Self-Study of the Graduate Program in Sustainable Forest Management

10-Year Program Review

Department of Forest Engineering, Resources, and Management

November 13, 2017

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In signing this document, I indicate that all graduate faculty members in the program have had an opportunity to participate in the development of this self-study and review the final document.

10/15/2017

John Sessions, Graduate Program Chair — Date

10/15/2017

Claire Montgomery, Department Head — Date

Contents

1.0 INTRODUCTION

1.1 History of Graduate Education at the CoF

The Department of Forest Engineering, Resources, and Management is one of three academic departments within the College of Forestry. The College is one of 12 academic colleges at OSU.

In 1906, the four-year undergraduate and one-year graduate program in forestry was established and in 1908 the Department of Forestry was established. In 1913, the School of Forestry was established and in 1921 graduate work in forestry was authorized with a Master of Science in Forestry, a Master of Forestry, a Master of Science in Forest Engineering, and a Master of Forestry in Forest Engineering. In 1959, a PhD program in Forest Management was initiated, and in 1963 the first PhD in Forest Management was granted. In 1974, the PhD program in Forest Engineering was initiated. In the late 1980's, the Forest Management department was changed to Forest Resources when the department expanded to include recreation, and the graduate program name changed from Forest Management to Forest Resources.

Prior to 2009, there were four departments in the College: Forest Engineering, Forest Resources, Forest Science, and Wood Science and Engineering. Each administered its own graduate program. In 2009, there was a reorganization of three departments (Forest Resources, Forest Engineering, and Forest Science) to two departments (Forest Engineering, Resources and Management or FERM, and Forest Ecosystems and Society or FES). Soon thereafter, the FERM faculty developed the following mission statement for the new FERM department:

To develop, communicate, and teach the science and engineering necessary for sustainable management of forest, land, and water resources to achieve economic, environmental, and social objectives. ~~~ Our department comprises a unique group of specialists in forest management, engineering, biometrics, hydrology, forest health, and silviculture working to support decisions for sustainable forests. Our teaching and research emphasize all aspects of active forest management and restoration from regeneration through harvest for multiple land use objectives, including wood production and management for values other than wood.

The new FERM department comprises faculty from each of the three original departments; all Forest Engineering (FE) faculty went to FERM, most Forest Science (FS) faculty went to FES with a few coming to FERM, and Forest Resources (FR) faculty was split fairly evenly between the two new departments. Hence, FERM faculty advised graduate students in each of the three graduate programs. This situation caused some administrative problems and led to some confusion among prospective students.

1.2 Creation of the Sustainable Forest Management Program

In November 2010, in an effort to remedy the situation, and to align the FERM department graduate program with the mission of the FERM department, a CAT I proposal was submitted to merge and rename the FR and FE graduate degrees into a single Sustainable Forest Management (SFM) degree. The CAT I proposal was approved in February 2011 and the first students entered the SFM program in Fall 2011.

Nationally, training of graduate and undergraduate students in forest management and sciences has moved toward ever more interdisciplinary approaches to complex processes, replacing traditional discipline-specific courses of study. The SFM program reflects this movement. With the overarching single major, the SFM program offers concentrations in all areas of active forest management including: 1) Forest Operations Planning and Management; 2) Forest Policy Analysis and Economics; 3) Forest Biometrics and Geomatics; 4) Silviculture, Fire, and Forest Health; 5) Forest Soil and Watershed Processes; and 6) Engineering for Sustainable Forestry.

1.3 Mission Statement

The mission of the SFM program aligns with the mission of the FERM department in the context of the missions of OSU[1] and the College of Forestry[2] and includes preparing students to:

- Be experts within their discipline(s).
- Have critical thinking skills and being able to pose appropriate and effective questions.
- Develop interdisciplinary skills and knowledge to critically evaluate existing research.
- Identify and contribute to collaborative solutions in their discipline.
- Be able to communicate knowledgeably and effectively about current topics in natural resources policy.
- Be prepared to participate in and contribute to interdisciplinary research teams and conduct rigorous, high-quality research.
- Add to the base of knowledge and understanding in sustainable forest management.

Our program contributes to all three of the OSU Signature Areas of *Advancing the Science of Sustainable Earth Ecosystems; Improving Human Health and Wellness; and Promoting Economic Growth and Social Progress,* in its central focus on the sustainable management of forested

[1] http://oregonstate.edu/leadership/strategic-plan
[2] http://www.forestry.oregonstate.edu/our-vision-mission-and-values

ecosystems for the economic, social, and physical well-being of people. And it contributes fundamentally to the College of Forestry mission "*to educate and engage the next generation of scholars, practitioners, and users of the world's forest resources, to conduct distinctive problem-solving and fundamental research on the nature and use of forests and related resources, and to share our discoveries and knowledge with others*."

1.4 Changes over the Last 5 Years

Since the implementation of the SFM degree in AY12, there have been major changes in the composition of the SFM graduate faculty (*Table 1.4A*). The leadership of the department has changed frequently. There have been 3 department heads since the beginning of FERM in 2009; there will be an interim head in 2018 and a search to recruit a permanent head will be launched in January. There have been 7 retirements, 6 resignations, and 1 promotion out of FERM. These changes have affected, we believe positively, our capacity to deliver graduate education. Although half the faculty have been at OSU for 3 years or less, we already observe:

1. Increased offerings of graduate level (G) courses,

2. Increased capacity to advise graduate students,

3. Potential for increased funding opportunities as new faculty develop research programs.

The status of the *active* SFM graduate faculty is presented in Table 1.4A. By *active*, we mean those who are actively directing graduate programs. Of those, several hold full-time appointments as administrators, extension specialists/agents, or instructors. To reflect *effective* advising capacity, we count these as ½ to reflect their actual advising capacity. In addition, there are around 30 courtesy faculty who may serve on graduate committees (Table 6-G).

Table 1.4A. Composition of FERM graduate faculty with permission to direct Doctoral programs.

Year	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018
Total Active	18	19	21	22	26	27	25
Total Effective	15.5	17	18	18.5	22	21	19
College-supported FTE	13.1	13.0	13.3	14.2	16.3	15.6	14.6
Full Professor	10	7	5	4	4	6	6
Associate Professor	5	5	5	6	5	6	5
Assistant Professor	0	4	5	6	11	10	10
Instructor	2	1	3	2	3	3	3
Fixed-term Senior Research	1	2	3	4	2	1	0

1.5 Current Challenges/Issues

The biggest challenges we face in the next few years for the SFM graduate program are:

1. Change. We are in the process of recruiting a new Department Head and there are two vacated faculty positions that we hope to fill – one specializing in Forest Roads and one, formerly geomatics, that we hope to redirect to policy/economics. Then faculty numbers should be stable. However, we have a lot of relatively young faculty and we now need to focus on nurturing successful career development and building an effective and collegial working community.

2. Disruption. Deconstruction of Peavy Hall commenced during Summer 2016. Almost the entire FERM department, including graduate students, was displaced to Snell Hall in Summer 2016. We currently expect to move to the new Peavy Hall in Fall 2018. Research labs were displaced as well.

3. Master of Forestry (MF) degree. With the decline of support for professional forestry degree programs nationwide, OSU is poised to fill a growing void of practical expertise by offering focused one-year MF degrees to graduates of natural resource, environmental science, and forestry degrees to strengthen their professional forestry education. We developed 3 professional MF programs in Forestry Business, Advanced Silviculture, and Geomatics under development for implementation in AY18, which we anticipate will grow MF enrollment. Others are under consideration.

Table 1.5A Graduate Student Enrollment in FERM Department

	Actual FR+FE	**Predicted SFM**	**Actual SFM**	**Actual Total[a]**
Fall of:	**2012**	**2015**	**Fall 17**	**Fall 17**
MF/MNR	6	18	9	16
MS	25	30	30	40
PhD	18	24	17	23
Total	49	72	56	79

[a] Actual Total includes students advised by FERM faculty who are in other degree programs: Water Resource Science/Engineering, Applied Economics, Civil Engineering, Crop and Soil Science, Forest Ecosystems and Society, and online Master Natural Resources (MNR).

4. Forest Engineering. Competence in forest engineering is essential for conducting forest operations with minimal impacts to the forest resource. Yet the national trend is to decrease investment in educating forest engineers. We, at OSU, offer the only ABET-accredited undergraduate forest engineering program in the United States and we have capacity to continue to conduct research and deliver graduate education in forest engineering. We recently made one important faculty hire in Forest Harvesting, to begin in March 2018, but 2 positions remain vacant – one in Forest Roads and one in Geomatics.

5. Cost of supporting graduate students. We face two concerns related to cost. First, the new CGE Collective Bargaining Agreements has increased the cost of graduate teaching assistants by imposing a minimum 0.3 FTE appointment level and disallowing student wage appointments (we sometimes used the latter for supplementing international students whose government support was low relative to GA stipend levels). Second, we now face a tuition remission budget that is quickly becoming restrictive as our graduate student numbers grow. This will impact our ability to support students using funding sources that do not allow tuition – such as USFS Joint Venture Agreements or Research Coop dues.

1.6 Strategic Planning

A 5-year internal review of the SFM graduate program was conducted in June 2017. In the review report, we were encouraged to "initiate a process to develop a strategic plan that clarifies program direction, hiring priorities, and curricular offerings."

The most recent effort to articulate a vision for the program and to develop a strategic plan occurred during the development of a proposal for the termination of the FR and FE degrees and the establishment of the SFM degree as a replacement. That plan is articulated in the Category I proposal document and is included as Appendix 7-A. In this self-study report, we address progress towards the enrollment goals and "Outcomes and Quality Assessment" goals set in the proposal.

That said, the review team is correct that we would benefit from a new strategic planning effort aimed not only at the SFM program but at the whole array of FERM programs and initiatives. The time, however, is not quite ripe for such an undertaking. As noted, 2/3 of the FERM faculty have been hired in the last 5 years. Service demands have been intense during that time. Everyone has served on up to 3 faculty search committees. There were planning and steering committees and focus groups for the new Peavy design, planning for and implementation of the relocation to Snell, ABET-reaccreditation, and a major undergraduate curriculum revision with the implementation of the Forestry and Forest Engineering Pro Schools. These demands came while new faculty were joining FERM, developing and teaching new classes, and building new research programs.

Things are settling down now. The wave of hiring is complete for the most part, the curriculum has stabilized, and new faculty have all taught their classes at least once. However, the department leadership is in transition. The current department head will retire at the end of December. The search for a replacement, conducted in Winter 2017, was unsuccessful. Therefore, there will be an interim head and a relaunched search beginning in January. A strategic planning effort, led by a new department head, will be an excellent vehicle for community building and setting goals for the department under new leadership. We plan to undertake a comprehensive strategic planning effort at that time.

1.7 Goals for the 10-Year Assessment

The program review and the preparation of this self-study report provides the SFM program with an opportunity to reflect on what we have achieved, where we are going, and where we can improve. Our primary goal is to receive valuable input (specific guidance) that will contribute to future successes.

Specifically, we seek to determine:

- If we are achieving our goal of preparing broadly trained professionals and scientists capable of managing forests sustainably.
- If our program is sufficiently rigorous.
- How we can continue to attract a sufficient cohort of students in an environment of declining support and increasing costs.

1.8 Organization of Self-Study Report

This self-study report has been prepared according to the Guidelines for review of graduate programs provided by the OSU Graduate School. Following this introduction, the following chapters are included:

Chapter 2. Program Description and Inputs

Chapter 3. Productivity

Chapter 4. Outcomes

Chapter 5. Summary

Chapter 6. Graduate School Sharepoint Data Tables

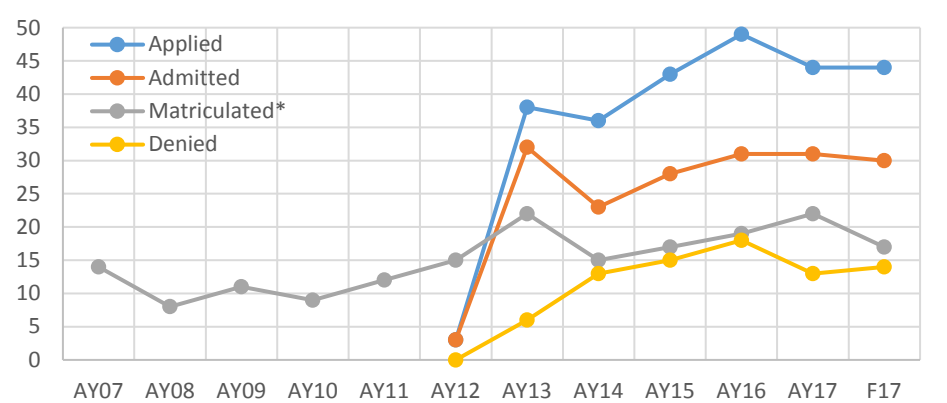
Note on the preparation of this document – We prepared this document for a 10-year review of the SFM graduate program that resulted from a merger of the Forest Engineering and components of the Forest Resources graduate programs. Since about half the FR graduate faculty aligned with FERM and SFM, while half aligned with FES, there is a discontinuity in our numbers. We attempted to reconstruct records that accurately reflect a continuous engagement of faculty now aligned with FERM, where possible. Where we were unable to reconstruct numbers, we report only SFM trends. Where differences exist between department records and the Graduate School reports, department records are used.

2.0 PROGRAM DESCRIPTION AND INPUTS

2.1 Characteristics Applications, Admissions, and Matriculations

The first SFM program applications began in winter 2012. This was a transition year between the former FR and FE degree programs and the SFM program. The number of matriculations to the SFM program since 2012 and for the discontinued FR (for FERM faculty) and FE programs from 2007-2011 are shown in *Figure 2.1A* along with the number of applications and admissions since 2011 (also shown in *Table 2.1A*). During AY12, three students were admitted to the SFM program. In subsequent years, applications to SFM ranged from 33 to 49 per year – 28% international and 28% female (*Table 2.1B*). 90% of domestic applicants identify as white. The largest non-white student applicant groups were Latino and Asian.

Figure 2.1A. Student applications to SFM Program:



The number of matriculating SFM students averages 19 per year, compared to 11 FE/FR in FERM per year for AY08 through AY12. 60% to 70% of those admitted to SFM matriculate. The average GPA of applicants and matriculates is 3.5 (*Table 2.1C)*. There appears to be a modestly increasing trend in the quality of matriculates as indicated by GRE scores. The average verbal and quantitative percentiles for AY16-AY18 were 20% higher than in AY13-15.

Table 2.1A. Students matriculated, declined, rejected, total and accepted % for Fall term 2011-2015. () indicates students that transferred into SFM from the former FOR and FE programs.

AY	Matriculated	Admitted	Denied	Total	Accept %
12	3	3	0	3	100
13	22 (4)	32	6	38	84
14	15 (2)	23	13	36	64
15	17	28	15	43	65

16	19	31	18	49	63
17	22	31	13	44	70
F17	17	30	14	44	68
Total	127	178	79	257	69

Table 2.1B. Applications by Gender, Citizenship, and Race/Ethnicity for Fall term 2011-2017.

AY	Female	Identify as White	Undisclosed Race/Ethnic	Identify as Race/Ethnic	Inter-national	Total
12	2	2	1	0	1	3
13	13	26	9	3	10	38
14	17	19	1	2	14	36
15	10	28	2	2	11	43
16	8	24	8	2	15	49
17	15	32	1	0	11	44
F17	8	31	1	2	10	44
Total	73	162	23	11	72	257

Table 2.1C. GPA and GRE scores (% of students with lower scores).

AY	Applicants				Matriculated			
	GPA	GRE Verbal	GRE Quant	GRE Analytic	GPA	GRE Verbal	GRE Quant	GRE Analytic
12	3.3	-	-	-	3.3	35	56	30
13	3.5	57	50	42	3.6	60	53	52
14	3.4	58	52	42	3.4	59	48	47
15	3.5	63	57	42	3.5	64	58	43
16	3.5	62	53	46	3.6	76	65	55
17	3.5	65	61	48	3.6	75	65	52
F17	3.4	72	58	56	3.5	73	59	47
Avg	3.4	63	55	46	3.5	63	58	45

2.2 Characteristics of Enrolled Students

The number of SFM students enrolled since 2011 is shown in *Figure 2.2A*, along with the number of FR (in FERM) and FE graduate students prior to 2011. FERM faculty also advise students in other programs. These are shown for the years in which we have data.

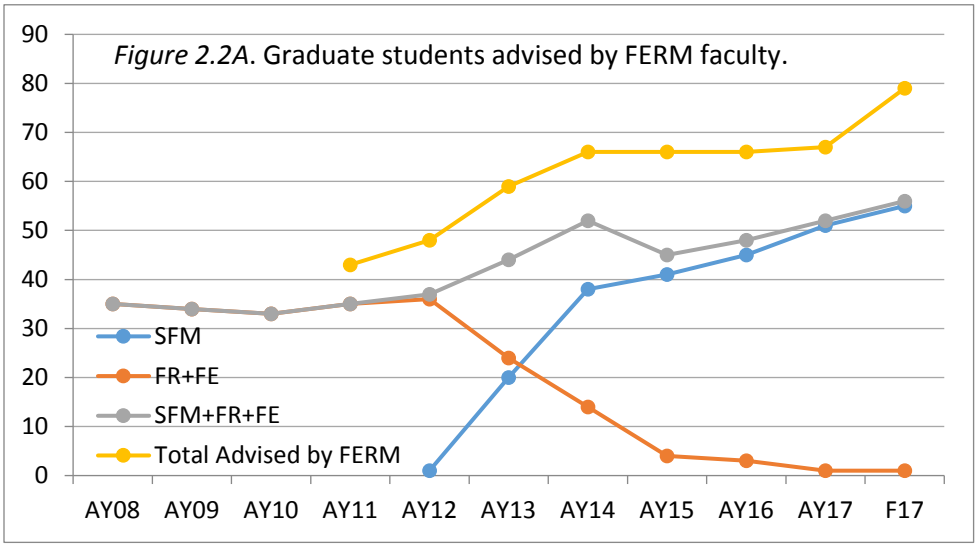
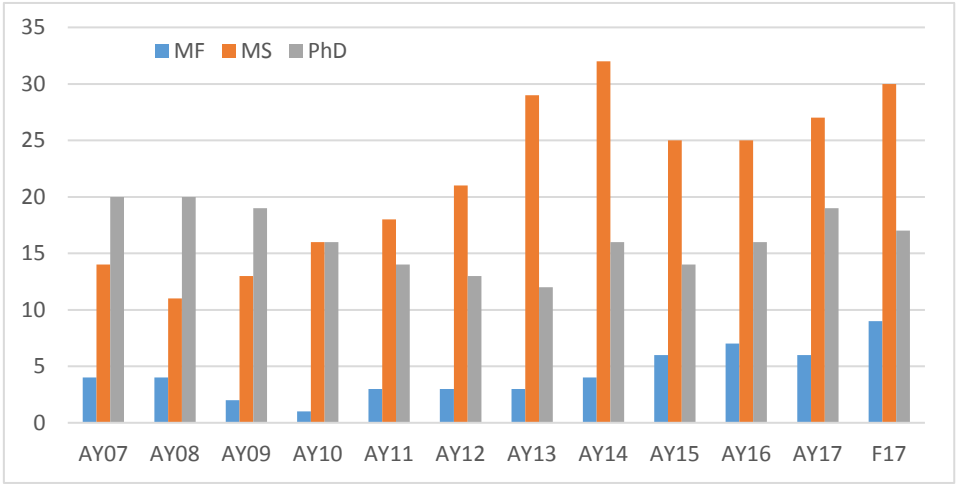


Figure 2.2A. Graduate students advised by FERM faculty.

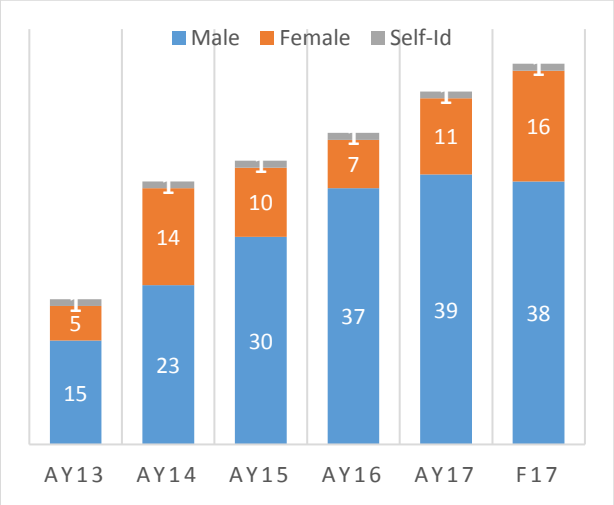
After a dip in enrollment during the economic recession of 2008, enrollment has more than recovered, with the gain primarily in the number of MS students. PhD students comprised a smaller proportion of graduate enrollment Fall 2009 to Fall 2015 than in previous years (*Figure 2.2B)*.

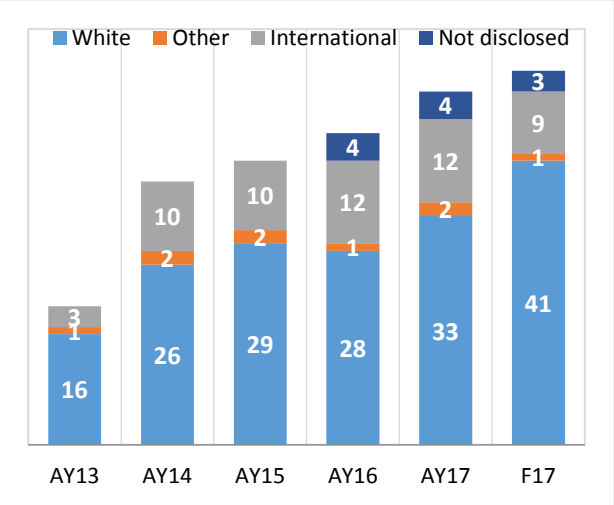
Figure 2.2B. Enrolled graduate students advised by FERM faculty in new SFM degree and old FR and FE degrees by degree objective.



The proportion of SFM students who are women has varied from 16% to 38% and is currently at 30%. International students typically comprise 25% of enrollment, but is only 16% this fall. Our domestic student population is not ethnically diverse.

Figure 2.2C. SFM enrollment by gender, citizenship, and ethnicity.





SFM is organized into six areas of concentration (*Table 2.2D*). The distribution of advisees in SFM and related programs reflects the distribution of faculty across areas of expertise. Applications are not comparably well-distributed and we turn more high-quality students in the area of Silviculture, Fire, and Forest Health than in any other area. Each year some students are rejected due to lack of available major advisor capacity but our overall graduate advising capacity has increased.

Table 2.2D. Number of students by Area of Concentration, Fall 2017. Students in related areas include FE, FR, Water Resources, Applied Economics, Civil Engineering, Crop and Soil Science, and Forest Ecosystems and Society.

Area of Concentration	SFM	Related Programs	Total
Forest Operations and Management	10	0	10
Forest Economics and Policy	7	1	8
Biometrics and Geomatics	10	7	17
Silviculture, Fire, and Forest Health	26	1	27
Forest Soil and Watershed Processes	2	9	11
Engineering for Sustainable Forest Management	0	7	7
Total	55	17	79

2.3 Recruitment and Admissions

2.3.1 Admissions Criteria

Guidelines are provided to prospective graduate students on the FERM website http://ferm.forestry.oregonstate.edu/application.

Applicants must meet the standards and requirements of the Graduate School (see the OSU Catalog or visit the OSU web site at www.oregonstate.edu) in addition to those of the Department. International students must meet the standards and requirements of the Graduate School. All applicants to SFM, including international students, must submit current scores for the Graduate Record Examination (GRE) General Test. GRE scores must not be older than five (5) years. We do not require a minimum score for admission. The GRE score is considered along with all other application materials in making admission decisions. In addition to the academic requirements listed above, we require that a major professor be assigned upon admission. There are two reasons for this. First, because of the multi-disciplinary nature of the SFM program and faculty, it is particularly important to match student and major professor interests when assigning advisors. Second, we find that the availability of immediate advising and mentoring improves student outcomes.

The final acceptance decision and assignment of major advisor is made by the department head. Students may request a reassignment if interests change or if the student/mentor relationship does not work well.

2.3.2 Recruiting Strategies

Our recruiting efforts could be termed passive. We generally rely on our reputation and our WEB presence. Once we have identified top candidates in the applicant pool, we initiate conversations with prospective major professors, we fund campus visits, and we do what we can to provide attractive financial support packages.

Any discussion of recruiting must include a parallel discussion of capacity. We expect regular teaching/research faculty to serve as major professor for 2-4 graduate students. Taking administrative, extension, and part-time appointments into consideration, we estimate our current capacity to be 37-74 graduate students. FERM faculty currently advise 79 graduate students – 56 in SFM. Hence, recruiting effort should be directed at increasing the quality, rather than the quantity of graduate students in our program.

2.4 Financial Support

2.4.1 Sources

Funding sources for students are external research grants awarded to faculty, member-funded research cooperatives managed by faculty, internal research grants awarded to faculty through

the Institute for Working Forest Landscapes or State budget line items, departmental appointments to assist in teaching (on-campus labs and/or Ecampus courses), University fellowships, and department fellowships. Some students are funded from outside sources or self-funded.

There are two types of ***fellowships or scholarships*** awarded to students in FERM: full fellowships that provide at least the equivalent of a 4-term GA at 0.49 FTE and fellowships/scholarships that are intended to supplement a GA or full fellowship. FERM students have access to full fellowships at 3 levels:

- Seven Provost's Distinguished Graduate Fellowship have been awarded to SFM PhD applicants since 2012; 5 have matriculated to our program.

- The College of Forestry Dean implemented a new fellowship program in 2015 that provides a matching fellowship to Provost Fellows in their 2nd year if the Department will commit to 2 additional years of support – ideally in the form of an externally funded GA appointment obtained by the major professor.

- The FERM Department is fortunate to have endowed graduate fellowship funds that provide full fellowships for 3 to 5 graduate students per year. We adopted a department policy for administering these fellowships in 2014 (See Appendix 7-B). It is expected that major professors seek funding for 2nd year and beyond for Department Fellows and for 3rd year and beyond for Provost Fellows. However, the Department is committed to use fellowship funds to support the 2nd year for MS and the 2nd and 3rd year for PhD students, should the major professor be unsuccessful.

College of Forestry awards $200,000-$300,000 per year in graduate scholarships/fellowships. In past years, these are typically in the range of $3000 to $6000 per year, with some as high as $22,000. Nominations for CoF awards are coordinated by the graduate program chair for each department. A College committee reviews the nominations and selects awardees. There are now three rounds of awards. In the first two rounds, the goal is recruitment and awards are limited to applicants based on application materials. In the third round, continuing students are considered as well. Because these are meant to be supplementary, preference is given to students who will have GA appointments.

Graduate assistantships for research are primarily funded by grants and administered by the grant PI who is usually the major professor. Other sources include start-up funds for new faculty and College Forest projects. Our standard start-up package includes 8 terms of GA support at 0.49 FTE.

The department provides ***graduate assistantships for teaching***. These appointments have historically been at 0.25 FTE (now 0.3 FTE as per CGE Collective Bargaining Agreement) for the

equivalent of one lab section or 0.49 FTE for supervised delivery of an Ecampus class. We are revisiting how we allocate support for teaching assistance in light of the Coalition of Graduate Employees collective bargaining agreement and the implementation of limited budgets for tuition remission. These teaching appointments are especially important for classes with field labs – particularly those that involve safety concerns, such visits to active logging sites.

Table 2.4. Graduate Student Support (MNR not included)	AY16			AY17		
	Fall	Wtr	Spr	Fall	Wtr	Spr
a. # FERM Grad Students Enrolled	57	54	51	59	63	56
b. % with tuition covered	70%	74%	80%	81%	84%	84%
c. GA FTE needed to support all students at 0.49 FTE	27.9	26.5	25.0	28.9	30.9	27.4
d. GA FTE provided	16.2	15.7	15.0	16.4	17.2	16.9
e. % of need funded by GA -- d/c	58%	59%	60%	57%	56%	62%
f. Number of Grad Fellows	6	6	8	8	10	10
g. % of need funded as Grad Fellow -- f/a	11%	11%	16%	14%	16%	18%
h. Total Level of Support -- e+g	**68%**	**70%**	**76%**	**70%**	**72%**	**80%**
i. % GA appointments funded at 0.49 FTE	89%	88%	85%	86%	84%	92%

We provide 56-62% of needed funding through GAs and 11-18% through graduate student fellowships. Of those with GA appointments, the proportion appointed at 0.49 FTE has increased steadily from 65% in AY11 (not shown) to ~ 90% in AY17. Approximately 20-30% of enrollment is not supported through OSU; external funding sources include international students funded by their home governments, employed students returning to defend, and Laurels tuition scholarships. Fewer than 10% of SFM students are fully self-funded.

2.4.3 Strategy Changes

Recruiting

We believe that one reason accepted applicants choose not to matriculate is lack of competitive funding. To address this, we moved from 1-year recruitment fellowships to multiple-year packages – 2 years for MS, 3 years for PhD, and 4 years for Provost Fellows. For example, Provost Fellowship awardees receive second year support from the College and FERM guarantees third and if needed, fourth year support, either by GA or fellowship. FERM uses Laurels Block Grant awards to pay tuition for outstanding MF applicants. In 2015, the Laurels Block Grant was pivotal in attracting our top MF applicant. For the last 2 years, the College has made $5000 per year available to each department to fund recruiting visits for applicants considering our program.

Continuing Support

To reward high achieving continuing SFM students, FERM aggressively pursues graduate fellowships including the Oregon Lottery (SFM students received two in 2012 and two in 2014) and continuing student graduate supplemental fellowships from the College (generally four to six per year).

2.5 Curriculum

Students choose one of six areas of concentration (AoC):

- **Forest Operations Planning and Management (FOPM)–** Planning, organizing, and executing forest plans; enhancing supply chain efficiency and improving competitiveness.s
- **Forest Policy Analysis and Economics (FPAE)** - Analyzing tradeoffs in the forest and resource policy decision process; public land use policy; interpreting regulations; markets for forest products; forest certification; theoretical and applied research related to ecosystem services.
- **Forest Biometrics and Geomatics (FBG)-** Modeling tree and stand development; forest data sampling and monitoring methods; mapping and data management technologies.
- **Silviculture, Fire, and Forest Health (SFFH)** - Managing vegetation to achieve management objectives, from restoration to intensive timber production; fire ecology and fire management; forest ecosystem health.
- **Forest Soil and Watershed Processes (FSWP)** - Understanding watershed conditions and processes in forested ecosystems and the effects of management activities; evaluating and improving soil and water quality and related practices and policies for forest operations.
- **Engineering for Sustainable Forestry (ESF)** – Designing forest operations to achieve sustainable forest management objectives; ecological restoration operations; road design and construction; harvesting systems.

In addition, MF students may choose from one of 3 focused Programs of Study in:

- Forest Business for Private Landowners
- Spatial Science and Analysis
- Silviculture, Fire, and Forest Health

Typical programs of study for each Area of Concentration for the MF, MS, and PhD programs are in the SFM Graduate Advising Guide http://ferm.forestry.oregonstate.edu/academic-programs/graduate-degree. The SFM program requires three core courses for all SFM students

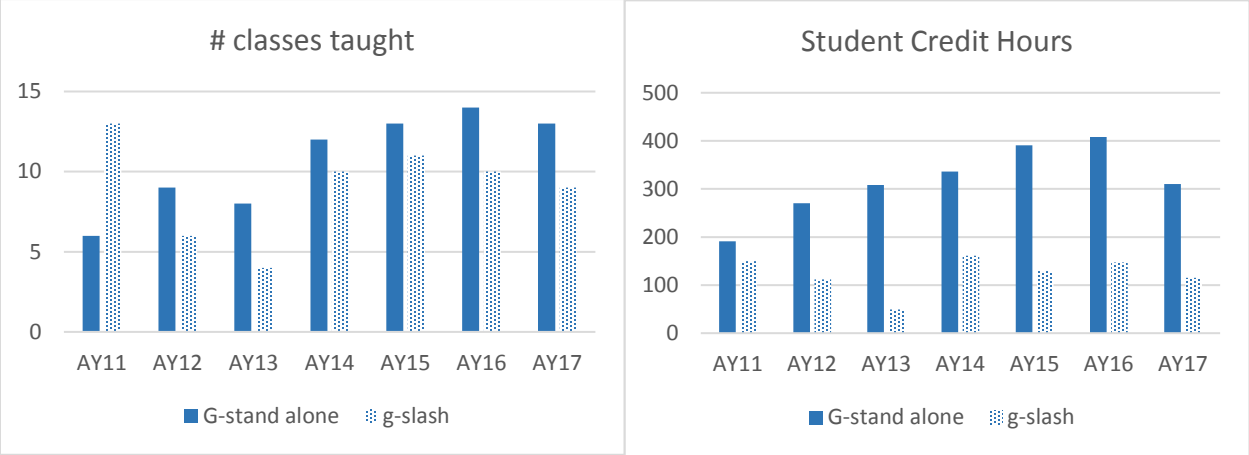
plus an additional two required core courses depending on the graduate student area of concentration within the SFM program.

2.5.1 Curriculum Concerns and Issues

The FERM department head conducts exit surveys/interviews with each graduating SFM student. One recurring complaint has been the small number of stand-alone graduate classes that were being taught on a regular basis; many of the classes listed in the catalog were taught sporadically, if at all. We have worked hard to mitigate the situation and, in recent years, this has no longer been mentioned as a concern – even when specifically asked.

Number of graduate classes taught (and sudent credit hours generated) by FERM faculty are shown in *Figure 2.5*. Because we reassigned course designators in the 4 years following the College reorganization, our numbers do not match those generated by the Graduate School. We constructed our numbers based on FERM faculty teaching assignments and catalog queries. We report classroom instruction only and exclude blanket courses and thesis credits. In the SFM program, there is little distinction between 500 and 600 level classes and the statistics are combined. Graduate course offerings declined during 2010 to 2012 and are now increasing along with course credit. Graduate course credit hours have also been increasing. The number of standalone graduate courses (G) has nearly doubled since AY11. Slash classes (g) are offered whenever the associated undergraduate class is offered and enrollment is sporadic. We reported only classes with enrollment.

Figure 2.5. Number and SCH for *stand-alone* (G) and *slash* (g) graduate classes taught by FERM faculty.



2.6 Graduate Learning Outcomes

The SFM program outcomes that were designed to meet the overall Graduate School Learning Outcomes for Doctoral and Master's students are as follows:

1. Ability to conduct and defend original research that is a significant contribution to sustainable forest management (the Doctoral requirements state that the research must also be original).

2. Demonstrate skills in written and oral communication.

3. Demonstrate mastery of the subject material.

4. Be able to conduct research, teaching, and service with high ethical standards.

2.6.1 Assessment

We measure these outcomes as follows:

1. Faculty assess the qualifications of the student as an independent scholar during a final oral defense of the thesis for both MS and PhD students and have a further chance to evaluate mastery for PhD students during the Preliminary exam.

2. For the MS/PhD degree, the student's committee evaluates the quality of the thesis to ensure that it represents a well written document. For the MF degree, the student's committee assesses the defense of the project at the final defense and the major professor is responsible for grading of the project. Communication skills are developed through participation in two graduate seminars and then assessed through the quality of the final presentation at the defense.

3. Students must successfully complete all coursework in their program and maintain a minimum GPA of 3.0. Student knowledge of coursework is also assessed during the final oral defense of the thesis.

4. Students can complete the ethics training by taking GRAD 520/IST 520, by participating in the NSF or CITI online courses, or by taking FES 521. A new course is under development to meet this requirement specifically for MF students.

In 2012, following up on the Graduate Council adoption of the graduate learning outcomes, we developed a set of rubrics (*Table 2.6A*) to assist in evaluation of student performance at the preliminary and final examinations. These rubrics were adopted by the faculty, incorporated into the SFM graduate advising guide, and implemented at the Fall 2012 graduate student orientation. The rubrics provide the student with our educational expectations and how they will be measured at the final examination. The rubrics are completed at the final examination by each faculty member and form the basis for the examination decision. The completed rubrics are stored digitally at the department. The data from rubrics provide feedback on general gaps in our program. A similar rubric is used at the PhD preliminary examination.

Table 2.6A. SFM Rubrics for Evaluating Graduate Student Learning Outcomes.

Ph.D. Outcomes	M.S. Outcomes	M.F. Outcomes
Outcome 1. *Able to define a research problem.*	**Outcome 1***. Able to define a research problem.*	**Outcome 1**. *Can demonstrate proficiency in the area of study.*
Outcome 2. *Able to do a literature search and synthesize previous work*.	**Outcome 2**. *Able to do a literature search and synthesize previous work.*	**Outcome 2.** *Able to state goals of a professional project clearly, providing motivation for undertaking a project.*
Outcome 3. *Can understand impact of a proposed research*.	**Outcome 3**. *Can understand impact of a proposed research*.	**Outcome 3.** *Able to do a literature search on a specific problem.*
Outcome 4. *Can apply sound state-of-the-field research methods/tools to solve a defined problem and describe the methods/tools effectively*.	**Outcome 4**. *Can apply sound state-of-the-field research methods/tools to solve a defined problem and describe the methods/tools effectively*.	**Outcome 4.** *Can demonstrate the potential value of solution or application within the area of study.*
Outcome 5*. Can analyze and interpret research results/data effectively.*	**Outcome 5.** *Can analyze and interpret research results/data effectively.*	**Outcome 5.** *Can apply sound state-of-the-field methods/tools to solve a defined problem and can describe the methods/tools effectively.*
Outcome 6. *Can communicate research results clearly and professionally in both **(a)** written and **(b)** oral form.*	**Outcome 6**. *Can communicate research results clearly and professionally in both **(a)** written and **(b)** oral form.*	**Outcome 6.** *Can communicate project results clearly and professionally in both **(a)** written and **(b)** oral form.*
Outcome 7. *Can demonstrate capability for independent research in the area of study, <u>significant expertise in the area</u>, and ability to make original contributions to the field.*	**Outcome 7**. *Can demonstrate capability for independent research in the area of study, <u>significant expertise in the area</u>, and ability to make original contributions to the field*.	**Outcome 7.** *Can Demonstrate awareness of broader implications of a project*.
Outcome 8. *Can demonstrate awareness of broader implications of a proposed research.*	**Outcome 8**. *Can demonstrate awareness of broader implications of a proposed research.*	**Outcome 8.** *Can develop a journal or conference publication*
Outcome 9. *Can develop a journal/conference publication.*	**Outcome 9**. *Can develop a journal/conference publication*.	**Outcome 9.** *Understands responsible and ethical conduct of research/professional conduct*
Outcome 10*. Understands responsible and ethical conduct of research.*	**Outcome 10**. *Understands responsible and ethical conduct of research.*	

2.6.2 Student Retention Rate

Each student completes an annual performance review with the major professor. The purpose of the review is to ensure satisfactory progress to the degree. The annual review is signed by the student, major professor, and department head.

We have had a total of 45 students graduate from the SFM program from its inception through AY17: 13 MF, 30 MS, and 2 PhD. Average time to completion is 6 academic year terms for MF, 7

for MS, and 12 for PhD. SFM students are generally provided funding for summer work on research, which often requires field work.

2.6.3 Inactive/Discontinued Student Programs

As of end of AY17, 10 students have left the SFM program without completing a degree and 4 are currently on leave.

2.6.4 Academic Warnings

During the period 2012-2017 we received warnings from the Graduate School on six graduate students with less than a 3.0 GPA during any quarter. Two of the students with a GPA warning have graduated. Meetings with 4 of the students were conducted by the Program Chair and major professor (2 additional students had a quarter GPA of 2.97 and these students were not contacted). Procedures were emailed to all faculty on how to access MyOSU to review their student academic progress.

2.7 Personnel

Information regarding active SFM faculty (those actively directing graduate programs) is in *Table 2.7A*. All are approved to teach graduate courses, direct non-thesis students, serve on graduate committees, and direct Masters and Doctoral programs. Due to either full-time administrative or extension appointments, 6 members of the graduate faculty do not teach courses. In addition, there are approximately 30 courtesy faculty who do not direct graduate programs, but may teach or serve on graduate committees. The full SFM graduate faculty, including courtesy, is listed in Table 6-G. Courtesy appointments are for 3 years and, hence, this list changes relatively frequently.

Faculty members are associated with Areas of Concentration (AoC); they can be associated with more than one. The six AoCs and participating faculty are: Forest Operations Planning and Management (FOPM – 5 faculty), Forest Policy Analysis and Economics (FPEA – 4 faculty), Forest Biometrics and Geomatics (FBG – 5 faculty), Silviculture, Fire, and Forest Health (SFFH – 9 faculty), Forest Soil and Watershed Processes (FSWP – 5 faculty), and Engineering for Sustainable Forestry (ESF – 8 faculty). Of these six areas, Silviculture, Fire, and Forest Health is the only AoC that regularly turns high quality students away due to faculty capacity constraints.

2.7.1 Trends in Graduate Faculty Numbers

The graduate SFM faculty has been in active transition since 2012. In 2012, there were 18 graduate faculty members; there are now 25 (*Tables 1.4A and 2.7B*).

Historically, faculty appointments in the College of Forestry were 12-month 1.0 FTE. In 2012, it became CoF policy to fill vacant positions as 9-month 1.0 FTE positions (with the exception of extension specialists or faculty whose position description includes an administrative

appointment). Therefore, while the number of graduate SFM faculty has increased by 39% since AY12, College-funded FTE has increased by only 11% in that same time period.

2.7.2 Transition from Senior to Junior Faculty

The faculty has transitioned from primarily senior faculty to primarily junior faculty. In AY12, 56% of the SFM faculty were full professors and 0% were assistant professors. Now only 28% are full professors and 40% are assistant professors. In the next five years, junior faculty will be progressing in rank and attaining tenure.

2.7.4 Faculty Diversity

The ongoing renewal of the FERM faculty has given us a unique opportunity to transform the FERM department. We have become markedly more diverse, in terms of gender, ethnicity, and academic pedigree, over the last 5 years as a result of the recent wave of hiring. Historically, there has been a strong preference for hiring CoF faculty who have experience with PNW forestry: Douglas-fir in steep terrain; the result was a faculty dominated by individuals who earned their PhD's in the College of Forestry at OSU. In AY12, the FERM faculty was 95% white, 95% male, and 45% OSU terminal degree. Of the 15 faculty who joined FERM since 2012, 60% are white male and only 20% OSU terminal degrees so that in AY17, the department faculty was 76% white, 80% male, and 30% OSU terminal degrees.

Table 2.7A. Faculty statistics. (* denotes full-time administrative appointment)

Faculty	Rank	Area of Conc	Home[a]	Graduating Institution	Degree	Appt Date
Bailey, John	Professor	SFFH	FERM (100%)	Oregon State Univ	PhD	Dec. 2005
Belart, Francisca	Assistant Prof	FOPM	FERM & Ext (100%)	Oregon State Univ	PhD	Aug. 2016
Bladon, Kevin	Assistant Prof	FSWP	FERM (100%)	Univ Alberta	PhD	Sept. 2014
Chung, Woodam	Associate Prof	FOPM & ESF	FERM (100%)	Oregon State Univ	PhD	Sept. 2014
Cushing, Tamara	Assistant Prof	FPAE	FERM (50%) & Ext (50%)	Univ Georgia	PhD	Jun. 2014
Davis, Anthony[a]	Prof & Assoc Dean	SFFH	FERM & DO (100%)	Purdue Univ	PhD	Aug. 2016
Fitzgerald, Stephen	Professor	SFFH	FERM, Ext (75%) & DO (25%)	Univ Idaho	MS	Feb. 1984
Gonzalez-Benecke, Carlos	Assistant Prof	SFFH	FERM (100%)	Univ Florida	PhD	Jul. 2015
Hailemariam, Temesgen	Professor	FBG	FERM (100%)	Univ British Columbia	PhD	Sept. 2003
Hatten, Jeff	Assistant Prof	FSWP	FERM (100%)	Univ Washington	PhD	Sept. 2012
Huntington, Geoff[a]	Sr Instructor & Dir	FPAE	FERM (30%) & DO (70%)	Oregon State Univ	JD	Apr. 1996
Kiser, Jim	Instructor	FBG & SFFH	FERM (100%)	Oregon State Univ	PhD	Apr. 2013
Kuusela, Olli-Pekka	Assistant Prof	FPAE	FERM (100%)	Virginia Tech	PhD	Sept. 2015
LeBoldus, Jared	Assistant Prof	SFFH	FERM (50%) & BPP (50%)	Univ Alberta	PhD	Sept. 2015
Leshchinsky, Ben	Assistant Prof	ESF	FERM (90%) & CE (10%)	Columbia Univ	PhD	Sept. 2012
Lyons, Kevin[b]	Associate Prof	ESF	FERM (100%)	Oregon State Univ	PhD	**Mar. 2018**
Maguire, Doug	Professor	FBG & SFFH	FERM (100%)	Oregon State Univ	PhD	Aug. 1996
Montgomery, Claire[a]	Professor & Head	FPAE	FERM (100%)	Univ Washington	PhD	Sept. 1995
Olsen, Michael	Associate Prof	ESF	FERM (10%) & CE (90%)	UC San Diego	PhD	Apr. 2016
Powers, Matt	Instructor	SFFH	FERM (100%)	Michigan TechUniv	PhD	Aug. 2013
Segura, Catalina	Assistant Prof	ESF & FSWP	FERM (100%)	Univ Colorado	PhD	Oct. 2013
Sessions, John	Emeritus Professor	FOPM ESF	FERM (100%)	Oregon State Univ	PhD	Sept. 1983
Shaw, David	Associate Prof	SFFH	FERM (15%) & Ext (85%)	Univ Washington	PhD	Aug. 2005
Souder, Jon	Assistant Prof	FSWP	FERM(25%) & Ext (75%)	UC Berkley	PhD	Oct. 2015
Strimbu, Bogdan	Assistant Prof	FBG & FOPM	FERM (100%)	Univ British Columbia	PhD	Sept. 2015
Wing, Michael	Associate Prof	FBG & ESF	FERM (100%)	Oregon State Univ	PhD	Oct. 1991

[a] DO = Dean's Office, Ext = Forestry Extension, BPP = Botany & Plant Pathology, CE = Civil Engineering

[b] Lyons is a new hire and will join us in March 2018.

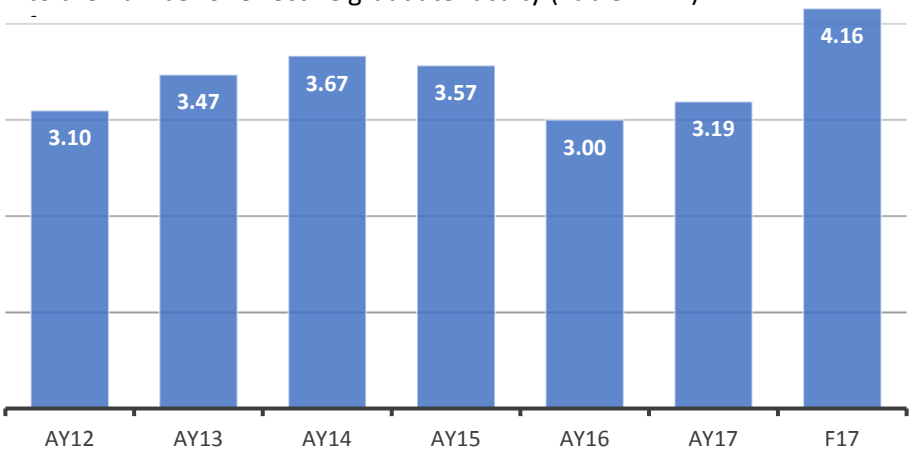
Table 2.7B. SFM graduate faculty transitions since 2012.

SFM Graduate Faculty	Current Rank	Status
Adams, Paul	Emeritus Professor	Retired 2014
Argerich, Alba	Assistant Professor (SR)	Resigned 2016
Boston, Kevin	Associate Professor	Resigned 2016
Hilker, Thomas	Assistant Professor	Resigned 2016
Kellogg, Loren	Emeritus Professor	Retired 2014
Latta, Greg	Assistant Professor (SR)	Resigned 2016
Maness, Thomas	Professor and Dean	Promoted 2012
McDonnell, Jeff	Professor	Resigned 2012
Murphy, Glenn	Emeritus Professor	Retired 2013
Pyles, Marvin	Emeritus Professor	Retired 2014
Rose, Robin	Professor	Retired 2014
Sessions, John (active)	Emeritus Professor	Retired 2016
Skaugset, Arne	Emeritus Associate Prof	Retired 2015
White, Eric	Assistant Professor (SR)	Resigned 2015
Argerich, Alba	Assistant Professor (SR)	Joined 2014
Belart, Francisca	Assistant Professor (Ext)	Joined 2016
Benecke, Carlos Gonzalez	Assistant Professor	Joined 2015
Bladon, Kevin	Assistant Professor	Joined 2014
Chung, Woodam	Assistant Professor	Joined 2014
Cushing, Tamara	Assistant Professor (50% Ext)	Joined 2014
Davis, Anthony	Professor	Joined 2016
Hatten, Jeff	Associate Professor	Joined 2012
Hilker, Thomas	Assistant Professor	Joined 2012
Kiser, Jim	Instructor	Joined 2013
Kuusela, Olli-Pekka	Assistant Professor	Joined 2015
Latta, Greg	Assistant Professor (SR)	Appointed 2014
LeBoldus, Jared	Assistant Professor	Joined 2015
Leshchinsky, Ben	Assistant Professor	Joined 2012
Lyons, Kevin	Associate Professor	Will Join 2018
Olsen, Michael	Associate Professor	Appointed 2016
Powers, Matt	Instructor	Joined 2013
Segura, Catalina	Assistant Professor	Joined 2013
Souder, Jon	Assistant Professor	Joined 2015
Strimbu, Bogdan	Assistant Professor	Joined 2015
Wing, Michael	Associate Professor	Appointed 2012
Bailey, John	Professor	Unchanged
Fitzgerald, Steve	Professor (Ext) - Admin	Unchanged
Huntington, Geoff	Senior Instructor - Admin	Unchanged
Maguire, Doug	Professor	Unchanged
Montgomery, Claire[a]	Professor/Dept Head	Unchanged
Shaw, Dave	Associate Professor (Ext)	Unchanged
Temesgen, Hailemariam	Professor	Unchanged

[a] Montgomery will retire in December 2017.

2.7.5 Student to Faculty Advisor Ratio

Figure 2.7C. Ratio of the number of FERM graduate students (all degrees) to the number of effective graduate faculty (Table 1.4A)



All graduate students, including MF students, have a faculty advisor. The ratio of graduate students (including Water Resources, Civil Engineering, Natural Resources, and Applied Economics) to *effective* (resident, not retired, accounting for full-time administrative or extension appointments) graduate faculty is shown in *Figure 2.7C*.

There are 4 points worth emphasizing in this graph:

- Expectations are being met (e.g. 2-4 students per graduate faculty).
- The numbers mask wide discrepancies in numbers across individual faculty. Actual number of graduate advisees for individual faculty ranged from 0 to 11 over the time period reported here. This is a situation that we are working hard to address.
- In AY15, 4 new assistant professors joined the SFM graduate faculty and there were 5 more in AY16. As new assistant professors build their research programs and recruit students, average graduate advising loads will increase.

2.7.6 Faculty and Student Office Space

All faculty have private offices. SFM graduate students have an assigned desk (open cubicle); these are currently scattered between Richardson Hall and Snell Hall as we are relocated for the reconstruction of Peavy Hall. Some faculty prefer to cluster graduate students in research lab groups. The quality of student office space was a concern in the old Peavy Hall (see Section 4.3) Graduate students space will be impacted negatively during the 18-month construction period, but will be greatly improved in the new Peavy Hall.

2.7.7 Organizational Support

The SFM graduate program is supported by the FERM Administrative Manager, who handles human resources for both the undergraduate and graduate programs, and the Graduate Program Coordinator who processes applications, maintains records and the graduate advising guide, and is the first stop for graduate student questions. Both the Administrative Manager and Graduate Program Coordinator have received awards recognizing superior service to faculty and graduate students. In graduate student exit interviews, students uniformly praise the FERM office support staff. The College of Forestry also provides a Computer Helpdesk with a 10-person staff to assist graduate and undergraduate students, as well as a statistical consultant to help with research design; these staff also receive strongly positive comments from graduating students during exit interviews.

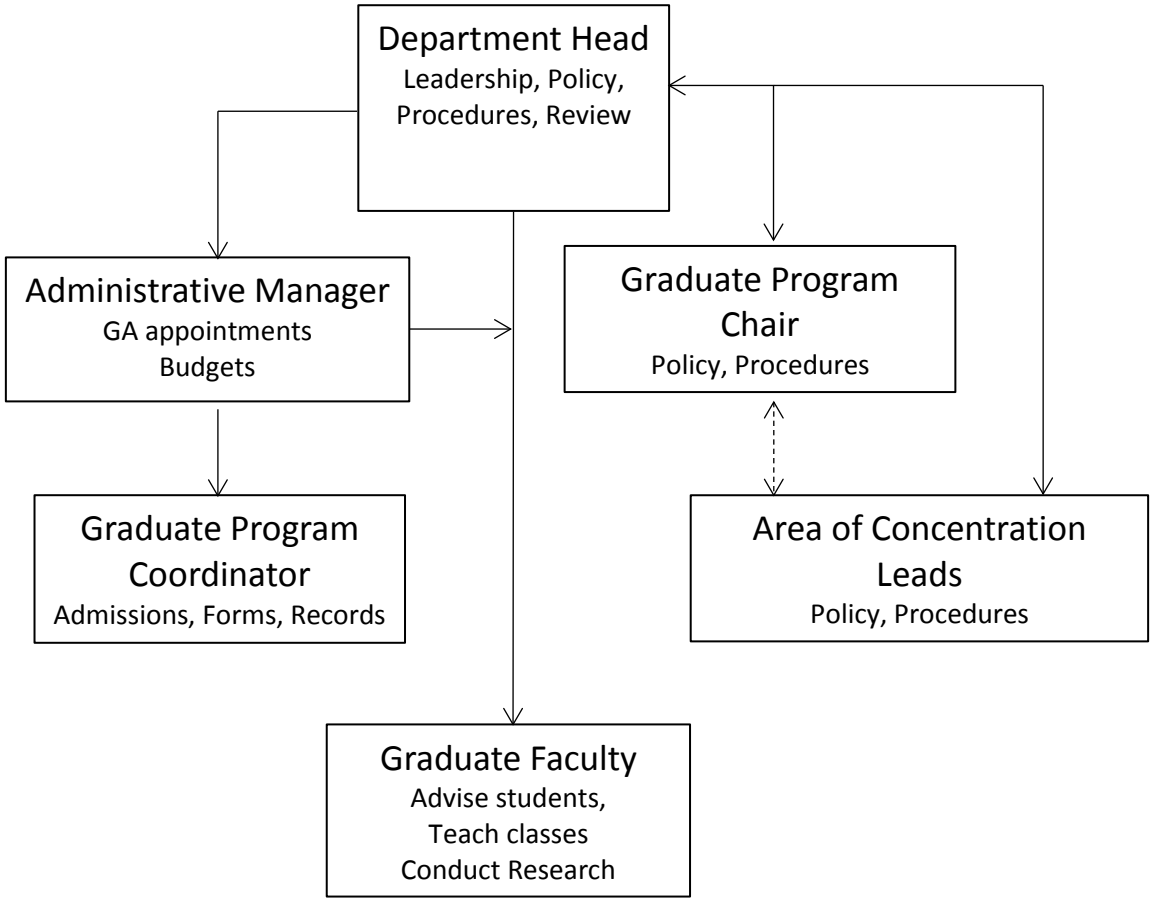
2.8 Facilities

The College manages the 11,500-acre MacDonald-Dunn Forest for research, teaching, revenue, community outreach and relations, and recreation. There are usually 40 to 80 active research projects under way on the Forest at any given time. More than 40 university classes receive part of their instruction on the Forest each year.

FERM was housed in Peavy Hall, which has been demolished and is currently being rebuilt. In the old Peavy Hall, there were roughly 1900 square feet allocated to graduate student desks, 3700 square feet allocated to computational lab groups (which house both graduate students and research support faculty, such as postdocs and faculty research assistants), and 7300 square feet allocated to wet and dry lab uses, including 1200 square feet that were allocated to the Department of Wood Science and Engineering. Much of this space was located in the basement of the old Peavy Hall, where lighting, temperature, and moisture/leakage were concerns. An additional 2500 square feet of wet lab space was allocated to uses outside the College that will not be located in the new Peavy Hall. In the new Peavy Hall, there will be less square footage: roughly 1600 square feet for graduate student desks, 3200 square feet for computational lab groups, and 6500 square feet for dry lab uses. Wet lab uses have been relocated to Richardson Hall where several wet labs were under-utilized (e.g. used for storage or dry lab). We anticipate that the functionality of the new space in Peavy Hall will be greater than in the old building. In particular, there will be an additional 1000 square feet for faculty storage cubicles (for samples, equipment, and materials that are currently stored in labs). The labs will be organized by function rather than individual faculty, allowing more flexibility for adapting to changing needs. There will be shared lab space for surge uses, such as sample processing, that currently occur in individual labs. And there will be office space allocated for research support faculty who are currently often housed in labs.

2.9 SFM Administrative Organization Chart

Figure 2.9. Organization chart of FERM staff and faculty affiliated with the SFM graduate program.



3.0 PRODUCTIVITY

3.1 Student Performance

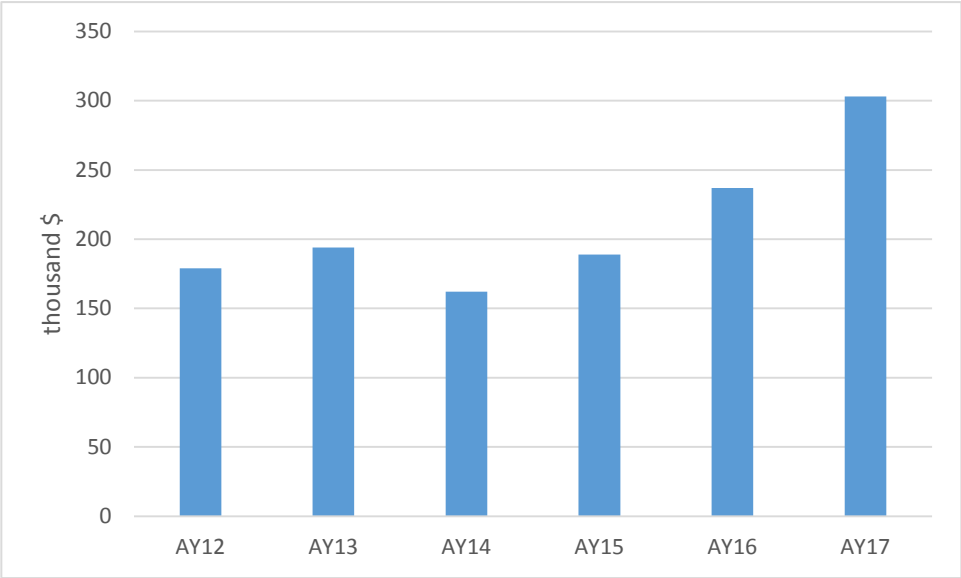
The average graduate student GPA for SFM students taking graded courses during academic year 2016 was 3.77 with a range of 3.14 to 4.0.

3.1.1 Student Honors and Awards

SFM graduate students have been recognized by the Oregon State University chapter of National Honor Society of Phi Kappa Phi, as well as the Oregon State chapter of Xi Sigma Pi. SFM graduate students have also been successful at winning continuing student scholarships through the Oregon Lottery. One student was recognized as the best student paper at a recent annual Council on Forest Engineering meeting. Another was recognized as the top presenter at the OSU University-wide Scholar's Insight competition.

Our graduate students compete well for both entering and continuing fellowships, scholarships, and travel awards receiving over $300,000 in AY17 (*Table 3.1A*).

Table 3.1.A. Scholarships, fellowships, and travel awards received by FERM students during AY12-AY17.



3.1.2 Presentations, Publications and Related Activities

SFM students participate in a wide range of activities including oral presentations at symposiums, poster presentations, manuscript preparation, and grant proposals. We do not track these as accurately as we might, but during 2014/2015 (as a representative year) SFM graduate students made at least 27 symposium presentations, 14 poster presentations, and 7 grant and fellowship proposals. In calendar year 2014, SFM faculty co-authored at least 28 publications with current or recent graduate students.

As part of each SFM student's academic program, the presentation of one poster and one oral presentation on their research is required. This is usually done during the student-organized Western Forestry Graduate Research Symposium held in late April, though other venues such as professional meetings can substitute.

A complete list of dissertations/theses/projects is in Table 6-H.

3.2 Faculty Performance

Faculty vitae are supplied separately on a flash drive.

3.2.1 Teaching

The College recently adopted a teaching policy that sets an minimum expectation of three 3-credit courses per year. In the past, FERM faculty carried a heavier teaching load than in other departments, with some faculty teaching as many as 7 classes per year. This had negative impacts on career advancement for some of those faculty. The teaching policy has allowed for reassignment within FERM and within the College to level the playing field. In FERM, with few exceptions, faculty members teach the equivalent of 3.5 classes per year. The exceptions include faculty who choose to teach more, faculty who direct research coops, and faculty who have extension and/or administrative appointments. Most graduate faculty will teach 1 graduate and 2 undergraduate courses per year. Most undergraduate classes are 4-credits and involve field or computer labs. New faculty members build their teaching programs over the first 3 years of their appointment.

3.2.2 Scholarly Productivity

Metrics for faculty grant, publication, and graduate student advising activity are shown in *Table 3.2A*. There is an overall increasing trend in research productivity. This is a trend that we are happy about and we anticipate will continue in the near future because of the replacement of end-of-career faculty with early-career faculty. However, we face the same uncertainty regarding future federal funding for research and state support for higher education that the University faces as a whole.

Table 3.2A. Trends in scholarly output for the SFM graduate faculty in total, per faculty FTE, and per faculty research FTE for grant, publication and graduate student advising activity

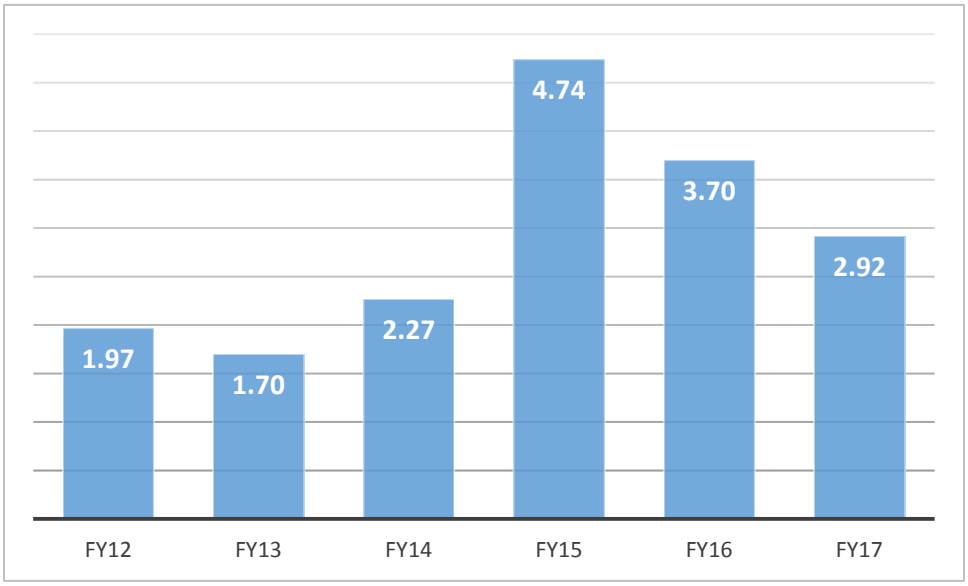
Fiscal Year:	11	12	13	14	15	16	17	Fall 17
Grad Faculty	19	21	21	22	24	26	27	25
Grad Faculty FTE[a]	14.0	13.1	13.0	13.3	13.8	16.3	15.6	14.6
Research FTE	5.9	4.7	4.1	4.2	4.9	6.2	6.0	5.9
Grant Activity[b] (mill $)	3.5	3	2.6	3.2	5.8	4.6	3.4	--
MS/MF/MNR students	25	31	43	46	48	45	44	56
PhD students	18	17	15	20	17	21	23	23
Total Students	43	48	59	66	66	66	67	79
Calendar Year:	2010	2011	2012	2013	2014	2015	2016	--
Refereed Journal Articles	41	85	57	70	71	70	79	--
Other Research Pubs	20	23	27	29	34	41	44	--

3.2.3 Grants and Contracts

The grant activity reported in *Table 3.2A* includes any activity tracked in Cayuse – external grants and contracts – research funds channeled through the Forest Research Lab, research cooperative membership dues, and funds distributed via internal competitions are excluded. These can be substantial. In Fiscal Year 2016, FERM faculty were awarded $0.53 million in internal competitions and there were 4 research cooperatives which generated nearly $1 million in dues.

External grants and contract income, shown in *Figure 3.2A*, totaled $11.4 million for the last 3 fiscal years – compared to $5.9 million for the previous 3 years. The greatest number of grants are from USDA—other sources include USDI, DOE, NCASI, NASA, NSF, ODF, Oregon BEST and NIOSH. SFM were instrumental in establishing OSU as an FAA Unmanned Aerial Systems Center of Excellence.

Figure 3.2A. **Value of external grants and contracts** received by SFM faculty during in Fiscal Years FY12 – FY17 (million $).



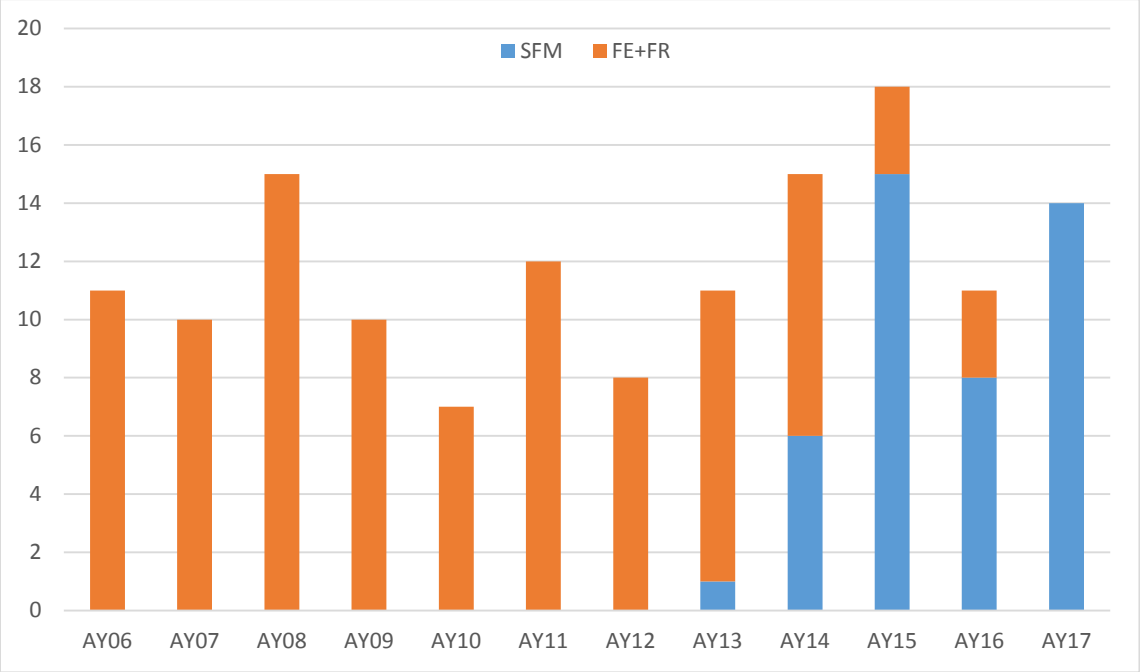
4.0 OUTCOMES

4.1 Degrees conferred

The first graduate from the SFM program was in AY13. As noted above, a total of 45 students had graduated from the SFM program by the end of AY17: 13 MF, 30 MS, and 2 PhD. Average time to completion is 6 academic year terms for MF, 7 for MS, and 12 for PhD. Prior to AY13, an

average of 10 FE and FR graduate degrees were conferred per year. Since then, an average of 14 SFM, FE, or FR degrees have been conferred per year.

Figure 4.1A. Number of graduate degrees conferred to FE, FR, and SFM students advised by FERM faculty.



4.2 Professional Viability of Graduates

Graduates of the SFM, FE, and FR(FERM) degrees work for state and federal agencies, private companies, NGO's, and Universities in the range of specialties spanned by the SFM areas of concentration. See Table 6K for last-known employment status of our graduates. Note that we were able to identify employers for most of our graduates. Almost every graduate holds employment in some aspect of forestry. Of the 54 PhD graduates that we could locate, 24 hold a professorial rank at a University, 12 identify as research scientists, and the remaining 18 are employed by private consulting firms, as forestry analysts, in agency planning, or in operations.

4.3 Student Satisfaction

The FERM department head conducts Exit Interviews with all FERM graduate students. Since Fall 2013, the interview is preceded by a 21-question Exit Survey. The questions are generally open-ended, but we've done our best to categorize the responses based on 45 (31 SFM or FR, 4 WRE or AEC) interviews; results are reported in Appendix 7-C. Some key points are:

- The 3 main reasons given for choosing the SFM degree or to study with FERM faculty are reputation of/contact with the individual faculty member (31%), reputation of the OSU College of Forestry (26%), and good fit with the student's interests (25%).

- Most (84%) said they had achieved their academic goals while only 2% said they did not.

- Most (89%) rated the program as good or better and none rated it as poor.

- When asked if they would recommend the program to others, 90% said yes, 5% said it depends on interests, and 5% said no.

- Advisors are generally available to meet with their students (98%) and are very good at providing information about the curriculum and the program (80%).

- Advisors were somewhat less effective at providing good career guidance and helping find employment (62% good). However, many respondents said that they didn't ask for or need assistance with career planning. The few comments that referred specifically to help with personal issues were strongly positive.

- The FERM office staff and the College of Forestry computing support staff were uniformly praised as outstanding, excellent, awesome, or the like. Comments include statements like: "The support staff in FERM is phenomenal," "The helpdesk and FERM office staff were always extremely helpful," "the office staff is incredible," "always kind and helpful." There were a few respondents who identified problems with the Business Center or the overall OSU bureaucracy.

- 98% said that the College of Forestry computer facilities were adequate or very good.

- 24% rated office space as good and 30% rated it as not adequate. The most common complaints were lack of natural light, leaks in the basement, and noise. In the new Peavy Hall, graduate student spaces will be on the 2nd and 3rd floor in the same wing as faculty offices and all offices will have natural light.

When asked for suggestions for improvement, nearly 30% said they wouldn't change anything. The 2 most frequently offered suggestions referred to the quality of graduate student office space (addressed above) and the availability and regular scheduling of graduate classes – particularly stand-alone graduate classes. Several suggested that they'd have liked more opportunities to connect socially with other graduate students in the College.

As discussed in section 2.5.1, Curriculum Issues, we increased the number of stand-alone (G) graduate classes and the regularity with which they are offered; as a result, there are fewer complaints. Some students suggested specific classes or types of classes, including a graduate student "field school," more courses in applied forestry, forest engineering, silviculture classes,

or scientific writing. Several say that they wish they had made time to take or audit more undergraduate forestry courses. We held our first graduate field class in forest health in Fall 2016, which was well-received, and added an advanced silviculture class, taught by Doug Maguire. Other suggestions include more opportunities for interactions with public agencies and private companies, and less bureaucracy.

When asked about courses in their programs that were "ranked at the bottom" or, conversely, ranked as "very good," there are a few that especially stand out. FOR 550 Sustainable Forest Management is the only class that is required of every SFM student. Students graduating in AY 2014 and 2015 consistently identified it as a problem course (14 out of 21). We revamped the class in response and have had only one negative comment (out of 12) since – even when students are specifically asked about it. The only other class that is ranked low by multiple students is FES 521 Natural Resource Research Planning; comments indicate that the problem isn't necessarily the quality of class, but rather its relevance across disciplines. It works well for students who are conducting scientific inquiry; it works less well for students whose contribution will be methodological – e.g. equations for growth models, algorithms for optimization platforms, or statistical models for price projections. FOR 562 and 563 – Natural Resource Policy and Law and Environmental Policy and Law Interactions – are repeatedly identified as "very good" (10 students list them). Students also like FOR 436 and 446 – Wildland Fire Ecology and Wildland Fire Science and Management (6 students list them). Other classes listed more than once as "very good" are Forest Biometrics, Forest Modeling, Transportation Planning, Economics of the Forest Resource, Sediment Transport, Silvicultural Influences on Forest Ecosystem Dynamics, Forest Hydrology, Natural Resources Data Analysis, and Carbon Sequestration in Forests.

5.0 SUMMARY

The program assessment is a vital part of the cycle of continuing improvement. This has been an important opportunity to collate data on program metrics and to reflect on goals of the SFM program, strengths of the program, areas of improvement and future tasks. Overall, we feel that the SFM program is solid and growing – largely due to an energetic faculty dominated by early-career scholars who are actively building their programs. We like the Area of Concentration structure of the degree, but feel that it may be time to revisit the goals of each AoC now that the department is relatively stable.

5.1 Strengths

Our strengths are:

- A first-rate reputation with brand name recognition for the College of Forestry at OSU – plus a beautiful location near ocean and mountains!

- A vitality due to a commitment by the College, state legislature, alumni, and supportive industry to the FERM mission and to supporting and employing our graduates.

- An investment by the College, the University, and our stakeholders to restore professorial FTE to the FERM department after a nadir in 2011 (Table 1.4A), with a concurrent increase in faculty numbers.

- Fantastic support staff!

- A faculty who are:

    - team players, enjoy working together, and are committed to creating and maintaining a positive, collegial working community.

    - creative thinkers and productive in research; in recent years, individual faculty have averaged around 3 refereed journal articles per year and $150k new grant awards per year.

    - committed to delivering high quality education; SET scores for course and instructor average approximately 5.0 compared to OSU average of 4.4.

    - multidisciplinary – we advise and collaborate with colleagues in water resources, economics, policy, engineering, botany and plant pathology, geosciences, computer sciences, and more.

    - very involved in international research in many ways (collaboration with international peers, hosting international scholars and students, participation in international research partnerships – especially the International Union of Forestry Research Organizations).

    - connected to real-world applications through member-funded research cooperatives, partnerships with agencies such as USFS, EPA, USGS, ODOT, and more (some of which have research stations located literally next-door), joint appointments in Forestry and Natural Resource Extension at OSU, and association with professionally accredited undergraduate programs in Forestry and Forest Engineering.

- We are attracting very good students who are excited about forestry and who find jobs related to their interests soon after graduation.

5.2 Challenges and Ongoing Measures to Address Them

The SFM program has some issues and challenges. Those we identified include:

- *Maintain and support morale and productivity of SFM graduate faculty.*
    - Challenge – 16 new hires in 4 years. Disruption and change resulting from Peavy Reconstruction and other College priorities and initiatives.
    - Current Progress – This faculty is characterized by collaboration, support for one another, respect, and willingness to step up for the good of the whole – while doing what is needed to protect individual productivity (e.g. say "no" when necessary).
    - Goal – work together to support work/life balance and a positive collegial working environment. We want to be a place that faculty thrive and do not want to leave!
- *Maintain excellence.*
    - Challenge – We are in a time of transition with dislocation, many new faculty, changing leadership, and uncertainty about what the changes in the federal government is going to mean for research support.
    - Current Progress – The faculty has been revitalized by the many new hires. We are in the process of rebuilding our home which will house well-lit and aesthetic working spaces and top-of-the-line lab and teaching spaces. We are supporting mentoring and professional development opportunities – in grant-writing, faculty success, time management, and (we hope) work/life balance.
    - Goal -- CoF at OSU was just ranked #2 in Forestry in the world by the Center of World University Rankings. We want to maintain that level of excellence or even move to #1. We want to have a meaningful impact on how people exist in and around, manage, and think about forests in the PNW, in the U.S., and in the world.
- *Diversity of FERM faculty and student population.*
    - Challenge – When SFM program was established, SFM faculty was 5% female, 5% people of color, and 10% international. Moreover, 45% received their terminal degree from OSU College of Forestry. As noted in Section 2, while the gender balance of the SFM graduate student population is reasonably representative, the racial/ethnic balance is not. Most of the racial/ethnic diversity that exists in SFM is in the international population.
    - Current Progress – The wave of new hires has given us the opportunity to draw faculty from a more diverse pool than in the past and we have made a concerted effort to consider OSU graduates only if they have established their research career independently of OSU and their OSU major professors. The result is that our current

faculty is now roughly 20% female, 25% may be identified as people of color, 40% international, and 70% with terminal degrees from institutions other than OSU.

- Goal – We want the diverse backgrounds, experiences, and perspectives of the faculty to be a part of the educational experience of students in our program. We want to create and maintain a welcoming environment for students of all backgrounds. And we want to broaden the views of those who have a traditional view of forestry and what/who that looks like.

- Goal – Provide opportunities for students to interact in a meaningful way with one another and faculty in informal settings. There are some natural constituents for advanced degrees in forestry among the under-represented groups that the University has identified as target populations. Tribal forestry is one of them – many native American tribes own and manage forest land and often need to hire professional forestry expertise from outside the tribe. Working with the Intertribal Council to develop pathways into our programs – both undergraduate and graduate – may be a vehicle for contributing to the OSU goal of enhancing diversity in a meaningful way.

- *PhD enrollment.*

  - Challenge – PhD enrollment in SFM has declined relative to MS enrollment.

  - Current Progress – hiring of new faculty with active and growing research programs. We have received Provost's Distinguished Graduate Fellowship awards for our top applicant in each year since the program existed.

  - Goal – Faculty discussion to address the following questions: Is this a problem? We are ranked #2 in Forestry in the world. Should we focus on PhD level graduate education? Do we want to allocate effort and resources to support a goal of growing PhD enrollment relative to other levels?

- *MF enrollment.*

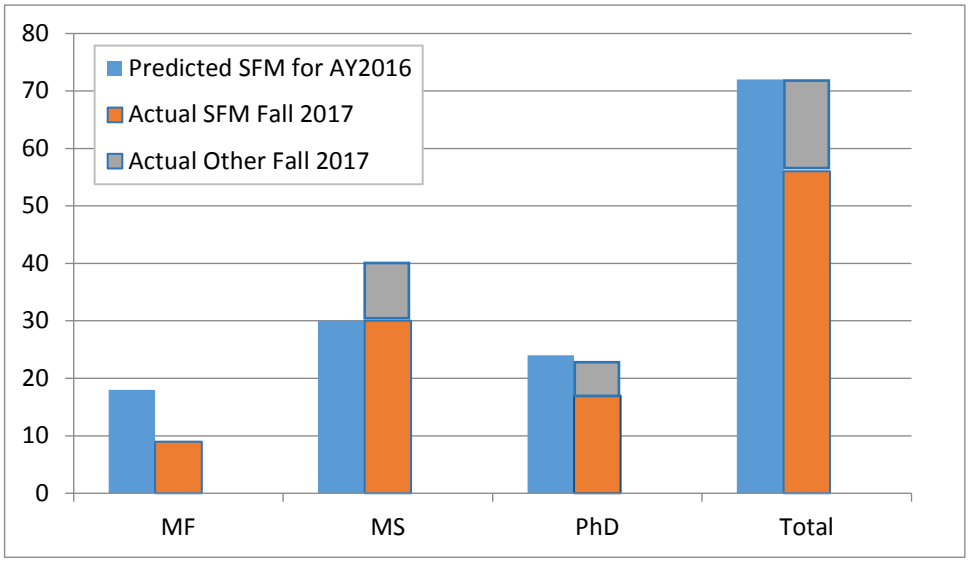
  - Challenge – MF enrollment is low and we often view the degree as a mini-MS. Therefore, it has no real identity as a program.

  - Current Progress – We recently implemented 3 focused coursework MF degrees targeted in areas where we believe there is demand – both from students and from employers.

  - Goal – Develop degree pathways and populate the degrees so that they are self-supporting, in the sense that they pay for the additional resources necessary to offer

them. Faculty discussion to address the questions: Is this a goal that we share? Do we want to seek SAF accreditation for these focused MF pathways?

Figure 5.2. Enrolled SFM students versus the CAT I projections.



- *Uneven advising and teaching load*.
    - Challenge – Classroom teaching assignments (both graduate and undergraduate) have ranged from 0 to 7+ classes per year. Graduate student advising loads have ranged from 0 to 11 students at a time.
    - Current Progress – with adoption of a College Teaching Policy in 2013 and its implementation in 2014, teaching assignments are more equitably distributed within FERM and across the College. FERM faculty now teach, on average, the equivalent of 3.5 3-credit classes per year. Those with Research Coop Directorships teach 2 classes; instructors teach 4-6 classes. Graduate student advising loads are still quite variable.
    - Goal – stable student population distributed across the full faculty. Collaborative effort to recruit students to areas of concentration in which we have strength, but less demand.

IN CLOSING, we want to thank the review team for your time. We hope to receive thoughtful insights that can help us navigate our changing working environment and continue to grow and improve our programs.