DEPARTMENT OF FOREST MANAGEMENT
WA FRANKE COLLEGE OF FORESTRY AND CONSERVATION
FORESTRY DEGREE PROGRAMS (B.S. & M.S.)
2022 Assessment Report

MISSION STATEMENT

The Department of Forest Management provides the foundation and tools necessary for sustainable management of forest landscapes. While our home is in the diverse ecosystems of Montana, our activities are global. We foster an intellectual atmosphere conducive to interdisciplinary teaching, research, and service. Our educational program produces graduates with the knowledge and skills to manage the use, conservation and restoration of natural resources, while satisfying diverse objectives. Our research and service programs develop and apply innovative techniques for management of forest, grassland and riparian ecosystems in an ever-changing world. We integrate research with our graduate and undergraduate curricula, and prepare our students to embrace emerging challenges and grow into leadership positions in management, educational and research organizations.

DEPARTMENT ALIGNMENT WITH PRIORITIES FOR ACTION

1. Support the diversity of academic programs in the W.A. Franke College of Forestry & Conservation through curriculum development and course offerings. Teach courses covering foundational biological, ecological, and physical processes as well as courses that synthesize knowledge and techniques to address socio-economic challenges in the management, conservation, and restoration of natural resources.
    *   *Priority 1: Place Student Success at the Center of All We Do*
    *   *Priority 2: Drive Excellence and Innovation In Teaching, Learning, and Research*
    *   *Priority 4: Partner With Place*

2. Increase recruitment, improve student retention, and provide students in the W.A. Franke College of Forestry & Conservation with opportunities for professional and academic advancement through coursework, development of field skills, independent research, employment, internships, mentoring, and advising.
    *   *Priority 1: Place Student Success at the Center of All We Do*
    *   *Priority 2: Drive Excellence and Innovation In Teaching, Learning, and Research*
    *   *Priority 3: Embody The Principle Of "Mission First, People Always"*
    *   *Priority 4: Partner With Place*
    *   *Priority 5: Proudly Tell The UM Story*

3. Advance society's ability to manage, conserve, and restore working landscapes through the pursuit of basic and applied research. Recruit and mentor outstanding researchers and engage students in research in the classroom, in the field, and in the laboratory.
    *   *Priority 1: Place Student Success at the Center of All We Do*
    *   *Priority 2: Drive Excellence and Innovation In Teaching, Learning, and Research*

- *Priority 3: Embody The Principle Of "Mission First, People Always"*
- *Priority 4: Partner With Place*
- *Priority 5: Proudly Tell The UM Story*

4. Support land and resource stewardship through direct engagement with, and service to, governmental and non-governmental agencies, as well as the public. Through our appointments in the Montana Forest & Conservation Experiment Station we engage and support practicing foresters, landowners, and the wood products industry.
    - *Priority 2: Drive Excellence and Innovation In Teaching, Learning, and Research*
    - *Priority 4: Partner With Place*
    - *Priority 5: Proudly Tell The UM Story*

ACADEMIC PROGRAMS OF THE DEPARTMENT

This Assessment Report includes information for the B.S. Forestry (pp. 3-11) and M.S. Forestry (pp. 12-14) because these two programs are directed by faculty in the Department of Forest Management (DFM). DFM faculty also hold appointments in other programs and initiatives within the Franke College. Tabulated below is a summary of the Department's contributions to academic programs and student organizations in the College:

Academic Programs & Student Associations	Provide faculty leadership	Advise students	Teach required courses	Teach elective courses	Supervise internships
B.S. Forestry	X	X	X	X	X
B.S. Resource Conservation		X	X	X	X
B.S. Parks, Tourism, & Recreation Management			X	X	
B.S. Ecosystem Science & Restoration		X	X	X	
B.S. Environmental Science & Sustainability		X	X	X	X
B.S. Wildlife Biology			X	X	
Fire Sciences & Management Minor	X	X	X	X	X
Wilderness Studies Minor	X	X	X	X	
Ecological Restoration Minor		X	X	X	
Certificate in GIS Sciences & Technologies	X	X	X	X	
Ph.D. Forestry & Conservation	X	X		X	
M.S. Forestry	X	X		X	
M.S. Resource Conservation	X	X		X	
M.S. Resource Conservation, International Conservation & Development	X	X		X	
Ph.D. Wildlife Biology				X	
M.S. Wildlife Biology				X	
Ph.D. Systems Ecology		X		X	
M.S. Systems Ecology		X		X	
Forestry Student Association	X				
Society of American Foresters Student Chapter	X				
Student Fire Ecology & Management Club	X				
Xi Sigma Pi Honor Society	X				
Woodsman Team	X				

Forestry program faculty conducted a comprehensive self-study of the BS Forestry objectives, learning outcomes, and curriculum in academic year 2018/2019 as part of the process for external re-accreditation by the Society of American Foresters. A priority identified in this process and discussed in the previous biennial assessment was to develop and implement a formal, quantitative assessment program for the B.S. Forestry as required for external accreditation. This new assessment was implemented in Fall 2021 and is presented below.

BACHELOR OF SCIENCE IN FORESTRY
Graduates of the B.S. Forestry program will have the knowledge and skills to:

1. Interpret the biological, ecological, and physical processes and properties of forested landscapes and natural resources (PFA 2,4);
2. Conduct and integrate quantitative and qualitative analyses to critically appraise the status and dynamics of forest ecosystems (PFA 2,4);
3. Articulate technical and scientific information in writing and speech for effective communication in a professional environment (PFA 2,4,5);
4. Incorporate biophysical, social, and economic principles into analyses of natural resource issues;
5. Formulate resource management, conservation, and restoration plans at a range of scales, incorporating social, ecological, and economic values (PFA 1,3,4,5);
6. Implement land management plans and actions through service learning, extra-curricular activities (e.g., student clubs and associations), directed internships, and undergraduate research opportunities (PFA 1,4,5).

Our goal is to introduce each of these learning goals early, to develop and reinforce each through practical use, and to expect demonstration of mastery of each over the course of the curriculum. The progressive development of each of the six learning goals are shown in our curriculum map for the degree program in the Appendix.

Regarding PFA's specific to the B.S. Forestry, we highlight two innovations. First, students in the Forestry Capstone (FORS440) work directly with local land managers to develop projects that are implemented by the respective agencies after the students graduate. A drive around the Missoula Valley and up the Blackfoot River reveals eight fully-implemented projects designed by our students in the past three years (PFA 4. Partner with place; PFA 5. Proudly tell the UM story). Our students learn while helping get important forest restoration work done on the ground (PFA 3. Mission first, people always). Second, students celebrate field learning with faculty and land management partners by presenting projects across all disciplines in the WA Franke College of Forestry and Conservation in a formal event offered at the end of Fall semester (PFA 1. Place student success at the center; PFA 2. Drive excellence and innovation in teaching, learning, and research; PFA 3. Proudly tell the UM story). It is one of best student-centered celebrations on campus.

STUDENT LEARNING OUTCOMES & MEASUREMENT TOOLS (B.S. FORESTRY)
While we expect students to develop mastery in all six learning goals described above, <u>our program-level assessment focuses on learning goals #2 and #5</u>. Goal #5 was selected for assessment because it is a high-level, integrative outcome; goal #2 because the skills and experience associated with this outcome are critical for students entering a career in forestry and natural resources management. Achievement of these goals is assessed on an annual basis using direct methods as described below.

The program director for the B.S. Forestry is responsible for soliciting assessment results from faculty; summarizing these results; leading program faculty discussion of outcomes and program/course revisions; and submitting assessment reports to the Provost's Office every two years.

Assessment data are submitted by instructors to the Forestry program director each semester for all students in the courses noted below. Every two years, corresponding to the University's biannual assessment cycle, the B.S. Forestry program director summarizes the data for each assessment described herein. The program director also summarizes the progression (early - late) for students that have completed both assessments of learning goal #2.

Initial benchmarks for the late career assessment of learning goal #2 and of the assessment of learning goal #5 are median scores of 3 (Accomplished) from the evaluation rubrics shown below.

Each student enrolled in the B.S. Forestry program is assessed using the following rubrics.

Learning Goal #2
Graduates will be able to conduct and integrate quantitative and qualitative analyses to critically appraise the status and dynamics of forest ecosystems. Progression toward achievement is monitored by evaluating outcomes early and late in the academic program.

Early academic career assessment – FORS 202 Forest Mensuration

Student:			Year:		
Course:	FORS202 Forest Mensuration				
Activity	Beginning 1	Developing 2	Accomplished 3	Exemplary 4	Score
Laboratory assignments and stand inventory final project	Selects and applies appropriate tools for navigation, survey, and resource assessment.	Possesses more advanced experience with the use of appropriate tools; possesses basic understanding of common sampling strategies and methods for quant-ifying stand-level resources.	Mastery of appropriate tools; can design a stand inventory and specify appropriate sample distribution and measurement proto-cols; agency with development of stand and stock tables; assesses damage, defect, disturbance impacts/risk and identifies causal agents.	Meets criteria for 3; can appropriately summarize and interpret stand inventory results relative to objectives; can convey statistical uncertainty in estimates and specify appropriate sampling intensities; facility with the use of stand growth projection.	
Comments:					

Late academic career assessment – FORS 349 Practice of Silviculture

Student:			Year:		
Course:	FORS349 Practice of Silviculture				
Activity	Beginning 1	Developing 2	Accomplished 3	Exemplary 4	Score
Forest stand inventory and assessment report and associated lab exercises	Selects and applies appropriate tools for navigation, survey, and resource assessment.	Possesses more advanced experience with the use of appropriate tools; possesses basic understanding of common sampling strategies and methods for quant-ifying stand-level resources.	Mastery of appropriate tools; can design a stand inventory and specify appropriate sample distribution and measurement proto-cols; agency with development of stand and stock tables; assesses damage, defect, disturbance impacts/risk and identifies causal agents.	Meets criteria for 3; can appropriately summarize and interpret stand inventory results relative to objectives; can convey statistical uncertainty in estimates and specify appropriate sampling intensities; facility with the use of stand growth projection.	
Comments:					

Learning Goal #5

Graduates will be able to formulate resource management, conservation, and restoration plans at a range of scales, incorporating social, ecological, and economic values. This assessment is made of students upon their completion of their capstone projects in FORS 440 Forest Stand Management.

High-level, integrative assessment – FORS 440 Forest Stand Management (Capstone)

Student:			Year:		
Course:	FORS440 Forest Stand Management				
Activity	Beginning 1	Developing 2	Accomplished 3	Exemplary 4	Score
Course project reports (1-4) and presentation	Can collect and analyze inventory data to support a forest management plan.	In addition to 1, can identify the components of a forest management plan that meets multiple objectives and constraints.	In addition to 2, can develop implementation plans and analyze the economics of the silvicultural elements of a forest management plan.	In addition to 3, can communicate and defend all parts of a multiple resource forest management plan to stakeholders.	
Comments:					

RESULTS & MODIFICATIONS (B.S. FORESTRY)

Following are the findings of the program assessment for the B.S. Forestry degree after the first year of implementation of the new approach described previously. A high-level summary (details below) shows that students are meeting the Learning Goal #2 benchmark of Accomplished (median: 3) in ability to conduct and integrate quantitative and qualitative analyses to critically appraise the status and dynamics of forest ecosystems. In the early career assessment (FORS202), almost half of the students meet the benchmark (14/29) and in the late-career assessment (FORS349), all but one student meets the benchmark, suggesting a positive progression in learning in the middle part of the degree program. We do not yet have the data to track a cohort along this progression so these results should be interpreted with caution. Students are meeting the Learning Goal #5 benchmark of Accomplished (median: 3) in ability to formulate resource management, conservation, and restoration plans at a range of scales, incorporating social, ecological, and economic values, with two students in the Forestry Capstone still developing and four students exemplary. More detailed results and discussion follow.

Early academic career assessment - FORS202 Mensuration (2021)

Exemplary (4)   **X X X**
Accomplished (3)   **X X X X X X X X X X X**
Developing (2)   **X X X X X X X X X X X**
Beginning (1)   **X X**

The scores listed above are calculated by summing individual scores for each student in the course based on 3 criteria: 1) quantitative test scores from two midterm exams 2) weekly lab grades, and 3) the products, reports, and presentation for an integrative project involving the design, implementation, and presentation of results from a stand inventory.

Eighty-three percent of students are developing or accomplished after completing FORS202, split half and half between each rating. The accomplished students are able to design an inventory using an appropriate sample distribution and measurement protocols; have mastery of measurement techniques; can develop stand and stock tables; assesses damage, defect, disturbance impacts/risk and identifies causal agents. In contrast, developing students have advanced experience using appropriate measurement tools and techniques, possess a basic understanding of sampling strategies, but are unable to design an appropriate forest inventory without assistance.

Three students are exemplary meaning that they can produce, communicate, and iterate an inventory with stakeholders, and two students are still beginners who could assist with measurements in a forest inventory with guidance.

These results are as expected in the first class in the Forestry degree program that integrates measurement techniques and sampling methods, directed at the problem of quantifying the forest attributes of a stand. As noted above, half the students meet the benchmark of Accomplished and half do not.

Late academic career assessment - FORS349 Silviculture (2021)

Exemplary (4)   **X X X X**
Accomplished (3)   **X X X X X X X X X**
Developing (2)   **X**
Beginning (1)

Assessment in FORS 349 is based on multiple sequential lab exercises/reports, progressing from 1) design and implementation of a field inventory of selected stand; 2) conducting power analysis to specify appropriate sampling intensities; 3) compiling inventory data into summary statistics/tables/graphs, 4) assessing stand conditions in terms of disturbance impacts/risks, opportunities and constraints in light of ownership objectives; 5) developing target desired conditions and identifying potential silvicultural treatments; modeling stand growth projection with and without treatments into the next 20-40 years.

Ninety-three percent of students are accomplished or exemplary after completing FORS349. These students are able to design an inventory using an appropriate sample distribution and measurement protocols; have mastery of measurement techniques; can develop stand and stock tables; assesses damage, defect, disturbance impacts/risk and identifies causal agents.

Four students are exemplary meaning that they can produce, communicate, and iterate an inventory with stakeholders, and one student is developing, meaning that they have advanced experience using appropriate measurement tools and techniques, possess a basic understanding of sampling strategies, but are unable to design an appropriate forest inventory without assistance.

A comparison of outcomes between the early- and late-career assessment shows that students are progressing appropriately in learning from year 2 to year 3 in the Forestry Program. However, it is too early to draw concrete conclusions until we are able to track a cohort through this progression (next biennial assessment).

The assessment conducted in FORS349 was modified to accommodate some potential shortcomings in the evaluation rubric that became evident when analyzing the results. A strict application of the scoring rubric initially rated all but one student as Developing (2) with only one student meeting all components of Accomplished (3). Given that most students met multiple criteria of Accomplished (but not all) and some of Exemplary, we considered partial progress by separating criteria 3 and 4 into sub-components and rating students based on their mastery of them.

Subcomponents are as follows:

3a   Mastery of appropriate tools;
3b   can design a stand inventory; specify sample distribution & measurement protocols;
3c   agency with development of stand and stock tables;
3d   assesses damage, defect, disturbance impacts/risk and identifies causal agents.

4a   can appropriately summarize and interpret stand inventory results relative to objectives;
4b   can convey statistical uncertainty in estimates and specify appropriate sampling intensities;
4c   facility with the use of stand growth projection.

Each student was scored on each subcomponent on a scale of 0-1, and the results were weighted so that total could not exceed 1. This was done by summing the four components of level 3, and dividing by four, and similarly summing three components of level 4 and dividing by 3. One weakness of this approach is that it allows students to partially meet mastery of several components without actually meeting any of them, so it seems important to retain the individual scores for each subcomponent at a minimum. Discussions are ongoing within the Department of Forest Management on whether to modify the evaluation rubric at the higher levels to better reflect the progressions students are making within each category.

High-level, integrative assessment - Forestry 440 Forest Stand Management Capstone (2021)

Exemplary (4)   **X X X X**
Accomplished (3) **X X X X X X X X X**
Developing (2)   **X X**
Beginning (1)

Assessment in FORS440 is based three primary activities: (1) student production of written, shovel-ready stand management plans that include inventories, silvicultural plans, operations plans, economic appraisals, environmental assessments, and in some cases, burn plans; (2) field presentations of plans to forestry professionals and citizens who provide formal written feedback; (3) five independent writing assignments and one presentation to first-year forestry students or forestry professional societies. In-

field Q and A among students and faculty averages five hours per week. Students also complete exit interviews, which provides feedback on strengths and weaknesses of the Forestry program.

Eighty-eight percent of students were accomplished or exemplary in meeting learning goal #5 (Graduates are able to formulate resource management, conservation, and restoration plans at a range of scales, incorporating social, ecological, and economic values). In our professional judgement, the four students rated Exemplary are ready to begin careers as foresters and the ten Accomplished students have high potential but need a bit more experience and the confidence that comes from that experience.

The tiered nature of Learning Goals assumes that students cannot meet Exemplary without also meeting Beginning-Accomplished. In implementing the rubric for Learning Objective #5 in FORS440, we find that the skills described as Accomplished (3) and Exemplary (4) are not linear, meaning there are many cases where students are able to communicate and defend a plan (Exemplary), for example, but are not yet able to fully develop one (Accomplished). This could argue for making the Accomplished and Exemplary criteria independent, developing sub-criteria, or switching the order of criteria, similar to what is proposed in FORS349. Some of the reasons behind the observed discrepancies, we have found, is that developing a land management plan requires both work experience and an ability to critically combine classroom learning with professional practice. This is a skill that can be practiced but is not easily taught in a classroom setting, and is generally not easily assessed; more, it is a trait that some students have and others may develop in time with more experience. Anecdotally, we find that many past students that likely would have scored as Developing or Accomplished have become excellent professional foresters with time.

FUTURE PLANS FOR CONTINUED ASSESSMENT (B.S. FORESTRY)
In the next biennial assessment cycle, we will continue to collect and evaluate the data as described in our assessment plan with little change. The plan is new and needs 2-4 years of data in order to identify strengths and weaknesses and evaluate learning progressions effectively. However, we have identified that some of the evaluation rubrics could be more informative if we also track mastery of subcomponents within each rating level in addition to the rating levels themselves because we will be able to identify specific topic areas where students are succeeding and falling short. For example, in FORS349 Silviculture students are strong in 3a (mastery of tools), 3b (design a stand inventory using appropriate sample and measurement), 4a (summarize/interpret stand inventory results relative to objectives) and weaker in 3c (develop stand/stock tables), 3d (assess damage/defect/disturbance and identify causal agents), and particularly 4c (use stand growth projection). Faculty experience in FORS440 (Capstone) suggests that students indeed lack knowledge/experience assessing damage/defect (3d) and using stand growth projection tools (4c) and students are corroborating these observations in their exit interviews. FORS232 Forest Insects and Disease was added as requirement to the B.S. in Forestry to address the latter deficiency and the Department is in discussion of where to add content in forest growth and yield projection, perhaps in FORS202 Mensuration and/or FORS349 Silviculture.

While our current assessment in the FORS440 (Capstone) does not use exams or course grades alone, we do not specifically evaluate the following criteria that are important in professional practice and that we have found to be indicative of professional success:

- Engagement (does the student actively engage with learning material within and between courses and appear invested in the discipline?)
- Willingness to step-up and solve problems in groups
- Reliability

- Woods sense (the ability to use experience to temper and modify a "textbook" answer to fit a specific situation; the ability to work safely and independently in the forest)
- Humility and confidence (can take and use criticism but also provide and stand behind professional opinion, balanced appropriately for the situation)
- Ability to hear and incorporate feedback

How to assess these elements and whether it is even appropriate is a subject of ongoing discussion among program faculty. At first cut, there does not appear to be value assessing them without identifying learning mechanisms to improve them.

Based on assessments in FORS440 (Capstone) and feedback from program seniors, faculty are discussing how to better require students to gain work experience. We advise all students that the BS Forestry program requires them to gain at least 400 hours of degree-related work experience prior to graduation. However, we currently lack a mechanism to enforce this (although many students do graduate with 2-3 seasons of full-time related work experience). We have been counseled that the only way to officially set such a requirement is to have it appear in Degree Works which is complicated by several factors:

1) Requiring an internship is not appropriate because:
   i. We interpret an "Internship" to imply there is academic content beyond the work experience,
   ii. We do not have adequate staffing to supervise an internship for every student;
2) It seems inappropriate to ask students to pay for credits for a summer job;
3) If we did add credits for work experience to the program requirements, MUS policy does not currently allow a C/NC course to count towards graduation, and in this case and a letter grade is inappropriate.

Therefore, discussions are ongoing within the Department of Forest Management.

APPENDICES (B.S. FORESTRY)

Curriculum Map for Bachelor of Science in Forestry

Course Prefix	Course Title	Credits	Learning Goals					
			1	2	3	4	5	6
Required courses:								
FORS130	Introduction to forestry field skills	2		I				
CHMY121	General chemistry	3	I					
M151	Pre-calculus	4		I				
WRIT101	College writing	3			I			
BIOB160	Principles of living systems	3	I					
BIOO105	Introduction to Botany	3	I	I	I			
COMM111 or THTR120	Speech or Introduction to acting	3			I			
FORS201	Forest biometrics	3		I				
FORS202	**Forest mensuration**	**3**		**R**				
FORS230	Fire management	3	R			I		
FORS232	Forest insects & diseases	3	R			I		
FORS241	Dendrology	3	I					
FORS250	Introduction to GIS & Cartography	3		I				
NRSM210	Soil, climate, and water	3	I	I	I	I		
ECNS201	Introduction to microeconomics	3				I		
FORS320	Forest economics	3				R		
FORS330	Forest ecology	3	R	R	R			
FORS340	Forest products and manufacturing	3	R	R	R	I		
FORS341	Timber harvesting & roads	3			R	I		I
FORS349	**Practice of silviculture**	**3**	**R**	**R**	**R**	**I**	**R**	
NRSM385	Watershed hydrology	3	R	M	R	R		
FORS440	**Forest stand management**	**3**	**M**	**M**	**M**	**M**	**M**	**R**
NRSM422	Natural resource policy & administration	3			R	R	R	
FORS481	Forest planning	3	M	M	M	M	M	
Restricted electives:								
	Biophysical sciences	3+	R					
	Management applications	3+	R			R		V
	Policy and social science	3+				R		
	Measurement & analysis	3+		R				
Other:								
400 hours work experience (required)			V	V	V	V	V	V
Directed internships, research opportunities, extracurricular/club activities (elective)			V	V	V	V	V	V

Key   I   Introduced
        R   Developed and reinforced with opportunities to practice
        M   Mastery that is demonstrated
        V   Variable degree of connection depending on the nature of the experience

MASTER OF SCIENCE IN FORESTRY

The M.S. in Forestry covers a broad range of topics depending on the interests and motivations of students combined with the research of their advisors. For example, one student might study economics, policy, or human dimensions while another examines forest ecology and a third investigates fire behavior or forest harvesting methods. Each student develops a curriculum that suits their individual research areas. For this reason, we have not historically attempted to assess progressions of learning directly from coursework. Instead, the M.S. process, which requires students to develop evaluation committees to oversee their coursework, proposal development, and thesis, provides built-in assessment mechanisms that culminate in public presentation and formal defense of a thesis to the evaluation committee. Accomplishment is measured by a successful thesis defense along with approval of academic performance in coursework applicable to a student's research. Current programmatic assessment is the completion rate of graduate students, which is ~80 percent. The relatively high success rate is attributable to the fact that the vast majority of M.S. Forestry students are solicited individually through a highly competitive process and funded from research grants.

STUDENT LEARNING OUTCOMES & MEASUREMENT TOOLS (M.S. FORESTRY)

Student learning outcomes	Committee Coursework Evaluation/ Approval	Thesis/Paper Proposal Preparation and Defense	Thesis/Paper Presentation and Defense	External program review	Alumni Survey
1. Demonstrate knowledge, scholarship, and research skills in the core disciplines	X	X	X	X	P
2. Analyze, critique, synthesize scientific literature	X	X	X		
3. Conduct original research in an ethical and professional manner	X	X	X		
4. Identify applications of research in forestry and resource management		X	X		P
5. Articulate technical information in writing and speech	X	X	X		P
6. Synthesize and report research in a thesis/paper and plan for dissemination of results		X	X		

Key: X   Currently assessed   P   Planned/proposed assessments

RESULTS & MODIFICATIONS (M.S. FORESTRY)

The previous biennial assessment described an external evaluation conducted at the College level that identified a deficiency of graduate courses as well as a lack of cohesion among graduate students. Graduate student cohesion has been addressed in two ways. First, a multi-day student orientation program was developed at the College level and offered the week before the start of Fall semester 2021 and 2022 to bring all new graduate students together as a cohort. Second, a one-credit graduate seminar is now required of all students each semester to bring them together to share ideas, proposals, and research. Anecdotally, faculty report improvements in graduate student engagement with other students and resources, although a formal assessment mechanism for tracking student cohesion has not been identified.

A deficiency of graduate courses remains a challenge in the M.S. Forestry and little progress was made during the current biennial cycle. The lack of graduate courses (and the inconsistency with which they are offered) is a function of accumulated faculty vacancies, administrative re-assignments, and a shift in focus to the undergraduate curriculum; until vacant lines can be filled or backfill provided for re-assignments, it remains challenging to resolve this issue without impacting undergraduate programs. Progress is being made, however, with two faculty hires in DFM in 2023/2024. Although, DFM is currently working with other departments (e.g., computer science, math, business) to ensure that students gain access to a breadth of quantitative and analytical methods courses in addition to our own, these other programs are suffering the same accumulated faculty vacancies and administrative reassignments. For example, graduate courses in statistics were virtually absent across campus in Fall 2022 due to coincident staffing shortages in math, computer science, and forestry.

Finally, the table presented above under Student Learning Outcomes indicates that we have proposed to conduct alumni surveys to gain insights into Goal areas 1, 4, and 5. This proposal was made in the previous biennial cycle. We have not made progress on this part of the assessment due to previously described resource constraints (including time) and higher priority needs such as the UG curriculum. We still intend to conduct alumni surveys in the next biennial cycle but this endeavor remains a low priority relative to other needs. The College's Graduate Committee has proposed to design and implement an exit interview to assess the quality of the graduate experience and how effectively our programs were achieving student learning goals. The College has also discussed developing and maintaining an email database to facilitate alumni surveys. These would focus on the solicitation of reviews/advice regarding curricula, preparation for professional employment and/or academic advancement, and the overall graduate student experience. The Department of Forest Management will review and consider degree modifications when data from these activities are available.

FUTURE PLANS FOR CONTINUED ASSESSMENT (M.S. FORESTRY)

The M.S. in Forestry is historically and necessarily intertwined with other graduate programs in FCFC and most changes to them will occur through initiatives at the College level. Following are proposed activities to be conducted in the next biennial cycle.

1. Conduct a survey of graduate offerings across campus
2. Work with other UM programs to shore up consistent availability of core graduate offerings in statistics, data analytics, research methods, and earth/ecosystem sciences.
3. Develop a core of graduate offerings (2-3 courses) in the FCFC that are offered consistently and that serve students across all FCFC programs. These classes would likely focus on methods and techniques for statistical sampling; collecting, processing and analyzing data; and research design.

4. Coordinate and sequence the graduate curriculum so that the courses which are offered every-other-year can be better planned for and sequenced by graduate students.

Until these efforts are completed, plans for continued assessment are similar to the plans submitted previously. Faculty from DFM will, of course, contribute to these efforts. Also, the Department continues working across the College to provide a review of existing programs and broader opportunities for growth. The results of this process will shape priorities for continuing investment, and thus can be expected to shift assessment needs moving forward.

APPENDICES (M.S. FORESTRY)
No curriculum map is provided for this program. This is because a unique set of formal courses and independent study/research topics are pursued by each student, following recommendations and approval from their graduate committee.