

Annual Report from the Department of Forest Ecosystems and Society for FY 2016-17 (July 1, 2016 to June 30, 2017)¹

This report summarizes major accomplishments in the Forest Ecosystems and Society (FES) Department related primarily to teaching, research/scholarship, and service/outreach for the 2016-2017 fiscal/academic year. The report follows the outline provided by the College of Forestry Dean's office.

The department had several personnel changes in 2016-17. We added two new tenure-track faculty: Ashley D'Antonio and Reem Hajjar. These two positions shore up our ability to offer our recreation and natural resources undergraduate degree programs and provide guidance to social science graduate students. Two Associate Professors (Needham and Betts) were recommended for promotion to Professor and were granted this promotion effective July, 2017; Keith Olsen was also promoted (to Senior Faculty Research Associate). Mark Harmon, Norm Johnson, and Jo Tynon retired, and Assistant Professor, Senior Research, Andres Schmidt left OSU.

Part A: Major Accomplishments Related to the College's Five Strategic Areas and the OSU Strategic Plan

1. Strengthen the College's commitment to academic excellence

a. Transformative educational experiences: Teaching summary and commentary

Oregon State University seeks to provide transformational educational experiences by raising and equalizing student success, incorporating high-impact activities, growing on-line education, using new pedagogical models, and expanding efforts to recruit diverse and high-achieving students. FES contributed to this goal in several ways:

- Curriculum improvements. New faculty (re)developed and offered several undergraduate courses. In some cases this included adding field trips (FES 354), computer labs (NR 325) and working with clients (FES 354). The NR capstone course was revised to use a case-study model, which was well received by students. Broader improvements to curricula/programs are described in (b) below.
- Peer review of teaching. In 2016, FES voted to adopt a formal policy on peer-review of teaching in which teams of faculty review all course materials and observe in class (or on line) instruction. We have begun implementing this policy, which is providing very thorough careful critique of all aspects of teaching.
- High quality advising. New advisors were hired for the undergraduate RRM and NR programs. To improve communication, the NR program director (Hall) generally met weekly with advisors to discuss issues and review petitions. We created a new advising guide format for the NR program that is interactive and aids students in creating long term plans for the completion of their degree, and we refined the process for students to develop written justifications for Individualized Specialty Options. We also strengthened our work with OSU-Cascades and OSU-LaGrande to provide consistent, appropriate advising and policies for NR students at those

¹ Information of publications and presentations of scholarly work are for calendar year 2016.

campuses. For graduate programs, the FES graduate program coordinator co-led several brown-bag lunch workshops and information sessions with graduate students.

- Increased attention to assessing student accomplishment of program learning outcomes. FES graduate programs continued to refine policies and procedures, including more rigorous and thorough annual reviews of academic progress for all students. The NR program began a complete overhaul of the approach used to assess student achievement of learning outcomes, and the new TRAL program developed a detailed “map” of delivery and assessment points for learning outcomes.

b. New/revised curriculum/programs

FES continued the work begun in prior years to merge the Recreation Resource Management (RRM) program at Corvallis and the Tourism & Outdoor Leadership (TOL) program at OSU-Cascades into a new Tourism, Recreation, and Adventure Leadership (TRAL) degree. The abbreviated Cat I proposal was approved by the Faculty Senate in May, 2017, and marketing/communications work has begun. As of summer, 2017, four students have declared the TRAL major.

The NR program responded to the 10-year curriculum review (whose report was received in summer, 2016) in a written Action Plan presented to APAA in October, 2016. After discussion with the University Curriculum Council, this plan was accepted in Spring, 2017. Implementation of various actions began in Fall 2016 and are on-going. Notably, these include a complete review of all courses listed in the NR Core, NR Breadth, and each Specialty Option; submission of the Cat II proposal to create the new Integrated Conservation Analysis option led by FES faculty; new approaches to assessment of student learning outcomes; and a new governance model consisting of a faculty curriculum committee in addition to the existing Program Committee. The full proposal (“NR-3”) will be presented to the Program Committee for vote in fall, 2017.

c. Credit hours and scheduled courses

FES faculty and instructors based out of Corvallis/Ecampus delivered a total of 9,676 student credit hours (SCH) in scheduled courses across the four quarters of the academic year. (This does not include credits associated with thesis, research, capstone projects, or reading and conference courses). For cross-listed courses taught by FES employees, all SCH are included in this total. Overall, SCH production showed a steady increase from previous years (Figure 1), even though the number of teaching faculty has not increased. Just over half of the SCH generated in FES were through Ecampus courses. Appendix A lists courses and enrollments by faculty.

In addition to scheduled courses, the MNR 560 and SNR 506 capstone project courses generated 139 SCH of graduate courses. Separate from the Corvallis-based courses, the two tenured faculty with appointments in FES located at OSU-Cascades generated 220 SCH in the NR and TOL programs.

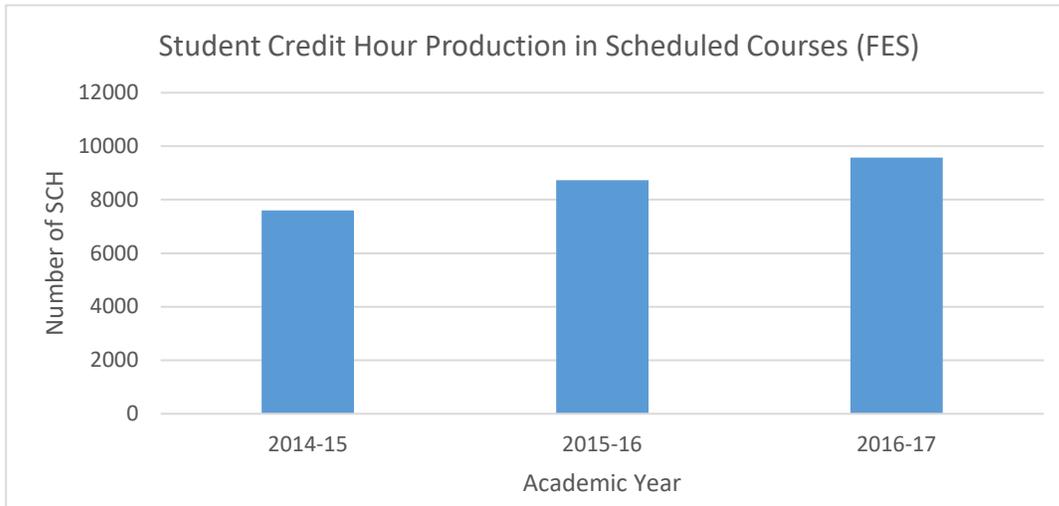


Figure 1. Student Credit Hour Production by Corvallis and Ecampus FES Faculty and Instructors, FY2014-2017

d. Number of graduates and enrolled students

FES directly oversees two undergraduate BS programs: Recreation Resource Management and Natural Resources. The Tourism and Outdoor Leadership program at Cascades is also considered a program in FES. On average across the three quarters of the academic year, 35 students were enrolled in RRM, 27 were enrolled in TOL, and 567 were enrolled in NR (194 Corvallis, 272 Ecampus, 14 La Grande, and 87 Cascades). Together, these numbers account for 68.5% of the students enrolled in BS degrees administered out of the College of Forestry. If one excludes the NR-Cascades, NR-LaGrande, and TOL students, RRM and NR accounted for 54.6% of the BS students in the College of Forestry. RRM (4 students), TOL (13 students), and NR (102 students) accounted for 68.4% of the 174 BS degrees conferred by the College across the academic year.

At the graduate level, FES offers MS, PhD, and MNR degrees. Collectively, these programs averaged 116 students enrolled during the academic year, 50.9% of all CoF enrolled graduate students. The three on-line graduate certificate programs (SNR, Urban Forestry, and Forests & Climate Change) averaged 47 students enrolled (with many of the certificate-seeking students jointly enrolled in the MNR program). The FCC certificate was new, and it grew from one student in fall to 8 students in spring. Of the 65 graduate degrees conferred by the College during the year, 41 (63%) were in degree programs in FES. Notably, the MNR program conferred 51% of all MS degrees in the college.

Finally, many FES faculty and staff mentored students from underrepresented groups in coursework, research experiences, or employment.

e. Other data (e.g., exit interviews)

No additional data were collected in 2016-17 regarding undergraduate programs, given the on-going creation of TRAL and the Action Plan for NR. For graduate programs, the Department Head conducted an hour-long exit interview with every graduating MS and PhD student. The results of

these interviews demonstrated that students were largely quite positive about their experiences, with especially high levels of praise for the FES office staff (particularly the graduate coordinator), the IT/Help Desk, availability and quality of facilities and equipment, and overall quality of the graduate program. However, they revealed some areas in need of attention, such as inconsistent expectations across major professors regarding work duties and research, superficial attention to some requirements (such as competencies), and some aspects of courses that could be improved.

2. Stabilize the financial health of the college

a. Donor activities or outreach

Several FES faculty participated in information sessions with the OSU Foundation. Apart from one meeting with a potential major donor, there was no concerted effort to engage in donor activities or outreach by FES.

b. New industry or community partnerships

None.

c. Using technology as a strategic asset

The Provost has requested information on how we “use technology as a strategic asset,” meaning how we share information to make effective decisions, invest in information technology to enable educational innovation, and enhance the quality of service in administrative processes.

In FES, the department head served as the primary link to share information upward and downward in relation to decision-making; at monthly departmental meetings, she reported on news and activities from the College and university administrations.

In terms of information technologies for educational innovation, the FES department supported license fees for specialized software needed for classes and encouraged faculty to participate in trainings related to teaching.

With regard to administrative services, the FES Office Manager served as a member of the university task force developing improved procedures for hiring student workers.

d. other

FES was diligent in implementing the Ecampus policy for course enrollments, so that – as a whole -- Ecampus tuition covered the costs of instruction. One issue that came to light was that the department must cover expenses associated with administering the MNR program, and we were in deficit. This was because the Dean’s “tax” on ecampus tuition was being taken before all program administration costs were paid. After discussion, it was agreed that the tuition should cover all administrative costs before the tax, and we expect the MNR program to be financially self-sufficient henceforth.

3. Strengthen the College’s commitment to research excellence

a. Research summary and commentary (Provost’s Goal 2)

OSU's Strategic Plan 3.0 identifies three signature areas of scholarship: Advancing the Science of Sustainable Earth Ecosystems, Improving Human Health and Wellness, and Promoting Economic Growth and Social Progress. FES research contributes directly to each of these. For example, FES faculty, staff, and students have world-renowned research programs related to the functioning and productivity of forested ecosystems, basic science related to climate change and carbon sequestration, and genetics/genomics of various tree species. The recreation and social science faculty focus on providing high quality outdoor recreation experiences -- which contributes to individual health -- as well as the resilience and health of resource-dependent communities.

FES faculty, staff, and students are strong leaders in research and scholarship. Exit interviews with graduate students affirm that it is the strong reputation of FES faculty that is the major consideration in attracting students. In addition to their own scholarship, faculty serve as Associate Editors or Editors-in-Chief for several scientific journals, and they review for journals and grant proposals (e.g., for NSF). Most FES PhD and MS students presented their work at national or international conferences, and several were organizers of the successful WFGRS conference in 2017.

A sampling of leadership roles includes the following:

- Barb Lachenbruch was Vice-Chair of the 2016 Gordon Research Conference, Multiscale Plant Vascular Transport, June 26-July 3, 2016, Sunday River, Maine and is the conference co-Chair for the 2018 Gordon Research Conference.
- Badege Bishaw was the Chairman for the PNW AgroForestry Working Group and President of the Association for Temperate Agroforestry.
- Paul Ries was President-Elect of the Board of Directors of the International Society of Arboriculture.
- Matt Betts served as Associate Editor for *Current Landscape Ecology Reports* and *Landscape Ecology*. He was also a member of the Advisory Board for the Las Cruces Biological Station.
- Janean Creighton served as Associate Editor for the *Journal of Forestry*
- Reem Hajjar was guest co-editor of a special issue on forest governance impacts for *Land Use Policy* and guest co-editor of a special issue on forests as a pathway to prosperity for *World Development*. She also served on the coordinating committee for the FLARE conference.
- Glenn Howe served as Associate Editor for *New Forests*. He also served on the steering committee for the Tree Genes Initiative on Accelerating Stress-Adapted Trees, a project co-sponsored by the U.S. Forest Service and the Institute of Forest Biosciences, as well as the Expert Advisory Panel for the Specialty Wood Products Partnership, Rotorua, NZ.
- Bev Law was an invited expert on forest carbon accounting, Intergovernmental Panel on Climate Change (IPCC), Wollongong, for the Expert Panel on "Technical Assessment of IPCC Inventory Guidelines for Agriculture, Forestry, and Other Land Use (AFOLU) sectors." She was also a member of the World Meteorological Organization Planning Team for an Integrated, Global Greenhouse Gas Information System (Ig3IS); on the Board of Advisors for the Integrated Carbon Observation System ICOS, a European system of land, ocean and atmospheric observations and modeling to quantify greenhouse gas emissions and the effects of climate on land, oceans and the atmosphere; on the Board of Advisors, ICOS Sweden; a member of AmeriFlux research network Science Steering Committee, which identifies gaps in knowledge and observations needed to better understand ecosystem responses to climate and disturbance. We advise

Lawrence Berkeley National Lab on improvements needed, technical advances, etc. to make sure it is leading cutting edge science; and a member of the Oregon Global Warming Commission Forest Carbon Subcommittee, which advises the use of scientifically rigorous methods for quantifying the forest carbon sector's role in meeting Oregon's greenhouse gas emissions target.

- Dan Luoma was chair of the Liaison for Amateur Societies Committee for the Mycological Society of America and vice president of the Native Plant Society of Oregon.
- Mark Needham was Editor-in-Chief for *Human Dimensions of Wildlife* and Associate Editor for the *Journal of Outdoor Recreation and Tourism*, *Leisure Sciences*, and the *Journal of Leisure Research*. He was also a steering Committee Member for the International Coastal and Marine Tourism Society.
- Michael Nelson was an Editorial Review Board Member for *BioScience* and a member of the Board of Advisors for the journal PAN: Philosophy, Activism, Nature, as well as a member of the Scientific Advisory Board for Project Coyote.
- Christine Olsen was a committee member for the 2nd International Smoke Symposium, Long Beach, CA
- Bill Ripple was an Editorial Review Board Member for *Biological Conservation*
- Jim Rivers was an Associate Editor for *Auk: Ornithological Advances*, a member of the American Ornithological Society Scientific Program Committee, a member of the North American Ornithological Conference Workshops and Training Opportunities Committee, and a Council Member for the American Ornithologists' Union.
- Darrell Ross served as subject editor (community ecology) for *Environmental Entomology*
- Brad Withrow-Robinson served as Committee Member, Willamette Mainstem Cooperative Steering Committee.
- Glenn Ahrens served as the Program Organizer, Society of American Foresters - Portland Chapter Program, and is serving on the OSAF 2017 program planning committee.
- Nicole Strong was a committee member on the Association of Natural Resources Professionals, Professional Development Committee.
- Paul Oester was Chairman, Union County Forestland Classification Committee, Oregon Department of Forestry.
- John Campbell organized the Forest Carbon Workshop for Oregon Stakeholders in Salem.
- Emily Jane Davis served as a member of Oregon's State Wood Energy Team. She also represented OSU at the Federal Forest Working Group, which federal forest health issues and collaboration.
- Troy Hall served on the US Forest Service's national Wilderness Information Management Steering Team and as subject matter specialist for the national Wilderness Character Monitoring protocol development.

b. Number of proposals submitted and total funding awarded

In FY17, FES employees submitted 57 proposals for \$16,741,293 through Cayuse for external funding (these do not include internal sources of funding, such as the IWFL professorships or the Fish & Wildlife in Managed Forests program). FES secured just over \$7 million in external funding (in new

awards or incremental additions to prior awards; Table 1). This includes the full annual amount for the NSF LTER (~\$1 million), as well as the first installment (~\$1.2 million) for new research funded by the NSF and led by Steve Strauss. Other notable grants include approximately \$470,000 (USFS) to Lisa Ganio for study of multidecadal forest vegetation change, approximately \$460,000 (NPS) to Ashley D’Antonio for visitor use studies at Grand Teton National Park, approximately \$380,000 to Janean Creighton (USFS) for the Northwest Fire Science Consortium, \$320,000 (BLM) to Jim Rivers for work on pollinator responses to disturbance in mix conifer forests, approximately \$310,000 (USFS) to Chris Still to evaluate down-scaled climate data and vegetation models at regional scales, nearly \$300,000 (USFS) to Meg Krawchuk for study of exotic species invasion dynamics in eastern Oregon, and \$270,000 (Lawrence Berkeley National Lab) to Bev Law for management of the Ameriflux Network that supplies critical data for global climate models.

Table 1. FY 17 Booked Awards by Unit, College of Forestry

Unit	Award Total
Extension Forestry & Natural Resources	\$242,307
Forest Engineering, Resources, & Management	\$2,919,021
Forest Ecosystems & Society	\$7,030,161
Wood Science & Engineering	\$936,281

c. Number of refereed publications and publications

In 2016, FES faculty published 88 papers in refereed journals and 8 book chapters (Appendix B), as well as numerous technical reports and other non-refereed articles. Outlets included top-tier journal such as the *Proceedings of the Royal Society B*, *Ecology*, *PNAS*, *Biogeosciences*, and *Global Change Biology*. FES faculty authored or co-authored dozens of presentations or posters at professional society meetings (Appendix C).

d. Selected highlights of major accomplishments, awards and achievements by faculty

FES faculty, staff, and students received several awards and honors in FY2017:

- Puettmann: Bullard Fellowship from Harvard Forest
- Betts: American Ornithological Union Elective Member
- Withrow-Robinson: OSUEA Search for Excellence, OSUEA
- Ahrens: Ask an Expert Question of the Year, OSU Extension Association

- Needham: Excellence in Teaching Award, The Academy of Leisure Sciences
- Strauss: 20 Year Mentorship, Apprenticeships in Science and Engineering, Saturday Academy, Portland, OR
- Strong: Awesome Force Award, Oregon State University Forestry and Natural Resources Extension, Experienced Faculty Award, Oregon State University Extension Association, State Recognized Program, Western Extension and Research Directors
- Law, Beverly E. Web of Science Most Cited Article in 2016 in *Global Change Biology Bioenergy* and ResearchGate’s Most Cited Researcher from OSU

- College of Forestry Dean’s Awards
 - *Fostering Student Success*: Dave Stemper
 - *Research / Scholarship*: Dick Waring
 - *FRA*: Becky Fasth
 - *FRA*: Keith Olsen
 - *Extended and Continuing Education (team)*: Janean Creighton, Carrie Berger
- FES Awards
 - Zarrate Charry: James H Dukes Jr Graduate Fellowship
 - Wolf: FES PhD Student Achievement Award
 - Heaston: FES MS Student Achievement Award
 - Stokely: Robert F Tarrant Graduate Fellowship
 - Elorriaga: Henry & Mildred Fowells Graduate Fellowship
 - Lu: Henry & Mildred Fowells Graduate Fellowship
 - Jarecke: Catherine G Bacon Fellowship
 - Batavia: Social Science Award
 - Nelson: Outstanding FES Faculty Member

The following are selected highlights of research in FES, which illustrate the diversity of disciplines and research areas within the department:

- Logan Berner and Bev Law published documentation of a long-term dataset (1999-2014) of plant and plot measurements for 35 tree and shrub species at 239 field sites in Oregon and California. Making these data publicly available helps address the need for standardized, landscape-scale data to further develop Earth systems models. (
- Bob Beschta, Bill Ripple and colleagues continued their long-term research on interactions among aspen, elk, wolves, and climate in Yellowstone National Park. Taking advantage of exclosures constructed in the mid 1900s to explore the impacts of herbivory on aspen, they provided evidence that the decline of aspen – a major concern in the northern Rockies – was more likely caused by herbivory than climate change. They also showed that the reintroduction of wolves led to a decline in the number of elk and therefore the recovery of aspen stands.
- Predicting how plant species will respond to climate change – including the possibility of migration – is a major scientific challenge. Dick Waring and colleagues developed a refined model that incorporates geographic and physiological variables related to tree reproduction and movement for 15 tree species in the Pacific Northwest. Their work showed that geographical barriers to movement (such as landscape fragmentation) will substantially impede the natural migration of species, and that assumptions about where different species may migrate based only on climate variables need to be seriously reconsidered.
- Janean Creighton’s research on family forests in Oregon and Washington explored reasons that forest owners are not successful in transferring forests to the next generation within families. Key factors were uncertainty in regulations, financial instability, and pressure for urbanization.
- Ashley D’Antonio incorporated new spatial analysis tools to expand her research on the ecological impacts of recreation use from the site-scale to larger spatial scales to better account for ecosystem-level impacts, particularly to wildlife species. In an extension of this work, she undertook a study with Norwegian researchers to investigate the relationship between

recreation disturbance and cultural ecosystem services in the most popular national park in Norway (Jotenheimen).

- The Betts lab continued research on the effects of fragmentation on pollinator movement and pollination success in tropical forests. Their experiments and observational studies demonstrate the importance of corridors for both hummingbirds and the plants they pollinate. This work has significant implications for the configuration of forest patches and connectivity in tropical landscapes.
- Darrell Ross and colleagues continued field experiments on the use of silver flies from the Pacific Northwest as a biological control agent for hemlock woolly adelgid (HWA) in the eastern US. HWA has caused high levels of mortality in eastern and Carolina hemlocks and is threatening the survival of both species. Classical biological controls have been unsuccessfully deployed for more than 20 years. Research at OSU discovered evidence suggesting that two species of predatory flies native to the Pacific Northwest are the primary controls on populations of HWA in the PNW. Ross and colleagues performed controlled releases of flies in the eastern US in 2015 and 2016, which were followed by free releases in 2017 in three states. Early results are promising, and ongoing research will monitor the effects of releases.
- Reem Hajjar's research focuses on community forestry and small and medium forest enterprises, particularly in developing countries. Recently, she analyzed documents from 41 countries to assess the potential for these enterprises to effectively participate in REDD+ strategies for climate change mitigation. Results highlighted the need for improvements in the capacities of forest enterprises to most effectively participate in REDD+ schemes.
- Chris Still published several papers related to the importance of fog as in mitigating drought in coastal ecosystems. Studies showed, for instance, that fog drip affects physiological process and plant growth, and that saplings are more susceptible to drought and more responsive to fog. Findings will help inform predictions of how populations of trees will respond under changing climatic conditions.
- Steve Strauss' lab continued to study the use of RNA interference to target a gene involved in floral organ formation; if successful, this may lead to effective methods to induce sterility in transgenic trees. Their research published in Nature Biotechnology showed that RNAi led to a loss of sexual organ development in field-grown trees, with vegetative development unaffected.
- Dana Warren has studied the interactions among pH, dissolved organic carbon, and thermal stratification in eastern lakes that are recovering from historic acidification. Analysis shows that, as temperatures warm under future climates, recovering lakes are likely to provide more refugia for cold-water species of fish. This work highlights the importance of exploring how recovery from impacts that occurred sometimes decades before can have secondary effects on future ecosystem conditions.
- Wildfire in natural ecosystems has heterogenous effects, and ecologists have noticed "fire islands" (or refugia) that persist in the face of repeated fire. Such refugia can play important ecological roles, but relatively little is known about why and where they occur. Meg Krawchuk and colleagues developed and tested a predictive model that included topographic complexity and fire weather conditions. Findings revealed several important drivers of refugia, such as slope, aspect, wetness, but the importance of each driver varied among environments.
- In many countries, poor communities living near protected areas are affected in various ways by ecotourism. Ian Munanura's research in East Africa explores how local communities can be

effectively engaged in ecotourism and develop more sustainable livelihoods. His recent research on Rwanda's Tourism Revenue Sharing policy at Volcanoes National Park revealed several structural and policy barriers preventing conservation and livelihood benefits.

- For the past several years, Klaus Puettmann has explored the utility of incorporating concepts from complexity science to help forestry students think about forests as complex adaptive systems. In a recent paper in *Natural Sciences Education*, he and colleagues present a set of learning outcomes and field exercises they have effectively used and that can be adapted by instructors in a range of contexts.

e. Cooperatives summary

Four research co-ops were active in FES:

- The Pacific Northwest Tree Improvement Research Cooperative (PNWTIRC), led by Glenn Howe, completed a new 5-year plan outlining high-priority research for the future. The PNWTIRC is currently focused on developing genetic markers called single-nucleotide polymorphisms (SNPs) that will be used to enhance the breeding of Douglas-fir and western white pine. Over the longer-term, it will be important to consider how breeding programs can be modified to account for climate change. Thus, future research will focus on the genetics of drought hardiness and breeding for future climates. A graduate student, Erda Celer, recently completed a first step in the drought hardiness research, with the publication of her M.S. thesis, "Douglas-fir Seedlings in the Pacific Northwest: The Genetics of Drought Adaptation." The plan adopted a new research model (called 'facilitated research') in which research projects will be led by one of the PNWTIRC members and PNWTIRC personnel will play a facilitator role by helping to develop the work plan, coordinating interactions among PNWTIRC members, and helping to analyze and report the results. This model will more effectively leverage the infrastructure and expertise of member organizations and address topics that are particularly relevant to them. Finally, the PNWTIRC remains actively engaged with research partners such as the Northwest Tree Improvement Cooperative, Northwest Advanced Renewables Alliance, Inland Empire Tree Improvement Cooperative, US Forest Service, Conservation Biology Institute, and the NSF Center for Advanced Forestry Systems.
- The Northwest Tree Improvement Cooperative, run by Keith Jayawickrama, celebrated its 30th year as a coop and 50 years since the start of the IFA-Progressive Tree Improvement System. Simulation (based on real 2nd cycle progeny test data) was completed on the effect of varying the number of test sites and trees per family, to aid design of 3rd cycle testing programs. The Coop worked with members to install the first series of 3rd cycle tests, a 2nd-cycle realized genetic gain trial for western hemlock, and a 2nd-cycle Douglas-fir realized genetic gain trial. Additionally, the coop has begun work on a new website and more user-friendly database. The coop added eight new members.
- The Tree Biosafety and Genomics Research Cooperative, led by Steve Strauss, continued work on genetic containment methods, high throughput sequencing of mRNA from eucalypts to design containment genes, and modifying floral genes to improve genetic containment. The Strauss lab submitted a major grant to USDA to continue gene editing work and conduct field trials and began a NSF-funded project developing new phenomics tools for in vitro and transformation studies, and GWAS to identify genes affecting transformation.
- The Hardwood Silviculture Cooperative was led by Glenn Ahrens.

4. Internationalize the College

a. Faculty participation in international programs

FES faculty participated in several aspects of international programs, including mentoring international graduate students and post docs, hosting visiting scholars, presenting at international conferences, and serving as experts for international organizations and agencies. Additionally, FES faculty were involved in the college's Chile initiative, including co-teaching a study abroad course.

5. Drive toward a diversified, pluralistic College community

a. Contributions by faculty and staff on advising, curriculum and/or participation in the DEIC committee or other DEI training opportunities

The FES department was well represented in many efforts related to the college's diversity, equity, and inclusion goals. Several faculty were on the core team that drafted the college's DEI plan, which was adopted in summer, 2017. Many others attended trainings on DEI issues. Department Head Hall was selected as one of five fellows for the OSU ADVANCE program, and Lisa Ganio and Meg Krawchuk participated in the ADVANCE summer seminar. The FES Promotion and Tenure Committee began discussions of how to incorporate the new requirements related to diversity, equity, and inclusivity that the Faculty Senate voted last year to include in P&T criteria.

Some faculty were able to acquire external funding to help attract underrepresented students to FES graduate programs. However, despite concerted efforts to attract more diverse students, the FES graduate programs did make progress in this regard (Table 2). However, the MNR program continues to attract a more diverse population than the campus-based MS and PhD programs. By comparison, the College graduate programs is 10% domestic minority (including Asian students).

Table 2. Diversity among FES Graduate Students

	AY 2016	AY 2017
FES MS & PhD		
Total students	66	66
Domestic minority (including Asian)	6 (8%)	4 (6%)
MNR		
Total students	51	49
Domestic minority (including Asian)	9 (15%)	8 (16%)

FES has made considerable progress in the past three years on issues related to departmental governance. Having an effective and accepted governance process helps ensure equity in distribution of responsibilities among members of the unit. For example, voting guidelines were refined and adopted, leading to a more consistent and transparent process for decision making. Development and implementation of a peer teaching review policy brought the department in line with university requirements and should help ensure the greatest possibility of success for all

teaching faculty. The department passed a policy on mentoring committees, which will help faculty, particularly junior faculty, move toward success and productive, healthy work-life balance.

b. Impacts from outreach and engagement

See other sections of this report and report from Extension.

Part B: Goals and Priorities for FY 2018 in the Five Strategic Areas

a. Academic excellence

In the past three years, significant work has gone into refining the FES undergraduate programs. In the upcoming year, a priority is carrying out – in a sustainable, stepwise fashion – the various actions identified during program reviews. For the undergraduate NR program, this includes approval of the new “NR 3.0” curriculum, adoption of a process for assessing student learning outcomes, and tighter integration with OSU Cascades and LaGrande.

One important goal is to effectively market the new TRAL program across campus, the state, and the country. It is critical that enrollment reaches a sustainable level over the next few years. There are excellent opportunities to partner with other programs to incorporate minors and certificates (e.g., the Leadership Certificate) into TRAL students’ programs. It is also important to connect with current efforts by the State and Travel Oregon that are focused on nature-based tourism and outdoor recreation.

The new Integrated Conservation Analysis option in the NR program was developed in response to employer and student input. Thus far, enrollment in the new classes has been limited, and we will need to market this option within NR but also to related programs across campus. Several of our new classes have no parallels in other programs and could be of great benefit to their students.

It has become apparent that the departments in the colleges and even classes within departments have differing expectations for TAs; some classes require a tremendous amount of work by TAs and instructors, while others require much less. We will continue to work with the other departments to develop guidelines for TA allocations. Although this is obviously a financial matter, it is also a matter of academic excellence, both for the students taking courses with TAs and for the TAs themselves.

Another goal for all academic programs in FES is to develop a better mechanism to track graduates so that we can conduct effective post-graduation surveys. All programs have implemented protocols to collect permanent contact information, and this year we will work with the Associate Dean for Undergraduate Affairs to develop a strategy for post-graduate surveys.

A goal for the FES MS and PhD programs is to reach resolution on outstanding issues related to program requirements (namely, coursework requirements and proposal requirements). For the

MNR program, several issues were identified in the 5-year review (spring, 2017), and plans and progress need to be made on all of these. The FES MS and PhD programs will have their 5-year review in 2017-18.

b. Stabilize financial health

The FES department has operated within budget in recent years and we do not anticipate any substantial changes. However, we are aware that graduate student tuition remissions is a major cost without an existing policy for distributing remissions. We will work with the other departments and Dean's office to develop guidelines for allocation and tracking of remissions. Additionally, we will consider whether to increase caps on Ecampus courses that are taught by graduate students to ensure that the costs of the students' tuition can be covered by students taking their Ecampus classes.

A goal for the upcoming year will be to work with FES faculty to develop criteria for prioritizing spending of departmental discretionary funds.

FES will participate in discussions about how to increase indirect cost recovery for grants and ways to incentivize/reward faculty for grants with full overhead.

c. Commitment to research excellence

We will carry on as usual and recognize significant research achievements.

d. Internationalization

New faculty who have international research programs will continue to develop materials for their courses that incorporate international cases, policies, and practices. It is likely that FES faculty will co-teach study abroad in Chile (Mountains to Sea) and Borneo.

e. Diversity, equity and inclusivity

FES will support implementation of the college's DEI plan, through service on the standing committee and ad hoc committees.

Appendix A. Courses taught by FES faculty in FY2016-17

Summer 2016

Course	Title	Credits	Instructor	Enrollment	Campus
FES 365	Issues in Natural Res Conserv	3	Stemper	29	Ecampus
FES/BI/TOX/MCB 435/535	Genes & Chem Value & Risk	3	Strauss	2	Ecampus
MNR 560	Master's Case Study	1-9	Bishaw	7	Ecampus
MNR 538	Adapt Forests Climate Change	3	Howe	8	Ecampus
SNR 530	Ecol Prin of Sus Nat Resources	3	Perry	14	Ecampus
FOR352	Wilderness Management	3	Stemper	27	Ecampus
FES 445/545	Ecological Restoration	4	Mangla	25	Ecampus
FES 499/599	St/Oil Palm to Orangutan Borneo		Bliss	10	Abroad
FES 506	Projects	2	Ries	3	On Campus
FES 505	Reading and Conference	2	Davis	2	

Fall 2016

Course	Title	Credits	Instructor	Enrollment	Campus
FES 240	Forest Biology	4	Lachenbruch	50	On Campus
FES 240	Forest Biology	4	Anzinger	37	Ecampus
FES 241	Dendrology	3	Anzinger	34	On Campus
FES 251	Recreation Resource Mgmt	4	Needham	78	On Campus
FES 341	Forest Ecology	3	Gumtow- Farrior	28	Cascades
FES 341	Forest Ecology	3	Painter	29	Ecampus
FES/HORT 350	Urban Forestry	3	Ries	45	Ecampus
FES 352	Wilderness Management	3	Stemper	28	Ecampus
FES 355	Mgt For Multiple Resource Values	3	Olsen	27	Ecampus
FES/BI/TOX/MC B 435/535	Genes & Chem Value & Risk	3	Strauss	7	Ecampus
FES/FW 439	Human Dimension of F&W Mgt	3	Diebel	31	On Campus
FES 445/545	Ecological Restoration	4	Mangla	38	Ecampus
FES 454/554	Managing Wildland-Urban Interface	3	Shindler	18	Ecampus
FES/ FW 452	Biodiversity Consv Managed Forests	3	Betts	25	Ecampus
FES/HORT 455/555	Urban Forest Planning, Policy	4	Ries	23	Ecampus

FES/ANS/FW/ SOC 485/585	Consensus & Natural Resources	3	Shindler	35	Ecampus
FES 493/593	Environmental Interpretation	4	Stemper	27	Ecampus
FES 520	Posing Research Questions	3	Ganio	20	On Campus
FES 646	Forest Ecosys Analys & App	4	Harmon	5	On Campus
MNR 511	Intro to Sustainable Nat Res	3	Bishaw, Olsen, K. Hall	17	Ecampus
MNR 560	Master's Case Study	1-9	Bishaw	18	Ecampus
NR 201	Mnging Nat Res For the Future	3	Stemper	32	Ecampus
NR 455	Natural Resource Decision Mak	4	Mangla	41	Ecampus
SNR 506	Ind Proj In Nat Resource Sustain	2	Bishaw	1	Ecampus
SNR 511	Sus Nat Resource Development	1	Bishaw	21	Ecampus
SNR 521	Econ of Sus Nat Resource Mgmt	3	K. Hall	24	Ecampus
SNR 540	Global Environmental Change	3	Turner	16	Ecampus
TOL 372	Ethics in Adventure Leadership	3	Gassner	7	Cascades
TOL 375	Experiential Education	4	Gassner	13	Cascades
TOL 478	Legal Issues in TOL	3	Brown	12	Cascades
FES 352	Wilderness Management	3	Stemper	28	Ecampus
FES 401	Res/Fire History & Climate	3	Krawchuk	1	On Campus
FES 430/530	Forest as Classroom	4	Stemper	27	Ecampus
FES 599	ST/Landscape Ecology	3	Betts	16	

Winter 2017

Course	Title	Credits	Instructor	Enrollment	Campus
FES 342	Forest Types of the Northwest	3	Anzinger	30	Ecampus
FES/HORT 350	Urban Forestry	3	Ries	26	Ecampus
FES 351	Recreation Behavior & Mgmt	4	D'Antonio	40	On Campus
FES 352	Wilderness Management	3	Stemper	37	Ecampus
FES 354	Comm, Nat Areas, & Sust Tourism	3	Munanura	26	On Campus
FES 360	Collaboration & Conflict Mgmt	3	Seales	10	Cascades
FES 365	Issues in Natural Res Conservation	3	Anzinger	35	Ecampus
FES 422	Research Methods Social Science	4	Engebretson	6	On Campus

FES/BI/TOX/ MCB 435/535	Genes & Chem Value & Risk	3	Strauss	22	Ecampus
FES 440/540	Wildland Fire Ecology	3	Krawchuk	29	On Campus
FES 440/540	Wildland Fire Ecology	3	Krawchuk	20	Ecampus
FES 440/540	Wildland Fire Ecology	3	Krawchuk	10	Cascades
FES/NR/RNG 477/577	Agroforestry	3	Bishaw	30	On Campus
FES/ANS/FW/ SOC 485/585	Consensus & Natural Resources	3	Shindler	34	Ecampus
FES/ANS/FW/ SOC 485/585	Consensus & Natural Resources	3	Rosenberg	39	On Campus
FES 493/593	Environmental Interpretation	4	Stemper	33	Ecampus
FES 500	Mrkt Tools GHG Emissions	3	K. Hall	8	Ecampus
FES 506	Projects	3	Ries	5	Ecampus
FES 507	Sem/Ecology, Evolution, Cons Bio	1	Betts	24	On Campus
FES 521	Natural Resource Research Planning	3	Howe	24	On Campus
FES 522	Research Methods Social Science	4	T. Hall, Engebretson	11	On Campus
FES 522	Research Methods Social Science	4	Olsen	9	Ecampus
FES 524	Natural Resource Data Analysis	4	Ganio	21	On Campus
FES 536	Carbon Sequestration in Forests	2	Harmon	10	On Campus
FES 548	Invasive Plants: Bio, Eco & Mgmt	3	Mangla	17	Ecampus
FES 560	Green Infrastructure	4	Ries	17	Ecampus
FES 580	Writing Scientific Manuscripts	1	T. Hall	13	On Campus
FES 599	ST/Advanced Tropic Cascades	3	Betts	6	On Campus
FES 600	Global Change Ecology	3	Law	5	On Campus
MNR 522	Research Methods Social Science	4	Olsen	9	Ecampus
MNR 560	Master's Case Study	4	Bishaw	18	Ecampus
NR 201	Managing Nat Res For the Future	3	Hajjar	76	On Campus
NR 201	Managing Nat Res For the Future	3	Stemper	48	Ecampus
NR 312	Crit Thing for Nat Res Challenges	3	Nelson	24	On Campus
NR 455	Natural Resource Decision Making	4	Creighton	13	On Campus

SNR 506	Ind Proj In Nat Resource Sustain	2	Bishaw	4	Ecampus
SNR520	Socially Sustainable Nat Res	3	Rosenberg	25	Ecampus
SNR 530	Ecol Prin of Sus Nat Resources	3	Perry	16	Ecampus
SNR 535	Sus Mgmt of Aquatic & Riparian Resources	3	Diebel	15	Ecampus
TOL 410	Internship	1-16	Gassner	3	Cascades
TOL 476	Risk Management in TOL	3	Gassner	11	Cascades
TOL 479	Nature and Human Experience	3	Gassner	21	Cascades

Spring 2017

Course	Title	Credits	Instructor	Enrollment	Campus
FES 240	Forest Biology	4	Anzinger	29	Ecampus
FES 240	Forest Biology	4	Lachenbruch	118	On Campus
FES 241	Dendrology	3	Anzinger	75	On Campus
FES 251	Recreation Resource Mgmt	4	Stemper	34	Ecampus
FES 341	Forest Ecology	3	Painter	28	Ecampus
FES 352	Wilderness Management	3	Stemper	34	Ecampus
FES 355	Mgmt For Multiple Resource Values	3	Olsen	29	Ecampus
FES 365	Issues in Natural Res Conservation	3	Reuter	20	Ecampus
FES 412/512	Forest Entomology	3	Ross	30	On Campus
FES 422	Research Methods Social Science	4	Lindberg	17	Cascades
FES 430/530	Forest As Classroom	4	Stemper	33	Ecampus
FES/BI/MCB/TOX 435/535	Genes & Chem Value & Risk	3	Strauss	23	On Campus
FES 440	Wildland Fire Ecology	3	Krawchuk	21	Ecampus
FES/FW 445/545	Ecological Restoration	4	Ross	63	On Campus
FES/FW 445/545	Ecological Restoration	4	Mangla	37	Ecampus
FES/FW 445/545	Ecological Restoration	4	Reuter	11	Cascades
FES 447/547	Arboriculture	4	Ries	26	Ecampus
FES/FW 452	Biodiversity Consv Mngd Forest	3	Cannon	56	On Campus
FES 456	Planning Cons Manged Forests	4	D'Antonio	21	On Campus
FES 457	Planning Sustainable Tourism	4	Munanura	6	On Campus
FES/ANS/FW/SOC 485/585	Consensus & Natural Resources	3	Rosenberg	14	On Campus

FES/ANS/FW/SOC 485/585	Consensus & Natural Resources	3	Shindler	39	Ecampus
FES 493/593	Environmental Interpretation	4	Stemper	34	Ecampus
FES 499/599	St/Mount to Sea: Ecosystems	3	Still	18	On Campus
FES 505	R&C/ Mixed Models & Program	3	Ganio	2	On Campus
FES 505	R&C/ Mixed Models & Program	1	Ganio	3	On Campus
FES 523	Quant Analysis in Social Science	4	Needham	29	On Campus
FES 550	Trophic Cascades	2-3	Ripple	7	On Campus
MNR 511	Intro to Sustainable Nat Res	3	Bishaw, Olsen, K. Hall	10	Ecampus
MNR 530	Tropical Forest Eco & Mgmt	3	Mangla	9	Ecampus
MNR 538	Adapt Forests Climate Change	3	Howe	5	Ecampus
MNR 550	Climate Change Impacts Forests	3	Turner	9	Ecampus
MNR 560	Master's Case Study	1-9	Bishaw	15	Ecampus
NR 202	Nat Res Problems & Solutions	2	Warren	9	On Campus
NR 325	Scientific Methods for NR Problems	3	Still	8	On Campus
NR 351	When Science Escapes the Lab	3	Rosenberg	20	On Campus
NR 407	Managing NR For Future	2	Fox	34	Cascades
NR 455	Natural Resource Decision Making	4	Creighton	23	On Campus
NR 499	ST/Natural Res & Costa Rica	1	Reuter	3/3	Ecampus
SNR 506	Ind Proj in Nat Resour Sustain	2	Bishaw	4	Ecampus
SNR 511	Sus Nat Resources Development	1	Bishaw	15	Ecampus
SNR 522	Basic Beliefs & Ethics in Nat Resources	3	Batavia	14	Ecampus
TOL 378	Tourism & Recreation Data Analysis	3	Lindberg	15	Cascades

Appendix B. FES Refereed Publications in 2016

- Aubrecht, D. M., Helliker, B. R., Goulden, M. L., Roberts, D. A., **Still, C. J.**, Richardson, A. D. (2016). Continuous, long-term, high-frequency thermal imaging of vegetation: Uncertainties and recommended best practices. *Agricultural and Forest Meteorology*, 228, 315-326.
- Baguskas, S. A., **Still, C. J.**, Fischer, D. T., D'Antonio, C. M., King, J. Y. (2016). Coastal fog during summer drought improves the water status of sapling trees more than adult trees in a California pine forest. *Oecologia*, 181(1), 137-148.
- Batavia, C., **Nelson, M. P.** (2016). Conceptual ambiguities and practical challenges of ecological forestry: a critical review. *Journal of Forestry*, 114(5), 572-581.
- Bechtold, H. A., Rosi, E. J., **Warren, D.**, Keeton, W. S. (2016). Forest Age Influences In-stream Ecosystem Processes in Northeastern US. *Ecosystems*. <http://dx.doi.org/10.1007/s10021-016-0093-9>
- Berner, L. T., Law, B. E.** (2016). Plant traits, productivity, biomass and soil properties from forest sites in the Pacific Northwest, 1999-2014. *Nature Scientific Data*, 3, 160002
- Beschta, R. L., Painter, L. E., Levi, T., Ripple, W. J.** (2016). Long-term aspen dynamics, trophic cascades, and climate in northern Yellowstone National Park. *Canadian Journal of Forest Research*, 46(4), 548-556.
- Beschta, R. L., Ripple, W. J.** (2016). Riparian vegetation recovery in Yellowstone: The first two decades after wolf reintroduction. *Biological Conservation*, 198, 93-103.
- Blades, J. J., Klos, P. Z., Kemp, K. B., **Hall, T. E.**, Force, J. E., Morgan, P., & Tinkham, W. T. (2016). Forest managers' response to climate change science: Evaluating the constructs of boundary objects and organizations. *Forest Ecology and Management*, 360, 376-387.
- Boer, M., Bowman, D., Murphy, B., Cary, G., Cochrane, M., Fensham, R., **Krawchuk, M.**, Price, O., Resco De Dios, V., Williams, R., Bradstock, R. (2016). Future changes in climatic water balance determine potential for transformational shifts in Australian fire regimes. *Environmental Research Letters*, 11(6) 065002.
- Brookes, H. B., **Ross, D. W.**, Strand, T. M., Thistle, H. W., Ragenovich, I. R., Lowery, L. (2016). Evaluating high release rate MCH (3-methylcyclohex-2-en-1-one) treatments for preventing *Dendroctonus pseudotsugae* (Coleoptera: Curculionidae) infestations. *Journal of Economic Entomology*, 109(6), 2424-2427.
- Burton, J. I., Olson, D. H., **Puettmann, K. J.** (2016). Effects of riparian buffer width on wood loading in headwater streams after repeated forest thinning. *Forest Ecology and Management*, 372, 247-257.
- Campbell, J. L.**, Donato, D. C., Fontaine, J. B. (2016). Effects of post-fire logging on fuel dynamics in a mixed-conifer forest, Oregon, USA: a 10-year assessment. *International Journal of Wildland Fire*, 25(6), 646-656.

- Campbell, J. L.**, Fontaine, J. B., Donato, D. C. (2016). Carbon emissions from decomposition of fire-killed trees following a large wildfire in Oregon, United States. *Journal of Geophysical Research: Biogeosciences*, 121(3), 718-730.
- Comfort, E. J., Clark, D. A., Anthony, R. G., Bailey, J. D., **Betts, M. G.** (2016). Quantifying edges as gradients at multiple scales improves habitat selection models for northern spotted owl. *Landscape Ecology*, 31(6), 1227-1240.
- Coops, N.C., **Waring, R.H.**, Plowright, A., Lee, J., Dilts, T.E. (2016). Using remotely-sensed land cover and distribution modeling to estimate tree species migration in the Pacific Northwest Region of North America. *Remote Sensing* 8(1), 65.
- Cotton, J. M., Cerling, T. E., Hoppe, K. A., Mosier, T. M., **Still, C. J.** (2016). Climate, CO₂, and the history of North American grasses since the Last Glacial Maximum. *Science Advances*, 2(3), e1501346.
- Creighton, J.**, Blatner, K. A., Carroll, M. C. (2016). For the love of the land: generational land transfer and the future of family forests in western Washington state, USA. *Small-scale Forestry*, 15(1), 1-15.
- D'Antonio, A.**, Monz, C. (2016). The influence of visitor use levels on visitor spatial behavior in off-trail areas of dispersed recreation use. *Journal of Environmental Management*, 170, 79-87.
- D'Antonio, A.**, Monz, C., Larson, N., Rohman, A. (2016). An application of recreation resource assessment techniques to inform management action in an urban-proximate natural area. *Journal of Outdoor Recreation and Tourism*, 14, 12-21.
- Donato, D. C., Fontaine, J. B., **Campbell, J. L.** (2016). Burning the legacy? Influence of wildfire reburn on dead wood dynamics in a temperate conifer forest. *Ecosphere*, 7(5).
- Engebretson, J.**, **Hall, T.**, **Blades, J.**, **Olsen, C. S.**, Toman, E., **Frederick, S.** (2016). Understanding public tolerance of smoke from wildland fires across the United States. *Journal of Forestry*, 114(6), 601-609.
- Everatt, K. T., Andresen, L., **Ripple, W. J.**, Kerley, G. I. (2016). Rhino poaching may cause atypical trophic cascades. *Frontiers in Ecology and the Environment*, 14(2), 65-67.
- Falk, J. H., **Needham, M. D.** (2016). Utilizing indicator-based methods: Measuring the impact of a science center on its community. *Journal of Research in Science Teaching*, 53(1), 65-69.
- Fischer, D. T., **Still, C. J.**, Ebert, C. M., Baguskas, S. A., Park Williams, A. (2016). Fog drip maintains dry season ecological function in a California coastal pine forest. *Ecosphere*, 7(6).
- Fischer, P., Spies, T., Steelman, T., Moseley, C., Johnson, B. R., Bailey, J. D., Ager, A., Bourgeron, P., Charnley, S., Collins, B. M., Kline, J., Leahy, J., Littell, J., Millington, J. D.A., Nielsen-Pincus, M., **Olsen, C. S.**, Paveglio, T., Roos, C. I., Steen-Adams, M., Stevens, F. R., Vukomanovic, J., White, E., Bowman, D. M.J.S. (2016). Wildfire risk as a socio-ecological pathology. *Frontiers in Ecology and the Environment*, 14(5), 276-284.

- Frey, S. J., Hadley, A. S., Betts, M. G.,** Robertson, M. (2016). Microclimate predicts within-season distribution dynamics of montane forest birds. *Diversity and Distributions*, 22(9), 944-959.
- Frey, S. J., Hadley, A. S.,** Johnson, S. L., **Schulze, M.,** Jones, J. A., **Betts, M. G.** (2016). Spatial models reveal the microclimatic buffering capacity of old-growth forests. *Science Advances*, 2(4), e1501392.
- Garcia, M. O., Jane, S. E., Jones, M. D., **Luoma, D. L.** (2016). Ectomycorrhizal communities of ponderosa pine and lodgepole pine in the south-central Oregon pumice zone. *Mycorrhiza*, 26(4), 275-86.
- Greer, B. T., Still, C. J., Howe, G. T.,** Tague, C., Roberts, D. A. (2016). Populations of aspen (*Populus tremuloides* Michx.) with different evolutionary histories differ in their climate occupancy. *Ecology and Evolution*, 6(9), 3032-3039.
- Grogan, J., **Schulze, M.,** Pires, I. P., Free, C. M., Landis, R. M., Morales, G., Johnson, A. (2016). How sustainable is mahogany management? *ITTO Tropical Forest Update*, 25, 5-9.
- Hadley, A. S., Betts, M. G.** (2016). Refocusing Habitat Fragmentation Research Using Lessons from the Last Decade. *Current Landscape Ecology Reports*, 1(2), 55-66.
- Hajjar, R.,** Badini, O. S., Kozak, R. A. (2016). Promoting small and medium forest enterprises in national REDD + strategies: A global analysis of enabling environments. *Climate Policy*, 1-33.
- Hajjar, R.,** Oldekop, J. A., Cronkleton, P., Etue, E., Newton, P., Russel, A. J. M., Tjajadi, J. S., Zhou, W., Agrawal, A. (2016). The data not collected on community forestry. *Conservation Biology*, 30(6), 1357-1362.
- Hall, T. E., Engebretson, J.,** O'Rourke, M., Piso, Z., Whyte, K., & Valles, S. (2016). The Need for Social Ethics in Interdisciplinary Environmental Science Graduate Programs: Results from a Nation-Wide Survey in the United States. *Science and Engineering Ethics*, 23(2), 565-588.
- Holm, S. R., Noon, B. R., Wiens, J. D., **Ripple, W. J.** (2016). Potential trophic cascades triggered by the barred owl range expansion. *Wildlife Society Bulletin*, 40(4), 615-624.
- Hyde, J. C., Blades, J., **Hall, T. E.,** Ottmar, R. D., Smith, A. (2016). Smoke management photographic guide: a visual aid for communicating impacts. Gen. Tech. Rep. PNW-GTR-925. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 59 p.
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- Kim, Y., Still, C. J., Hanson, C. V., Kwon, H., Greer, B. T., Law, B. E.** (2016). Canopy skin temperature variations in relation to climate, soil temperature, and carbon flux at a ponderosa pine forest in central Oregon. *Agricultural and Forest Meteorology*, 226, 161-173.
- Klocko, A. L., Borejsza-Wysocka, E., Brunner, A. M., Shevchenko, O., Aldwinckle, H., Strauss, S. H.** (2016). Transgenic Suppression of AGAMOUS Genes in Apple Reduces Fertility and Increases Floral Attractiveness. *PLoS one*, 11(8), e0159421.
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Books and Book Chapters

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Dearden, P., Rollins, R., **Needham, M. D.** (Eds.) (2016). *Parks and protected areas in Canada: Planning and management* (4th ed.). Don Mills, Ontario: Oxford University Press.

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Conference Proceedings

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Goralnik, L., O Connell, K. E., Schulze, M., **Nelson, M. P.** (2016). *H.J. Andrews Forest Discovery: A Conceptual Framework for Interdisciplinary Interpretation and Empathy Development* (pp. 30-34). 2015 Symposium for Experiential Education Research (SEER) Proceedings. Association for Experiential Education.<https://aee.memberclicks.net/assets/docs/SEER/2015%20seer%20booklet.pdf>

Mosel, J., Lachenbruch, B. 2016. Physiological and morphological characteristics of Douglas-fir and loblolly pine seedlings from varying provenances under repeated drought. *Novel Ecosystems in the Anthropocene: Annual Meeting of the Ecological Society of America*. Fort Lauderdale, FL, August 7-12, 2016.

Appendix C. Presentations by FES Faculty, January 1, 2016 - December 31, 2016

- Ahrens, Glenn Robert** (Author & Presenter), Ecological Forestry 101: Intro to Silviculture and Wildlife, "Introduction to Ecological Forestry," Miller Woods, McMinnville, OR. (June 4, 2016).
- Ahrens, Glenn Robert** (Author & Presenter), Hood River Master Gardener Training, "Trees and Tree Problems - What Master Gardeners Need to Know," Hood River, OR. (February 10, 2016).
- Ahrens, Glenn Robert** (Author & Presenter), The Future of Pacific Madrone, "Ecology of Pacific Madrone," Washington State University, Research and Extension Center, Puyallup, WA. (April 19, 2016).
- Ahrens, Glenn Robert** (Author & Presenter), Yamill County Small Woodlands Association Meeting, "Oregon Forests and Climate Change," McMinnville, OR. (April 20, 2016).
- Ault, Kori** (Author & Presenter), Ault (Author), Plant and Animal Genomes, "Genetic Variation and Genomic Associations of Leaf Physiological Traits in an Association Population of *Populus trichocarpa*," San Diego. (January 2016).
- Barry, Amy, Hagar, Joan, **Rivers, James W**, West Coast Regional Meeting of The National Council for Air and Stream Improvement, "Created snag dynamics and impacts on cavity-nesting bird communities over 25 years in western Oregon," Vancouver, WA. (October 2016).
- Berner, Logan** (Author & Presenter), **Law, Beverly** (Author), American Geophysical Union, "Multiscale assessment of water limitations on forest carbon cycling in the western United States," San Francisco, CA. (December 12, 2016).
- Betts, Matthew G**, Chicago Naturalists Society, "Tropical surprises: Conserving pollination dynamics in tropical forest landscapes," Las Cruces Biological Research, Costa Rica. (February 2016).
- Betts, Matthew G**, HJ Andrews Annual Symposium, "Can forest structure buffer biodiversity against climate change? HJA seminar series," OSU. (April 2016).
- Betts, Matthew G**, HJ Andrews Summer Seminar Series, "Can forest structure buffer biodiversity against climate change? HJA seminar series," Blue River, OR. (July 2016).
- Betts, Matthew G, Jim Rivers**, North American Ornithologists Congress, "Evaluating space use and reproductive success of the threatened Marbled Murrelet in Western Oregon.," Washington, DC. (August 2016).
- Betts, Matthew G, Jonathon Valente**, North American Ornithologists Congress, "Riparian zones enhance functional connectivity for forest passerines in a fragmented landscape," Washington, DC. (August 2016).
- Betts, Matthew G**, LTER Science Meeting, "Long-term population and community research at the H.J. Andrews LTER," Santa Barbara. (May 2016).
- Betts, Matthew G**, North American Ornithologists Congress, "Do birds help trees? Trophic cascades by birds in managed forests," Washington, DC. (August 2016).
- Betts, Matthew G**, Oregon Dept. of Forestry, "Early seral biodiversity and ecosystem services in managed forest landscapes. Invited presentation," Salem, Oregon. (January 2016).
- Betts, Matthew G**, OSU Cascades Science Pub, "Conserving pollination services in tropical forest landscapes," Bend, OR. (May 2016).
- Betts, Matthew G, Sarah Frey, Adam Hadley**, North American Ornithologists Congress, "Microclimate predicts within-season distribution dynamics of forest birds," Washington, DC. (August 2016).
- Boag, Angela (Author & Presenter), Hartter, Joel (Author), Hamilton, Larry (Author), **Oester, Paul** (Author), Christoffersen, Nils (Author), Stevens, Forrest (Author), Ducey, Mark (Author), Palace, Michael (Author), Society of American Foresters Annual Convention, "Barriers to climate adaptation among private forest owners in eastern Oregon," Madison, WI. (November 1, 2016).

- Celer, Erda** (Author & Presenter), **Howe, Glenn Thomas** (Author & Presenter), Plant Breeding Symposium, St. Paul, MN. (March 15, 2016).
- Chong, Geneva, **Krawchuk, Meg**, Haire, Sandra, Coop, Jonathan, Parisien, Marc-Andre, Whitman, Ellen, Miller, Carol, 13th Biennial Scientific Conference on the Greater Yellowstone Ecosystem (GYE), "Fire refugia – why do some areas escape burning or burn with lower severity than places nearby?." (2016).
- D'Antonio, Ashley** (Author & Presenter), Monz, Christopher (Author), Peter, Newman (Author), Heaslip, Kevin (Author), Taff, Derrick (Author), Noon, Daniel (Author), Newton, Jennifer (Author), Fuentes, Antonio (Author), 13th Biennial Scientific Conference of the Greater Yellowstone Ecosystem, "A collaborative, systems-based approach to visitor use planning: An example from the Moose-Wilson Corridor in Grand Teton National Park," Grand Teton National Park, Wyoming. (October 5, 2016).
- D'Antonio, Ashley** (Moderator), 13th Biennial Scientific Conference of the Greater Yellowstone Ecosystem, "Understanding and Managing Park Visitors," Grand Teton National Park, Wyoming. (October 5, 2016).
- Davis, Emily Jane** (Author & Presenter), **Nuss, Meagan L** (Author), Society for Ecological Restoration Northwest Regional Conference, "Oregon's forest collaborative groups: characteristics, motivations, and perceptions of success," Portland, OR. (April 7, 2016).
- Davis, Emily Jane** (Author), Ecological Society of America Annual Meeting, "Allies or Adversaries? Considering Rural Community Interests in Forest Landscape Restoration," Ft. Lauderdale, FL. (August 11, 2016).
- Davis, Emily Jane** (Author), **Wollstein, Katherine** (Author), Central Oregon Fire Science Symposium, "When Two Worlds Collide: Rangeland Fire Protection Associations, Federal Agencies, and the Politics of Resilience," Bend, OR. (March 21, 2016).
- Davis, Emily Jane**, Facing the Fire: New Tools and Science for Resilient Forests, "Five Common Conceptions About Collaboratives," Boise, ID. (February 24, 2016).
- Davis, Emily Jane**, Oregon Community Foundation Annual Leaders Gathering, "Our Culture of Collaboration: The Oregon Way to Sustain Lands and Livelihoods," Sunriver Resort, Sunriver, OR. (September 29, 2016).
- Davis, Emily Jane**, Strategic Conservation Gathering, "The Roles of Community-Based Organizations in Forest and Community Stewardship," World Forestry Center, Portland, OR. (November 29, 2016).
- Davis, Emily Jane**, U.S. Forest Service Region 6 Social Science Forum, "Studying Collaboration," Corvallis, OR. (March 8, 2016).
- Davis, Emily Jane, Ulrich, Donald R** (Author & Presenter), Federal Forest Working Group Meeting, "An Assessment of Collaborative Forest Restoration on the Mt. Hood, Willamette, and Siuslaw National Forests," Portland State University, Portland, OR. (April 7, 2016).
- Elorriaga, Estefania** (Author & Presenter), **Strauss, Steven H** (Author), Plant and Animal Genome, "High Incidence of Homozygous Mutation of Floral Genes in CRISPR-Cas9 Transgenic Poplars," San Diego. (January 2016).
- Engebretson, J., Pizo, Z., Hall, T. E., & O'Rourke, M.** 2016. Transdisciplinary imaginations: How interdisciplinary environmental science students envision the environmental assessment and decision-making process. International Symposium on Science and Resource Management, Houghton, MI, June 22-26, 2016.
- Foote, Gabriel A.** (Author), Fettig, Christopher J. (Author & Presenter), Runyon, Justin B. (Author), **Ross, Darrell W.** (Author), Coleman, Tom W. (Author), Gaylord, Monica L. (Author), Graves, Andrew D. (Author), Lowrey, Laura L. (Author), McMillan, Joel D. (Author), Mortensen, Leif A. (Author), Munson, A. Steve (Author), Mafra-Neto, A., Society of American Foresters National Convention,

- "Development of a novel semiochemical tool for tree protection and assessment of ecological risks to pollinators in Douglas-fir forests," Madison, WI. (2016).
- Frank, Aline (Author & Presenter), **Howe, Glenn Thomas** (Author & Presenter), Sperisen, Christoph (Author & Presenter), St. Clair, Bradley J. (Author & Presenter), Schmatz, Dirk R (Author & Presenter), Heiri, Caroline (Author & Presenter), SAF National Convention, "Relative risk of maladaptation to climate change in three major European tree species in Switzerland: management implications," Madison, Wisconsin, USA. (November 4, 2016).
- Frederick, Stacey** (Author & Presenter), **Olsen, Christine Shaw** (Author), 2nd International Smoke Symposium, "Public perceptions of smoke and agency relationships before and after an active fire season: Longitudinal panel results from northern California," Long Beach, CA. (November 15, 2016).
- Frey, Dave (Author & Presenter), Hatten, Jeffery A (Author), **Stokely, Thomas** (Author), **Betts, Matthew G** (Author), Vegetation Management Research Cooperative Annual Meeting, "Effects of the interplay between wildlife, plant communities, decomposition, and soils on productivity in intensively managed forest plantations," Corvallis, Oregon. (December 1, 2016).
- Frey, Dave (Author & Presenter), Hatten, Jeffery A (Author), **Stokely, Thomas** (Author), **Betts, Matthew G** (Author), Soil Science Society of America Annual Meeting, "Effects of the interplay between wildlife, plant communities, decomposition, and soils on productivity in intensively managed forest plantations," Phoenix, Arizona. (November 6, 2016).
- Frey, Dave (Author & Presenter), Hatten, Jeffery A (Author), **Stokely, Thomas** (Author), **Betts, Matthew G** (Author), Ecological Society of America Annual Meeting, "Effects of the interplay between wildlife, plant communities, decomposition, and soils on productivity in intensively managed forest plantations," Fort Lauderdale, Florida. (August 12, 2016).
- Ganio, Lisa Maria**, Forest Health Protection Technical Meeting, "Mortality classification of large fire-injured Douglas fir and ponderosa pine in Oregon and Washington," Portland Oregon. (November 15, 2016).
- Hajjar, Reem** (Author & Presenter), Oldekop, Johan A (Author), 2nd Annual FLARE Conference, "What factors are associated with improvements in livelihood and environmental outcomes in forests managed by communities? A systematic review," Edinburgh. (December 3, 2016).
- Hajjar, Reem** (Author & Presenter), Political Ecology Society Annual Meeting, Society for Applied Anthropology, "On legitimacy of secondary-level institutions: An empirically-informed discussion of forest producer associations in Ghana and Mexico," Vancouver. (March 2016).
- Hall, T. E.** 2016. Studying how humans interact with Natural Resources. Invited presentation, USFS Region 6 Social Science Forum, March 8, 2016. Corvallis, OR.
- Hall, T. E.** 2016. What can science tell us about recreation impacts? Invited presentation, Central Oregon Trails Summit. May 24, 2016. 80 attendees
- Hall, T. E.** 2016. What can science tell us about recreation impacts? Invited presentation, Central Oregon Sustainable Trail Summit, May 24, 2016, Bend, OR.
- Hart, Benjamin** (Author & Presenter), Smith, Jane E (Author), **Luoma, Daniel Lewis** (Author), Mycological Society of America Annual Meeting, "Effects of fuels treatments of ponderosa pine (*Pinus ponderosa*) in the blue mountains of eastern Oregon: A mycorrhiza perspective," Berkeley, CA. (August 10, 2016).
- Houtz, Jennifer, **Rivers, James W**, Horton, Brent, **Betts, Matthew**, Pennsylvania State System of Higher Education Undergraduate Research Conference in Science, Technology, Engineering, and

Mathematics, "Evaluating the influence of forest herbicides on offspring sex ratio in an early-successional forest songbird," Millersville, PA. (September 2016).

Houtz, Jennifer, **Rivers, James W**, Horton, Brent, **Betts, Matthew**, North American Ornithological Conference, "Evaluating the influence of forest herbicides on offspring sex ratio in an early-successional forest songbird," Washington D.C. (August 2016).

Howe, Glenn Thomas (Author & Presenter), Douglas-fir Breeding Workshop, "Possibilities for genomics in Douglas-fir breeding," University of Canterbury, Christchurch, New Zealand. (June 9, 2016).

Howe, Glenn Thomas, "Douglas-fir breeding and genecology," Sofia, Bulgaria. (June 23, 2016).

Howe, Glenn Thomas, "Douglas-fir breeding and the Pacific Northwest Tree Improvement Research Cooperative," Rotorua, New Zealand. (June 7, 2016).

Howe, Glenn Thomas, "Forest genetics from science to management," Zurich, Switzerland. (June 30, 2016).

Howe, Glenn Thomas, Jayawickrama, Keith, Annual Meeting, "Genomic selection for Douglas-fir tree improvement," Pensacola Beach, Florida. (April 26, 2016).

Howe, Glenn Thomas, Olympic Resource Management, "Timberlands in the Pacific Northwest: Managing for Climate Change," Portland, OR. (September 20, 2016).

Howe, Glenn Thomas, St.Clair, Brad, Stevenson-Molnar, Nik, Ward, Brendan, Bachelet, Dominique, PNWTIRC Meeting, "Seedlot Selection Tool." (2016).

Howe, Glenn Thomas, St.Clair, Brad, Stevenson-Molnar, Nik, Ward, Brendan, Bachelet, Dominique, CBI Webinar, "Climate-Smart Seedlot Selection Tool: Reforestation and Restoration for the 21st century," online. (November 3, 2016).

Jayawickrama, Keith (Author), **Ye, Terrance Zhihong** (Author & Presenter), **Howe, Glenn Thomas** (Author), Kling, Jennifer (Author), **Kolpak, Scott E** (Author), NWTIC Annual Meeting, "Genomic Selection in Douglas-fir: A preliminary study," Aurora, Oregon. (October 17, 2016).

Kerns, Becky (Author & Presenter), **Krawchuk, Meg** (Author), **Zald, Harold** (Author), Vaillant, Nicole (Author), Kim, John (Author), Naylor, Bridget, Ecological Society of America, "Ecosystem change in the Blue Mountains Ecoregion: exotic invaders, shifts in fuels structure, and management implications.," Ft. Lauderdale, FL. (2016).

Klocko, Amy (Author & Presenter), **Strauss, Steven H** (Author & Presenter), Advanced Hardwood Biofuels Final Meeting, "Efficacy of RNAi and CRISPR Containment Technologies in Poplar," Walla Walla, WA. (August 2016).

Klocko, Amy (Author & Presenter), **Strauss, Steven H** (Author), Plant and Animal Genome, "Genetic Containment of Forest Trees by RNAi Suppression of LEAFY," San Diego. (January 2016).

Klocko, Amy (Author & Presenter), **Strauss, Steven H**, Plant and Animal Genome, "RNAi Suppression of Two AGAMOUS Homologs in Sweetgum (Liquidambar) Impairs Male and Female Reproductive Development Under Field Conditions," San Diego. (January 2016).

Klocko, Amy L (Author & Presenter), **Ault, Kori** (Author & Presenter), **Lu, Haiwei** (Author & Presenter), **Jones, Kristin** (Author), **Elorriaga, Estefania** (Author), **Ma, Cathleen** (Author), Morel, Alice (Author & Presenter), Huang, Jian (Author & Presenter), **Helliwell, Emily** (Author), **Magnuson, Anna** (Author), **Betts, Matt** (Author & Presenter), Zhao, Dazhong (Author), **Howe, Glenn Thomas**, **Strauss, Steven H** (Author & Presenter), National Institute of Food and Agriculture, "Poster Efficacy and Ecological Impacts of Transgenic Containment Technologies in Poplar." (2016).

Kormann, Urs, Betts, Matthew G, Hadley, Adam, North American Ornithologists Congress, "Corridors restore animal-mediated pollination in fragmented tropical forest landscapes. Invited speakers to special symposium on Ecosystem Services Provided by Birds," Washington, DC. (August 2016).

Krawchuk, Meg (Author & Presenter), Refugia Research Coalition, "Fire refugia: the role of topography," Portland. (2016).

- Lachenbruch, B.**, J. LeBoldus, J.P. Zhao, and E. M. Hansen. 2016. Diseases that kill phloem may cause dieback by preventing transport from phloem to xylem. Gordon Research Conference on Multiscale Plant Vascular Biology, Sunday River, Maine, Jun. 26 to Jul 1, 2016. (Poster)
- Lachenbruch, B.**, and H. Flamenco. 2016. Which xylem zones' densities correlate with ks or vulnerability to embolism? Gordon Research Conference on Multiscale Plant Vascular Biology, Sunday River, Maine, Jun. 26 to Jul 1, 2016. (Poster)
- Law, Beverly E** (Author & Presenter), Carnegie Institution of Science, "Drought, fire and management in forests. Facing the future," Stanford University, Palo Alto, CA. (December 7, 2016).
- Law, Beverly E** (Author & Presenter), Ecological Society of America, "20th Anniversary of AmeriFlux," Fort Lauderdale, FL. (August 8, 2016).
- Law, Beverly E** (Author & Presenter), USDA PI Meeting, "Carbon cycle dynamics within Oregon's urban-suburban-forested-agricultural landscapes," San Francisco, CA. (December 12, 2016).
- Law, Beverly E** (Author), Wolf, Sebastian (Author & Presenter), Keenan, Trevor (Author), Baldocchi, Dennis (Author), Richardson, Andrew (Author), European Geophysical Union, "Carbon-Water Interactions during Warm Spring and Summer Drought," Vienna, Austria. (April 23, 2016).
- Leavell, Daniel Michael, **Ahrens, Glenn Robert**, Citizen Fire Academy, "Fire Behavior and Fire Prevention," Estacada, Oregon. (October 29, 2016).
- Lu, Haiwei** (Author & Presenter), **Howe, Glenn Thomas** (Author & Presenter), Horvath, David P. (Author & Presenter), Dharmawardhana, Palitha, Priest, Henry D. (Author & Presenter), Mockler, Todd C. (Author & Presenter), **Strauss, Steven H.** (Author & Presenter), In Plant Dormancy Workshop, "Extensive transcriptome changes during natural onset and release of vegetative bud dormancy in Populus," San Diego, CA. (January 9, 2016).
- Lu, Haiwei** (Author & Presenter), **Strauss, Steven H** (Author), Plant and Animal Genome, "Low Frequency and Deleterious Impacts from Zinc Finger Nuclease Mutagenesis in Populus," San Diego. (January 2016).
- Luoma, Daniel Lewis** (Author & Presenter), Eberhart, Joyce L (Author), Mycological Society of America Annual Meeting, "Removing trees for healthy forests: impacts on the American matsutake mushroom resource," Berkeley, CA. (August 9, 2016).
- Luoma, Daniel Lewis** (Author & Presenter), Eberhart, Joyce Louise (Author), "Science for Everyone" Speakers' Forum, "Forest Health and Ectomycorrhizae: The Effects of Swiss Needle Cast Disease," The Adobe Resort, Yachats, OR. (October 22, 2016).
- Ma, Cathleen** (Author & Presenter), Society for In Vitro Biology Annual Meeting, "Extensive Natural Variation in Callus and Shoot Regeneration in relation to Agrobacterium - Mediated Transformation of Wild Black Cottonwood (*Populus trichocarpa*)," San Diego. (June 2016).
- Mosel, J.** and **B. Lachenbruch**. 2016. Physiological and morphological characteristics of Douglas-fir and loblolly pine seedlings from varying provenances under repeated drought. Annual Meeting of the Ecological Society of America, Aug. 7-12, Ft. Lauderdale, FL. (Poster)
- Motley, Kyle (Author & Presenter), Havill, Nathan P. (Author), **Ross, Darrell W.** (Author), Mayfield, Albert E. (Author), Wallin, Kimberly F. (Author), 27th USDA Interagency Forum on Invasive Species, "Assessing the potential of two species of silver fly, *Leucopis argenticollis* and *Leucopis piniperda*, as biological control agents of hemlock woolly adelgid, *Adelges tsugae*, in the eastern US," Annapolis, MD. (2016).
- Munanura, Ian E** (Author & Presenter), International Ecotourism Conference, "Using Total Quality Management framework to examine the influence of quality improvement on performance of community based ecotourism organizations at Nyungwe National Park, Rwanda," Tampa, Florida. (January 26, 2016).
- Munanura, Ian E**, Seminar, "The potential of ecotourism based social enterprises in promoting Mountain Gorilla Conservation," Corvallis, Oregon. (November 4, 2016).

Munanura, Ian E (Panelist), International Ecotourism Conference, "Models of community based ecotourism and potential for success. The International Ecotourism Conference," Tampa, Florida. (January 26, 2016).

Needham, Mark D (Author & Presenter), Annual Meeting of the Siuslaw Watershed Council, "Understanding beaver in the beaver state," Mapleton, Oregon. (April 27, 2016).

Needham, Mark D (Author & Presenter), Szuster, Brian W (Author), World Leisure Congress, "Recreationists swimming with manta rays: Conflict, sanctions, and management," Durban, South Africa. (June 27, 2016).

Nelson, Michael Paul, Andrews LTER Monthly Meeting, "Human intervention to secure land health: a case study featuring public comments about genetically rescuing the wolves of Isle Royale," Corvallis USFS FSL. (February 2016).

Nelson, Michael Paul, Andrews LTER Symposium, "Long-Term Ecological Research meets Traditional Ecological Knowledge: from Metaphysics to Ethics," OSU. (May 12, 2016).

Nelson, Michael Paul, Invited seminar - U. of Oregon Environmental Studies Program, "How Shall We Live with Wolves: findings at the edge of ecology, social science, and ethics." (October 25, 2016).

Nelson, Michael Paul, ISSRM, "Blood and Goodwill," Houghton, MI. (June 2016).

Nelson, Michael Paul, Opening comments and emcee for book opening - Forest Under Story: creative inquiry in an old-growth forest, "On the Value of Long Term Ecological Research," Corvallis Public Library. (March 2016).

Nelson, Michael Paul, OSU COF Wood Science Dept. Seminar Series, "At the intersection of ethics, social science, and ecology: the intrinsic value of nature and the wolves of Isle Royale," OSU. (February 10, 2016).

Nelson, Michael Paul, Panel Discussion on Art, Science, and Humanities responding to climate change, "An Ethical Perspective on Climate Change," Portland, OR. (January 2016).

Nelson, Michael Paul, Science Pub, "How Will We Live with Wolves?* From Isle Royale to Oregon, from Science to Ethics - *seriously, folks, how are we going to do this?," Cottage Grove. (October 25, 2016).

Nelson, Michael Paul, Seminar Series - University of Arizona, "Where science and philosophy meet the wolves and moose of Isle Royale: Toward the inevitable fusion," Tucson, AZ. (April 26, 2016).

Nelson, Michael Paul, Student Organized Earth Week seminar series, "It's Not Only Stupid, It's Also Wrong to Wreck the World," OSU. (April 21, 2016).

Nelson, Michael Paul, The Wildlife Society - Oregon Chapter, "Killing in the Name of Conservation - An Ethical Analysis," Seaside, OR. (February 4, 2016).

Nelson, Michael Paul, USFS Social Science Forum, "Studying the ethical dilemmas of natural resource management," Corvallis. (March 8, 2016).

Olsen, Christine Shaw (Author & Presenter), Toman, Eric (Author), **Frederick, Stacey** (Author), 2nd International Smoke Symposium, "What influences public acceptance of smoke?" Long Beach, CA. (November 15, 2016).

Olsen, Christine Shaw, Pyro-maniacs, "People manage fires: a social science perspective on fire and smoke management," Corvallis, OR. (February 24, 2016).

Olsen, Christine Shaw, Wildfire Smoke and Health Risk Communication Workshop, "A social science perspective on communicating about health impacts from wildfire smoke," Research Triangle Park, NC. (September 22, 2016).

Ott, Daniel S. (Author & Presenter), Fettig, Christopher J. (Author), Munson, A. Steve (Author), **Ross, Darrell W.** (Author), Meinzer, Rick (Author), Wallin, Kimberly F. (Author), International Congress of Entomology, "Physiological, physical, and chemical characteristics of Engelmann and blue spruces related to spruce beetle host selection, colonization, and reproduction," Orlando, FL. (December 2016).

Pluess, Andrea R. (Author & Presenter), Frank, Aline (Author & Presenter), Rellstab, Christian (Author & Presenter), Vendramin, Giovanni Giuseppe (Author & Presenter), **Howe, Glenn Thomas** (Author & Presenter), Sperisen, Christoph (Author & Presenter), Heiri, Caroline (Author & Presenter), Oddou-Muratorio, Sylvie (Author & Presenter), Genomics and Forest Tree Genetics, "Evidence for local adaptation and potential maladaptation to climate change in *Fagus sylvatica*: Genome-environment and phenotype-environment associations at regional scale," Arcachon, France. (May 30, 2016).

Puettmann, Klaus Johannes (Author & Presenter), Annual Meeting, "Small woodland owner as a critical part of complex adaptive forestry systems," Olympia, WA. (June 16, 2016).

Puettmann, Klaus Johannes (Author & Presenter), IUFRO International Workshop on Uneven-aged Silviculture, "Managing for the parts of the sum," Little Rock, Arkansas. (June 2, 2016).

Puettmann, Klaus Johannes (Author), Puettmann, Maureen (Author & Presenter), Oneill, Elaine (Author), FPS Annual meeting, "Life Cycle Assessment: Quo Vadis?," Portland, OR. (June 28, 2016).

Puettmann, Klaus Johannes, Pacific Northwest Collaboratives Workshops, "Restoration treatments in Douglas-fir forests," Hood River, OR. (March 31, 2016).

Ripple, William John, "Environmental Effects of Carnivory," Loma Linda University, CA. (January 20, 2016).

Ripple, William John, "Human behaviors affect environment and predators." (October 5, 2016).

Rivers, James W, Annual meeting of the Oregon Forest and Industries Council, "Evaluating the effects of intensive forest management on songbird productivity," Sun River, OR. (October 2016).

Rivers, James W, Annual meeting of the Pacific Northwest Reforestation Council, "Testing the impact of experimental herbicide treatments on breeding productivity of early-successional forest songbirds," Vancouver, WA. (October 2016).

Rivers, James W, Betts, Matthew, Nelson, Kim, Roby, Daniel, West Coast Regional Meeting of The National Council for Air and Stream Improvement, "Predictors of space use and reproductive success in the Marbled Murrelet," Vancouver, WA. (October 2016).

Rivers, James W, Northrup, Joseph, Betts, Matthew, Nelson, Kim, Roby, Daniel, North American Ornithological Conference, "Evaluating space use and reproductive success of the threatened Marbled Murrelet in western Oregon," Washington D.C. (August 2016).

Rivers, James W, Oregon Audubon Society Council, "The Marbled Murrelet: understanding its habitat use and nesting biology." (October 2016).

Rose, Kathleen (Author), Toman, Eric (Author), **Olsen, Christine Shaw** (Author), 2nd International Smoke Symposium, "Framing messages about prescribed fire and smoke emissions," Long Beach, CA. (November 15, 2016).

Ross, Darrell W (Author & Presenter), **Brookes, Harrison M.** (Author), Wallin, Kimberly F. (Author), International Congress of Entomology, "High release rate MCH dispensers increase efficiency of applications for prevent Douglas-fir beetle infestations," Orlando, FL. (December 2016).

Rushing, Jaclyn (Author & Presenter), **Needham, Mark D** (Author), Western Forestry Graduate Research Symposium, "To visit or not to visit? Constraints and place attachment in Portland Metro parks," Corvallis, OR. (April 22, 2016).

Schmidt, Andres (Author & Presenter), **Law, Beverly E** (Author), **Still, Chris** (Author), American Geophysical Union, "Changing carbon cycle dynamics in Oregon's urban-suburban-forested-agricultural landscapes in a bioenergy land-use change scenario," San Francisco, CA. (December 15, 2016).

Soto, Daniel (Author & Presenter), **Puettmann, Klaus** (Author), IUFRO Landscape Ecology - Latin American Congress, "Forest Ecosystem Dynamics in Times of Change," Temuco, Chile. (November 28, 2016).

Soto, Daniel (Author & Presenter), **Puettmann, Klaus Johannes** (Author), IUFRO International Workshop on Uneven-aged Silviculture, "Ground disturbance improves natural regeneration in high-graded old-growth forests," Little Rock, Arkansas. (June 1, 2016).

St.Clair, Brad, **Howe, Glenn Thomas**, Bachelet, Dominique, Northwest Climate Hub, "Seedlot Selection Tool: A Decision Support Tool for Reforestation and Restoration." (June 29, 2016).

St.Clair, J.B., Bower, A., Erickson, V., **Howe, Glenn Thomas**, Gene Conservation of Forest Tree Species – Banking on the Future, "Prioritizing gene conservation activities in the face of changing climates.," Chicago, IL. (May 17, 2016).

Still, Christopher J (Author & Presenter), Botany and Plant Pathology Seminar Series, "What can we learn from thermal imaging of forests?" Oregon State University. (March 2016).

Still, Christopher J (Author & Presenter), FES 520: Posing Researchable Questions, "How can we determine how clouds and fog influence coastal forest distributions and ecological processes?" Oregon State University. (November 2016).

Still, Christopher J (Author & Presenter), HJ Andrews Monthly Meeting, "Reinvigorating tree canopy research at the Andrews Forest: from microclimate to ecology," Corvallis, OR. (November 2016).

Still, Christopher J (Author & Presenter), Seminar Series, "Taking the Temperature of Forest Canopies Using Thermal Imaging," Vancouver, WA. (October 2016).

Still, Christopher J (Author & Presenter), Swiss Needlecast Coop Annual Meeting, "Just dew it: measuring and modeling dew formation," Corvallis, OR. (December 2016).

Still, Christopher J (Author), Cotton, Jennifer (Author & Presenter), Mosier, Thomas (Author), Cerling, Thure (Author), Ehleringer, Jim (Author), Hoppe, Kathryn (Author), American Geophysical Union Fall Meeting, "Climate changes decrease C3/C4 gradients across the Great Plains by the end of the century," San Francisco, CA. (December 2016).

Still, Christopher J (Author), Griffith, Dan (Author & Presenter), American Geophysical Union Fall Meeting, "Drivers of inter-annual variability in C4 abundance in mixed C3-C4 grasslands," San Francisco, CA. (December 2016).

Still, Christopher J (Author), Lluvia, Flores (Author & Presenter), Waring, Kristen (Author), Cushman, Sam (Author), Eckert, Andrew (Author), Wehenkel, Christian (Author), Whipple, Amy (Author), Wing, Michael (Author), Kolb, Tom (Author), Sniezko, Richard (Author), IUFRO Genomics and Forest Tree Genetics Conference, "Blending Ecology and Evolution using Emerging Technologies to Determine Species Distributions with a Non-native Pathogen in a Changing Climate," Arcachon, France. (2016).

Still, Christopher J (Author), **Schmidt, Andres** (Author & Presenter), **Law, Bev** (Author), American Geophysical Union Fall Meeting, "Dynamics of carbon, water and energy cycles in a heterogeneous landscape and a changing climate," San Francisco, CA. (December 2016).

Still, Christopher J (Author), **Voelker, Steve** (Author & Presenter), Merschel, Andrew Gregory (Author), Meinzer, Rick (Author), Spies, Tom (Author), American Geophysical Union Fall Meeting, "Fire suppression has led to greater drought-sensitivity in dry conifer forests: tree-ring carbon isotope evidence from Central Oregon," San Francisco, CA. (December 2016).

Still, Christopher J (Author), Waring, Kristen (Author & Presenter), Cushman, Sam (Author), Eckert, Andrew (Author), Flores, Lluvia (Author), Lintz, Heather (Author), Sniezko, Richard (Author), Wehenkel, Christian (Author), Whipple, Amy (Author), Wing, Michael (Author), Society of American Foresters National Convention, "Collaborative Research for Sustainable Management of Southwestern White Pine." (November 2016).

Strauss, Steven (Author & Presenter), American Association for the Advancement of Science, Washington DC - Annual Meeting, "GMOs in Regulation & the Marketplace," Washington DC. (January 2016).

Strauss, Steven (Author & Presenter), American Chemical Society Annual Meeting, "Genetically Engineered Trees: Impressive progress, opportunities, and obstacles," Philadelphia. (August 2016).

Strauss, Steven (Author & Presenter), **Elorriaga, Estefania** (Author & Presenter), American Society of Plant Biology, "CRISPR/Cas9 Efficiency and Biological Impacts in Transgenic Poplars and Eucalyptus," Austin, TX. (July 2016).

Strauss, Steven (Author & Presenter), National Research Council Committee on Future Biotechnology Products and their Regulation, "Suggestions for new regulatory models for genetically engineering plants," San Francisco. (June 2016).

Strauss, Steven (Author & Presenter), Salem Chamber of Commerce monthly lecture, "Are we using GMOs wisely?" Salem, OR. (March 2016).

Strauss, Steven (Author & Presenter), Willamette Valley Habitat and Restoration Annual Meeting, Corvallis Public Library, "GBS Analysis of aspen phylogeography," Corvallis. (March 2016).

Strauss, Steven H (Author & Presenter), Cochran Biotechnology Fellow Training, "Genetically engineered trees: Rationale, progress and constraints," Michigan State University. (June 2016).

Strauss, Steven H (Author & Presenter), Cochran Biotechnology Fellow Training, "Regulatory experiences and ideas for GMO Crops," Michigan State University. (June 2016).

Strauss, Steven H (Author & Presenter), Pankow Foundation Workshop, Portland, OR, "Tree Biotech 101," Portland, OR. (January 2016).

Strauss, Steven H (Author & Presenter), Webinar presented to Regulatory Framework Information Forum of Biotechnology, Mexico, "GMO crops: Their use, impacts, and evolution," Monterrey, Mexico. (June 2016).

Urhan, Oguz, Rust, M L, Davis, A, **Howe, Glenn Thomas**, Hipkins, V, Annual Meeting, "Development of genetic markers for western white pine and Douglas-fir," Pensacola Beach, Florida. (April 26, 2016).

Vasquez Fernandez, Andrea (Author & Presenter), **Hajjar, Reem** (Author), Innes, John L (Author), Kozak, Rob A (Author), NAISA Annual Meeting, "Indigenous Federations in the Peruvian Amazon: Addressing Conflicts and Striving for a Collective Self-Determined Well-Being," Honolulu. (May 18, 2016).

Wallin, Kimberly F. (Author & Presenter), Arsenault-Benoit, Arielle (Author), Gaimari, Stephen D. (Author), Havill, Nathan P. (Author), Mayfield, Albert E. (Author), **Ross, Darrell W.** (Author), Whitmore, Mark C. (Author), USDA HWA Biological Control Technical Committee Meeting, "Preliminary findings from silver fly (*Leucopis* spp.) predators under field conditions near the leading edge of the HWA range in the eastern United States," Annapolis, MD. (2016).

Wallin, Kimberly F. (Author & Presenter), Arsenault-Benoit, Arielle (Author), Gaimari, Stephen D. (Author), Havill, Nathan P. (Author), Mayfield, Albert E. (Author), **Ross, Darrell W.** (Author), Whitmore, Mark C. (Author), 27th USDA Interagency Forum on Invasive Species, "Testing silver fly (*Leucopis* spp.) as possible predators of HWA under field conditions in the eastern United States," Annapolis, MD. (2016).

Warren, Dana, Cornell University, Department of Natural Resources, "Changing forests – Changing streams: How riparian forest stand-development influences aquatic ecosystem function in headwater streams," Ithaca, NY. (November 2016).

Warren, Dana, FES/FW 452 - Forest management and biodiversity conservation, "Riparian zones." (May 2016).

Warren, Dana, FW course: Global Change Biology, "Changing climate and its impact on fish in freshwater ecosystems," Nash Hall. (June 2016).

Warren, Dana, Hubbard Brook Ecosystem Study 51rd Annual Cooperators Meeting, "Will stand development shift HBEF streams from light to nutrient limitation." (July 2016).

- Warren, Dana**, Oregon Forest & Industry Council (OFIC) annual Board meeting, "Fish and forest management in headwater ecosystems," Corvallis OR. (June 2016).
- Warren, Dana**, Society for Freshwater Science annual meeting, "Alternative trajectories of stand development in the riparian forest affect long-term stream light dynamics and ecosystem function in temperate headwaters," Sacramento CA. (May 2016).
- Wassin, Kimberly F., Arsenault-Benoit (Author & Presenter), Gaimari, Stephen D. (Author), Havill, Nathan P. (Author), Mayfield, Albert E. (Author), **Ross, Darrell W.** (Author), Whitmore, Mark C. (Author), North American Forest Insect Work Conference, "Establishment, reproduction and impact of silver fly (*Leucopis* spp.) predators under field conditions near the leading edge of the HWA range in the eastern United States," Washington, DC. (May 2016).