SCHOOL OF ENVIRONMENT AND NATURAL RESOURCES

Self-study 2021




THE OHIO STATE UNIVERSITY
COLLEGE OF FOOD, AGRICULTURAL,
AND ENVIRONMENTAL SCIENCES

Table of Contents

List of Figures 3
List of Tables 3
Section I: Executive Summary 4
Section II: Overview 5
Brief History 5
Organization 6
External Reputation 6
Section III. Faculty 9
Current Profile 9
Mentoring and retention 11
Recruitment 11
Intellectual life of the unit 12
Section IV. Research 13
Overview 13
Research Scope 13
Productivity and Impact of SENR Research Faculty 14
Interdisciplinary Research 18
Key Issues for Research Program 21
Section V: Undergraduate program 24
Overview 24
Enrichment opportunities within the School 25
Recruitment 27
Assessment 28
Time to Graduation Trends 28
Advising and Academic Support/mentoring 29
Career Counseling 30
Student Engagement and Activities 30
Student Satisfaction 31
Curriculum Improvements and changes 31
Key Issues 32
Section VI Graduate and Professional Education 33
Description of ENR Graduate Program 33

Program Administration 35
Graduate Student Recruitment 35
Student diversity and representation 38
Program Evaluation 38
Role of Graduate Students in Research and Instruction 41
Graduate student advising 43
Graduate student placement 43
Key Issues 44
Section VII: Extension and Outreach Programs 45
Overview 45
Signature Extension and Outreach Activities 45
Connections with OSU Extension and External Stakeholders 47
Key issues 47
Section VIII: Infrastructure 48
Key Issues 49
Section IX: Leadership 51
Key issues 52

List of Figures

Figure 1: Relative research productivity and impact of SENR faculty. 166
Figure 2: SENR External Grant Funding, 2011-2021. 177
Figure 3: Trends in External Collaborations by SENR faculty 188
Figure 4: Active Internal Ohio State Research Collaborations..... 19
Figure 5: Scholarly Research Index Scores for SENR faculty, by rank and years post-PhD..... 222
Figure 6: Results from the Graduate student progress questionnaire 400
Figure 7: Availability and receipt of Graduate student fellowship funding.. 42

List of Tables

Table 1: SENR Faculty by Rank, select years between 2011 to 2021..... 9
Table 2: SENR Faculty by graduate specialization 111
Table 3: Citation counts and H-Indices for current SENR faculty. 155
Table 4:Undergraduate students by Major, Autumn 2016 throughu Autumn 2020..... 255
Table 5: Undergraduate students graduating with an ENR minor:..... 255
Table 6: Honors enrollment by major, Autumn 2016 throughu Autumn 2020 266
Table 7: New Undergraduate students by pathway by and academic year..... 27
Table 8: Graduate enrollment numbers by degree plan over the last five years..... 37
Table 9: Composition of the MS, PhD and MENR plan students by race and ethnicity..... 37
Table 10: Recent Graduate student funding patterns..... 41

Section I: Executive Summary

The School of Environment and Natural Resources (SENR) was established in 1968 to deliver teaching, research and outreach programs focused on the interaction of humans with the natural environment. From its inception, SENR has taken a broad view of this mission, maintaining expertise and programs that are anchored in both the natural and social sciences. Over time, we have broadened in scope as institutional reorganizations and disciplinary realignments have brought new faculty members and programs into SENR. SENR has also been aggressive in aligning with significant University initiatives to grow faculty through special hiring initiatives. Despite occasional budget constraints, we have expanded our teaching, research and outreach/extension efforts, and deliver them in quantitatively and qualitatively impactful ways. Our faculty members are widely recognized in their fields; we attract high quality students to our academic programs; and our Extension and outreach programs are highly regarded by constituents and stakeholders. For more detail, see 2019 and 2020 Impact Statements.

In this self study, we share some specifics about various programmatic and mission related activities. While we are proud of our successes and believe there is considerable positive momentum, we are committed to continuous improvement and recognize opportunities to qualitatively improve our efforts. Below are several key overarching themes, challenges or opportunities. Many of these themes are also acknowledged in our current strategic plan, which was adopted in early 2020 (just prior to the start of the pandemic).

1) SENR is committed to inclusivity, including diversifying its faculty, staff, and students. Progress has been modest, but momentum is building. Within most programmatic areas, there has been successful activity to improve recruitment, support and retention of underrepresented groups. To better coordinate and guide these efforts, the School recently appointed a Chief Diversity Officer to provide further leadership to better aggregate these efforts into a more effective strategy.
2) The School has undergone considerable faculty change over the last 10 years. The School now has many early career associate professors and several recently promoted professors. The School is seeking to sustain the momentum of these faculty as well as support faculty who may be susceptible to stalling as they balance competing needs. With many research labs entering a growth phase, this is challenging us to identify ways to better utilize our research infrastructure and allocate space.
3) The School has experienced substantial growth in the undergraduate program and more modest growth in the graduate program. At the undergraduate level, there is a need to expand the course offerings and identify ways to deliver and manage the curriculum more efficiently. All this, while adapting to a set of new general education requirements at Ohio State. At the graduate level, the curriculum needs to be updated to reflect our existing faculty expertise and course offerings may need to be expanded to meet current needs.
4) Outreach and application is a priority for the School, but direct Extension funding of the School is modest compared to other funding sources. In response, the School is attentive to ways to weave the outreach mission with the teaching and research missions to cross-subsidize outreach while also enhancing overall impact in all mission areas.

Section II: Overview

Brief History

In an effort to strengthen all Ohio State University activities related to natural resources, the Board of Trustees created the School of Natural Resources (SNR) on July 1, 1968. By the autumn of 1969, the School's initial set of programs included a Master of Science degree and a set of undergraduate course offerings that addressed: conservation and outdoor education; fisheries management; forestry; park administration and outdoors recreation; and wildlife management.

According to a history of the SNR prepared for the Centennial Celebration of Ohio State in 1970, "the programs of the School are designed to focus on the interaction of man's natural environment wherein social factors, science, and political practices are recognized as co-determinants. The goal is a holistic view of man (sic) in relation to his natural resources base." This shift away from single commodity science (forestry, fisheries, etc.) paved the way for a new paradigm of ecosystem function and management within the framework of the SNR.

In 1994, the College of Food, Agricultural and Environmental Sciences was re-organized and the Department of Agronomy was dissolved. Soil Scientists associated with the department were assimilated into the School of Natural Resources together with a graduate program that provided both M.S. and Ph.D. degrees in Soil Science. In 1999, a Ph.D. in Natural Resources was approved by the Board of Regents.

In November 2005, the Ohio State University Board of Trustees approved a request from the School faculty for a name change, and the School of Natural Resources became the School of Environment and Natural Resources (SENR). This name change was to better indicate who we are, what we provide our students, and what we have been about throughout our history. In 2008, the name of the School's graduate program was also changed to reflect the name of the unit.

In 2010, faculty affiliated with the College of Food, Agricultural and Environmental Sciences' (CFAES) Rural Sociology program, along with one additional faculty member, transferred their tenure home from the Department of Human, Community and Resource Development (HCRD) into SENR. The Rural Sociology graduate program also transferred into SENR.

The Soil Science and Rural Sociology graduate programs have subsequently both been deactivated and faculty primarily advise students through the Environment and Natural Resources Graduate Program which allows a range of specializations. Some faculty also advise in a university level, multi-disciplinary Environmental Science Graduate Program.

Today, SENR continues to broaden its interdisciplinary leadership within the University, including partnering on a new major with the Department of Agricultural, Environmental and Development Economics related to sustainability; partnering with the Departments of Horticulture and Crop Sciences and Entomology on a recently approved major in Sustainable Agriculture; and current efforts to work with the School of Earth Sciences to develop a major in Water Science.

Our Vision

A productive society, with sustainable management of natural resources for a healthy environment.

Our Mission

To provide leadership, educate students, serve the general public, and conduct research that promotes the use of natural resources in an efficient, economically viable, environmentally compatible, and socially responsible manner.

Organization

The School of Environment and Natural Resources is one of two Schools and ten academic units in CFAES. SENR differs from CFAES departments in that it offers a "tagged" undergraduate degree program, which is independent from the CFAES undergraduate degree. Although we work very closely with the CFAES academic associate dean, assistant deans and academic staff, SENR sets its own degree requirements, approval of which rests with the Office of Academic Affairs, rather than CFAES.

SENR is administered by a Director. In addition to the Director, there are three Associate Directors: one who has responsibility for administering daily and recurring operational matters, support of graduate education, education abroad, and other academic matters; one administers SENR operations on the Wooster campus as well as provide primary administrative support and leadership of research matters; and one serves as the Chief Diversity Office as well as the Director of the Olentangy River Wetland Research Park (ORWRP). As an independent academic unit SENR also has a School Secretary, who has responsibility for keeping the records of the School. Our organizational structure is graphically represented in the SENR Organizational Chart.

Several standing committees are responsible for the governance of SENR affairs. The most active are the Academic Affairs, Graduate Studies, Promotion and Tenure Oversight, Honors, Research, and Seminar Committees. Descriptions of committee functions are in our Pattern of Administration (POA) and our Appointments, Promotion and Tenure (AP&T) documents, but the names are highly descriptive of their respective functions. There is a Leadership Team, which meets regularly and is comprised of the Director, Associate Directors, chairs of Graduate Studies, Academic Affairs and Honors committees, the Extension Team Leader and the School Secretary. There is additionally an administrative team that meets monthly to manage and coordinate operational activities that includes the Director, Associate Directors, and leads of various operational activities (see SENR Leadership Handbook).

External Reputation

Stated succinctly, SENR's programs and people are held in high regard by students and colleagues in other academic units at Ohio State and elsewhere. Our academic programs attract

high quality students, our research portfolio is robust, and many faculty members have strong national and international reputations (see sample of Faculty Recognition below).

At Ohio State, SENR faculty are seen as key leaders in the environmental and natural resource fields. The SENR Director, in collaboration with the Sustainability Institute, facilitates an informal caucus of environmental chairs from across the university. SENR faculty are regularly tapped for important leadership and advisory panels at the University. The School's faculty have been active in several key institutional initiatives, including the recent Discovery Theme Initiative and continue to position themselves to take advantage of future initiatives, including the RAISE initiative and its goal to add new and more diverse faculty in the coming years.

Determining the School's national or international reputation is difficult to assess. Our School is somewhat unique in its mix of disciplinary expertise and blend of basic and applied science. Our teaching program has a long track record of quality and successful placement of graduates. We have many standout research faculty and programmatic areas of strength (e.g., an unusually large and diverse number of social scientists; and particular depth of talent in soil science, and traditional natural resource fields. Academic Analytics analysis, which evaluates and compares programs according to a number of different research metrics (such as articles, awards, citations and federal grants), currently ranks SENR 24 out of 53 among natural resource programs and 54 out of 122 environmental science programs. In the Academic Analytics metrics, the School lags in the area of federal grantsmanship, yet the School has a robust portfolio of state and other non-federal grants that are critical in supporting our land-grant mission. Furthermore, the School's relatively young faculty are poised to improve the School's federal competitive grant success in the coming years as growing young labs aggressively and successfully pursue external funding (the School has had an uptick in external federal grants success during the last 18 months, see research section for more detail).

Below is a sampling of some standout faculty awards and leadership responsibilities that contribute to our reputation.

Nick Basta

- The National Academies of Sciences, Engineering and Medicine U.S. National Committee for Soil Science, May 2020-2023.

Richard Dick

- President of Soil Science Society of America
- Editor-in-Chief – Applied Soil Ecology Journal

Suzanne Gray

- Early Career Teaching Award, Association of Public and Land-Grant Universities, U.S. Department of Agriculture National Awards Program for Excellence in College and University Teaching in the Food and Agricultural Sciences

David Hix

- Member appointed by Governor John R. Kasich to the Ohio Forestry Advisory Council, Ohio Department of Natural Resources

Doug Jackson-Smith

- President, Rural Sociological Society
- Member, Board on Agriculture and Natural Resources (BANR), National Academies of Sciences

Rattan Lal

- President-Elect, President, Past President, Member Executive Committee of International Union of Soil Sciences, Vienna, Austria (2014-2020)
- World Food Prize, often referred to as the "Nobel Prize for Food and Agriculture," Des Moines, Iowa (2020)
- Arrell Global Food Innovation Award in the Research Category, Guelph, Ontario, Canada (2020)
- Japan Prize in "Biological Production, Ecology", Tokyo, Japan
- Clarivate-Thomson Reuters Highly Cited Researchers in Agricultural Sciences (top 1%),

Mazeika Sullivan

- Fulbright Distinguished Chair in Biodiversity and Sustainability (2015-2016)
- Society for Freshwater Science – Chair of Justice, Equity, Diversity, and Inclusion (JEDI) Task Force (2020-present).
- Society for Freshwater Science – Board of Directors (2019-present).
- Congressional Briefings to Members of Congress on Connectivity of Waters and Impacts of Proposed "Waters of the US" (WOTUS) Rule under Trump administration

Nicole Sintov

- Chair, 2019 Society for Personality and Social Psychology Sustainability Preconference

Robyn Wilson

- Current President of the Society for Risk Analysis (2020 – 2022)
- Member, Board on Environmental Change and Society (BECS), National Academies of Sciences
- Member, National Academies Resilient America Roundtable
- Top Downloaded Paper in Risk Analysis from 2018 to 2019 (2020).

Section III. Faculty

Current Profile

Number and Rank of Faculty

As of September 1, 2021, there are 40 tenure track faculty in SENR, three professional practice faculty (clinical faculty), and three faculty holding an appointment in SENR but tenured in another unit, for a total of 46 faculty. SENR is approved to fill one tenure track faculty position during the 2021-22 academic year and is currently in negotiation to fill an additional tenure track position. Among the faculty tenured into the School or on the tenure track, there are 14 Professors, 20 Associate Professors and six Assistant Professors (see Table 1). Three faculty members are jointly appointed with tenure in other academic units, two (Drs. Steven Lower and Yanlan Liu) in the School of Earth Sciences and the other (Dr. Risa Pesapane) in the Department of Veterinary Preventative Medicine.

Table 1: SENR Tenure Track Faculty by Rank, select years between 2011 to 2021

Rank	2011-12	2016-17	2021-22
Professor	14	10	14
Associate	12	12	20
Assistant	10	17	6
Total	36	39	40

A portion of SENR faculty, staff and graduate students are located at the CFAES Wooster campus, the center of the Ohio Agricultural Experiment Station located 90 minutes from the main Ohio State campus. At present, there are six tenure-track faculty members based at Wooster, with one new hire expected to join the team there in 2022.

In addition to tenure-track faculty, SENR has three professional practice faculty whose primary responsibility is supporting the teaching mission. All are appointed at the rank of Assistant Professor. Per our Pattern of Administration, no more than 15% of SENR's total faculty may be appointed as professional practice faculty.

Finally, the School employs a number of lecturers, including five on either 9 or 12-month at .75 FTE or greater appointments, plus 8 to 10 lecturers who teach or co-teach a single class (most having done so for a number of consecutive years).

There are two trends associated with SENR's faculty numbers and rank that merit noting (Table 1). First, in comparison to the faculty profile in 2011 (the date of the last external review), the School has grown. In September of 2011 there were 34 tenure track faculty members, one research track faculty and two faculty with joint appointment in other academic units, for a total of 37 faculty. The School has been successful in replacing most of its retirements and departures over the last 10 years and also has grown through effective engagement in the University's Discovery Theme Initiative (DTI), which sought to hire several hundred new faculty at Ohio

State across a number of strategic areas of focus. SENR successfully collaborated with the Sustainability Institute (formerly the Sustainable and Resilient Economy DTI) to hire three tenure track faculty directly into the School and partnered with the Institute and School of Earth Sciences (SES) on another tenure track faculty in SES. The School also collaborated with the Initiative for Food and AgriCultural Transformation (InFACTI) DTI to successfully hire three more tenure track faculty.

Second, the rank profile of SENR's tenured and tenure track faculty has evolved considerably over the last 10 years, with periods of substantial hiring during the first 5 years of this time period and then substantial effort stewarding faculty through the tenure and promotion process over the last five years.

After a series of retirements and departures between 2011-12 and 2016-17 and several years of seeking to fill 3 to 5 positions annually, faculty turnover has slowed. Faculty turnover since autumn 2018 has been modest, with two retirements, no resignations, 3 tenure-track hires in SENR, 2 joint hires where the TIU is elsewhere, and one professional practice faculty hire.

Demographics

There are currently 10 tenure-track SENR female faculty members and 2 professional practice faculty plus two female faculty with joint appointments but tenured into other units, for a total of 14 female faculty. Among the female tenured or tenure-track faculty, there is 1 professor, 5 associate professors, and 4 assistant professors.

The racial and ethnic makeup of SENR tenure track faculty includes 2 Hispanic/Latino (1 international), 1 African-American and 3 Asian faculty members in addition to 34 white (not Hispanic).

Currently it is estimated that there is one SENR tenured faculty eligible to retire with full benefits and another 5 who are currently retirement eligible but with reduced benefits. Another two become eligible for retirement with reduced benefits within the next two years.

Discipline

Our faculty membership includes both social (approximately 40%) and natural (60%) scientists. As defined by graduate program specializations (which align reasonably well with research tracks), the two primary program areas in the social sciences are environmental social sciences and rural sociology. Natural science program areas include ecological restoration, ecosystem science, soil science, fisheries and wildlife science, and forest science. Table 2 reports the number of faculty identifying with each graduate specialization. The sum will exceed the total number of faculty as many faculty members identify with more than one specialization. The blurring of program areas, and opportunities to collaborate with colleagues across disciplinary lines, seem to be highly valued by a vast majority of the SENR faculty. One problem with this specialization structure is that it masks the School's strengths in aquatic ecology and water science. This is an issue acknowledged in the graduate education section of this document.

Table 2: SENR Faculty by graduate specialization

Specialization	# of SENR faculty
Ecological Restoration	11
Ecosystem Science	14
Environmental Social Science	16
Fisheries and Wildlife	11
Forest Science	6
Rural Sociology	8
Soil Science	13

Mentoring and retention

The School is transitioning from a period of time when there were nearly as many untenured professors as there were tenured professors. To mentor and assist faculty in negotiating the promotion and tenure process and develop as scholars, the School relies on a formal monthly program conducted at the College level to support assistant professors, group advising sessions with the Director once or twice a semester, and informal mentoring by senior faculty of junior faculty. The School also invests substantial energy in helping faculty craft dossiers and narratives that highlight their productivity in preparation for the tenure related reviews. At Ohio State, the dossier structure is quite involved and asks candidates to provide substantial narratives regarding their activities and impact. Each candidate during their 4th year review and again in the months leading up to the mandatory review for promotion is assigned a case manager that works closely with them to perfect this dossier. Now that the School is moving into a phase with fewer untenured faculty and more tenured faculty, a formal mentoring program was proposed during the 2021-22 academic year, although implementation of the program has not yet begun.

The School has many faculty who steadily move through the ranks and achieve the rank of professor, but there are a couple faculty who do not manage this progression. During the last ten years, the University and the School has sought to take a broader view of scholarship and work that warrants promotion to tenure. In the coming years, especially given that the School's scale has grown substantially, there is the potential for some faculty to stall in the rank of associate professor. Unlike the last ten years, when the focus was primarily on seeing assistant professors promoted, the coming five to seven years will require greater attention to assisting associate professor moving toward the rank of professor and strategies for engaging and supporting professors to sustain high quality work.

Recruitment

After undergoing substantial faculty hiring over the last eight years and given its current scale, the School is not necessarily looking to expand its tenure track faculty numbers but will do so if it qualitatively enhances the School's diversity or expertise. There is a particular need to expand the number of underrepresented minority faculty across all disciplines and to add gender diversity in the natural and physical sciences. The School's pattern of faculty replacement and expansion has been a combination of filling important areas of expertise (e.g. a soil fertility

specialist; a forest economist) but also adapting to new needs and opportunities (addition of more water science capacity, a restoration ecologist, an environmental education faculty, or a GIS and remote sensing specialist).

The School has enhanced its hiring practices to be much more attentive to faculty who bring diversity to the School and/or who demonstrate a commitment to enhancing diversity efforts (e.g., through enhanced search methods to reach broader audiences, required diversity statements by applicants, trainings in implicit bias in hiring). This has yielded some success, but we believe there is room for further improvement. The School recently appointed a Chief Diversity Officer and has a growing number of faculty committed to enhancing diversity and open to creative strategies to enhance and support diversity at all levels of the pipeline.

Intellectual life of the unit

The School seeks to foster interdisciplinary collaboration in teaching, research and outreach and be a rewarding community for all. The School's organizational structure helps facilitate interactions across disciplinary boundaries (all standing committees have considerable diversity of disciplinary expertise at the table) and the broad definition of specializations allow diverse expertise to be connected under larger umbrellas. Faculty do collaborate across disciplinary boundaries on a variety of research projects. The School can be especially rewarding for faculty who value these sorts of high level, multi-disciplinary undertakings. The School is also seeking to foster collaboration and sharing of resources within various sciences, including the Environmental Social and Sustainability lab, which seeks to support a number of social scientists with shared interests. There are also attempts to connect some of the natural and physical scientists through the Soil, Water and Environmental Lab (SWEL).

While somewhat dated, survey data from the University's 2017 SENR Faculty Culture Survey reveals that SENR faculty responding to the survey reported a high level of unit fit, including a very high percentage of faculty (83.3%) reporting "I am satisfied with opportunities to collaborate with faculty in my primary department," "My colleagues value my research/scholarship" and "My colleagues value my teaching." These percentages were considerably higher than the average levels of support reported by other CFAES and University faculty. While these data are dated, there is a general perception within the School that we have a healthy and supportive culture where individual members are valued and respected.

Section IV. Research

Overview

Our faculty members' research is comprised of a mix of applied and basic research across a wide range of disciplines, including biophysical sciences (soil science, forestry, fisheries and aquatic sciences, ecosystem restoration) and social sciences (sociology, political science, psychology, decision-making and risk sciences). A significant and growing portion of our research portfolio involves interdisciplinary collaborations. A strength of the School is also its integration of research into our instructional and outreach/education activities.

The School's research portfolio includes broad support from federal and state agencies, private industry, and foundations, with total research expenditures exceeding $4 million annually. SENR's extramural research program is diverse in both disciplinary scope and sources of support. As noted below, our success in competitive federal research programs has been increasing, with several significant awards in recent years and a rapidly growing number of submissions. True to the land-grant mission, we have been deliberate in developing relationships with state natural resource and environmental agencies that have contributed significantly to our funding portfolio. For example, the Terrestrial Wildlife Lab and the Ohio Biodiversity Conservation Partnership are formal partnerships with the Ohio Department of Natural Resources that have resulted in approximately $10 million total over the last decade.

Over the last 10 years, the number of tenure track SENR faculty grew from 36 to 40. Whereas we have a number of very active and successful mid- and late-career researchers, over half of our faculty were hired since 2011 and have been actively building their research labs and programs.

Research Scope

Research program areas within the SENR are used to enhance and impart knowledge of natural and social systems and their essential relationships in the context of natural resource-use, conservation, and management. Many of our faculty are not only well known and influential scientists within their respective disciplines, but also engage in interdisciplinary work with a mix of basic and applied science.

Below we list some examples of active and often overlapping clusters of research faculty that collectively provide a window into some notable areas of research strengths among our faculty:

Soil Health and Carbon Sequestration
A number of our faculty[1] are nationally and internationally recognized for their work on soil fertility and soil health, soil carbon sequestration, and the management and remediation of contaminated soils.

[1] Nicholas Basta, Steve Culman, Scott Demyan, Jeffery Hattey, Rattan Lal, Brian Slater, Christine Sprunger.

Forest Ecology and Restoration
SENR has a long history of research on forests, and a number of our current faculty[2] are leading important research projects that explore the impacts of climate change, wildfire, and land use pressure on forested ecosystems in Ohio, across the US, and around the world.

Wildlife Ecology
The *Terrestrial Wildlife Ecology Laboratory (TWEL)* is a collaborative venture between SENR and the Ohio Department of Natural Resources that works to conduct research and develop outreach programs to support effective stewardship of Ohio's wildlife resources and promote understanding of ecological and social factors that affect wildlife and natural resources nationally and internationally.

Water Quality and Aquatic Ecosystems
SENR researchers[3] are engaged in a wide range of research projects that revolve around water quality and aquatic ecosystems.

Human Dimensions and Social Science Research
Roughly a third of SENR faculty[4] have social science disciplinary expertise, and a significant amount of the research taking place in the School focuses on the human dimensions of environmental and natural resource problems. Our research encompasses work on environmental psychology (values, attitude-behavior links, risk and decision-making), political science (policy design, collaborative networks) and sociology (rural communities, health care, and attention to social structures and social processes that contribute to the unequal distribution of environmental and health risks and benefits).

See also the SENR impact statements from 2019 and 2020 that further describe our research activities and impacts.

Productivity and Impact of SENR Research Faculty

Based on a number of metrics (Table 3), research by SENR faculty has had a strong and growing impact on a wide range of disciplines. As a group, our faculty average nearly 4,000 career citations per person and an h-index of 24 (median 1,486 citations and h-index of 20). All of our faculty regularly publish in top-tier journals, and most have seen consistent growth in the citation and impact of their work in recent years.

In addition to high productivity, our faculty publish in some of the world's leading journals. For example, in the last five years, our faculty have published 3 articles in *Science*, 6 in *Nature* journals, 2 in *PNAS*, and our work regularly appears in other top #5 ranked journals in our

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[2] Matthew Davies, David Hix, Stephen Matthews, Sayeed Mehmood, Roger Williams, Kai Zhao.
[3] Konrad Dabrowski, Rachel Gabor, Suzanne Gray, Steve Lyon, Lauren Pintor, Mažeika Sullivan (ORWRP Director).
[4] Kerry Ard, Ramiro Berardo, Jeremy Brooks, Jeremy Bruskotter, Alia Dietsch, Matthew Hamilton, Shoshanah Inwood, Douglas Jackson-Smith, Jeffrey Jacquet, Kristi Lekies, Sayeed Mehmood, Jeff Sharp, Nicole Sintov, Eric Toman, and Robyn Wilson.

respective disciplines.[5]. In recent years, our faculty have served as appointed members for several Boards of the National Academies of Science, Engineering and Medicine, have been asked to provide expert testimony to Congress, and have served as elected as leaders of major scientific societies.

Table 3: Citation counts and H-Indices for current SENR faculty.

	CAREER			Since 2016		
Metric (n=40 faculty)	Citations	H-Index	i10 index	Citations	H-Index	i10 index
Sum	155,446			82,769		
Average	3,791	24	57	2,019	16	25
Average per year				404		
Median	1,486	20	29	874	14	17
Median per year				175		
Percent by H Index Class						
Under 10		5%			24%	
10 to 19		44%			49%	
20 to 29		29%			15%	
30 to 39		7%			12%	
40 to 49		12%			0%	
50 and over		2%			0%	

While there are few comparable academic units in the US that have the exact mix of disciplinary and interdisciplinary faculty as SENR, data from *Academic Analytics*© allows us to compare our faculty's productivity with other Natural Resource departments.

As shown in Figure 1, SENR ranks in the top 10% of departments among peer institutions on most indicators related to peer reviewed publications, citations, and professional awards and recognitions. We are in the top 30% for the number of federal grants, but closer to the median for the proportion of faculty and $/faculty from federal grants.

This pattern is partly a reflection of the fact that many of our applied natural resource scientists utilize a mix of federal, state, and private funding sources to support their research programs. Partnerships with state forestry, wildlife, and natural resource agencies are a particularly important source of research funding in SENR, and we have a number of faculty who also receive significant funding from private foundations (Max McGraw Wildlife Foundation) and agricultural commodity check-off fund organizations (like the Ohio Soybean Council and Ohio Corn and Wheat Association). These sources of funding are not tracked in the Academic Analytics database. That said, our faculty have been very active in pursuing large scale

[5] *Advances in Agronomy, Global Change Biology, Soil Biology and Biogeochemistry, Remote Sensing of the Environment, Water Research, Conservation Letters, Conservation Biology, Geoderma, Bioscience, Global Environmental Change, Agriculture and Human Values, Ecology Letters, and Ecological Monographs*.

competitive federal research funding in recent years, and we are seeing significant success – particularly in the last 18 months (which have yet to show up in the Academic Analytics database).

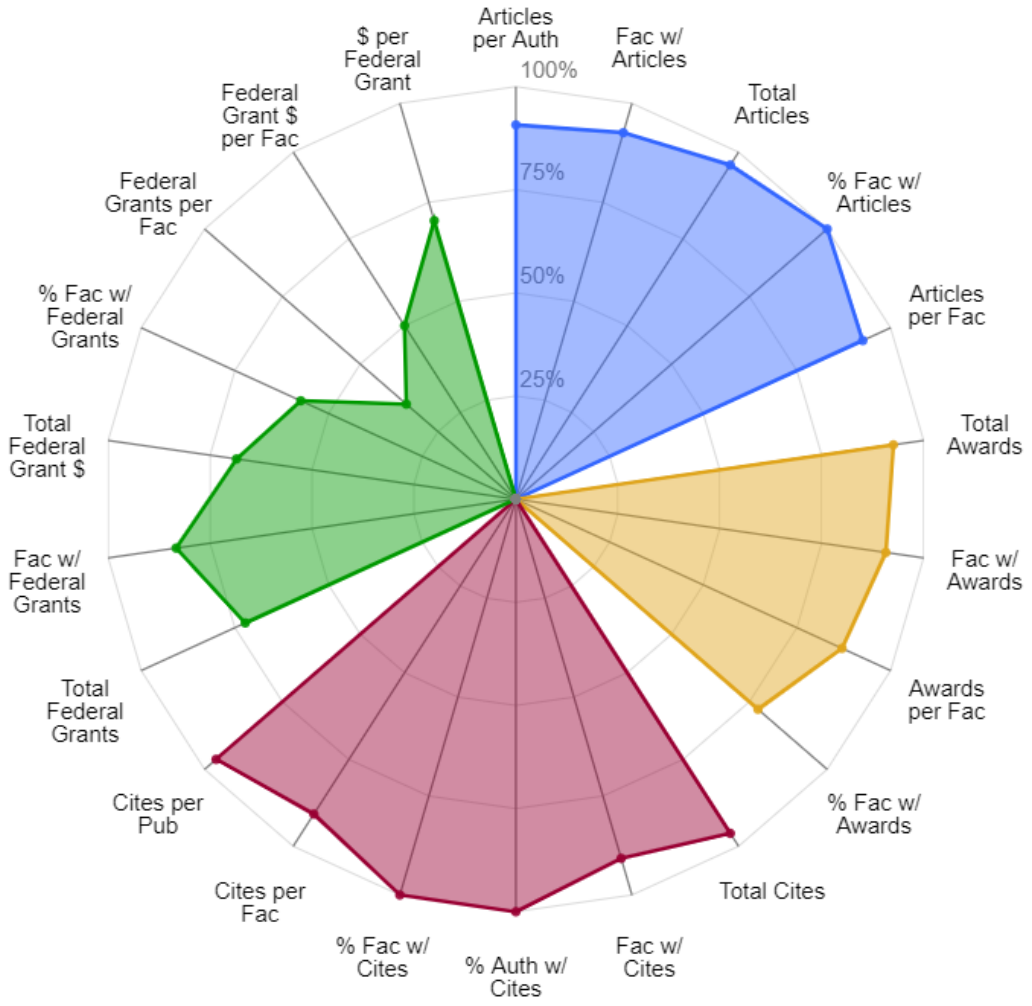


Figure 1: Research productivity and impact of SENR faculty relative to peer Natural Resource Departments in the United States. Data from Academic Analytics (shows SENR's percentile ranking relative to all similar units).

Research Funding Trends

Over the last 7 years, SENR faculty have submitted 60-80 external research grant proposals annually, and the number and total value of funded awards has been increasing (Figure 2). These

funds include awards from both state agencies and private sources, but also a growing share of research funding from federal agencies that include a higher facilities and administration (F&A) return. The most recent year (2020-2021) was a particularly successful year for our faculty, who secured over $8 million in new external grants, a large fraction of which are from competitive federal programs (NSF, USDA, and USEPA). Total F&A returns to SENR have grown to more than $1 million per year.

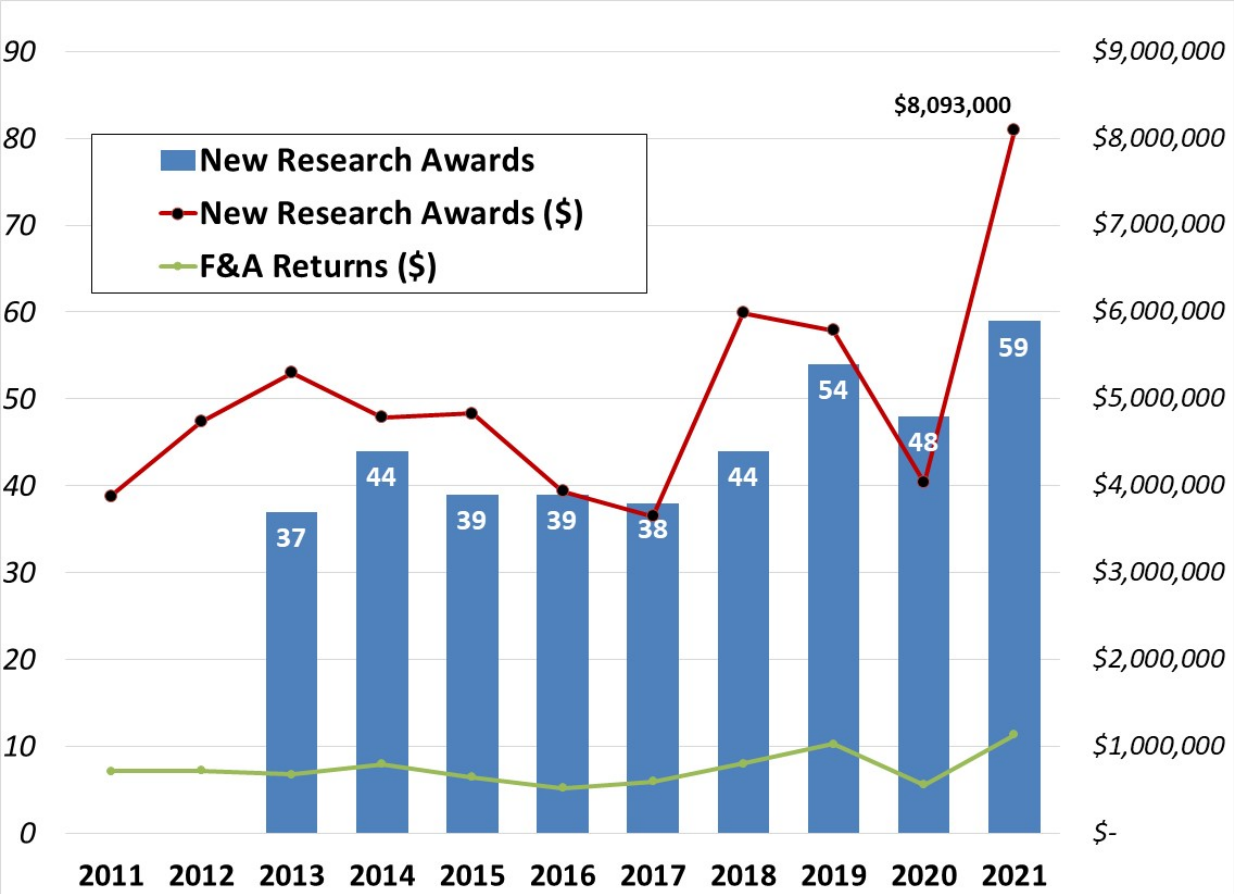


Figure 2: Number and Value of New SENR External Grant Awards, 2011-2021.

Research Spending

Aside from covering the cost of materials, equipment, and fieldwork, external grants are an important source of funding to support our SENR graduate students, postdocs, and research staff (technicians, program managers, etc.). In recent years, SENR faculty have supported an average of 15 project funded GRAs each semester. Total annual research expenditures in SENR have averaged between $4 and $5 million, with a slight slowdown over the last 2 fiscal years because of the impacts of the COVID-19 restrictions on our ability to carry out lab and field research. With the significant increase in size and scope of recent grant awards, we anticipate the volume of faculty research spending to increase significantly this year as we catch up on work that was delayed during the pandemic.

Interdisciplinary Research

As noted above, most of our faculty are engaged in interdisciplinary research. This includes extensive collaboration between scientists with complementary expertise, including intensive long-term partnerships between natural and social scientists. Many of these collaborations occur within SENR. In addition, as a group, our faculty average almost 10 collaborative publications with scholars outside of SENR, 13 active external collaborators, and more than a third of our publications and grants are considered to be collaborative by Academic Analytics (See Figure 3). The trend lines suggest growing levels of collaboration with non-SENR partners.

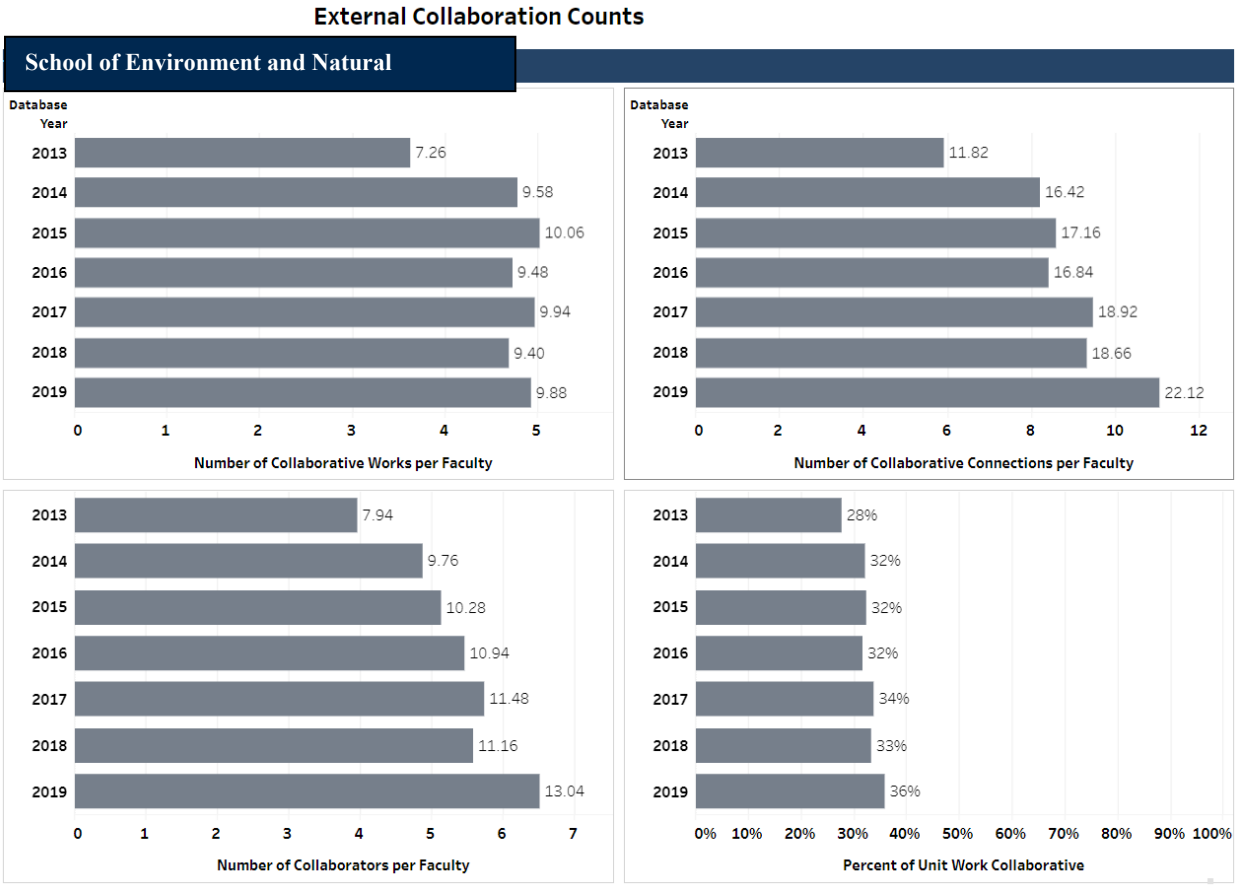


Figure 3: Trends in External Collaborations by SENR faculty, 2013-2019. Source: Academic Analytics Report; August 3, 2021

Figure 4 illustrates some of the important interdisciplinary clusters of faculty research taking place *within* SENR and between our SENR faculty and faculty from other departments at Ohio State (as captured by Academic Analytics based on patterns of coauthored publications and co-investigators on federal grants). Several of our faculty are at the center of major collaborative nodes with colleagues from multiple departments and colleges at Ohio State and even more are regularly collaborating with peers from across the country and globe). While the graphic offers a high-level overview of many of the SENR faculty who serve as collaborative nodes among

researchers at Ohio State, we also recognize that the Academic Analytics data misses several other vibrant and active research partnerships. This graphic provides an illustration of the types of clusters of ongoing work, if not a complete inventory.

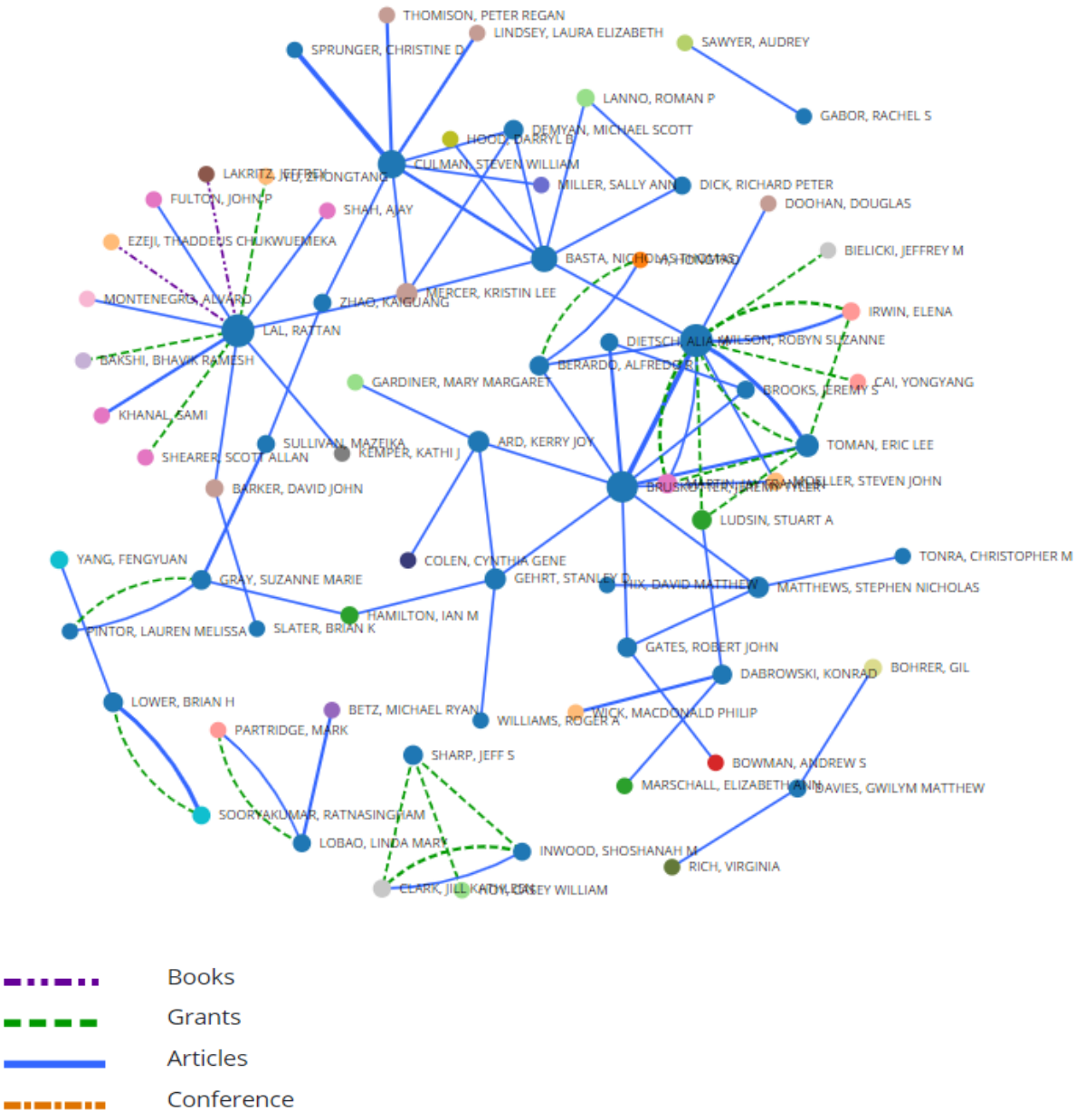


Figure 4: Illustrative Examples of Active Internal Ohio State Research Collaborations within SENR faculty and between SENR & Ohio State faculty in other departments, 2015-2019. Blue dots = SENR faculty. Source: Academic Analytics report, August 3, 2021.

Current Examples of Interdisciplinary Research Projects

There are several prominent examples of recent and current major (>$200K) externally funded interdisciplinary research projects that are led or co-led by SENR faculty (bolded names). These provide a flavor of the depth and breadth of our current collaborative research portfolio:

- ***Building a sustainable and resilient agroecosystem through an understanding of climate and farmer behavioral variability***. USDA-NIFA, $1.2M; 2017-21. **Robyn Wilson** (PI-SENR), Co-PIs **Kaiguang Zhao** (SENR), Elena Irwin, Yongyang Cai, and Alan Randall (all OSU-Ag Env and Devt Econ), Aaron Wilson, Jason Cervenec and Brian Mark (OSU Byrd Climate Center/State Climate Office), Greg Labarge (OSU Extension).
- ***Comparing the environmental tradeoffs and synergies of alternative modes of integrating livestock into cash grain cropping systems***. USDA/AFRI, $1M; 2021-24. **Douglas Jackson-Smith** (PI, SENR), with Co-PIs **Steve Culman, Christine Sprunger,** and **Steve Lyon** (all SENR), Marilia Chiavegato (OSU-Hort & Crop Sciences), Tony Parker (OSU-Animal Science), and Ajay Shah (OSU-Food Ag and Biological Engineering).
- ***Sustainable and Circular Engineering for the Elimination of End-of-life Plastics: A Framework for Assessment, Design, and Innovation***; 2020-24; NSF EFRI E3P Program, $2M; 2020-2024. **Nicole Sintov** (SENR-CoPI); with Bhavik Bakshi (OSU Engineering-PI), Li-Chiang Lin (OSU Chemical and Biomolecular Engineering), Phillip Savage (Chemical Engineering, Penn State) and David Allen (Chemical Engineering UT Austin).
- ***Cumulative effects of ecological and social stressors on the dynamics of integrated ranching-wildlife systems: drought, wolves, and human decision-makers***. NSF DISES program, $1.6M; 2021-25. **Jeremy Bruskotter** (SENR, Co-PI) with Sophie Gilbert (PI, Wildlife Ecology, U Idaho), and CoPIs Neil Carter (Political Science, BYU-Idaho) and Chloe Wardropper (Geography, U Idaho).
- ***Impacts of deglobalization on the sustainability of regional food, energy and water systems***. NSF INFEWS/T1 program, $2.5M, 2017-22. **Robyn Wilson** and **Douglas Jackson-Smith** (SENR Co-PIs) with Elena Irwin (PI) and Co-PIs Alan Randall and Yongyang Cai (all OSU-AEDE), Jay Martin (OSU-FABE), Jeff Bielicki (OSU-Engineering/Public Policy), and Bhavik Bakshi (OSU-Engineering).
- ***FUTURE Restoration: Food in Urban Environments-Training Undergraduates for Research and Extension in restoration and agroforestry.*** USDA Education Workforce Development Award. $500K; 2021-24. **Jeffory Hattey** (SENR PI) with Co-PIs **Nicholas Basta, Matthew Davies, Brian Slater, Christine Sprunger, Roger Williams** (all SENR), Maria Rodriguez (OSU-Ag Comm), and B. Wenner (OSU-Animal Science)**.**
- ***Environmental, human, and animal health risks from the dissemination of Carbapenem-resistant Enterobacteriaceae into agricultural watersheds.*** USDA NIFA $1M, 2020-23; **Mazeika Sullivan** (SENR Co-PI) with Thomas Wittum (PI, Vet Medicine) and Jiyoung Lee (OSU-Public Health)
- ***Coproducing Actionable Science to Understand, Mitigate, and Adapt to Cyanobacterial Harmful Algal Blooms (CHABS).*** NSF DISES program, $1.6M, 2021-25. **Robyn Wilson** (Co-PI), with Christine Kirchoff (PI, Policy Science, U Conn), and Co-PIs David Keiser

(Economics, U Mass), Timothy Davis (Aquatic Ecology, Bowling Green), and Rebecca Muenich (Watershed Modeling, Arizona State).

- ***Whole-plant based feedstock supply system for biobased industries. USDA-NIFA, AFRI Foundational and Applied Science.*** USDA NIFA $1M, 2019-22. **Steve Culman** (Co-PI, SENR); with A. Shah (PI), F. Circle, K. Cornish, G. Kelderman, S. Khanal, S. Shearer, J. Witter (all OSU-FABE).
- ***Collaborative Research: Cognitive, social, and institutional dynamics of decision-making in complex hazard-prone environments.*** National Science Foundation. $398,275; 2020 – 2023. **Matthew Hamilton (PI-SENR) with Co-PI's Eric Toman (SENR)**, Max Nielsen-Pincus (Portland State University), John Salerno and Antony Cheng (Colorado State University), and A. Paige Fischer (University of Michigan).
- ***Development of a multi-scale management tool for predicting and mitigating HABs in Ohio River watersheds***. EPA Freshwater Harmful Algal Blooms research grant; $681K, 2018-20. **Mazeika Sullivan** (PI), **Lauren Pintor** and **Kaiguang Zhao** (Co-PIs).
- ***Environmental fate and persistence of microcystins in land applied drinking water treatment residuals***. ODHE HABs Initiative $350K, 2018-21. **Nicholas Basta** (PI-SENR), with **Elizabeth Dayton** (SENR) and Jiyoung Lee (OSU-Public Health).
- ***Organic Dual-Use Perennial Grain Crops: Pathways to Profitability and Soil Health***, USDA OREI. $1.8M, 2019-23. **Steve Culman (PI) with CoPIs Christine Sprunger (SENR)**, Mark Sulc (Hort & Crop Science), Ryan Haden (HCS), J. Junger, M. Ryan, T. Crews, and L. DeHaan.
- ***Post-fire recovery and restoration of soil health and ecosystem productivity in the sagebrush-steppe rangelands***. USDA AFRI Agroecosystem Management Program, $500K, 2021-24. **Matthew Davies** (PI-SENR), and Co-PIs **Jeff Hattey, Scott Demyan**, **Steve Culman** (all SENR) and Jonathan Bakker (Env & Forest Science, U Washington).
- ***After the Flood: Impacts on Rhizosphere Biology, Nutrient Cycling, and Corn Growth and Yield***. USDA AFRI $500K, 2021-25. **Christine Sprunger** (SENR CoPI) with Laura Lindsey (OSU Hort & Crop Science).
- ***Strategic and Operational Agenda to Promote Sustainable Growth in the Developing Pawpaw Value Chain***. USDA-AFRI. $214K, 2020-2023. **Matt Davies** (SENR; Co-PI) with Guil Signorini (PI; HCS)

Key Issues for Research Program

1. Sustaining Research Trajectory through Mid- and Late-Career Stages

While our faculty overall have sustained a steady stream of research outputs over the last decade, a comparison of the research accomplishments of our faculty by rank (and by years since terminal degree) reveals that our mid- and later-career faculty often experience reduced productivity. Figure 5 is based on data for all active individual SENR faculty compiled by Academic Analytics, which computes a Scholarly Research Index (SRI) that captures

information about their articles, federal grants, citations, and professional awards.[6] The yellow dots/line in Figure 5 represent the average SRI score for all faculty from similar departments in their database at each career stage.

Most SENR faculty are above the yellow line (and are seeing rapid growth in SRI scores) until about 12 years post-PhD, after which a sizeable group falls below the line. There are legitimate reasons for this trend (e.g., many of our mid- and late-career faculty are performing important leadership or service roles for SENR and some faculty choose to focus more on teaching and outreach activities). However, there is reason to believe that we could do more to facilitate and sustain levels of research activity for post-tenure faculty. We want to ensure that the highly productive junior faculty who have joined SENR in the last 8 years continue to grow and develop their research programs as they move through the tenure and promotion process. We are interested in suggestions for how best to support mid-career faculty and encourage a larger percent to sustain research programs that contribute to promotion to professor and onward.

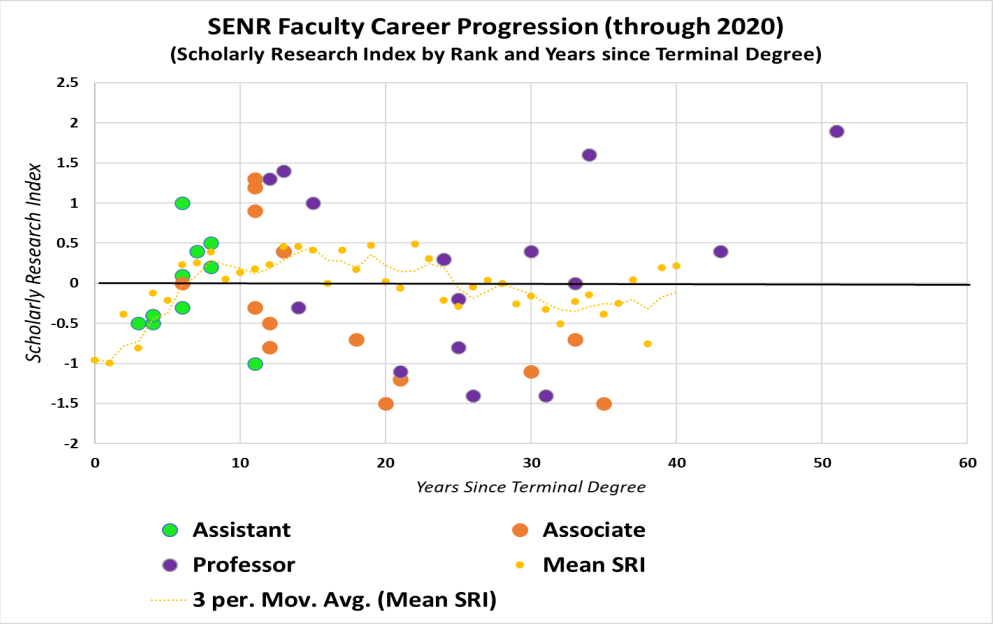


Figure 5: Scholarly Research Index Scores for SENR faculty, by rank and years post-PhD. We present these data to highlight broad trends in productivity vs. as a precise metric of individual faculty productivity as we recognize that this metric does not fully captures the full complement the productivity of individual faculty.

2. *Increase federal competitive grant success while sustaining support from state agencies, foundations, and private sector*

[6] Articles and citations each account for 35% of the score, grants 20%, and awards 10%. It is worth noting that nonfederal grants are not included in RSI scores.

As noted above, the SENR faculty appear to slightly underperform (relative to peer institutions) in the number and scale of federal competitive research grants received. Since our faculty also attract funding from a mix of other external sources (particularly significant funding from state agencies, foundations, and private commodity groups), we do not feel this is a major problem and is in-line with the land-grant mission of Ohio State, and particularly of CFAES. However, federal grants typically pay much higher F&A returns (which are a key source of funding for SENR's research infrastructure investments) and are one of the most important sources of funding for large-scale interdisciplinary and transdisciplinary research on topics that are core to the SENR mission (agriculture, natural resources, and the environment). In response, SENR has worked to increase our incentives and support for faculty who are preparing and submitting grant applications to competitive federal agency programs (and we encourage our faculty to participate in college- and university-level programs to build this capacity as well).

3. Increasing external grant support for graduate research assistants

Federal (and other external) grants are also a critical source of funding for graduate research assistants in SENR. GRA slots are combined with graduate teaching assistantships to provide the backbone of our graduate student funding platform. In recent years, Ohio State recently increased the minimum stipends for graduate assistantships by 20% (up to $2,344/month), which has placed stress on the number of state-funded GTA slots we can provide. To address this gap while maintaining the size and quality of our graduate program, we will need to increase the number of externally funded GRA positions in the coming years.

4. Addressing the administrative burdens placed on research faculty

SENR faculty are required to assume excessive administrative work in order to carry out their research activities. Although pre-award support provided by the Office of Sponsored Programs and the Grant Development Support Unit has increased in the last couple years, faculty have generally been required to complete all proposal development on their own. SENR has one staff position dedicated in-part to post-award management, but the size and scope of the SENR's current and potential research portfolio requires additional support. Further, faculty are largely responsible for purchases, budgeting, and HR transactions, which can be extremely time consuming and take faculty away from research development and management. This has been exacerbated by the 2021 transition to *Workday*, a "self-service" model that squarely puts purchasing, travel, budgeting, and HR responsibilities on faculty. Faculty are also asked to submit extensive and often duplicative reports to administrators to document the impacts and importance of their research. The administrative workload involved in applying for, implementing, and reporting on research grants (including learning new reporting and business software systems) have demanded more and more time from faculty, and discouraged some from pursuing more research opportunities. As might be expected, the more productive a faculty member, the more administrative burden they face, leading to increased risk of our most productive faculty reducing their research activities.

Section V: Undergraduate program

Overview

SENR offers a Bachelor's of Science in Environment and Natural Resources degree with five majors: Environmental Science (ES); Forestry, Fisheries and Wildlife (FFW); Environmental Policy and Decision Making (EPDM); Natural Resource Management (NRM); and Environment, Economy, Development and Sustainability (EEDS). Within each major, students may choose from among a number of specializations.

Our Environmental Science major has four specializations, including Ecosystem Restoration, Water Science, Environmental Molecular Science, and Soil Resources and Environmental Sustainability.

The Forestry, Fisheries, and Wildlife major includes specialization and requirements that allow it to maintain accreditation, certification and double-certification options uniquely available to students in the major, including Society of American Foresters (SAF) accreditation and The Wildlife Society (TWS) and American Fisheries Society (AFS) certifications.

The Environmental Policy and Decision Making major includes three specializations based on existing focal areas in the major: Communication & Behavior Change, Environmental & Social Justice, and Policy & Governance.

Natural Resource Management has three specializations: Parks and Recreation Management, Natural Resource Administration and Management, and Sustainable Agriculture, with additional focus-area options (non-transcript) aligned with employment opportunities and existing programs in the School: Forestry, Fisheries, Wildlife, Soil and Water, Visitor Services, and Zoo Science and Management. The Sustainable Agriculture option will be retired during the coming year as a result of the College now offering a Sustainable Agriculture major associated with the B.S. in Agriculture

Finally, the Environment, Economy, Development and Sustainability major is jointly managed by SENR and the Department of Agricultural, Environmental and Development Economics (AEDE). It is the newest major, coming into existence 10 years ago. There are currently four specialization options within this major, including: Sustainability and Business; Environmental Economics and Policy Analysis; International Development; and Community Development. Discussions are underway to combine the two development specializations into a Community and International Development specialization.

Table 4 reports data on the enrollment trends in each major. All five majors enjoy a relatively healthy level of interest, with interest in Environmental Science steadily growing over the last five years.

Table 4: Students by Major, Autumn 2016 through Autumn 2020

	AU16	AU17	AU18	AU19	AU20
EEDS	206	206	187	173	199
EPDM	66	93	94	100	109
ENV SC	177	178	216	240	264
FFW	117	117	130	142	127
NRM	111	111	110	118	114
ENR, UND	16	33	25	21	27
Total:	**695**	**738**	**762**	**794**	**840**

Demographic highlights:

- Student body has shifted over the past 5 years from an even female/male split to 60% female, 38% male, and 2% unreported.
- Percentage of underrepresented students has grown modestly, averaging an increase of 1% each year from 11% in AU16 to 15% in AU20.
- First-generation students have comprised on average roughly 21% of the student body over the past 4 years, with AU20 seeing the largest number at 23%.

The School offers seven minors (Table 5), most of which are stripped down versions of majors or specializations within majors. The minors include: Environment, Economy, Development and Sustainability; Environmental Science; Forestry, Fisheries, and Wildlife; Rural Sociology; Society & Environmental Issues; Soil Science; Sustainable Agriculture

Table 5: Students graduating with an ENR minor:

	16-17	17-18	18-19	19-20	20-21
EEDS	19	27	19	19	26
ENV SC	14	17	30	32	25
FFW	16	21	13	14	7
RURLSOC	4	1	1	0	1
SOC ENV	11	13	11	8	15
SOIL SC	0	2	2	1	1
SUST AGR	1	1	2	1	2
Total:	**65**	**82**	**78**	**75**	**77**

Further statistical data regarding the School's undergraduate program is located in the SENR Undergraduate Academic Highlights Report, 2020-21.

Enrichment opportunities within the School

ENR Honors Program

The School's Honors Program has seen growth over the past five years. (Table 6).

Table 6: : Honors enrollment by major, Autumn 2016 through Autumn 2020

	AU16	AU17	AU18	AU19	AU20
EEDS	11	13	9	11	16
EPDM	3	7	6	6	7
ENV SC	13	17	17	26	27
FFW	3	5	3	5	8
NRM	2	0	0	0	1
ENR UNDEC	2	5	5	2	3
Total	**34**	**47**	**40**	**50**	**62**
% of total enrollment	4.9%	6.5%	5.2%	6.4%	7.3%

The ENR Honors Program includes two tracks that students select from, a research track and a curriculum track. The curriculum track was created in 2018 and offers students an opportunity to pursue honors through a track that is more professional development and curriculum focused. The track was created in large part to accommodate a growing number of EEDS honors students that were not interested in pursuing research but were high ability and wanted an honors experience. The split is currently 60% pursuing the curriculum track, 40% the research track.

Education Abroad

SENR consistently provides high-impact opportunities for students across all majors to engage in learning environments. Current programs managed by SENR include trips to Australia, China, Iceland, and New Zealand. Students have studied the impact of climate change on fragile ecosystems in Australia, researched forest ecosystem management and wildlife in southern China, and in Iceland, students have studied energy, soils, geology, and sustainability while also learning about Icelandic culture and the impacts of increased tourism on natural resources.

During the last 8 years, students in SENR have travelled to over 50 countries.
Education abroad cannot be high impact if it is exclusive. SENR has awarded $53,000 in financial assistance to 53 students since the creation of the SENR Education Abroad Scholarship in 2016. This award was designed to remove barriers to participation in education abroad programs for students with acute financial need. Approximately 41% of ENR students participate in at least one education abroad experience, and total ENR student participation rates on education abroad programs have been consistent over the past 10 years.

Experiential Learning

SENR is strongly committed to hands on and experiential learning. This is realized through courses that have substantial field-based learning experiences, including the active use of the ORWRP Park as an outdoor laboratory. The School has several dedicated funding sources to support these sorts of activities, including regularly receiving disbursements (~$30,000 annually) from the Peyton fund, held by the Columbus Community Foundation and funds associated with the SENR program fee, which is assessed of each undergraduate major each semester.

On-line and Distance Education

The School's first online course, "Introduction to Environmental Science" (ENR 2100) was offered summer of 2015 and was developed with Ohio State's Office of Distance Education and eLearning (ODEE) as part of the larger University strategy to bring General Education (GE) courses online. In order to aid the transition of students transferring into SENR, the School adopted a similar strategy and began to target Freshman and Sophomore level courses for distance education (DE). While not all the initial courses developed held GE status, these courses (e.g., ENR 2100, RURLSOC 1500, ENR 3300, ENR 3900) were approaching the limits of what SENR could sustainably support with current sections. Developing a DE offering allowed SENR to support additional students, while reducing bottlenecks and time to graduation, without the need to secure additional limited classroom space. The School's on-line portfolio has further evolved to include graduate level courses that integrate into professional masters or certificate programs. During the academic year 2019-20, over 2000 students took one of SENR's 11 on-line courses.

Recruitment

There are four pipelines through which undergraduate students enter the School. Table 7 identifies each of these pipelines and the number of students arriving in the school.

Table 7: New Students by pathway by and academic year

Academic year	**18-19**	**19-20**	**20-21**
New First Year Students	82	87	117
Transfer Students	54	62	56
Campus Change Students	17	20	38
Intra-University Transfers	109	96	98
Total:	**262**	**265**	**309**

Recruitment Trends

- Interest in SENR degrees has grown significantly among prospective undergraduates since 2010. In that time frame, new first year student (NFYS) applications to SENR majors have increased by 248%, admits have increased by 282%, and enrollees by 134%. The university has seen increases in these numbers as well but not to the extent of the School, increasing applicants by 137%, admits by 100%, and enrollees by 31%.
- NFYS enrollment has grown in both social science majors over the last 10 years, with Environment, Economy, Development, and Sustainability (EEDS) coming into existence and 150% new student enrollment increase in the Environmental Policy and Decision Making major. Environmental Science NFYS enrollment has grown by 73% and Natural Resource Management and Forestry, Fisheries, and Wildlife have maintained numbers.
- Transfer student enrollment has grown by 10% since 2010, compared to the university transfer enrollment which has decreased by 10% during that same time frame.
- A large percentage of new enrollment has historically come from current Ohio State students changing their major into SENR (Intra-University Transfers, or IUTs). We began tracking

this information closely in 2013 and have seen annual incoming numbers in this group range from 96 to 140 new students. Until 2017, IUTs represented more than half of incoming SENR students. As we have seen the NFYS population grow, IUTs have begun to represent a smaller percentage of new students though the numbers remain steady. Recently IUTs are between 35-40% of incoming SENR students with the majority of incoming IUTs selecting Environmental Science or Environment, Economy, Development, and Sustainability as their major.

Recruitment Strategy

- With significant and steady enrollment growth over the past ten years, nearly doubling during that time and growing 25% in the last five years alone. While we have been able to expand the course offerings to keep up with that growth so far, we are approaching capacity issues in courses and physical space that may diminish our ability to provide the quality of experience we intend for our students. Our overall recruitment goals allow for modest enrollment growth of our undergraduate student population overall but primarily focus on supporting specific populations with barriers to matriculation and degree completion.
- Our recruitment strategy is to provide accessible and personalized support throughout the exploration and enrollment process, focusing support on underrepresented and under resourced students. Our information focuses on career pathways for the environment and natural resources field. We utilize physical mailings as our primary contact as email has become less effective. We seek to provide resources for our allies in recruitment (Ohio State Admissions staff, high school teachers and counselors, etc.) so they have accurate information about our majors, career opportunities, and experiential learning opportunities.
- CFAES is hoping to grow undergraduate enrollment and we have been the greatest source of growth within the College in recent years. The University is wanting to hold steady on enrollment but increase access for underrepresented students and high academic metric students, which is more in line with our goals.

Assessment

SENR participates in a rigorous assessment program administered by the College of Food, Agriculture, and Environmental Sciences (CFAES). The program is based on the National Institute for Learning Outcomes Assessment (NIOLA) Transparency Framework.

As part of this framework, each major has a set of Learning Goals and associated Outcomes. These outcomes are paired with content from specific courses within a major and instructors incorporate assignments that will allow them to evaluate how well students are meeting the learning goals and outcomes. See here for a summary of SENR's most recently compiled undergraduate assessment data.

Time to Graduation Trends

- Based on the latest retention and graduation numbers for new first year students (NFYS) we are tracking similarly to the university.

- We bring in a significant number of intra-university transfers (IUTs) each year, some of these students often have difficulty staying on track to complete in 4 years due to the FFW and ENV Science curricular requirements and how those courses are offered. If a student doesn't declare early enough, they can miss the window to take critical major courses.
- The math and science requirements can also create a sticking point for students that either stopped progressing through math and science after their first year or for IUT students, they may need a higher level than their previous major required.

Advising and Academic Support/mentoring

Every student is assigned an academic advisor upon entering the School. There are four academic advisors in SENR that focus on all 5 of the undergraduate majors. There is also an advisor in AEDE that provides advising support to the EEDS majors specifically focusing on Business and Sustainability or Environmental Economics and Policy Analysis. Academic advisors work with students from orientation through graduation, focusing on providing academic guidance and degree planning assistance. Advisors meet with students through individually scheduled appointments and Express Services which are offered one day a week and are open walk-ins for quick academic questions.

Once a student has declared a specialization they are assigned to a faculty mentor. Students are encouraged to meet with their faculty mentor to discuss topics like going to graduate school, involvement in research, career plans, course selection within their major, etc. Faculty mentors do have to approve requested course changes within the major and specialization course selection.

Graduate Student Mentoring Program

The SENR Mentorship program is an emerging program dedicated to connecting graduate students with undergraduate students who have an interest in research and graduate school. The program focuses on networking, developing communication and leadership skills, and encouraging personal, academic, and professional growth. As the program continues to grow, it is excelling at reaching underrepresented student populations such as first-generation college students, LGBTQIA, and students of color.

Over the AU20-SP21 school year, 78 undergrads expressed interest in the program by completing the initial survey, and 49 were matched with a graduate student mentor. There was considerable enthusiasm among the SENR graduate student population, with 39 students participating. In many cases, graduate students mentored more than one undergraduate.

Peer Mentors

Peer mentors (advanced undergraduate students) integrate new students into the SENR community by mentoring first-year and transfer students, engaging in the survey class content, and acting as a resource for peers throughout the School. They assist with the day-to-day questions new students have ranging from places to study, favorite GE classes, career exploration, wellness resources, and using Ohio State's scheduling tools. Peer mentors lead

discussion groups throughout the summer before enrollment at orientation and within mentoring groups. These groups continue throughout the first semester and include discussions within the introduction to the School survey class, an ongoing group message with resources, and a few group meet-ups outside of class to get to know campus and the surrounding area.

Career Counseling

SENR has a Career Development Coordinator working exclusively with SENR students. The Career Development Coordinator offers an array of career development resources and programming for students, including one-on-one career advising, workshops and class visitations, and collaboration with student clubs and organizations to offer professional networking panels. In addition, SENR has also developed a 1-credit career development course taught twice a year and open to all ENR students. The Career Development Coordinator works closely with the CFAES Career Development Office and collaborates with them to create additional student resources, host career fairs during the fall and spring semesters, and track first destination outcome data for recent graduates.

Placement Rates

The percentage of recent graduates with a reported outcome has remained relatively stable over time, with some oscillation year-by-year. From 2014-2020 three of the five majors (EEDS, EPDM, FFW) averaged 90% or higher at 92.7%, 90.8%, and 91.1%, respectively. ES and NRM averaged 87.9% and 87.8%, respectively.

Student Engagement and Activities

SENR undergraduates have access to a wide range of extra-curricular activities and professional development opportunities in the form of clubs, organizations, learning communities, research opportunities, and planning and curriculum committees.

SUSTAINS Learning community (Students Understanding Sustainability and Taking Action to Improve Nature and Society): Students in this program have the opportunity to live alongside peers who share an interest in exploring sustainable solutions for local, national, and global issues. Through discussion, service and hands-on learning, students who are members of this community will learn about best practices for sustainable living and have opportunities to explore how sustainability relates to their lives and the lives of others.

ENR Scholars: The Environment and Natural Resources Scholars program is designed to support students with an interest in exploring the natural world. Students examine areas such as environmental problems and solutions, alternative energy, wildlife management, and outdoor recreation. ENR Scholars have the opportunity to go on recreation trips across the United States during breaks and explore parks and outdoor adventure opportunities throughout the Columbus area.

Student clubs, organizations, and leadership: SENR students participate in, and in some cases lead, over 50 clubs and organizations related to the environment, natural resources and

sustainability. Some of the clubs that are housed in SENR, led by SENR students, and advised by SENR faculty including Forestry Forum, Society for Ecological Restoration and Ornithology Club among others.

SENR students also have an opportunity to serve in a variety of leadership roles. Both the Academic Affairs Committee and the Graduate Studies Committee have an undergraduate student representative with full voting privileges. In addition, students have the opportunity to serve on the School of Environment and Natural Resources Student Leadership Board, which is the umbrella organization for the two primary undergraduate leadership opportunities: SENR Ambassadors and Peer Mentors. Each major has several students that serve as ambassadors and peer mentors.

SENR students also multiple pathways through which they can gain research experience. Students accepted into the Honors program can pursue a research-based honors degree and collaborate with faculty on an independent research project. Non-honors students can also work with faculty on independent research to earn research distinction. Lastly students can assist with faculty or graduate-student led research to earn credit or for pay.

Student Satisfaction

All undergraduates receive a comprehensive satisfaction survey approximately every 3 years. The survey asked students about their satisfaction with their courses, career development, out of class opportunities, the ENR community, as well as services provided through the School and University. The survey also collects data on their wellness levels, food and housing insecurity, and the perceived strengths and weaknesses of the School. Data from the survey is discussed and changes have been implemented. For example, a food pantry was created within the School in response to the number of students that indicated they were food insecure. Feedback received from students that have changed their majors into the School indicated they were frustrated with navigating the curriculum. We created a new event called Careers & Classes that we invite all recent intra-university transfers and we focus on jumpstarting their career development and talk through scheduling priorities for each major.

Curriculum Improvements and changes

Work is ongoing on the university's new General Education (GE) program that rolls out in AU22. An initial list of courses has been identified for the foundations and themes within the new GE structure and those courses are being submitted for review and approval. Each major must be reviewed to determine how the new GE will fit into the existing structure. Three of the School's majors will easily accommodate the new GE structure including EEDS, EPDM, and NRM. Faculty are currently reviewing ENV SC and FFW to determine how to maintain the science and major requirements while fitting in the new GE structure. Revision of the GE is a huge undertaking, with implications for our majors but also implications for our existing high enrollment general education courses.

SENR is also collaborating with the School of Earth Sciences to develop a new major in Water Science (likely to be administered by SENR as a sixth major associated with the BS in ENR, although specific details of how to administer the major are still being discussed).

Key Issues

1. Managing the restructuring of General Education curriculum:

The university is undergoing a major revision to its General Education (GE) curriculum that will substantially change the landscape of courses that students take to fulfill their GE requirements. It is unclear what impact these changes will have on credit hour generation in the School. enrollments may decline in courses that had been popular in the old GE, but newly developed courses or courses that are included in the new GE curriculum may experience substantial growth. In addition, the new GE could impact – positively or negatively – our ability to attract intra-university transfers. A number of students first learn about our program through one or more of our GE classes and transfer into the School based on their experiences in those courses.

2. Meeting the curricular demands associated with student growth, especially in the Environmental Science major:

As our undergraduate enrollment approaches 900 students we are faced with the challenge of offering high quality learning experiences with our current faculty and staff. Enrollment problems have been, and will remain, a continual challenge, especially in hands-on courses with lab and/or field components where the student to instructor ratio must remain low. It will be an ongoing challenge to provide the number of course offerings that students will need to complete their degrees on time without taxing the faculty and impinging on their ability to conduct research

3. Reduce complexity of majors, focus on specializations

One strategy of managing our substantially larger student population is to focus and reduce the complexity of our majors. There are advising benefits to this as well as increased ability to anticipate course demand and response appropriately. This is no easy undertaking though as it requires time and also rethinking social and professional identities in relation to specialization names.

4. Enhance diversity of the student population and provide appropriate support.

The School is increasingly attentive to ways to enhance the diversity of its student body and seeking to identify ways to adequately support the success of diversity students enrolling in our majors.

Section VI Graduate and Professional Education

Description of ENR Graduate Program

The Environment and Natural Resources Graduate Program (ENRGP) currently offers three graduate degree plans: two research-based degrees, the Master of Science in Environment and Natural Resources (MS) and the PhD in Environment and Natural Resources (PhD) and a non-thesis, professionally-orientated Masters in Environment and Natural Resources (MENR). The ENRGP also manages a number of dual degrees, graduate minors and a new Graduate Certificate in Environmental Assessment. In addition, a substantial number of SENR faculty advise students through the campus-wide, cross-college interdisciplinary Environmental Science Graduate Program (ESGP). This section will primarily focus on the MS, PhD and MENR degrees. Full details of the structure, requirements and administration of these degrees can be found in the ENR Graduate Program Handbook.

The Master of Science Degree

- Purpose: The Master of Science is a research degree that engages students in course work, study, and research leading to the production of a scholarly Master's thesis. Students completing the Master of Science are prepared for careers in environmental and natural resource science, management, policy, and education. Students may focus their study in one of seven specialization areas: Ecological Restoration, Ecosystem Science, Environmental Social Sciences, Fisheries and Wildlife Science, Forest Science, Rural Sociology, and Soil Science.

The Doctor of Philosophy Degree (including direct-admit PhD)

- Purpose: The PhD is an advanced research degree that prepares students to pursue high-level, independent, scholarly research. The ENR Graduate Program Handbook currently states: "the PhD program is fundamentally oriented toward preparing students to pursue academic careers, it also provides a foundation for students wishing to pursue research careers in government and the private sector". Similar to the MS, doctoral students may focus their study in one of seven specialization areas: Ecological Restoration, Ecosystem Science, Environmental Social Sciences, Fisheries and Wildlife Science, Forest Science, Rural Sociology, and Soil Science.

Degree Specializations

The specializations have varying requirements for approved relevant courses but all students must complete a minimum of 10 credits from the relevant specialization curricula and be advised by a faculty member who is a member of that specialization. Some specializations have well-defined core course sequences (e.g. Rural Sociology, Soil Science), others simply provide an approved list of courses that students can select from. At the time of writing, relevant faculty have voted to merge to the Ecological Restoration and Ecosystem Science specializations and are beginning the process of revising the associated curriculum. Recent proposed revisions to the Rural Sociology and Environmental Social Sciences specializations are pending approval from the Ohio State Council on Academic Affairs. Most other specialization curricula were last

revised in 2012 during the semester conversion. All specialization curricula can be found at the end of ENR Graduate Program Handbook.

Our specialization structure and the core requirements of our MS and PhD degrees are currently under active review by the Graduate Studies Committee (described in more detail in the following section). This is based on recognition that the current structure may not adequately represent current faculty or meet the program's goals for providing students with interdisciplinary and career development training. To inform this work, we have engaged our community through focus groups (graduate students) and surveys (graduate students and faculty). Key themes emerging from these surveys include:

Graduate student responses:

- Graduate students desire more graduate-level courses (instead of courses including both undergraduate and graduate students) within their areas of specialization
- Dissatisfaction among our students with some of our core courses
- Graduate students have explicitly, and formally, requested that core courses be more focused on issues relevant to Justice, Equity, Diversity and Inclusion (JEDI)
- Students desire additional opportunities to engage in interdisciplinary learning and gain interdisciplinary experience

Faculty responses:

- Most felt the current balance between core (required of all students) and elective credits was "about right" for our MS and PhD degrees
- Regarding topics to cover in core courses a majority of faculty identified the following: introduction to research and research design; socio-ecological or coupled systems
- Just under half indicated support for including training in diversity, equity, and inclusion
- There was generally more support for including courses in the core for our direct-admit PhD students including: An introduction to graduate school; Introduction to social sciences for natural science students and vice versa for social science students; Communication of science to diverse audiences (50%)
- Regarding our current areas of specialization, a survey of faculty revealed:
    - Just over half (55%) were "moderately" or "very happy" with our current specialization names
    - 60% indicated they were "moderately" or "very" happy and none indicating they were "not all happy" with the coursework currently required within the areas of specialization where they advise students
    - Over half respondents indicated the name of the specialization was important to allow students to apply for certain jobs upon graduation

The Master of Environment and Natural Resources Degree

- Purpose: The MENR is primarily orientated to environmental management professionals, individuals seeking a change of career into an environmental field, or anyone wishing to pursue advanced studies in environment and natural resources with professional development rather than research as their focus.
- Proposed new MENR specialization track: The MENR program's first specialization track in Ecosystem Health is currently under development as a joint effort by SENR and the

Department of Veterinary Preventative Medicine, College of Veterinary Medicine (CVM). The expected first offering for the Ecosystem Health specialization is Autumn 2022.

Dual Degrees, Minors and Graduate Certificates

Dual Degrees: ENR graduate students can enroll in the dual degree graduate programs and credit-sharing arrangements often allow the combined program to be completed in a reduced period. More commonly-completed dual degrees for students in our program include:

- Dual MS/MENR and Master of Public Administration (MPA)
- Dual MS/MENR and City and Regional Planning (MCRP)
- Dual MENR and Master of Business Administration (MBA)
- Combined MS/MENR and Juris Doctorate (JD)

Graduate Minors are available in Environment and Natural Resources, Soil Science and Rural Sociology.

A Graduate Certificate in Environmental Assessment was introduced for Autumn 2021 and consists of a four-course, 12-credit curriculum. The Certificate may be completed fully on-line and is available to both Ohio State graduate students and those external to the university. Admission requirements include a baccalaureate degree from an accredited institution with a minimum cumulative undergraduate GPA of 3.0.

Program Administration

The ENRGP is overseen by the ENR Graduate Studies Committee (GSC). The GSC consists of six representatives from each of the graduate specializations (Ecosystem Science and Ecological Restoration provide a single representative). Two representatives are elected by graduate students, one from the MS and one from the PhD degree plans. Student representatives are full voting members of the GSC. The Graduate Studies Chair is appointed for a three-year term by the SENR Director and is confirmed by the GSC. The SENR Associate Director sits on the GSC as an ex-officio member and the MENR Director attends meetings as a non-voting member.

Graduate Student Recruitment

Graduate student recruitment within the ENR program is predominantly organized by individual labs, graduate research faculty, the MENR Director, and professional graduate program managers. Student recruitment is facilitated by existing professional networks, websites, recruiting events, and faculty online presence which attracts student enquiries. Targeted recruitment of known individual students (e.g. existing Ohio State students) is also common. Professional graduate program recruitment is limited by capacity constraints. Where grant-funded Graduate Research Assistantships (GRAs) are available these may be advertised online with professional/scientific societies and through Ohio State's central HR system.

Some of the specialization groups have sought to increase applications through strategic and joint recruitment efforts by advertising with professional organizations and academic societies. Information about the MENR is provided on university websites and disseminated by alumni

within the environmental professional practice community. The MENR Director also recruits via professional connections with agencies, non governmental organizations (NGOs), and consulting firms and occasionally by attending career fairs. The EA Graduate Certificate started in Autumn 2021. Information on the certificate program is provided on the SENR and on the Ohio State Office of Distance Education and eLearning (ODEE) information platform. ODEE will provide marketing services to promote the program. An advertising flyer will be distributed among potentially interested departments' graduate programs in Autumn 2021.

Enhancing diversity, equity and inclusion through student recruitment

A number of strategic initiatives facilitate recruitment of under-represented populations. The Graduate and Professional Student Recruitment Initiative (GPS) is hosted and coordinated out of the Office of Diversity and Inclusion in collaboration with The Graduate School and academic units. The Summer Research Opportunities Program (SROP) is designed to help historically underrepresented students explore opportunities for graduate study and academic careers. As of 2018 the Fellowship competition for SROP alumni is only open to PhD students. Moving forward the ENRGP will actively engage with Ohio State ODI, CFAES ODEI and the newly appointed SENR Chief Diversity Officer to develop best-practices in recruitment and mentoring of under-represented students.

Admissions Decision Process

The GSC has developed rubrics to facilitate holistic review of MS and PhD application packets. No rubric currently exists for the MENR degree, Graduate Certificate or Graduate Minors. Over the last 2-3 years, the GSC has placed significant attention on reviewing and revising the ENR admissions process and requirements. This was driven by reconsideration of requiring the GRE for admission consideration, the need to identify best practices in applicant review and the desire to reduce barriers to the recruitment and admission of diverse students. The faculty voted to remove the GRE requirement from the AU 2021 admission cycle onwards. Applicants may still supply GRE scores if they wish, and individual faculty may request them, but submission of GRE scores is no longer a requirement for admission consideration to the ENRGP.

Application and Enrollment Trends

- 26% increase in the number of enrolled students between 2011 and 2020
- The MS and PhD degrees saw growth of 50% over the same period.
- MENR experienced rapid early growth, numbers have more recently declined and plateaued.

Overall admission rates for the period 2011-2020 averaged 61% for the MS, 47% for the PhD and 69% for the MENR. Admission rates have increased notably for the MS and PhD (from 44% to 79% and 39% to 59% respectively between 2011 and 2020). Meanwhile the student yield (proportion of accepted applicants that actually enroll) has varied dramatically from year-to-year but tends to be higher for the Masters level degree plans (PhD: mean = 49%, range = 14% - 70%; MS: mean = 56%; range = 40% - 68%; MENR: mean = 62%, range = 42% - 75%).

Applications to our programs have been fairly consistent over the period 2010-2020 with roughly twice the number of applicants to the MS compared to the PhD program. The MENR program saw an average of 14 applications per year with a notable dip between 2016 and 2018 when numbers were in single figures. For 2019 and 2020 applicant numbers had returned to more typical values.

Table 8: Enrollment numbers by degree plan over the last five years.

Degree plan	'16-'17	'17-'18	'18-'19	'19-'20	'20-'21
PhD	38	45	52	47	47
MS	46	39	42	52	51
MENR	18	10	12	14	20
Grad. Cert.	-	-	-	-	2
Grad. Minors*	3	1	1	0	0
ESGP**	6	3	8	4	4
Total	**102**	**94**	**106**	**113**	**118**

* All enrolled students were within the Rural Sociology minor

** Data is number of students with SENR as their home unit who were admitted each year rather than total enrolled

Table 9: Composition of the MS, PhD and MENR plans by race and ethnicity. Note those with "unknown" race/ethnicity are generally international students.

Year	'16-'17	'17-'18	'18-'19	'19-'20	'20-'21
Asian	1	0	0	1	2
Black/African American.	3	4	4	6	5
Hispanic	7	7	10	11	9
Two or more races	5	4	3	1	4
White	78	71	75	76	78
International	6	7	9	12	16
Unknown	2	1	5	6	4
Total URM	**16**	**15**	**17**	**19**	**20**
Total	**102**	**94**	**106**	**113**	**118**

Enrollment in minors and specializations

Current enrollment in graduate minors is limited. There were no active students in minors during 2019-2021 with numbers having declined steadily from five students in 2011. Two students have enrolled in minors since 2011 and both of these were in Rural Sociology. While the minors have remained active, little has been done to promote participation in recent years. The ENRGP recently reviewed the ENR and Soil Science minors and will begin advertising these more actively following updating of their curricula.

Comparatively few students formally declare a specialization. For students admitted since 2011, 23% of MS and 33% of PhD students declared a specialization. Environmental Social Sciences and Fisheries and Wildlife Science together accounted for more than half of all declared specializations during this period. No students declared a specialization in Forest Science.

Student diversity and representation

Since 2011, women have consistently outnumbered men in our graduate student population (64% to 36% as of 2020), and the number of female students has grown more rapidly than male. There is growing recognition of the importance of access to female advisors/mentors for female graduate students. It is thus salient to note that 20% of the School's natural sciences faculty and 41% of the social sciences faculty are female (28% of all SENR faculty are female). However, there is significant variability among faculty groups. For example, our aquatics/water science faculty (tenure-track) is 63% female/37% male, whereas our wildlife ecology and soils groups have only 1 female (and the female wildlife faculty is tenured in the Veterinary Medicine.

The proportion of enrolled graduate students from under-represented minorities (URM) increased from 16% in 2017 to 20% in 2020 (Table 8) but has doubled since 2011. The largest growth was seen in the recruitment of Hispanic students. Underrepresentation of racial and ethnic minorities remains substantial within the PhD where no African American students graduated between 2009 and 2019 (there are currently two active students in the program).

Low numbers of URM students in our programs is partly a function of the low number of applications. The proportion of applications from URM students averaged 16% for the MS and 17% for the PhD. For the PhD program there is often only one or two applications from URM students in a given year.

Among URM applicants to the MS program, 81% were admitted (compared to 70% for White students). Within the PhD program admission rates were 63% and 70% respectively. The apparent disparity between these numbers, and those for the overall program, is explained by very low admission rates for international students in some years. The program has historically received large numbers of unsolicited international applications that are not considered as there is no committed advisor. Numbers of URM students applying to the MENR program were too small to allow for meaningful analysis (average applications = 1.4 per year; average yield = 75%).

Program Evaluation

In 2016 the ENRGP developed a series of Learning Outcomes Assessment Plans that link broad Program Learning Goals to specific Supporting Outcomes and associated Measures. More details regarding graduate program evaluation are located here. To date the School and University have done limited tracking of data to allow comparison with performance criteria.

Student performance

Across all students admitted between 2011 and 2020, mean undergraduate GPAs for incoming MS, PhD and MENR students were 3.61, 3.57 and 3.37 respectively. Incoming GPA scores tended to be slightly lower for URM students within the research degree plans. While incoming MENR students tended to have lower GPA scores, more recently there has been less difference between them and students in the research-based degrees. The GSC is tracking admissions rubric scores for incoming students, but it is too early to provide any meaningful quantitative analysis.

Overall degree completion rates were high for students exiting the programs between 2010 and 2019. Completion rates were 90% for the MS, 74% for the PhD and 82% for the MENR. Compared to white students, completion rates tended to be slightly higher for URM students in the MS program but were lower for international students. Completion rates were lower for URM students in the MENR and PhD programs, though these figures are partly a reflection of the very small number of such students exiting the program during the period examined.

Median student time to degree obviously differs between the programs and for the period 2012-2020 averaged 2.3 years for the MS, 5.0 years for the PhD and 2.0 years for the MENR. Recommended time to completion for the MS and MENR degrees is two years and is four years for the PhD. White students currently take about 2.3 years to complete an MS while African American and Hispanic students take 2.6 years (equivalent to an extra semester). Reliable comparison by URM status for PhD students is not possible due to the small number graduating during the period for which data is available.

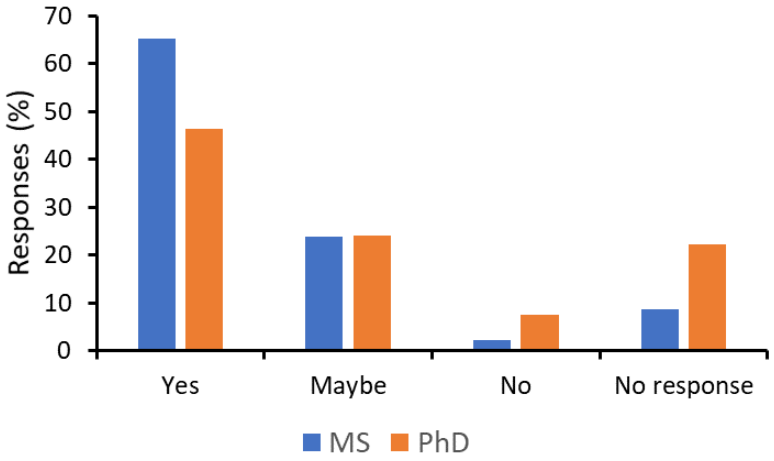
There is a concern that that the graduate program may not currently provide the support necessary for URM students to reach their full potential. Addressing disparities and focusing on recruitment, retention and the specific mentoring needs of URM students has been identified as a priority of the GSC.

Graduate Student Satisfaction

Two surveys are distributed annually to our graduate students: i) since 2017 MS and PhD students receive an annual progress review questionnaire; ii) since 2016 all graduate students receive an annual evaluation advising questionnaire. However, to date the distribution, completion and analysis of responses from these surveys has been sporadic and incomplete.

The progress review questionnaire includes both open-ended and multiple-choice responses where the latter simply asks: “Are your training and educational needs being effectively met?”. Two thirds of MS students and nearly half of PhD students answered that they are (Figure 6). Responses were somewhat more equivocal from PhD students with a higher proportion indicating their needs were not being met effectively or choosing to not respond to the question.

Figure 6: Results from the student progress questionnaire regarding whether students' educational needs are being effectively met (n = MS: 46 and PhD: 54). Answers for responses 2016-2020



The results of student satisfaction surveys returned between 2016 and 2020 revealed that, on average across all questions, Masters students generally reported satisfaction (scale of 1 to 5, with 5 being most satisfied) with their advising and programmatic support while PhD students were more equivocal (MENR = 4.1, MS = 4.3, PhD 3.7). Students generally agreed that their advisors were supportive of their professional goals, and that they were easy to communicate with, respectful and fair. Key issues identified by PhD students included:

- Lower satisfaction with professional development opportunities offered by the School/Program
- Concern about financial support among PhD students
- Lower satisfaction with the extent to which coursework supported PhD research goals
- PhD students tended to express reduced satisfaction with regularity of meetings with their advisor and the timeliness of responses to submitted written work

Graduate students were highly impacted by the issues of institutional racism, implicit bias and police violence during the period from 2016. Students were understandably traumatized by the extra-judicial killings of Breonna Taylor, George Floyd and many others as well as by their subsequent direct experiences of police violence during protests in Columbus. Graduate students shared a letter to the School and College which drew clear attention to their concerns and to their frustration at our program's perceived failure to make comprehensive progress on anti-racist reform. Key issues they raised included: the lack of representation of, and support for, minority students, a desire for better integration of DEI issues into graduate student curriculum, a perceived lack of action by School, College and University administration on DEI issues, and a need to integrate DEI activity into expectations for faculty tenure and promotion. While some of the issues raised were beyond the purview of the ENRGP or School to directly address, representatives of the School and program administration liaised with the leaders of the student body and are continuing to work on these points to consider appropriate changes that may be adopted within the ENRGP and School.

Role of Graduate Students in Research and Instruction

Our graduate students play a critical role in achieving the teaching and research mission of our School. Most of our MS and PhD students are supported across different sources of funding during their time in our program (Table 10). Primary sources of funding include university and college fellowships, Graduate Research Associates (GRA's) on externally funded grants, and Graduate Teaching Associates (GTA's). Students often move between different sources of funding while completing their degree.

Across Autumn and Spring semesters, the School regularly provides approximately 66 GTA positions each year. The number of provided positions has increased in some years due to additional need for support in our undergraduate courses. Supported courses include high enrollment general education courses (with enrollment from 100 to 500+ students) to lower-enrollment advanced courses (often including substantial field and lab components).

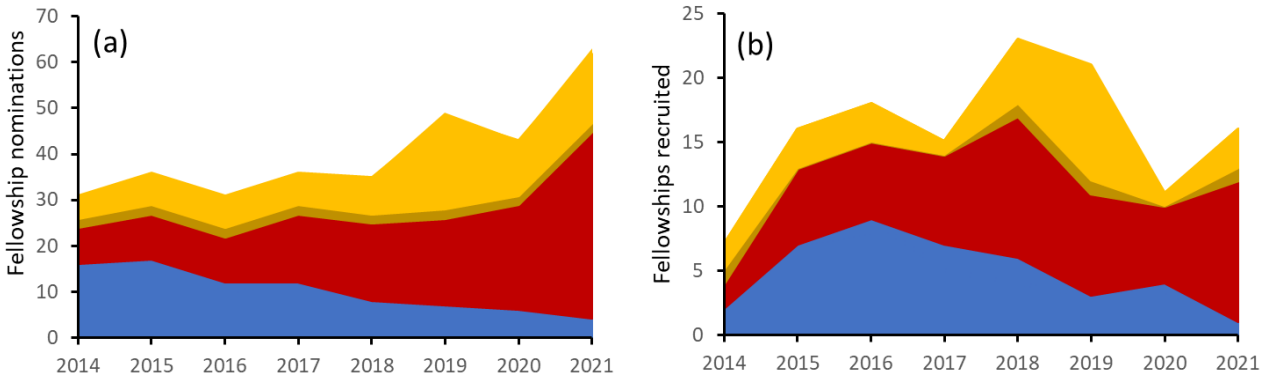
The School typically provides no more than 4 semesters of GTA funding for MS students or 6 semesters for PhD students (counting any semesters of support used while an MS student). There are very limited opportunities for GTA positions during the summer.

Table 10: Table 3: Recent Graduate student funding patterns by funding type, source (SENR, CFAES, Ohio State or External) and semester

Funding type	**Source**	**Fall 2019**	**Spring 2020**	**Sum 2020**	**Fall 2020**
Project funded GRA	External	12	15	9	19
GTA	SENR	38	34	1	39
Start-up GRA	SENR	10	12	10	15
Other (internal funds)	SENR	1	1	1	4
CFAES SEEDS Grant	CFAES	1	3	1	1
Total GA	**-**	**62**	**65**	**22**	**78**
University Fellowship	OSU	20	22	22	10
CFAES Fellowship	CFAES	6	6	5	5
External Fellowship	External	1	1	1	0
Total	**-**	**87**	**94**	**50**	**93**
% Externally funded	**-**	***17***	***21***	***25***	***26***

In addition to supporting students through GTA and GRA positions the program is able to recruit and fund students via fellowship competitions conducted at both the University and College level (Figure 7). Generally, when a student successfully secures a fellowship, further funding support is guaranteed (either through centrally funded GA or project funded GRA support) as long as the student is making adequate progress towards degree completion.

Figure 7: Availability and receipt of graduate fellowship funding from 2014 to 2021. (a) maximum possible nominations by competition type; (b) number of fellowship students recruited. University and College competitions are shown in red and blue respectively. Yellow represents diversity enhancement-specific competitions, with the brighter yellow representing University resources and the darker representing College.



The ENRGP invests considerable time and resources in selecting students for these competitions and in preparing detailed and competitive nomination packets. This investment has resulted in substantial success. The efforts of our program, coupled with the excellent recruiting efforts of our faculty, has resulted in an increase in our nomination cap to university competitions (number of nominations permitted by program, based on previous success) from 7 in 2014 to a program record 18 nomination slots in 2020 (with 12 years of fellowship support awarded). To meet our goals in enhancing the diversity of our graduate program, we have also increasingly emphasized recruiting high quality candidates for our university Graduate Enrichment Fellowship program resulting in both an increase in nominations (5 in 2014 and 17 in 2020) and awards (3 in 2014 and 8 in 2020) to this competition as well. During this time, we have also improved our ability to successfully recruit fellowship awardees to enroll in our program; in 2014 one-third of our fellowship awardees enrolled while in 2020, more than three-fourths accepted admission. Our success in these competitions regularly results in total awards of more than $600,000 per year to support our graduate students.

We do have some concerns about our ability to achieve similar outcomes in these competitions moving forward as changing criteria and priorities in both the College and University award decision making process are a challenge to sustain this success. In particular, changes in college fellowship policies have led to a dramatic decline in both nomination opportunities and awards for SENR students over the last six years.

Research grants, workshop and conference support

Many of our graduate students regularly apply to a range of funding competitions to support their research. A substantial number of funding opportunities are regularly available internally within Ohio State. Most pertinently the CFAES Internal Grant Program provides competitively-awarded grants to support graduate student research. Presently little data is centrally- collated by the Program on the numbers of applications and success rates.

The ENRGP has prioritized providing some support to graduate students to attend and/or present at workshops, symposia and academic conferences. The maximum amount that can be requested in any one academic year has varied over time according to student numbers, anticipated demand and the ENRGP budget allocation. Presently students may request up to $600 each academic year. In FYs 2016-2019 the School typically dispersed 50-60 awards with a total value of around $45k/year

Graduate student advising

Advising in MS and PhD program: The small size of the ENRGP core curriculum means that student advisor(s) and advisory committees play a significant role in identifying and providing students' academic and professional training needs. Key professional skills including scientific writing, presentational skills and career development planning are currently largely left to the discretion of the advisor and student's committee. Individual faculty have considerable flexibility in the organization of their "lab" community and the extent and manner in which they provide individual and communal advising and mentoring support.

Advising within the MENR program: The MENR Director advises MENR and EA Graduate Certificate Program students from initial recruitment, including non-degree coursework prior, to beginning the program and career placement and advancement. Advising covers all aspects of the graduate program experience: selection of courses, seminar events, internship experiences, networking opportunities, career development, and securing employment.

Graduate Program Coordinator (GPC) role: The Graduate Program Coordinator provides general academic advising to graduate students affiliated with SENR by providing information on program and Graduate School requirements. The GPC also monitors and advises students on degree progress pertaining to the completion of program milestones (documented through forms signed by students' committee members) and steps to successfully apply for graduation. Another academic services staff provides basic academic advising to MENR students on course selection and advises certificate and graduate minor students on curricular requirements

GradRoots is the official graduate student organization of the School of Environment & Natural Resources at The Ohio State University. GradRoots serves the SENR graduate student body by advocating for their needs, informing them of School and University policies and resources, providing academic and professional development opportunities, and building a sense of community within the School. GradRoots also manages a mini-grant competition which is financed through SENR development funds. Total funding available to GradRoots is around $2,500 annually.

Graduate student placement

Data from the Ohio State Alumni Insight program is used to track the placement of PhD graduates. Currently we have limited data tracking outcomes and placements for our MS and MENR students, though advisors report most of their graduates have been able to find employment or have moved on to further research study. For PhD alumni employment data is

available for 94 of 114 alumni who completed the ENR, Natural Resources (forerunner of the ENR degree), Soil Science and Rural Sociology programs between 2005 and 2020. Of these 68% were in academic positions, 15% were with state or federal agricultural or environmental agencies, 9% were with non-profit organizations (e.g. Ducks Unlimited, Nuttall Ornithological Club), 6% with for-profit employers (e.g. Ernst & Young), and 2% were with unclassified organizations or self-employed. Approximately 71% of these alumni were employed within the United States with by far the largest number (23) working in Ohio). Salaries were available for 54 alumni and ranged between $60k and $150k with a mode of $90k.

Key Issues

1. Provide quality offerings while managing growth student growth

The rapidly growing total student population in SENR creates some logistical and pedagogical challenges including: access to classrooms and laboratory space of sufficient size; mixed graduate-undergraduate (i.e. 5000-level) courses being dominated by undergraduates which may detract from the graduate student experience; difficulty in offering highly-specialized courses due to the need to service core courses and respect minimum enrollment caps; a growing administrative load associated with managing the program. Steps taken to address these issues have included net growth in SENR faculty over the reporting period and the hiring of a new academic staff to focus on the MENR and Graduate Certificate program. We will also look to reduce our reliance on combined graduate-undergraduate course offerings where possible.

2. Curriculum Revisions and Improvements

This includes, revising the PhD and MS core curriculum to reflect the need for i) cross-specialization interdisciplinary environmental science training, and ii) improved opportunities for professional skills development. A key component of this will also be to develop fora where students can explore DEI issues. Also, reviewing graduate specializations and associated curriculum and update MENR degree requirements to accommodate individual interest areas while providing core training to meet the demands of current environmental professionals and those looking to transition to environmental careers and increase our capacity to effectively serve more MENR students.

3. Enhance recruitment, support and mentoring or URM graduate students

Multifaceted efforts to increase the pipeline of URM students tracking toward SENR, close scrutiny of admission requirements, increased sensitivity to support and mentoring are all part of actions underway or being considered.

4. Facilitate and enhance support of students from external funding sources

Externally (i.e. grant) funded students currently constitute a relatively small proportion of our population (average over last four semesters = 22%). The ENRGP and SENR need to develop policies that facilitate increasing external support to maintain the resilience, size and quality of our program irrespective of fluctuating income from tuition, and University/College Fellowships.

Section VII: Extension and Outreach Programs

Overview

The School of Environment and Natural Resources provides leadership in life-long educational programs for Ohio citizens and organizations. Extension faculty and staff in the School work in partnership with a diverse range of individuals, communities, businesses, and organizations to promote the conservation and management of our natural resources. Our major collaborations include, but are not limited to, Ohio State University Extension and county-based Extension system, the Ohio Department of Natural Resources, Ohio Environmental Protection Agency, Ohio Department of Agriculture, USDA Natural Resources Conservation Service and Forest Service, and Ohio's Watershed groups.

SENR maintains a core group of outreach-focused tenure-track faculty, and non-tenure track staff members with explicit extension and outreach responsibilities. However, these are complemented by many more faculty and research staff in our School who also work with Extension educators and various stakeholders to translate research, communicate directly with stakeholders, and deliver outreach programs. We have 2.5 extension faculty FTE's, distributed among seven faculty, and six full-time staff (3 MS, 3 PhD). Coordination and leadership of the extension team has been a responsibility of the Associate Director (Columbus) until recently and continues with a dedicated team leader who remains a member of the SENR leadership team.

SENR maintains a comprehensive directory of team members and their expertise, as well as details of active extension and outreach programs.

Signature Extension and Outreach Activities

Environmental Professionals Network (EPN)
The Environmental Professionals Network remains SENR's flagship outreach community. Currently more than 2000 professionals from diverse career and employment sectors plus students and volunteers participate online, posting notices, events, and jobs. Professionals are thus connected in a "community" of people who share their passion for our world and its environment, natural resources, people, and communities -- local to global. The EPN continues monthly networking events (including breakfast meetings) which annually attract hundreds of attendees, and in most years presents a larger signature event with up to 1000 registered attendees. EPN programs are recorded and posted online to reach an even wider audience. The EPN is an important means for SENR faculty, staff and students to engage with external constituents. Feedback shows that many collaborations and partnerships have been created, grants, internships, and jobs gained, and projects initiated and sustained. *epn.osu.edu*

Soil Health Program
The Soil Health program is an outreach effort to educate and engage with stakeholders (farmers, gardeners, homeowners) on holistic management of soils. Soil health integrates soil chemical, biological and physical properties into a single framework. This program provides support for

quantifying soil health and for management practices that foster soil health. The program also engages with growers through on-farm research.

Ohio Woodland, Water & Wildlife Conference

Across the state of Ohio there are numerous individuals charged with managing Ohio's varied natural resources. These individuals are either in charge of land management for metro-parks, city parks, county parks or conservancy districts or are working with landowners who are responsible for managing the resource. Providing opportunities for these land managers and natural resources professionals to improve their knowledge base will allow them to better serve their clientele and be better manage the lands they oversee. To meet these needs, the SENR Extension program now offers an annual conference Ohio Woodland, Water, and Wildlife Conference. The knowledge gained by the attendees can have a large multiplier effect when considering the amount of land resources the attendees have the potential to impact. For example, in one year the conference attendees represented 18 different park districts that had management responsibilities for over 90,000 acres of Ohio's park lands. Conference information is available on the Ohio Woodland Stewards website.

Ohio Certified Volunteer Naturalist Program

The Ohio Certified Volunteer Naturalist (OCVN) program is a research-based scientific training program that emphasizes hands-on natural resource education coupled with community-based volunteer service. OCVN is based upon the very successful OSU Extension Master Gardener The Ohio Certified Volunteer Naturalist (OCVN) program includes a 40-hour education course on Ohio's environment and natural resources and certification after 40 hours of volunteer service in the areas of interpretation and education, citizen science, or program support as well as on-going continuing education. The course is offered in collaboration between staff in the School of Environment and Natural Resources and local OSU Extension county offices, state and local park districts, environmental centers, and arboretum

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Ohio Timber Price Report

Having current data on the forest products market is essential for forest landowners, the industry, policy makers, and forestry professionals. The Ohio Timber Price Report has been an excellent and reliable source of long-term data in Ohio stumpage and saw log prices. Having been in existence since 1960, it is also one of the longest running continuous source of timber price data in the nation.

Ohio Woodland Stewards

Ohio is 30% forested with over 360,000 family forest owners controlling almost 80% of the resource. The Ohio Woodland Stewards program strives to offer these landowners a variety of educational programming options with the goal being to help them be better stewards of the resource they manage. The program offers classes to help landowners with basic introductory management skills (tree id, tree planting, management planning) and then offers additional classes, fact sheets and newsletter articles that help build on those skills for specific management goals and objectives.

Soil-Environment Technology Learning Lab
Wastewater treatment for more than 250,000 homes and business in Ohio is carried out in onsite-wastewater treatment systems, mostly relying on soil-based treatment. SETLL provides a variety of educational programs for onsite wastewater system designers, contractors and regulators. Programs include workshops, educational materials (factsheets and bulletins) a complete hybrid (online and field) course for continuing education, and technology demonstration sites. Research in appropriate systems for Ohio conditions provide science-based solutions for wastewater treatment to contribute to improved water quality and public health in Ohio.

Center for Community and Working Landscapes
Two SENR social scientists based in Wooster have collaborated to conduct applied research and develop extension outputs and programming to help farmers and rural communities address critical socioeconomic and environmental challenges associated with changes in food, agriculture, and working landscapes. The CCWL has conducted statewide surveys of Ohio farm operators, and developed extension resources targeting farm businesses (farm viability, conservation practice use), farm households (health, well-being, and intergenerational transition), and rural community leaders (ag and food-based economic development).

Connections with OSU Extension and External Stakeholders

The Extension team in SENR is quite modest both in terms of staffing and budget, with about 6% of the School's total faculty FTE with formal OSU Extension responsibilities and 6% of its annual budget allocation coming from Extension funds. Further, the Extension capacity is spread thinly across all areas of expertise in the School. For instance, there is one SENR wildlife faculty with Extension responsibilities and one program staff. So while individual faculty and staff are impactful, they must be selective and strategic with their efforts. The School has also adopted a strategy of seeking to weave mission activities together to strengthen the outreach impact. For example, our instructional efforts on the Mansfield campus have yielded outreach opportunities in the area of forestry and subsequently have led to research efforts (forest right of way, maple industry) that feed back into the teaching and outreach mission. Similarly, the EPN signature program is funded primarily through general funds but has become a signature outreach program that engages students in professional development activities and also highlights important research and fosters new collaborations.

Key issues

1. Sustaining formal OSU Extension activities within existing resource constraints

While the School is committed to the application of science and outreach, a growing proportion of this activity is happening outside of traditional extension channels. At the same time, OSU Extension would like to see enhanced connections with academic units such as SENR. While we are able to provide some basic programming, the School has limited capacity to serve or expand its support of OSU Extension.

Section VIII: Infrastructure

SENR's programs and people are divided between two campuses (Columbus and Wooster) and several buildings. There are 34 tenured or tenure track faculty who are located in Columbus and 6 on the Wooster campus. Most faculty, staff and students are housed in Kottman Hall, which is part of the Midwest campus of Ohio State's Columbus campus. In addition to the Kottman Hall office and lab spaces, we also have a modern soil biology and biochemistry laboratory in nearby Parker Hall, and a necropsy lab in Plumb Hall (adjacent to Kottman) in Columbus. There is also a large building (the Heffner Building) with laboratory (aquatic focus), office, storage and conference space at the 21 ha Wilma H. Schiermeier Olentangy River Wetland Research Park on the northern edge of campus. All Wooster faculty are located in Williams Hall, which has both lab and office space, as well as close proximity to extensive agronomic and forest research properties managed by the Ohio Agricultural Experiment Station.

There are research laboratories on both campuses. Collectively, they represent a continuum of somewhat outdated to very modern facilities. As the School has experienced substantial turnover in its faculty ranks over the last 10 years, many of these labs have undergone considerable renovation. There is also laboratory and office space in Parker Hall (Columbus) and the Heffner Building (ORW, Columbus). In Williams Hall the School recently gained occupancy of additional lab space in the building that will be renovated over the next year or two. While the quality of research space has been increased in many labs, as our faculty numbers have grown and funded research grant activity has increased, we have not seen a concomitant overall change in available lab and office space in our core SENR buildings. With anticipated future retirements and/or faculty growth, new lab space is a potentially serious constraint on the Columbus campus, particularly if we replace less active researchers with active young scholars with growing lab and equipment needs. The School has some lab capacity on the Wooster campus, though.

In addition to the ORW, which is directly managed by SENR, there are several other outdoor laboratories/facilities associated with OSU/CFAES that are actively utilized by SENR. These include:

- Waterman Agricultural and Natural Resources Laboratory (which includes a small woodlot, some riparian natural areas and test plot areas)
- The Ohio State Mansfield campus Ecolab, which includes 600 acres of unique forests, pine plantation and wetlands
- Pomerene Forest Laboratory, located in Coshocton County, comprised of 227 acres of land with extensive planting of conifer and hardwood species
- Stone Laboratory, Ohio State's island campus on Lake Erie.

While the ORW has been utilized for research purposes for years, the active and strategic use of the ORW, Mansfield campus and Stone Laboratory facilities for instructional purposes is a more recent phenomenon of the last seven or eight years. As the School seeks to enhance experiential learning opportunities, all of these facilities have provided remarkable outdoor aquatic and terrestrial learning spaces that positively impact students. In addition, substantial extension and outreach programming has been conducted on the Mansfield campus. The School has also been fortunate to have access to a number of sizable development funds that have helped us provide these experiential learning experiences.

Technology linking the Columbus and Wooster campus is constantly evolving. Undergraduate instruction occurs primarily on the Columbus campus, while graduate courses are delivered from both the Columbus and Wooster campuses. There is some video linking of instruction between the two campuses, although the total number of students video linking has varied depending on the number of students resident on the Wooster campus (which has been more modest in recent years). The School has steadily invested in conference room and classroom technology upgrades to improve the quality of connectivity between the campuses (as well as serve students directly in the classroom). Examples of significant investments over the last five years include the creation of a high-quality conference/huddle/collaborative space on the Wooster campus and the development of a second computer lab in Columbus (room 122). The latter space is actively used for GIS instruction and complements the small computer lab space that is used for occasional use by other courses. The computer and classroom enhancements are partially funded through College technology fee funds (received each semester from each undergrad and graduate student). Questions moving forward including examining the amount of computer lab space that is needed and technology needs for hybrid zoom conferencing (where some participants residential and others remote). In the wake of the Covid-19 epidemic, it is unclear what the our future technology needs and norms of behavior will be regarding managing residential (in-person face-to-face) and remote (via zoom or other videoconferencing software) instruction and small group interactions.

Pre-Covid, office space was in critically short supply, especially in Kottman Hall. Steady growth of our graduate programs has outstripped our ability to provide adequate graduate student workspace and there is also growing research staff associated with many research programs in a growth stage. Post-COVID, it appears that patterns of office occupancy may be changing for faculty, staff and students. We see possible opportunities for shared desk assignments for some staff, "hotelling" space assignments for some (no dedicated desk assignment but desk space available as needed), and an overall reduction in the total office space required. It will take some time to sort through this new paradigm, but the need to acquire more office space is less urgent.

Common spaces in Kottman Hall and the Midwest campus have improved in recent years, including a major renovation in Kottman Hall six years ago that improved student gathering space in the building considerably. There has also been the addition of a campus food hub in the nearby Agricultural Administration building. The satellite library in the Agricultural Administration building has also been renovated to improve gathering space. CFAES, though, continues to look at ways to create more gathering spaces and areas for building community on the midwest campus.

Key Issues

1. Space Constraints

Space is particularly limited in Kottman Hall (our main building) where researchers (particularly those hired in the last 6 years) are confronting insufficient lab space and cold storage facilities to support their growing research programs. There are also concerns about the equitable distribution of research facilities and space between older and younger faculty. In response, we have begun a planning process to inventory our use of research space and equipment in order to identify spaces

that could be repurposed to better support research (e.g., moving storage of field equipment and long-term samples off-site). In recent years, SENR has allocated significant internal funds to support renovation of research spaces, purchase shared research equipment, and provide partial salary support to research technicians who can serve multiple PIs. We are also working with the college to help us cover the costs of infrastructure investments that would expand our research footprint. We have also accelerated efforts to manage our existing research spaces more collaboratively and flexibly to accommodate the growth and expansion of research activity associated with grant cycles.

2. Wooster vs. Columbus research opportunities and constraints

While research facilities in Columbus are relatively space-limited, the Wooster campus offers significant opportunities for growth. SENR's faculty in Williams Hall have access to several new labs, offices, and sample storage/processing rooms (due to the relocation of another analytical lab that used to share the building), and there is potential for expanding the size and scope of the research team at that location. Unfortunately, the driving distance (90 minutes) has limited the desire for Columbus-based faculty and students to carry out research in Wooster. Similarly, the Wooster-based research faculty are often challenged to attract and retain graduate students and postdocs to the Wooster campus for a variety of reasons (often having to do with the rural character of the community). The Wooster campus also lacks adequate housing options for short- and medium-term students, postdocs, and visiting scholars. Discussions at the college level to expand on-campus housing in Wooster have accelerated in recent years, but new investment/projects have yet to be implemented.

Section IX: Leadership

The School increasingly relies on several roles to provide critical leadership in various domains of activity. This includes a Director (full-time) and two Associate Directors based in Columbus and Wooster (both part-time). We have recently appointed a third Associate Director that serves as the Chief Diversity Officer and as the Director of the ORWRP. Additionally, the chair of the Graduate Studies and Academic Affairs committees play important leadership roles. And there is an Extension team leader. The leadership handbook for the School, enumerates the leading administrative and faculty leadership roles as well as important committees.

The School's current director has served over eight years and will be stepping back into the faculty ranks at the end of the current academic year. The School is currently preparing to undertake a search for a replacement and as of this writing it is unknown whether the College will authorize an external search or rely on an internal search to fill this position. The Associate Director for Columbus is new to his position, having replaced an Associate Director who had served for five years. This transition was by design to avoid having both a new Director and Associate Director in Columbus become vacant at the same time. The Associate Director for Wooster and the chair of Academic Affairs have been in their positions for several years. The School's Graduate Studies chair is new this year, but has served ably on the GSC for several years. The previous GSC chair now serves as the Associate Director. Our third Associate Director has been the Director of the ORWRP and an Assistant Director of SENR since 2014, but has just begun his role as the Chief Diversity Officer in August 2021.

The School's leadership team is comprised of the Director, Associate Directors, Chairs of Academic Affairs and Graduate Studies, the Extension team leader, the chair of the undergraduate research, honors and scholarship committee, and the School Secretary (a staff position that also serves as the academic program manager for the School). This team is comprised of 6 male faculty, 1 female faculty, and 1 female staff. There is one URM on the team. The leadership team meets monthly during the week prior to a faculty meeting with the goal of helping the Director set an agenda, discuss emerging issues in the School, and help formulate standard operating procedures to help the School function more efficiently.

The School also convenes a monthly administrative team meeting that includes the lead staff for fiscal, HR, communications, undergraduate academics, graduate program, administrative support, the Director, and the Associate Directors. The purpose of this team meeting is to facilitate communication among administrative functions of the School and develop strategies and procedures for grappling with salient issues. Over the last 18 months, many meetings were focused on managing administrative affairs during COVID.

All members of the SENR faculty community are expected to provide service. Nearly all faculty have one major committee assignment (P&T Oversight; Graduate Studies; Academic Affairs, Seminar, Research, etc.). Faculty are elected by their peers to represent each of our major graduate specializations on the Graduate Studies Committee, otherwise the Director works with faculty to identify a service assignment.

The School actively encourages faculty and staff to participate in leadership development programs as available. CFAES regularly conducts a leadership program for staff and faculty and each year several faculty and staff from SENR have participated in this program. There are also leadership programs offering at the University level that SENR faculty have participated in. The School is encouraging of pursuit of these professional development opportunities and the Director regularly visits with faculty and staff about their leadership interest and needs. This includes discussions of academic unit level leadership but also scientific and research leadership.

In terms of internal governance, the School's governance documents have steadily evolved as new issues arise. The pattern of administration has been refined to enhance faculty governance and input and distribute responsibility more broadly among the associate directors as the School's size and scale has grown. Current issues related to governance and promotion and tenure include:

1) For promotion and tenure purposes, better articulation of what is excellence in Extension and what are the criteria for judging this excellence. This need arises, in part, because of the shrinking proportion of faculty in SENR who have Extension appointments and the lack of familiarity of peers to what is excellence in Extension.
2) For both promotion and tenure and governance, new language acknowledging diversity. The School is seeking to provide clear language that allows faculty efforts that enhance diversity to be recognized and evaluated. Also, within our governance structures, explicit assignments of responsibility for enhancing diversity are being considered.

Finally, we do have data to help judge the effectiveness of SENR leadership related to vision, managing operations, and facilitating collaboration. The best data points on this are somewhat outdated from a periodic survey of Ohio State campus culture. Last conducted in 2017, data regarding the faculty's view of the School's leadership and culture were generally quite positive (see the 2017 culture survey). In fact a consistent strength of the School since the first survey in 2011 has been the relatively high marks given to the School leadership and community. COVID is an intervening factor that may have changed this pattern, but the SENR leadership team generally perceives a healthy and positive community culture and regard for leadership.

Key issues

1. Managing the School's Scale effectively

A theme of the School over the last 10 years has been growth. Growth in faculty, growth in undergraduate enrollment, growth in professional programming, etc. At the same time, the School's reputation and responsibility as a leader in the State of Ohio has grown. As a result, the School is constantly grappling with how to more effectively manage its activities.

2. Managing Leadership transitions effectively

As the School's demographics have shifted from large numbers of assistant professors to more advanced rank faculty, it has expanded the pool of faculty available to provide more depth of leadership. At the same time, quality leadership is essential to managing the School's size and

momentum. The School is increasingly attentive to leadership development and transitions, with the impending appointment of a new Director in the spring being a major change for which to prepare. Lastly, we recognize that we need to be attentive to developing and fostering leaders from diverse backgrounds, including women and racial and ethnic minorities.