

Committee Report: Academic Program Review

University of Washington School of Environmental and Forest Sciences

March 13, 2020

Review Committee:

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1. Introduction

On February 3-4, 2020, the review committee conducted an in-person review of the undergraduate and graduate degree programs offered by the School of Environmental and Forest Sciences, in the College of the Environment at the University of Washington. The May 28, 2019, charge letter (from the interim Deans of Undergraduate Academic Affairs & The Graduate School) states: *“The committee’s charge in this review is to assess the quality of the undergraduate and graduate degree programs in the School of Environmental and Forest Sciences and to provide its faculty with constructive suggestions for strengthening those programs.”*

Prior to the review, our committee received a copy of a document titled “School of Environmental and Forest Sciences Self-Study Report for Academic Program Review”. We also received copies of an external review of the undergraduate and graduate degree program of SEFS [then known as the College of Forest Resources] completed in 2009, as well as SEFS’s and the Provost’s responses to the 2009 review.

During the review, the committee met with:

Dan Brown, the Director of SEFS,

Monika Moskal, SEFS Associate Director for Research,

Clare Ryan, SEFS Associate Director for Academic Programs,

Josh Lawler (via phone), SEFS Chair, Elected Faculty Advisory Council,

A group of five current SEFS graduate students,

A group of nine current SEFS undergraduate students,

A group of five SEFS associate and full professors,

A group of two SEFS assistant professors,

Michelle Trudeau, SEFS Director of the Office of Student and Academic Services,

Lisa Nordlund, SEFS Academic Advisor,

Patrick Tobin, SEFS Graduate Program Coordinator
Rick Gustafson, BSE Undergraduate Program Coordinator
Sergey Rabotyagov, ESRM Undergraduate Program Coordinator
Jenn Weiss, SEFS Administrator
David Iyall, Senior Director for Advancement, College of the Environment
Liz Exell, Director for Corporate and Foundation Relations, College of the Environment

Our two day on site review of SEFS's undergraduate and graduate degree programs ended with a two hour exit discussion and executive session attended by Dan Brown, Monika Moskal, Clare Ryan, Michelle Trudeau, and Jenn Weiss of SEFS; as well as Lisa Graumlich, Dean, College of the Environment; Kima Cargill, Associate Dean for Academic Affairs, Graduate School; Patricia Moy, Associate Vice Provost for Academic and Student Affairs; Janice DeCosmo, Associate Dean, Undergraduate Academic Affairs; Becky Corriell, Director, Academic Program Review & Strategy, Graduate School; Layla Tavassoli, Specialist, Academic Affairs & Planning, Graduate School; Rene Overney, Professor, Department of Chemical Engineering, Graduate School Council Representative; and Mark Long, Associate Dean, Daniel J. Evans School of Public Policy and Governance, Adjunct Professor, Economics, Graduate School Council Representative.

2. Key Findings

- SEFS hosts an ambitious and talented group of scholars, with healthy academic programs. Strategic decisions are required to align curriculum and programs to an evolving faculty.
- The unit is making rapid strides towards transparency and equity under the guidance of the new director. Clear efforts to strengthen faculty and student engagement and build a unit-wide intellectual community are underway. Strategic planning is in progress. These efforts should be rewarded.
- There is a specific and urgent need for facilities upgrades and new resources to support the emerging vision of the unit.

We present our observations in sections 3-6, with specific recommendations in section 7.

3. Graduate programs and curricula

SEFS hosts four graduate degree programs: two professional Masters degrees and two research degrees (MS and PhD).

3.1 Professional graduate programs

The Masters in Environmental Horticulture (MEH) is a professional degree leading to work in restoration, horticulture, and environmental management. Students pay tuition to attend. Enrollment has fluctuated from a few to 10 graduates per year over the past decade. The program leverages expertise and infrastructure at the Center for Urban Horticulture. Recent

departure of two faculty in environmental horticulture has led SEFS to suspend admission to the MEH. The committee heard concerns from faculty and staff about the viability of this program in the absence of new faculty to teach and advise students in this area.

The Masters in Forest Resources in Forest Management (MFR) provides professional training leading to careers related to silviculture, a traditional strength of SEFS. It has a steady but very small enrollment, graduating a few students each year. The program is accredited by the Society of American Foresters. Students pay tuition to attend. Our impression is that SEFS continues to successfully deliver this program, even as wildlife and forest ecology eclipse the unit's historical strength in forest resource management. Given the small number of students and faculty engaged, however, questions about the program's long-term future are emerging.

3.2 Research graduate programs:

The research graduate programs engage the greater proportion of both students and faculty. The program enjoys a strong national reputation (National Research Council rating). The program has an outstanding, productive and engaged faculty, and engages some of the top graduate scholars in the nation (NSF GRFPs, awards). The review committee heard comments about enrollment, graduate student funding, curriculum, community, and facilities.

Graduate student enrollment is declining in response to internal and external pressures. The committee heard some concern about this decline; others characterized the change as "right-sizing" the program, consistent with current staffing and funding levels. The decline is most pronounced in the number of MS students enrolled, where the total number is about half that at the last review. The data suggest that this decline is partially the result of successful efforts to decrease time-to-degree for MS students (from about 3 years to about 2 years). The PhD program awards about 10 degrees annually, with a slight decline in the first part of the decade. Average time-to-degree for PhD students is somewhat more than six years (impacted by a "long tail" of a small number of lingering students). Efforts continue to shorten time-to-degree for PhD students, and this could reduce the apparent enrollment numbers further. The ratio of MS to PhD students in SEFS has also changed. The College of the Environment and University incentive structure (e.g. for tenure & promotion) leads faculty to prioritize PhD students with research ambitions over MS students who are headed to the non-academic workforce. The old College of Forest Resources may have rewarded different priorities.

Graduate funding models in SEFS are changing, and this impacts enrollment. At present, up to 40% of graduate quarters are un-funded. (The committee received several different estimates). Some faculty have made a commitment to admit only those students that can be supported through RA- or TA-ships. Recent volatility in RCR revenue suggests that faculty may be reticent to admit students when external support is uncertain. At the same time, the cost of supporting graduate students has increased: UW graduate student stipends have grown substantially in the past decade, without a proportional increase of support to academic units. It is therefore not surprising that graduate enrollments have declined.

Addressing graduate funding is a clear priority across SEFS. The Elected Faculty Council (EFC) advocates for establishing a guaranteed minimum funding for all students admitted to the research program, a goal echoed in many conversations over our two-day visit. The review committee also heard some concerns that restrictive funding requirements could reduce flexibility for graduate students to evolve their own ideas or explore cross-disciplinary collaborations. Students and faculty both expressed a need for transparent policies regarding the allocation of graduate funding. At present, key decisions regarding resource commitments (graduate admissions) and resource allocation (TA assignments) are made at the individual faculty level. The EFC advocates for pooled TA resources and additional attention paid to equity in SEFS fellowship allocations.

SEFS research has impressive breadth, and this makes it difficult to define a single graduate curriculum. Graduate students stated enthusiasm about the diversity of expertise and intellectual resources in the School. A successful school-wide graduate curriculum must illuminate connections and collaborative opportunities across the disciplines, while also providing a framework for each student to develop deep expertise. The existing SEFS curriculum appears to have a sound structure to achieve this: an introductory course that can provide a common foundation for graduate students; a selection of secondary courses to build key competencies; and additional study as required to address the student's research. As SEFS articulates a strategic vision for the future, there is an opportunity to revise the elements of this curriculum to reinforce links among SEFS disciplines and common research methods. As the single shared experience for all SEFS graduate students, the introductory graduate course is an important mechanism to enlist new graduate students in the shared vision of the School, and deserves review. In particular, students expressed that they felt the introductory course was a lost opportunity in its current iteration and felt strongly that the course could be more effective in delivering some of the stated objectives of the course while also building a more cohesive cohort. For secondary courses, data science skills are an emerging need that the committee heard in several conversations with faculty and students at all levels. The committee sees opportunities within the cross-departmental Quantitative Science Program for a data science initiative that could draw broad participation across the College. Students also expressed strong desire for a writing course, additional informational programming throughout the first semester beyond the initial orientation, improved professional conduct training (particularly as related to potential sexual harassment at remote field sites), and more direct mentorship and guidance regarding professional opportunities post-graduate school. SEFS has a tremendous record of community engagement and co-located agency partners that could be enlisted in that effort.

Students report a need for clarity in timeline and expectations for graduate exams and other milestones, and they welcomed the news that new guidelines were recently adopted. The committee heard hopes from all levels that such benchmarks will guide student progress toward their degree goals and improve transparency and fairness in the exams. Communicating and reiterating these new guidelines to faculty and students appears to be an important next step, to ensure uniform adoption and application across the school. Similarly, given the importance of field work to much of SEFS research, students expressed a need for personal

safety guidelines for field work. A “best practices” report that was recently produced for the College could provide this guidance.

Graduate students praised efforts to foster exchange among broader SEFS community, including the fledgling departmental seminar and recent implementation of a graduate student council. They expressed desire for shared (inter-lab) work and gathering spaces in order to build the community.

4. Undergraduate programs and curricula

SEFS hosts two primary degree programs: BS degrees in Bioresource Science and Engineering (BSE) and Environmental Science and Resource Management (ESRM), with several transcript options. Although under the same administrative umbrella, the two programs presently operate with apparently little interaction.

4.1 Bioresource Science and Engineering

BSE is a strong, successful undergraduate program with stable enrollment and high job placement. Students are enthusiastic and engaged. Historically rooted in the pulp and paper industry, the curriculum has evolved to address a broader set of opportunities, including biofuels and biochemicals. Recent student achievements include significant prizes in “sustainable innovation” competitions. The program receives strong support from alumni and corporate donations, including a recent substantial donation to modernize a core lab facility. BSE is ideally positioned to grow, with increasing student demand for degrees in both engineering and environment.

Relative to the number of courses that need to be taught, this degree program is grossly understaffed. Enrollment is limited by capacity in core courses. BSE is an ABET accredited degree program with established core requirements. Current faculty are stretched to deliver the program, and a recent departure raises the issue of sustainability. BSE faculty report a critical need for a Chemical Engineer. Institutional barriers at UW (ABB structure, direct-to-College admissions in other engineering programs, closed majors and courses) impede efforts to leverage extra-departmental courses in support of BSE. Within SEFS, a historical “green/brown divide” and tyranny of the majority are clear threats to the future of BSE as it is currently structured.

4.2 Environmental Science and Resource Management

ESRM is a popular and successful major; enrollments have doubled in the last decade. Along with other programs in the College of the Environment, ESRM is one of a minority of “open majors” in the University, where any undergraduate meeting UW’s overall academic requirements many enroll. The program is also home to some of UW’s most successful students, including a recent President’s medalist and several Husky 100 awardees. ESRM students we spoke to have strong sense of identity, purpose, and belonging. These students specifically noted that SEFS advising staff play an important role in creating this welcoming

environment. Students recognize passion of the faculty, and opportunities to engage in research, and field study as important elements of the program. Faculty emphasized field and project-based learning, problem solving, and community engagement as particular program strengths.

ESRM hosts several transcript options, most with a flexible path through the major. The open major also draws some students relatively late in their undergrad careers. The flexibility is appealing for many students but leads to unavoidable redundancy in course content, as common material is (re)introduced in each course to ensure students have a common baseline. The committee heard comments from all levels about the tension between flexibility and rigor, the conflict between a desire for more structure versus opportunity for students to define their own program.

Faculty expressed concerns that ESRM enrollments are “at capacity.” Demands of the growing undergraduate program have stretched already limited TA resources, and place strain on teaching in the graduate program. Once causality of this success is the compulsory undergraduate capstone, now required only of Wildlife Conservation students. It was not clear whether the requirement was being dropped for other subject areas because it was not deemed to be a useful aspect of the curriculum or due to lack of faculty engagement in these capstone courses. We did hear that the “self-designed” capstone experiences could be highly stressful for some undergraduate students because it was difficult for them to figure out how to find a faculty mentor and design their own project. Some faculty wonder what will replace the capstone for students outside Wildlife Conservation, and how to encourage talented students to embrace the opportunity for an optional capstone.

Some students mentioned that required labs can get expensive, which may indicate a need to identify potential financial barriers to some students and evaluate opportunities to reduce these barriers. Students also expressed a desire to see increased diversity of authors and prominent scientists and conservationists featured within the curriculum in order to reflect the changing face of the field and represent non-Western viewpoints. Students appreciated current programming aimed at career placement, although some students indicated that they would like to see existing programs expanded, particularly in terms of employers beyond the region and in less research-oriented fields.

Connections between undergraduate and graduate students are embraced and valued by both groups. A new effort to have grad student mentors well-received by undergraduates. Graduate students also noted benefit when undergrads have summer internships in their labs. Many students are also engaged in extracurricular learning and outreach through UW Farm and UW student chapter of the Society for Ecological Restoration, among other SEFS-related organizations.

4.3 Other teaching efforts

SEFS faculty noted efforts to diversify offerings to undergraduate non-majors, including new or expanded courses in Wildlife in the Modern World, Forests & Society and concepts for courses in wildfire, digital Earth, sustainable industry. These efforts may partially replace student credit hours generated by a now-defunct, on-line, large-enrollment, introductory environmental science course (ESRM 100).

5. Personnel, Facilities, and Resources

Consistent with the narrow scope outlined in the charge letter, our assessment is focused on the graduate and undergraduate degree programs, based on information gathered from the School's self-study report and our two days of interviews. We did not attempt a comprehensive review of other attributes of the Unit. These other attributes are, however, inextricably linked to the success of degree programs, and here we note where these factors appear to be positively or negatively impacting the academic mission of the unit.

5.1 Academic Personnel

SEFS hosts excellent and productive faculty with a tremendous breadth of expertise. The faculty include many internationally recognized and decorated researchers and exemplary community-engaged scholars. SEFS research has broad reach and immediate impact, addressing some of the most urgent issues of our time. The curriculum is embedded in this dynamic, research-active environment.

There are evident and on-going challenges to integrating the diverse and already heavily committed group of faculty members. We heard about efforts to build and maintain a sense of intellectual community beyond faculty interest areas, and the persistent challenge of overcoming traditional disciplinary boundaries and the structural legacy of the old College of Forest Resources. The committee saw evidence that the Elected Faculty Council, the Inclusion and Diversity Committee and the fledgling SEFS seminar are important efforts toward this end.

The committee heard discussion of the development of a forward-looking strategic hiring plan that identifies key thematic links among SEFS focus areas, rather than simply replacing departed expertise. The faculty seem to appreciate the overall approach that is being taken and seem to feel like it is inclusive, with a variety of mechanisms to provide input. We also heard mention of a proposed new policy document, outlining the hiring process, to provide a transparent structure for hiring decisions and ensure attention to faculty diversity. Both appear to be positive developments.

Director Dan Brown has strong support of the faculty and staff that we met. He is making rapid, clear and ongoing progress toward transparency and fairness in policies and procedures, beginning with an exemplary tenure and promotion document. Faculty report a very positive and healthy move toward faculty and student governance, with additional attention to inclusion & diversity. Pre-tenure faculty are receiving structured mentoring. The director is

guiding SEFS toward a shared, forward-looking, transdisciplinary vision. Strategic planning is ongoing and completion of that plan is an urgent next step.

SEFS academic advising staff are appreciated by students and faculty. Their work is important to the success and satisfaction of current students, and their dedication is evident. They are short-handed. Staff do not presently have bandwidth to conduct important student outcomes tracking that will be essential to evaluate changes to the program in the next decade or to expand professional development opportunities that are in high demand.

SEFS is a large and complex unit. We did not meet non-tenure-track faculty, research faculty, affiliated researchers, or agency partners engaged with SEFS, although they likely contribute significantly to the research mission. Apart from academic advising staff, this review does not address the role of research or professional staff in the delivery of academic programs.

5.2 Facilities

The committee did not have a formal tour of academic or research facilities, but the glimpses we had during our short visit indicate that there are critical upgrades required to support the educational and research missions of the School. Casual faculty and staff comments about repeatedly flooded research laboratories in Bloedel Hall belie recurring infrastructure failures that could ultimately undermine faculty and student success. That the core academic home for SEFS, Anderson Hall, is not ADA accessible is shocking, and indicates that renovations are urgently needed and long-neglected.

SEFS is unusual in that the unit also oversees several external facilities with very large staffs. The UW Botanic Gardens, the Center for Sustainable Forestry at Pack Forest, and the Olympic Natural Resources Center are each significant operations, with far-reaching community impact both within the city of Seattle and in communities far from campus. Our brief review is insufficient to evaluate the influence, positive or negative, of these off-campus facilities on the academic programs.

5.3 Resources

SEFS is striving for excellence, but budget constraints place the School in a precarious condition.

We heard about the stress that unfunded mandatory raises and wage increases have placed on the unit. The school has cannibalized faculty and staff FTE to meet these demands. This is obviously unsustainable.

Large infrastructure demands, including several major off-campus facilities, increase the financial pressures. Fund-raising for \$10M toward campus building upgrades has been pushed down to the College and to SEFS, competing with efforts to enhance academic and research programs.

The SEFS budget is also challenged by low RCR from the federal agencies (USDA, USFS) and other sponsors that support a significant fraction of research in the unit. We heard that new

SEFS guidelines require proposals to sponsors who do not pay overhead to direct 30% of costs toward supporting graduate students. This is a positive step, but RCR is also the principal revenue stream for faculty start-up funds. The committee notes that SEFS is challenged to provide start-up for new faculty.

Activity Based Budgeting creates its own challenges. The costs for delivering large-enrollment courses are borne by the unit, but SCH revenue is delivered to the College. This model effectively sheltered SEFS from major losses with the closure of ESRM 100, but it also makes difficult the necessary strategic decisions about how to implement new large-enrollment courses for non-majors.

6. Progress since the 2009 external review

The previous evaluation of SEFS (then CFR) was completed March 27, 2009. At the time, the review committee reported significant uncertainty about 1) the budget, 2) the move to the new College of the Environment, and 3) SEFS leadership. SEFS is now fully integrated into the CoEnv. We are optimistic that leadership issues are now resolved, after a decade of flux. Budget issues remain a serious concern. In addition to the budget, we recognize several concerns from 2009 that are still relevant today:

The undergraduate program in BSE was already precarious in 2009: *“The main concern that we have for the program is that the faculty are so few in number that they are at risk of not having sufficient ‘critical mass’ to sustain the program.”*

Both the 2009 and 1996 reviews identified inadequate funding for graduate students as a persistent concern.

It is also noteworthy that the 2009 review stated *“we recommend that [SEFS] develop metrics to assess how well-suited the students are for the current and likely future career opportunities across the range of fields that are open to students”*. Staffing increases are required to provide long-overdue student post-graduation data.

The 2009 review also noted that SEFS off-campus facilities represent *“major potential resources for the new CoEnv”* and *“a key mechanism to involve stakeholders in mission-oriented research programs”* but also urged *“the [SEFS] to continue to critically assess each unit, considering the costs of administration and facility maintenance, utilization in teaching and research, and relevance to the mission of [SEFS] and the CoEnv.”* This sentiment is equally warranted today.

7. Recommendations

The committee offers the following recommendations:

7.1 Recommendations to SEFS regarding the graduate programs

Consider the role of both research MS and professional MS programs in the strategic vision of the School and make investments as required to support that vision. The situation for MEH is acute, requiring some critical decisions in the immediate future. MFR seems to be stable for now, but attention should be paid before the next review to foster its success, if it continues to have a place in the SEFS degree programs. Given the changing proportion of MS students in the research program, it is also important for the School to articulate the value of MS students in the research 'ecosystem' and establish expectations about whether and how the research MS will be cultivated. These conversations should recognize graduate student desire for increased guidance regarding professional careers outside of academia.

Continue the work already in progress to articulate a clear policy on funding for graduate research students. This could include a commitment to fund admitted research students for a specified number of quarters. The plan may require recognizing exceptions for disciplines that do not typically offer such a commitment or differentiating between MS and PhD students. This effort may also require a more holistic view of the graduate admissions process, collective decisions regarding TA appointments, and revisions to fellowship allocations.

Consider updating elements of the common graduate curriculum to reflect the SEFS strategic vision for the next decade and emerging skill sets useful to many disciplines.

7.2 Recommendations to SEFS regarding the undergraduate programs

A strategic plan for the future of engineering within SEFS is critically needed. If the BSE program is to continue, SEFS must articulate a commitment to support and develop its engineering degree. Both the 1996 and 2009 external reviews also noted that BSE was understaffed, and the present situation appears particularly precarious. Continued existence of BSE will require both immediate investment in new faculty and continued, forward-looking evolution of the curriculum.

Director- and Dean-level intervention are required to pierce institutional barriers for BSE cooperation with College of Engineering programs. This is important for the undergraduate program and is likely essential to the success of any new faculty who are hired to contribute to BSE.

A comprehensive look at ESRM curriculum could benefit both students and faculty. In the context of growing enrollments and changing faculty composition, new foci or pathways may be required. A more structured progression through the major could reduce redundancy for students and provide opportunities for higher-level courses that might partially replace undergraduate capstones. Streamlining the undergraduate programs may also free faculty to invest time in other endeavors important to the success of the School.

There is tremendous unrealized potential in the unique co-location of engineering and environmental science within the same academic unit. At minimum, BSE can deliver an important perspective within SEFS, just as broader perspectives from across SEFS can inform the goals and directions of the engineers it produces. A shared vision and greater

communication among faculty across the School are essential next steps to realizing this potential.

7.3 Recommendations for overall School

Continue building on efforts to improve transparency, inclusive dialogue, and ensuring that policies are clearly communicated and uniformly enforced. Major improvements have already been identified or appear to be in progress on multiple fronts that have improved the culture for students, staff, and faculty alike. These efforts are applauded and continued emphasis will help ensure equity across SEFS and empower community members. In particular, we suggest that continual improvement efforts include communication and enforcement of policies and guidelines regarding graduate exams, key benchmarks, and best practices.

Continue diversity and inclusion efforts. There are already solid efforts in place to the lay groundwork to improve diversity, equity, and inclusion outcomes. The committee commends these efforts and highlights the need to work toward continual improvement. As SEFS considers potential new hires and recruits new students, special efforts should be taken to implement best practices for fair and inclusive recruitment efforts. In addition, identifying barriers to a diverse and inclusive community and working to implement effective and actionable solutions will continue to be important, addressing both concerns within the community and embedded within the curriculum.

Continue efforts to foster community at all levels. Many of the efforts to improve transparency and communication contribute to an environment of trust and mutual respect and multiple individuals expressed a desire to explore ways to enhance the community.

An urban campus represents multiple challenges to helping build community outside of working hours, so creative solutions may be necessary to engage members of SEFS to build a greater sense of community and help build more cohesive cohorts of students.

7.4 Recommendations to the University

Support the SEFS Director and Faculty in their continued effort to build a compressive strategic plan with broad faculty engagement. This is difficult work, and it appears that they have a sound and inclusive process underway. They deserve encouragement, praise, and tangible support to get this work done soon. Ask the Director what they need most to achieve this goal in the short term.

Reward a forward-looking, transdisciplinary, and credible strategic plan with corresponding strategic investments in new faculty lines and start-up funds. Such an investment would catalyze the most exciting and fruitful new directions and might provide some relief on budget pressures as SEFS implements their new plan.

Fix the buildings. We see tremendous mismatch between the quality of the scholarship in SEFS and the state of their facilities. Do not permit further delay in the renovation of Anderson Hall.

It is inadequate as a modern research facility, not compliant with ADA, and seismically unsound. Ensure that deferred maintenance in Bloedel Hall is addressed, and that it is also in the queue for renovation. It is unreasonable that the cost of these upgrades be borne by the unit or the college.

8. Conclusions

In response to the primary questions posed to the committee the charge letter, SEFS is providing excellent education and training to its students. SEFS faculty are already engaged in internal conversations that will improve their programs further, and we make some specific recommendations to support that effort. The University can significantly aid SEFS by attending to aging and inadequate facilities and providing resources to support the unit's emerging new directions. We recommend that the next formal academic review of SEFS occur in ten years time. SEFS can also take many proactive measures to strengthen the undergraduate and graduate programs before then.