage of Students Meeting Criterion:	100%

Second Means of Assessment for Outcome 4 (SLO4b):

Final grade of B or better in Forest Management (FORS 4100).

Summary of Data:

Number of Students Meeting Criterion:	11	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	11	Percentage of Students Meeting Criterion:	100%

Third Means of Assessment for Outcome 4 (SLO4c):

Final grade of B or better in Applied Forestry Research (FOR 4920).

Summary of Data:

Number of Students Meeting Criterion:	11	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	11	Percentage of Students Meeting Criterion:	100 %

Fourth Means of Assessment for Outcome 4 (SLO4d):

Final grade of B or better in Natural Resource Law and Policy (FORS 3300) or Geologic Resources, Law, and Environmental Policy (GEOL 4120).

Summary of Data:

Number of Students Meeting Criterion:	13	Number of Students Not Meeting Criterion:	2
Total Number of Students Assessed:	15	Percentage of Students Meeting Criterion:	87%

Fifth Means of Assessment for Outcome 4 (SLO4e):

Final grade of B or better in Dendrology (FORS 3130).

Summary of Data:

Number of Students Meeting Criterion:	5	Number of Students Not Meeting Criterion:	5
Total Number of Students Assessed:	10	Percentage of Students Meeting Criterion:	50%

Interpretation of Results for Outcome 4:

The impacts of COVID-19 restrictions are evident in student learning outcome 4 with students towards at the end of their degree being able to show mastery of forestry knowledge and skills while students that were learning the foundations of forestry not meeting some criteria. Student outcomes for Dendrology (SLO4e) were impacted by needing to accommodate COVID-19 restrictions for both the lecture and lab. The modality of both lecture and lab were switched to remote, which removed hands-on learning of major woody species. Furthermore, the lab had to be canceled in Fall 2020 and instead was offered disjunct from the lecture the following semester in an 8-week online course. In spite of these COVID-19 restrictions, all criteria for Outcome 4 improved this year compared to the previous (60%, 54%, 80%, 64%, 38% to 100%, 100%, 100%, 87%, 50%, respectively). As discussed in other Outcomes, difference in grading among faculty may contribute to these differences together with changes in modality of courses. Furthermore, there is still room to improve the woody plant identification skills of students. These skills are reinforced in subsequent higher-level courses (e.g., FORS 4240, Wildland Pest Management). Overall, students are meeting outcome 4 objectives.

Utilization of Results:

The outcome results for the Forestry Program show that goals are generally being met. The improvement of the capstone course from previous years indicates that the implementation of the FORT-CREST project activities in the forestry curriculum together with the general subject matter of Forest Restoration in this reporting period has shown initial success (see below for a detailed description of this project). This is evidence that the program is meeting the program mission and SAF standards by providing high quality forestry education. Furthermore, the continued

implementation of the goals of the FORT-CREST project will improve the student outcomes in other areas of assessment, such as use of scientific method, communications, and critical thinking skills, which have been highlighted in this and previous years as areas that need improvement. While there was an impact of COVID-19 on outcomes, these outcomes reinforce the value of having instructors and students be face-to-face, hands-on laboratory learning and synchronicity of theory and laboratory instruction, which will be able to be done in subsequent semesters. More hands-on experiences that students highly value, as indicated in exit exams, will be further supported by the FORT-CREST project. Furthermore, the FORT-CREST project helps the program to overcome previously barriers to increasing hands-on experiences through incorporating research experiences in a cohesive manner into the forestry curriculum.

Changes to Program Based on Results:

Forestry students do not appear to be primarily content- or concept-limited, with regards to core forestry topics. Nevertheless, students struggle in communication and field-based skills. The SLOs where students struggled more than in the past or far below acceptable levels were related to SLO1a, SLO2c, SLO4e. Interpretation is difficult because although more rigor was introduced this assessment period, more students than usual did not complete their assignments and there were many COVID-19 issues that affected the student learning outcomes. For SLO2c, a better interpretation will be made next year since the professor and content will be consistent with this year. For SLO4e, very important skill of woody species identification, work is needed to ensure that students are leaving the class with the necessary tools to complete their other field-based work in subsequent years. While these skills will be reinforced in subsequent higher-level courses, the improvement of this outcome is needed.

Overall, we have found it difficult to interpret many of these outcomes because the assessment criteria have proven themselves to be weak, in many cases, and missing the target, in others. As indicated in previous assessments, many of the outcomes criteria are grade-based (which should be avoided in the future) and not targeting a student's ability to use the scientific method. This was noted by the Forestry Departments accrediting body (Society of American Foresters) in its latest visit. Therefore, a revision of the Outcomes Assessment Plan will be proposed this year to better assess the skills of students in the program.

Retention Strategies:

The Forestry Program has continued to revisit and revise course scheduling, curriculum changes (e.g., course numbering and offerings) and curriculum advising to create a more efficient and clearer path for new and transfer students to complete the forestry curriculum in a timely manner. Furthermore, we are integrating a big portion of these curriculum improvement thanks to the implementation of the NSF FORT-CREST project activities in the forestry curriculum. The project

was awarded to the Forestry Department in December 2019 and despite COVID-19, and it is a collaborative approach among three different institutions, with a focus on education, research and outreach activities based on Forest Restoration. The project contains three different subprojects with different research goals and scales, but all of them share the aim to integrate students in the research activities and incorporate the research experiences in a cohesive manner into the forestry curriculum. FORT-CREST approach incorporates field and internship opportunities for undergraduate students, as well as support an integrated case study approach to apply to the core forestry curriculum. FORT-CREST activities in coursework included the following:

- FORS 1010 classes (Ecosystems & Humans) participated in a series of labs to undertake vegetative surveys using quadrats and working with indices for community plant interactions, species abundance and diversity, Excel spreadsheets, field tablets (Survey123), Go Pro cameras and preparing presentations on their findings. This series of labs was jointly developed and coordinated with the NMHU NSF SomosSTEM CURE labs.
- Students in FORS 2010 (Forestry Field Practices) collected Common Stand Exam (CSE) data from forest stands in the Sangre de Cristo Range, which will be applied towards planning for fire management throughout the region and will be included in Subproject 2 analyses. They also collected dendrochronology information and stand characteristic data for CREST Subproject 2 Experiment 1.
- Students in FORS 3070 (Wildland Fire Management) conducted field sampling of fuel loads prior and posterior to a prescribed burn treatment at Black Lake as part of Subproject 2 Experiment 3.
- Students in FORS 3100 (Mensuration and Biometry) and FORS 3130 (Dendrology) measured stand and fuel plots at one of the CREST study areas at Black Lake, NM. In this extra credit activity, students were given explanations of the research purpose and design for CREST Subproject 2, field instructions on establishing plots and hands-on experience measuring stand characteristics and fuel estimates. This data will be used in the CREST Subproject 2 Experiment 3 research. Furthermore, students practiced their skills of identifying tree species, understory vegetation, and forest type (e.g., mixed conifer vs ponderosa pine lower montane).
- Students in FORS 3100 (Mensuration and Biometry) and FORS 3130 Dendrology were given extra credit to participate in the CREST Subproject 2 Experiment 3 research by planting seedlings and implementing treatments over six days in October.
- FORS 3100 and FORS 3130 students also collected data for CREST Subproject 2 Experiment 1 to evaluate current forest health condition and assesses the shifts in forest structure and composition in New Mexico's Front Range.
- Students in FORS 4920 (Applied Forestry Research) conducted fire and vegetation modeling to identify relevant ecological variables for Subproject 3 Experiment 1.
- Subproject 2 Experiment 3 was also used as a case study for explaining experimental

design in FORS 6250 (Advanced Quantitative Analysis).

FORT will assist to provide the students with a coherent progression of knowledge and skills as forest managers in assist stakeholders making informed decisions that promote the use of adaptive ecosystem management to reduce the risk of high-severity wildfires and restore the health of fire-adapted forests.

Our department developed a renovated mission and budget with its Forestry Department Strategic plan 2020-25, and this semester we will be proposing an Outcome Assessment Plan revision. These revisions will focus efforts of the Program to develop and implement high quality and hands-on forestry education. Additionally, an abundant number of activities, workshops and training opportunity will be implemented in the next 2-3 years, as opportunities to support more frequent communications and consultation between students and academic advisors, as well as to increase the contact with the community, and professional agencies and personnel. Moreover, FORT-CREST is promoting the participation of Forestry students in SAF conferences and professional events organized by the Student Engagement Coordinator of the project.