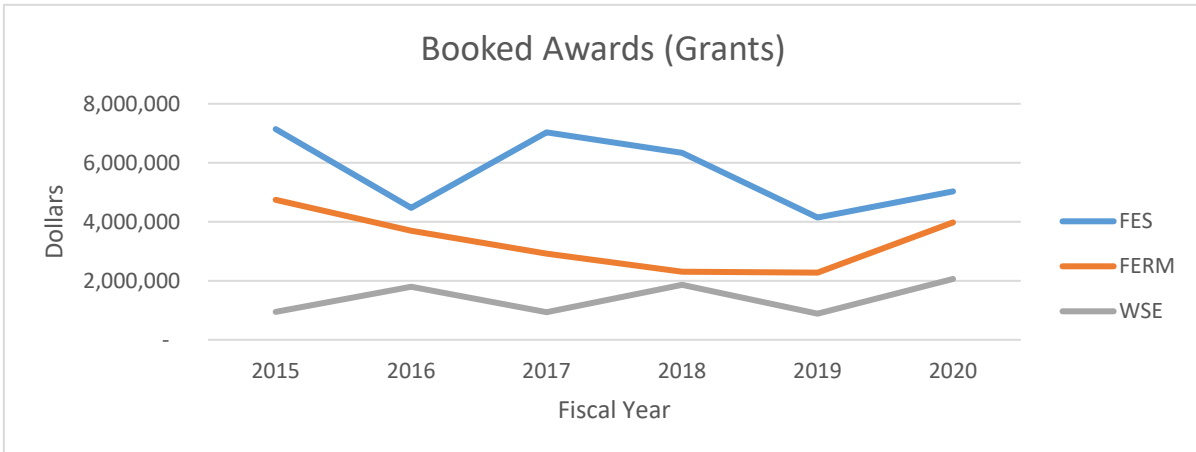


Research Highlights

Research programs in FES tend to be primarily driven by individual PIs or teams of PIs, so there has been little coordination at the departmental level. While grants were down considerably the previous year, they rebounded somewhat in 2019-20 year. FES continues to lead the college in grants, though the fact that we have several senior faculty who have retired or are approaching retirement may lead to a downward trend in grants, especially in the context of a hiring freeze and COVID-19.



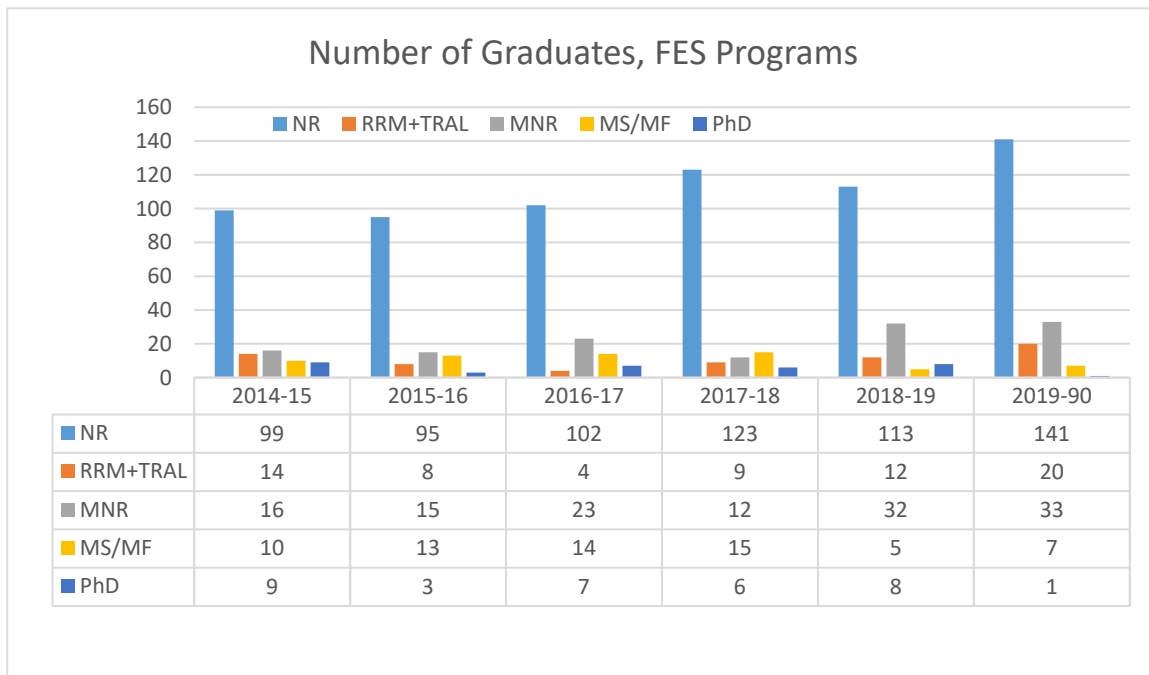
1. We hired Tak Iwamura to fill needs in “big data” and forest biodiversity conservation. His work on emerging infections diseases is an unexpected benefit given the current global situation and aligns with the OSU strategic initiatives on sustainable Earth systems and improving human health and wellness. Hopefully Tak will be able to get his visa soon. We were unable to fill the Forest Carbon position, which is unfortunate, since Mark Harmon and Bev Law have retired.
2. Meg Krawchuk had a very productive year publishing research on fire refugia and being invited to various stakeholder and agency meetings to share the work of her lab group.
3. Ashley D’Antonio received a competitive National Park Foundation Science Fellowship (formerly the Conway Fellowship) to advance her interdisciplinary research on the impacts of recreation to wildlife in national parks, including Yellowstone and Grand Teton.
4. Dana Warren received NSF funding for a remarkably innovative, interdisciplinary project to use scholarly techniques and tools from history and ecology to reconstruct features of eastern forests from 19th century landscape paintings.
5. Steve Strauss’ work on transformation in poplar is a great example of transdisciplinary research being conducted with computer scientists. Over the past few years, he has had NSF funding of ~\$4 million to develop new phenomic and genomic insights into genetic diversity in the capacity for regeneration of new shoots and roots in poplar. The team has created and submitted for publication a new annotation tool, using machine learning, to enable researchers to rapidly and precisely code images of plant material. These data are then used in machine vision models to estimate regeneration rates in thousands of samples used in genetic analysis – work at this scale was previously not possible using existing techniques. So far, they have completed and edited machine vision-derived data for two regeneration experiments involving over 1,000 replicated genotypes, and are currently subjecting them to genome wide association studies (GWAS) that

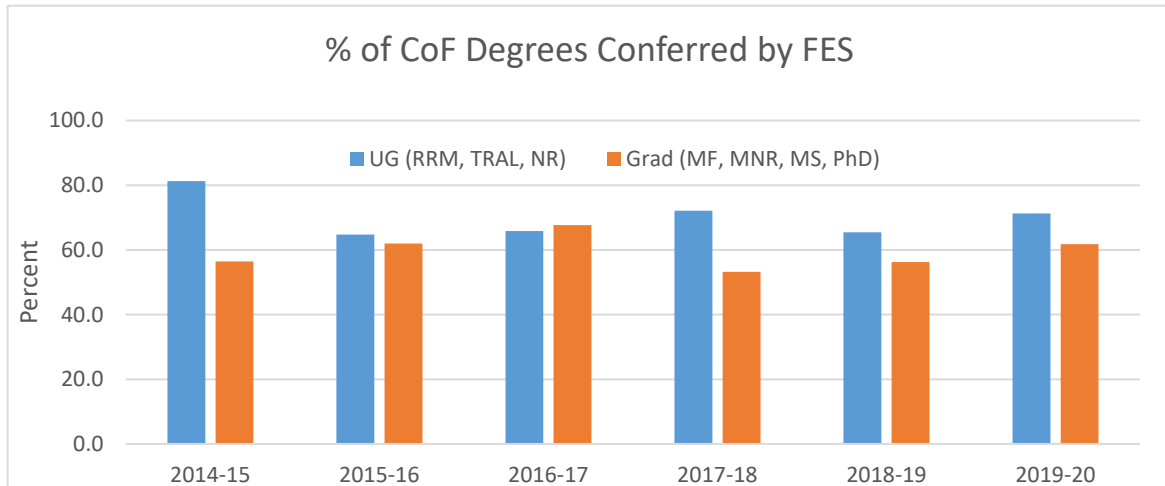
they have shown can identify key genes controlling those processes. An image analysis pipeline in Jupyter allows the team to rapidly segment and estimate the rate of inserted gene expression in large scale gene transfer experiments, which is now being optimized using Python coding. By using hyperspectral images, they can more effectively monitor tissue development and gene expression; these images will be run through the pipeline during the final GWAS experiments.

6. Hall (PI), Hajjar (Co-PI) and Krawchuk (Co-PI) secured a National Needs Fellowship from NIFA to support a trio of grad students working in the area of wildfire, community engagement, and governance. The goal of the NNF program is to increase the quality, capacity and impact of graduate programs.
7. Glenn Howe’s Pacific Northwest Tree Improvement Coop partnered with the Center for Intensive Plantation Silviculture on a project to develop low-cost genotyping methods to measure single nucleotide polymorphisms in Douglas-fir that can serve as genetic markers for various commercial uses. He also continues to provide tools for seed selection in the face of changing climate zones in the PNW.
8. Keith Jayawickrama worked with redwood growers in California and Oregon to establish a new Redwood Tree Improvement Coop with 15 members. The NWTIC increased to 50 members, with research influencing tree improvement along the entire PNW. Third-cycle trials of Douglas-fir were initiated at various sites.
9. The successful development of the LTER8 proposal furthers OSU’s emphasis area in the science of sustainable Earth ecosystems.
10. Betts’ research on intensive forest management furthers partnerships with industry and other external stakeholders around the tradeoffs associated with different levels of forest management.
11. Many FES faculty have been heavily involved in discussions about the potential research program at the Elliott State Forest.

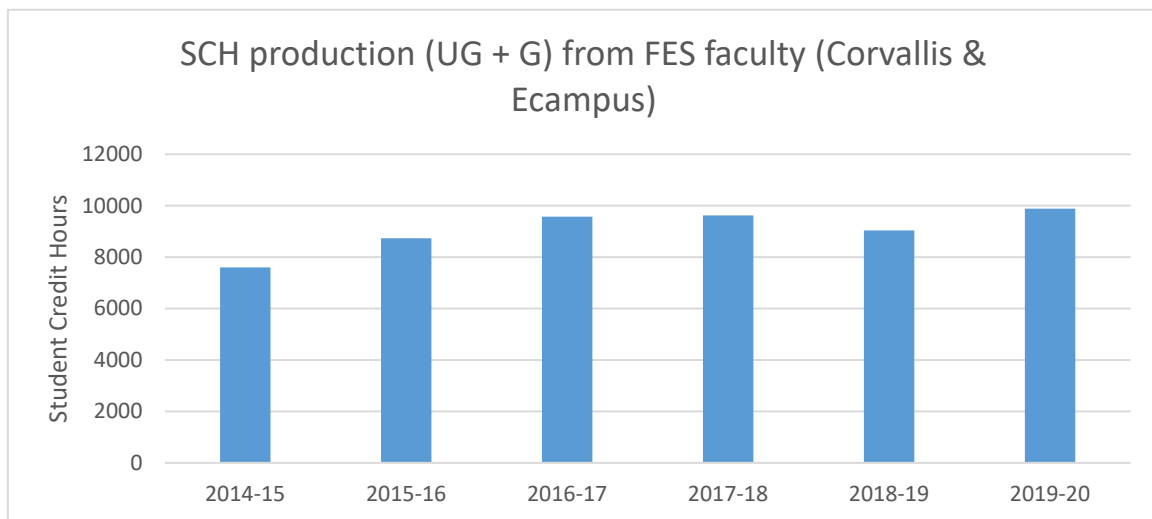
Education Highlights

FES continues to provide the majority of degrees conferred from the CoF.





Student credit hour (SCH) production by FES faculty/instructors was up slightly last year from the previous year, though the long-term trend is largely flat.



Specific items requested:

1. Advance learning through course and program (re)design, program assessment, and faculty development (in degree programs as well as the Baccalaureate Core)
 - a. Undergraduate programs in FES were in good shape. The BS Natural Resources continued to grow (across all three campuses combined), and revisions arising from the 10-year review in 2016 have been completely implemented and are working well. The TRAL program saw growth (TRAL includes both Corvallis and Cascades numbers), which was positive (although the enrollment is still smaller than would be ideal).
 - b. The FES MS and PhD programs attracted only 4 new students in fall, 2019, which was of concern to faculty. Faculty with large grants are often hiring post docs rather than MS/PhD students, as the costs for stipend and tuition are substantial. Also, external grants were down last year. Findings ways to sustain a research-based (MS/PhD) program is a constant source of conversation.

- c. The MNR program continued to show strong growth. The new Director (Janean Creighton) was engaged in discussions across campus about the potential for internationalizing the program. She also worked with the Department Head to make the coursework for the MNR capstone course more seamless for MNR students. Finding good advisors for MNR students continues to be a challenge and, with growth in the program, alternative advising models may need to be considered.
 - d. Several courses offered by FES faculty are part of the university Bacc Core. Stacy Rosenberg developed and offers the new WIC course used in the NR and TRAL degrees, which is a great improvement over the previous options. In 2019, TRAL 357 (Parks and Protected Areas) was approved for the CGI category.
- 2. Grow online and hybrid-delivery education and develop new pedagogical models
 - a. The development and approval of the Accelerated Masters Program (AMP) – a joint program of the BS Natural Resources and MNR -- was a major accomplishment, and we have already accepted the first students into the program. This could potentially be a strong pipeline for the MNR, though it likely will require offering the MNR in Corvallis (it is currently only online).
 - b. The Urban Forestry Certificate, under the leadership of Paul Ries, has continued to grow. Down the road we will need a transition plan, as Paul does all the teaching and advising, and we don't know how long he will be willing and able to run the program.
- 3. Promote responsible citizenship and global awareness among students
 - a. FES faculty were key contributors to study abroad: Ian Munanura in Borneo; Klaus Puettmann in Canada (instead of the original planned course in Patagonia); Ron Reuter in Costa Rica.
 - b. FES faculty have been working to incorporate DEI in meaningful ways into classes and mentoring. One example is Meg Krawchuk's inclusion of a new syllabus statement on pronouns and an open discussion of pronoun use with her classes on the first day. She also integrated new material on TEK and a land acknowledgement statement into her Forest Ecology Class. Ashley D'Antonio and Troy Hall hosted joint lab group discussions around topics and readings related to diverse perspectives, such as *Braiding Sweetgrass*. Reem Hajjar developed modules on decolonizing methodologies for her research methods class.

Outreach highlights

- 1. EJ Davis became the Vice Chair of the Rural Voices for Conservation Coalition. In this capacity she has helped shape the governance and functioning of the organization. She organized a workshop with NGOs focused on equity and safety for forest workers.
- 2. Bill Ripple continued to lead international scholars in a series of "Scientists' warnings." The "World Scientists' Warning of a Climate Emergency" was signed by >13,000 scientists from 156 countries; Altmetrics rated it this spring as the 4th highest impact of more than 14 million articles in the database in 2019.
- 3. *Tree School Oregon*, under the leadership of Glenn Ahrens, had its 30th successful year. More than 800 people enrolled in classes. *Tree school* received the national Association of Natural Resource Extension Professionals' Outstanding Team Award in 2019. Glenn also co-sponsored and event with the Aveda Institute in Portland, called *Evening for the Earth*, with 300 participants.
- 4. FES faculty participated in a Fire Summit in Washington, DC.

5. Steve Strauss led publication of an open letter in *Science* about the GMO research ban associated with forest certification. This was a large, international effort that stimulated subsequent conversations among various entities.

Other

1. *COVID response.* FES faculty were well prepared to adapt to remote teaching in Spring 2020, given our extensive involvement in teaching Ecampus classes. We were also able to continue many research programs, though some research was substantially disrupted, and the department and college haven't yet had a chance to develop a systematic approach to address these impacts.
2. *Diversity, Equity, and Inclusivity.*
 - a. FES faculty, students, and staff tend to be highly engaged in DEI activities. We have leadership roles on the college DEI committee and sub-committees, and we hosted several successful trainings and workshops in 2019-20.
 - b. Ashley D'Antonio was invited to give a Nature Nights Seminar in Bend (hosted by the Deschutes Land Trust), where she focused on DEI in outdoor recreation – approximately 150 people participated. She also mentored a first-generation college student.
 - c. Several faculty completed Search Advocate training and/or have served as Search Advocates.
 - d. Bill Ripple engaged with colleagues around how to more explicitly address equity in the scientists' warnings series, for instance around global poverty and gender inequality.
 - e. Keith Jayawickrama is active in the Association of Faculty and Staff for the Advancement of People of Color at OSU.
3. *Fundraising/development.* Development work to support FES was led primarily by Foundation staff and Anthony Davis. Some new gifts were secured and others were in development when COVID emerged.
4. *OREI involvement.* The FES Department Head and two faculty (Rosenberg and D'Antonio) were instrumental in helping the OREI initiative launch a new professional development opportunity for Agency and Industry middle managers.