School of Natural Resources
University of Missouri

STRATEGIC PLAN
2018-2019
OUR VISION

To be a leading institution providing solutions for complex local, national and global issues related to the management of natural resources through trans-disciplinary collaboration while cultivating a diverse community of preeminent scientists and educators.

OUR MISSION

Provide science-based knowledge for integrated sustainable management of natural resources through leadership in basic and applied research, education and outreach for the benefit of society.
TABLE OF CONTENTS

Message from the Director ............................................................................................................. 1

Section I. Grand Challenges and State and National Trends in Natural Resources .......... 2

Section II. Brief History of SNR .................................................................................................... 3

Section III. SNR Strength, Weakness, Opportunities and Threats Analysis ................. 6

Section IV. Phase 1-SNR Restructuring (2015-2017) ............................................................... 7

Restructuring of Undergraduate Programs .................................................................................. 9

Restructuring of Graduate Programs ......................................................................................... 9

Section V. Phase 2-The Visioning Process and the Way Forward (2017-2018) .................. 11

Section VI. Metrics to Measure Success (Versus 2016 baseline) ........................................ 16

APPENDIX A. Timeline of the SNR Restructuring and Strategic Planning Process ....... 18

APPENDIX B. New and Former Degree Programs ................................................................. 20

APPENDIX C. Specific Timeline for Undergraduate Degree Restructuring ....................... 21

APPENDIX D. Faculty Hiring Priority ....................................................................................... 22

APPENDIX E. Organizational Chart .......................................................................................... 25

Photos provided by CAFNR Flickr. Editor: Gina Gerstenecker.
MESSAGE FROM THE DIRECTOR

The School of Natural Resources is one of the most comprehensive schools of its kind in the country. Our undergraduate degrees train students in Environmental Science; Natural Resource Science & Management; and Parks, Recreation & Sport. Our graduate students can specialize in Agroforestry, Fisheries & Wildlife Sciences; Forestry; Human Dimensions of Natural Resources; Parks, Recreation & Tourism; Soil, Environmental, & Atmospheric Sciences; and Water Resources. Our renowned science and transformative ideas have helped integrate and apply new knowledge and management strategies to promote economic, environmental, and social vitality in Missouri and elsewhere in the country and the world. We remain committed to educating and training students, professionals, scientists, leaders and the general public who are empowered to conserve and manage the social-ecological system within which we live.

Our School has undergone a restructuring process (referred to as Phase 1 in this document) that began in 2015 and culminated in 2017. The second phase of the restructuring, which we called the “Visioning Process,” was a year-long process (April 2017 to April 2018) that involved faculty, staff, students and external stakeholders to chart a future course of action that positions SNR as one of the best natural resources programs in the country. We have identified our strengths, weaknesses, opportunities and threats. This document contains the nine goals and related action items, the process used to identify these items, and metrics that will be employed to measure success.

We are committed to capitalizing on our strengths, but open to exploring new opportunities in research, education, extension and engagement, and economic development to make a difference locally, regionally and globally. We look forward to moving our School of Natural Resources forward, together and through this shared strategic plan.

Shibu Jose
Professor and Director
September 1, 2018
SECTION I

Grand Challenges in Natural Resources and State and National Trends

The “Science, Education and Outreach Road Map for Natural Resources - 2014” published by the American Public and Land-grant Universities (APLU) has identified the following as the six grand challenge areas of the 21st century that need immediate attention:

• Sustainable management of social-ecological systems and landscapes for goods and services,
• Protecting and conserving watersheds for biodiversity and water resources,
• Impacts of climate change on our environment and society,
• Environmentally responsible agriculture,
• Alternative renewable energy sources, and
• Natural resources education

The School of Natural Resources, a premier institution with world-class faculty and outstanding teaching, research and extension facilities and a strong alumni and stakeholder base, is well positioned to transform its learning, discovery and engagement domains to address these grand challenge areas and more (Figure 1). State and national trends in natural resources indicate a strong job market, but not enough graduates produced to undertake the challenging careers in natural resource management. A few available statistics are provided below:

• By 2030, the world will need 70% more food, 50% for more energy and 50% more water exerting immense pressure on natural ecosystems, both terrestrial and aquatic
• Survival of human civilization depends on “life supporting” goods and services that are provided by healthy, coupled human and natural resource systems
• According to the Bureau of Labor Statistics, employment of conservation scientists and foresters is projected to grow 6% from 2016 to 2026 (as fast as average), environmental scientist employment by 11% (faster than average); atmospheric scientist jobs by 12% (faster than average); and recreation workers positions by 9% (as fast as average);
• Enrollment in natural resources programs across the US has remained steady in the recent past, but has declined compared to numbers from the 1970s and 80s
• The forest products industry contributes over $8B to Missouri economy, including 99,000 jobs and a $507M contribution to state and local taxes
• The state parks system contributes $1.02B in expenditure, $307M in payroll, 14,535 jobs and $123M in taxes
• Total annual economic impact of hunting in Missouri was estimated to be nearly $900M
Figure 1. Six grand challenges of the 21st century as identified by APLU (2014) and how SNR is poised to address these challenges through the three core areas of its research program.
SECTION II

Brief History of SNR

SNR was formed by merging multiple departments over time. It was the School of Forestry, then the School of Forestry, Fisheries and Wildlife and then in 1989 was renamed to the School of Natural Resources. The dates these programs were established and the buildings they were originally housed in are listed below.

- The Department of Soils was formed at MU in 1914 and joined SNR in 1990. (Mumford Hall)
- The Fisheries and Wildlife program, which was established in 1937 in the College of Arts and Sciences, became part of the School of Forestry in 1973. (Stephens Hall)
- The Department of Forestry was established at MU in 1947 and was elevated to the status of School of Forestry in 1957. (Agriculture Building)
- A Department of Atmospheric Science was formed in 1967 and joined SNR in 1991. (Gentry Hall)
- The Department of Parks, Recreation and Tourism was formed in 1965 and joined SNR in 1988. (Clark Hall)
- All departments moved into the new SNR building, the Anheuser Busch Natural Resources Building (ABNR), in 1998
- Sport management was added as part of the Parks, Recreation and Tourism degree in Fall 2010
- Departmental structure was eliminated in 2016 by making the School a single administrative division

The ABNR Building was dedicated in September 1998. The building is a 100,000 square foot facility on the MU campus, devoted exclusively to addressing natural resource issues in Missouri, the nation and the world. Containing laboratories equipped with the latest technology for research in natural resource fields, computer-equipped teaching laboratories and smart-board enabled classrooms, the building is a state-of-the-art education facility. SNR is noted for small classes, hands-on student research opportunities, active student organizations, high-tech classrooms, personalized advising and strong professional orientation.

The three degree focal areas integrate land, animal, atmospheric and water resources with social sciences. Deliberate linkage between natural and human systems better understanding of interactions between natural resources and society, which promotes sustainable management and conservation of natural resources for future generations:

- Environmental Sciences
- Natural Resource Science and Management
- Parks, Recreation and Sport
Research is grouped into three broad thematic areas, (1) Terrestrial ecosystems, (2) Water Resources, and (3) Environment and Society and addresses all the grand challenges identified earlier in Figure 1.

SNR is proud to partner on initiatives with many state and federal agencies, including the Missouri Departments of Conservation and Natural Resources, USDA Natural Resources Conservation Service, USDA Agricultural Research Services and the U.S. Geological Survey. The school houses a cooperative unit of the U.S. Forest Service, the U.S. Geological Survey and the US National Park Service (Cooperative Ecosystem Studies Unit).

Hands-on laboratories in the school include vast outdoor research centers dedicated to agroforestry, natural resource management, forest management and wildlife management. SNR is also home to unique, integrated research initiatives, such as:

- Center for Agroforestry
- Center for Watershed Management and Water Quality
- Missouri Climate Center
- Missouri Tree-Ring Laboratory
- Soil Health Assessment Center
- Sanborn Field
- The Duley-Miller Erosion Plots

Today SNR enjoys the status as one of the most comprehensive schools of natural resources in the country (Figure 2). All of the undergraduate and graduate programs are in the top 10% nationally.
### SECTION III
**SNR Strength, Weakness, Opportunities and Threats (SWOT) Analysis**

<table>
<thead>
<tr>
<th>✖️ Strengths</th>
<th>✖️ Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revised and renamed undergraduate degrees that are top ranked in the nation</td>
<td>Lacks sufficient number of faculty and expertise to offer curricula and expand research portfolio (e.g., soil/environmental microbiology, environmental pedology, atmospheric science, tourism, ecology, fisheries biology and management)</td>
</tr>
<tr>
<td>Improved and enhanced undergraduate and graduate curricula</td>
<td>Lacks TT faculty lines in certain areas (e.g., Sport Management)</td>
</tr>
<tr>
<td>Strong undergraduate and graduate enrollment in all degree programs</td>
<td>Limited Ethnic/Racial diversity</td>
</tr>
<tr>
<td>Comprehensive natural resources research program that covers the atmosphere, hydrosphere, geosphere and biosphere with special attention to social-ecological interactions</td>
<td>Lacks freshmen scholarship to further attract high-ability and underrepresented undergraduate students</td>
</tr>
<tr>
<td>SNR leads MU natural resources Extension</td>
<td>Lacks field positions to offer strong Extension programs to citizens of the state</td>
</tr>
<tr>
<td>Faculty with international engagement in teaching and research</td>
<td>Limited international undergraduate enrollment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>✖️ Opportunities</th>
<th>✖️ Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential to increase transfer students, particularly students from community colleges</td>
<td>Addition of forestry, wildlife and soils faculty at other universities in Missouri</td>
</tr>
<tr>
<td>Comprehensive nature of SNR should lend itself to larger collaborative grants</td>
<td>Other universities within Missouri and surrounding states may engage in opportunistic research endeavors if talents within SNR do not seek such collaborative opportunities</td>
</tr>
<tr>
<td>Uniquely positioned to offer multiple online graduate certificate and graduate emphasis to help working professionals</td>
<td>Salary structure is non-competitive so that we may lose faculty and staff expertise</td>
</tr>
<tr>
<td>Partnership opportunities with state and federal agencies and private sector to enhance endowed faculty positions and for assistantships and scholarships</td>
<td>Limited general revenue to support existing and future faculty lines</td>
</tr>
<tr>
<td>Potential to further internationalize curriculum through new study abroad programs and international research projects</td>
<td>Failure to enhance faculty and staff diversity could result in few individuals from underrepresented groups attending SNR for their education</td>
</tr>
<tr>
<td>Opportunity to recruit faculty, staff and students to enhance diversity</td>
<td>Lack of self-promotion could result in limited stakeholder and citizen support of SNR</td>
</tr>
<tr>
<td>Opportunity to further utilize CAFNR Communications to further tell our story and demonstrate relevance to Missouri citizens and the nation</td>
<td></td>
</tr>
</tbody>
</table>


SECTION IV. PHASE I.
SNR Restructuring (2015-17)

The strategic planning process initiated in September 2015 resulted in a major restructuring of the School and its degree programs (See Appendix A for a timeline). The four departments within the School (Fisheries and Wildlife Sciences; Forestry; Soil, Environmental and Atmospheric Sciences; Parks, Recreation and Tourism) were merged to form one School without departmental boundaries. Instead of organization by departmental names, faculty regrouped into three major focal areas for research, (1) Water Resources, (2) Terrestrial Ecosystems, and (3) Environment and Society (Figure 3). Several emerging cross-cutting research areas were also identified as priority for SNR. Four distinct degrees offered by the four departments were restructured to form three new degrees which were approved by the Missouri Department of Higher Education in early 2017 (Table 1). The new degree programs, B.S. Environmental Sciences, B.S. Natural Resource Science and Management and B.S. Parks, Recreation and Sport, began admitting students in Fall 2017.

Restructuring of Research Areas

Focal Areas: The three focal areas encompass land, animal, atmospheric and water resources with direct connection to social sciences. Deliberate linkage between natural and human systems facilitate and better our understanding of interactions between natural resources and society, which in turn, will promote sustainable management and conservation of natural re-
sources for future generations. The intersection of these three focal areas is intentional and represents the integrated and interdisciplinary nature of science within SNR that strengthens our role and relevance to CAFNR, MU, our students and external stakeholders.

Environment and Society: This area considers the integration of natural and social sciences with emphasis on understanding human interactions with the environment. The broad and interdisciplinary nature of this research facilitates application of our studies and incorporates elements of behavioral and social sciences.

Terrestrial Ecosystems: The Terrestrial Ecosystems area focuses on the ecology, conservation and management of land resources including flora, fauna and soils within and among diverse biomes. Research in this area addresses a variety of environments such as urban systems, managed forests, wildlands and agricultural areas.

Water Resources: The Water Resources focus area considers elements from multiple fields such as study of aquatic organisms (from bacteria to fish), climate events and meteorology, law and policy, and nutrient management in freshwater systems, throughout diverse settings ranging from urban environments to natural areas.

Emerging Research Areas: The emerging research areas are derived from ongoing and urgent societal issues that apply to natural resources and natural resource management. Salient issues include human health, water resource quantity and quality, climate change, sustainability, biodiversity loss and extinction, and integrating science and human behavior into policy and decision-making. Each area encompasses all three focal areas and provides synergistic opportunities for existing and future research and academic programs. In particular, the emerging research areas may be academic topics for new degree emphasis areas or minors.

Health and Environment: Strong links exist between human health, domestic and wild animal health, plant and forest health, and environmental integrity. These links between health and the environment are mediated by natural resource availability and affect diverse quality of life issues such as food and water quality, recreation and tourism, and societal norms and traditions. Research in this field reflects the increasing need to consider the diverse linkages of health and environmental quality when addressing natural resource use and its effects on communities.

Climate Science: Climate-related risks to human health, agriculture, natural resources and ecosystems are intensifying due to climate change. Transdisciplinary research in this area examines the current and anticipated climate states and pursues critical synergies linked to the impacts of climate change on a sustainable environment, including adequate water resources; disturbances (e.g., drought, flood, fire); sustainable and resilient populations and ecosystems; improved soil health; and renewable food, material, and energy supplies.

Sustainability Science: Interactions between natural resources and social systems create challenges for sustainable resource use and management. Research in this field helps meet the needs for natural resources of present and future generations while addressing poverty and conserving vital ecosystem services.

Administration and Management: Research exploring leadership, decision making, creation
and implementation of policies, and conflict resolution enhances the use and benefits derived from natural resources. This research examines how individuals, organizations and governments may benefit from improved efficiency and effectiveness, as well as the wide-ranging implications of natural resource management and administration for diverse communities and stakeholders.

Restructuring of Undergraduate Programs

As noted previously, the School spent a large portion of AY2015-16 evaluating and redesigning undergraduate degree programs to improve instruction. The faculty proposed and had approved by campus and the Missouri Department of Higher Education the following broad changes: (1) combining of the degrees Fisheries and Wildlife (BSFW) and Forestry (BSF) into one B.S. degree titled Natural Resource Science and Management with new emphasis areas and emphasis areas reflecting the former degree programs; (2) retitling of the B.S. Soil, Environmental and Atmospheric Sciences degree to Environmental Sciences with new emphasis areas; and (3) retitling of the B.S. Parks, Recreation and Tourism degree to Parks, Recreation and Sport with an alteration to one emphasis area. During the degree development process, key competencies for students completing the degree were developed. A general comparison of the new and former degrees can be found in Appendix B. The changes strengthen SNR degree programs, add new emphasis area offerings, generally reduce credit hours required to complete a degree, enhance marketability of the degrees to potential students, and more accurately reflect student interest and student body composition in one of the degrees (i.e., Parks, Recreation and Sport).

The process of evaluating and revising the degrees was faculty-driven. A committee titled the SNR Undergraduate Degree Restructuring Committee, composed of nine faculty and one professional advisor, was formed by former Interim SNR Director Josh Millspaugh in January 2016 to evaluate current SNR degree offerings. Details of faculty voting and School-wide meetings during this process are described in Appendix C.

Final approval of all three degrees was obtained by MDHE in the Spring 2017 semester, and all students attending SNR in Fall 2017 started in the new degree programs. Continuing students in the former degree programs were notified of the opportunity to transition to the new degree programs, and ~45% of continuing students opted to participate in the new degree programs.

Restructuring of Graduate Programs

The School offered MS and PhD programs through its departments until 2013. Efforts to consolidate graduate degree programs began in 2012 and resulted in a school-wide MS and PhD in Natural Resources with appropriate emphasis areas. The current graduate degree structure (effective as of 2013) is described on the following page.
Current Graduate Degree Programs

PhD in Natural Resources
Under the Natural Resources Ph.D. degree students can choose to focus in one of five Emphasis Areas (Fisheries & Wildlife Sciences, Forestry, Human Dimensions of Natural Resources, Soil, Environmental, & Atmospheric Sciences, and Water Resources). Students are admitted based on evaluation of the faculty affiliated with each Emphasis Area. Curricula are individually tailored based on the students’ background, career aspirations, research interests and are approved by the student’s graduate committee. Students, in collaboration with their major advisor, develop a program of study (curriculum) that identifies coursework to be completed to partially fulfill the requirements for the Ph.D. degree. The Ph.D. is a research-focused degree and prepares graduates for careers within their respective disciplines and sub-disciplines related to research, teaching and administration in colleges and universities, government agencies, non-government organizations, and industry. Through rigorous course work and research the learning outcomes of the Natural Resources Ph.D. degree include providing education that students will need to proficiently address current and future complex natural resources issues. Therefore, Ph.D. programs in the School of Natural Resources require students to develop advanced technical skills, process skills (e.g., writing) and research capabilities required to work in a variety of natural resource-related occupations. All Ph.D. students are required to complete an original research dissertation. The dissertation topic (and general methods) are approved by the student’s graduate committee. The completed dissertation is then defended in an oral exam administered by that committee.

MS in Natural Resources
Students pursuing the M.S. degree in Natural Resources choose to focus in one of seven Emphasis Areas (Agroforestry, Fisheries & Wildlife Sciences; Forestry; Human Dimensions of Natural Resources; Parks, Recreation & Tourism; Soil, Environmental, & Atmospheric Sciences; and Water Resources). Non-thesis options exist in the Agroforestry, Parks, Recreation & Tourism, and Forestry. Students are admitted based on evaluation of the faculty affiliated with each Emphasis Area. In most cases, thesis-seeking students in all Emphasis Areas follow individually-tailored curricula based on the students background, career aspirations, research interests, and approved by the student’s graduate committee. Students, in collaboration with their major advisor, develop a program of study (curriculum) that identifies coursework to be completed to earn the M.S. degree. The program of study must be approved by the graduate committee. The M.S. (thesis degree) is intended to prepare graduates for: future graduate study (e.g., Ph.D., Law), careers as professionals with governmental (local, state, federal) agencies, private sector, non-government organizations, and a variety of other natural resource employment opportunities. All M.S. students are required to complete an original research thesis or professional project. The completed thesis is then defended in an oral exam administered by that committee.
SECTION V. PHASE 2.
The Visioning Process and the Way Forward (2017-18)

Following the restructuring, SNR faculty, staff, students and stakeholders identified the following goals, objectives and action steps as a way forward for the next five years.

Goals and Objectives (for the next 5 years, each year comparing to the baseline year of 2016):

1. Achieve national and international recognition for leadership and science.
   Shibu Jose is the Lead Champion working with all of SNR

   Objectives:
   1. SNR ranked in top 5 similar programs/units across the country
   2. Increase faculty honors and scholarly awards by 10%
   3. Increase student honors and scholarly awards by 10%
   4. Increase faculty lines in emerging research areas or areas of high enrollment by two to five lines (See Appendix C for faculty line priorities).
   5. Increase staff lines by 10% (about two lines)
   6. Increase international collaborations and partnerships by 25%
   7. Increase research effort in areas of high enrollment (e.g. sport management).

   Action Steps:
   1. Create an awards committee to promote faculty, staff and student nominations
   2. Encourage engagement in research centers
   3. Strengthen and develop new or emerging research.
   4. Promote and strengthen current and new international collaborations and partnerships (e.g., formal MOUs, study abroad, exchange programs, conferences, host symposia)
   5. Create professional development opportunities for faculty and staff

2. Increase research productivity to enhance areas of excellence
   Shibu Jose will be the Lead Champion working with all of SNR

   Objectives:
   1. Increase competitive grant applications by 15%
   2. Increase competitive grant awards by 10%
   3. Increase grant expenditures by 20%
   4. Increase publications by 10%
   5. Increase publication citations by 10%

   Action Steps:
   1. Promote multidisciplinary/transdisciplinary and multi-institutional collaboration for grant applications (e.g., partner with other disciplines outside our traditional focus)
2. Facilitate grant writing (e.g., utilize grant writer support; faculty/graduate grant writing training) and identify opportunities (e.g., grant opportunity clearing house, networking, different funding sources, make use of Cooperative Agreements)

3. Create and strengthen research centers (e.g., water resources, climate, human dimensions, innovation and economic development), develop programs of distinction and transformational interdisciplinary big ideas and make strategic hires in these areas

4. Provide recognition and incentives to pursue large grants (e.g., grant matching funds, faculty release time to pursue grants).

3. Strengthen undergraduate education
Pat Market, Charlie Nilon, Sonja Wilhelm Stanis, Keith Goyne (Lead Champion)

Objectives:
1. Each degree program ranked in top 10 programs across the country
2. Job/professional/graduate school placement rate of 85% or above across all programs
3. Increase enrollment within SNR by 10%
4. Increase international student enrollment by 100%
5. Maintain retention rate of 85% or higher
6. Increase graduation rate by 5%
7. Increase student scholarship and fellowship awards by 10%
8. Increase student research presentations by 50%
9. Students satisfaction at 90% or higher across all programs

Action Steps:
1. Increase student opportunities (research, REU, internships, experiential learning)
2. Maintain high quality teaching and advising through reduced student-faculty ratio and implementation of periodic peer reviews of teaching for all faculty.
3. Maintain professional accreditation
4. Conduct periodic program reviews to ensure continued provision of attractive and relevant courses, degrees and skills
5. Emphasize recruitment (specialized recruitment events, advertisements, engage youth programs, targeted recruitment for diversity and state enrollment, marketing, improve communication with relevant campus programs, social media, maintain attractive website and update with staff contacts, engage alumni)
6. Special emphasis in minority enrollment and participation
7. Increase student diversity (in particular underrepresented groups)
8. Develop scholarships (in particular for incoming students)
9. Expand degree program opportunities (online degree program, dual degrees with other countries, integrated BS/MS program, partnership with other programs for new emphasis areas, professional certificates).
10. Increase professional development workshops and improve dissemination of employment and internship opportunities for students

4. Strengthen graduate education (MS, PhD, post docs)
Steve Anderson, Mike Gold, Matt Gompper, Charlie Nilon, Sonja Wilhelm Stanis, Rebecca North, Hong He (Lead Champion)
Objectives:
1. Academic placement and employment rate of 90% across all programs
2. Increase graduate program enrollment by 25%
3. Increase online degree offerings by 25%
4. Increase graduate student scholarship and fellowship awards by 10%
5. Increase graduate student publications by 25%
6. Increase graduate student conference presentations by 10%

Action Steps:
1. Create new innovative degrees and programs (e.g., BS/MS degree plans, joint professional programs, creative online degrees)
2. Provide additional graduate funding (e.g., teaching assistantships, named fellowships, endowed research assistantships, postdoc opportunities)
3. Increase opportunities for engagement in conferences (e.g., SNR research day, discipline conferences) and professional societies
4. Improve graduate website (updated faculty research, advertise success of past graduate students, advertise available stipends/fellowships/travel awards in SNR and MU)
5. Increase student diversity (in particular underrepresented groups)
6. Increase marketing and recruitment of graduate students (graduate recruitment days with funding, partner with other programs across MU for visitation days, conference booths, ads, organizations that target diverse students [SACNAS, McNair], slides/sessions to target current undergraduates).

5. Enhance the effectiveness of SNR outreach, extension and engagement efforts

Bob Pierce, Pat Guinan, Mike Gold, Mark Morgan, Hank Stelzer (Lead Champion)

Objectives:
1. Increase collaboration with SNR research faculty
2. Increase the number of webinars, workshops and field days offered by 10%
3. Increase the revenue generated from webinars, workshops, field days and website document downloads by 10%
4. Develop a system to assess needs of Missouri landowners and measure impact of delivered programs

Action Steps:
1. Encourage SNR faculty submitting research proposals to include Extension at the beginning of preparing the proposal to identify the project’s broader impacts and ways to measure them.
2. Encourage SNR faculty to share with SNR Extension pertinent research findings that either: (1) landowners can put into practice immediately; or (2) explain how their basic research lays the groundwork for potential future applications in the field.
3. Work with Extension County Program Directors to conduct a needs assessment of county landowners and adjust SNR Extension programming accordingly.
4. SNR Extension to follow up with six-month, post-workshop stakeholder surveys to measure impact.
5. Work with Extension Communications and Marketing to develop new, revenue-generating, online products.
6. Encourage SNR Extension faculty to collaborate with partners outside of SNR

6. Enhance diversity and inclusion of SNR personnel
Patti Quackenbush, Rebecca North, Dana Massengale, Christine Li (Lead Champion), Charlie Nilon (Lead Champion)

Objectives:
1. Increase student diversity (in particular underrepresented groups) by 25%
2. Increase faculty diversity (in particular underrepresented groups) by 25%
3. Increase staff diversity (in particular underrepresented groups) by 25%
4. Increase perception of inclusion across faculty, staff and students by 10%

Action Steps:
1. Develop a “Lunch and Learn” series with a diversity of topics.
2. Integrate efforts with campus initiatives.
3. Support external diversity opportunities.
4. Create committee to investigate where and how to recruit
5. Develop a definition for inclusion
6. Research best practices from peer institutions.

7. Enhance financial resources for SNR
Anita Carter (Lead Champion), Shibu Jose (Lead Champion)

Objectives:
1. Increase endowments by 100% or more.
2. Increase alternative sources of funding for staff, technology, research/teaching support by 100%
3. Increase entrepreneurial activity by 25%
4. Increase extension revenue generation by 50%

Action Steps:
1. Strengthen community and alumni relationships and support (encourage faculty to help identify networks/relationships with adjuncts)
2. Engage CAFNR Office of Advancement (partner, information on process, promote what we are doing)
3. Disseminate information about making donations (e.g., website that allows people to donate to SNR/faculty programs)
4. Develop list of needs to explain the value of donations and provide thank you with how donations were used.
5. Encourage sponsorships and naming rights (endowed positions, etc.)
6. Engage in alternative funding sources: crowdfunding; technology/social media; citizen science; innovation and intellectual property development through patents/trademarks; infrastructure grants/funds
7. Increase events, marketing, visibility (booths at professional society, etc.)

8. Increase visibility of SNR’s relevance, impact, and value
Laura Hertel, Cindy Greenwood, Jason Young, Mike Stambaugh, Robin Rotman (Lead Champion)
Objectives:
1. Increase media coverage by 25%
2. Increase public awareness of excellence
3. Increase internal awareness of excellence

Action Steps:
1. Promote activities to promote the relevance and recognition of SNR strengths across all areas (e.g., SNR research day, lecture series/seminar, brown bag lunch for internal communication, informal monthly coffee/bagels, staff/faculty tours of labs/field work). Note the value of seminars presented so that staff and faculty/students from other areas understand for wider audience and value.
2. Staff member partially dedicated to marketing/promotion and engage with CAFNR staff.
3. Enhance social media presence (Facebook, twitter, Instagram), using student intern/work study help.
4. Update weekly reader communications with rotating spotlight on faculty/staff/mid-career alums each month.
5. Establish SNR award ceremony (faculty, staff, students, alumni)
6. Encourage faculty online academic profiles (e.g., Research Gate, NIH profile, linked in)
7. SNR website updates (list staff, place to donate, staff webpages, communication/marketing, develop attractive degree program websites).
8. Work with CAFNR and MU News Bureaus to broadly promote SNR stories
9. Evaluate and highlight economic value to state of MO
10. Engage with local community events that relate to Natural Resources (e.g. Earth Day, South Farm Field Day, Parents Weekend).
11. Utilize alumni in outreach information efforts.

9. Strengthen research and teaching centers and facilities
Ben Knapp, Neil Fox, Dave Larson, Keith Goyne, Jennifer Upah, Greg Rotert (Lead Champion)

Objectives:
1. Increase activity/use of research centers and facilities by 50%
2. Increase public awareness of the research centers and facilities
3. Upgrade technology for teaching facilities

Action Steps:
1. Create/improve infrastructure at sites
2. Improve classroom and lab facilities (more smart boards, smart board use training, TVs, computer/tablets in 114, 109, 115, 116, 121, 39, iPad tablets, etc.)
3. SNR training to help students/faculty/staff to adapt to and instruct on new technology.
4. Develop database and calendar detailing what technological resources are available and activities are taking place at our (SNR/CAFNR/Extension) research centers and the ABNR building.
5. Explore opportunities to increase laboratory/office space and more effectively use space overall.
6. Incentivize use of our research facilities in teaching
7. Explore opportunities to increase laboratory/office space and more effectively use space overall.
### SECTION VI

**Metrics to Measure Success (vs. 2016 baseline)**

*Year by Year increases given for goals that might be linear in their trend. Goals that might progress stepwise provided in non-regular increments.*

<table>
<thead>
<tr>
<th>Goal</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goal 1 National and International Recognition</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase Faculty Honors / Awards</td>
<td>At least one faculty member per year (University, National, International) is honored. Nominate at least two faculty</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Honors</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Faculty Lines</td>
<td>Add one line</td>
<td>Add one line</td>
<td>Add one line</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase Staff Lines</td>
<td>Add one line</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Add an average of one per year school wide

| Goal 2 Research Productivity | | | | | |
|----------------------------|--------|--------|--------|--------|
| Increase Grant Applications | 2% | 2% | 2% | 2% | 2% |
| Increase Grant Awards | 2% | 2% | 2% | 2% | 2% |
| Increase Grant Expenditures | 2% | 2% | 2% | 2% | 2% |
| Increase Publications | 2% | 2% | 2% | 2% | 2% |
| Increase Citations | 3% | 3% | 3% | 3% | 3% |

<p>| Goal 3 Strengthen Undergraduate Education | 85% over all programs | | | | |
|------------------------------------------|----------------------|--------|--------|--------|
| UG Job / School Placement Rate | | | | | |
| Increase Enrollment | 2% | 2% | 2% | 2% | 2% |
| International Enrollment | 20% | 20% | 20% | 20% | 20% |
| Increase Graduation Rate | 1% | 1% | 1% | 1% | 1% |
| Increase Student Scholarship | 2% | 2% | 2% | 2% | 2% |
| Increase Student Research Presentations | 10% | 10% | 10% | 10% | 10% |
| GRD Employment | 90% over all programs | | | | |
| Increase Enrollment | 5% | 5% | 5% | 5% | 5% |</p>
<table>
<thead>
<tr>
<th>Online Degree Offerings</th>
<th>Scholarship / Fellowship</th>
<th>Grad publications</th>
<th>Grad Conference Presentations</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Goal 4 SNR Outreach / Extension / Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase Webinars / Workshops / Field Days</td>
</tr>
<tr>
<td>2% 2% 2% 2% 2%</td>
</tr>
<tr>
<td>Increase Revenue from above</td>
</tr>
<tr>
<td>2% 2% 2% 2% 2%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goal 5 Diversity and Inclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase Student Diversity</td>
</tr>
<tr>
<td>5% 5% 5% 5% 5%</td>
</tr>
<tr>
<td>Increase Faculty Diversity</td>
</tr>
<tr>
<td>5% 5% 5% 5% 5%</td>
</tr>
<tr>
<td>Increase Staff Diversity</td>
</tr>
<tr>
<td>5% 5% 5% 5% 5%</td>
</tr>
<tr>
<td>Increase Perception of Inclusion</td>
</tr>
<tr>
<td>10%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goal 6 Enhance Financial Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase Endowments</td>
</tr>
<tr>
<td>50% 50% 50% 50% 50%</td>
</tr>
<tr>
<td>Increase Alternative Funding</td>
</tr>
<tr>
<td>20% 20% 20% 20% 20%</td>
</tr>
<tr>
<td>Increase Entrepreneurial Activity</td>
</tr>
<tr>
<td>5% 5% 5% 5% 5%</td>
</tr>
<tr>
<td>Increase Extension Revenue</td>
</tr>
<tr>
<td>10% 10% 10% 10% 10%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goal 7 Increase Visibility of SNR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase Media Coverage</td>
</tr>
<tr>
<td>5% 5% 5% 5% 5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goal 8 Strengthen Research and Teaching Centers and Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase use of centers and facilities for research and teaching</td>
</tr>
<tr>
<td>2% 2% 2% 2% 2%</td>
</tr>
<tr>
<td>Upgrade tech for teaching facilities</td>
</tr>
</tbody>
</table>
APPENDIX A

Timeline of the SNR Restructuring and Strategic Planning Process

2015
Foundation work with SNR faculty, staff, students to bring them into the conversation and the process of SNR restructuring
1. SNR Small Working Group meeting (continuation of a conversation begun with the previous director Dr. Mark Ryan
2. Brown Bag meetings with select groups of faculty to discuss the future of SNR with Interim Director Millspaugh
3. Co-Chairs of Strategic Planning Committee (Steve Anderson, Sonja Wilhelm Stanis)
4. Regular, every other week meeting of Strategic Planning Committee
5. Creation of Three Ad Hoc Committees
6. SNR faculty meetings to discuss brown bag meetings, strategic planning committee; including special called meeting with CAFNR Deans
7. SNR Staff Meeting
8. Meetings with Grad students
9. Survey was sent out

2016
1. Retreat with (voting) faculty off-site to discuss survey results and working towards bringing a draft document to faculty in late April/early May
2. Continuation of meetings with all groups as identified in 2015
3. Resignation of Interim Director Josh Millspaugh effective May 1, 2016; Jack Jones named Interim Director; Chair designated (Jim English) to Chair Search Committee for SNR Director
4. Moving Strategic Planning Document forward
5. SNR Special Faculty Meeting to discuss Mission and Values of SNR and Emerging Research Areas so that feedback can be brought to faculty for a vote
6. SNR Special Faculty Meeting to discuss titling of undergraduate degrees
7. SNR Special Faculty Meeting to discuss small edits in the Policy Manual that reference department/department chairs (to be replaced by School)
8. SNR Special Faculty Meetings to discuss Policies 5 (Operational Policy on Graduate Degrees;) 9 (The School of Natural Resources Policy Committee), 10 (Tenure and Promotion Committee;) motions made to go forward to faculty with a vote
2017
1. New Director (Shibu Jose) joins on March 1
2. Meets with the newly formed Director’s Faculty Advisory Council (DFAC) with the call to lead the “Visioning Process” to complete the Strategic Planning process that began with the restructuring of the School back in 2015.
3. DFAC and DSAC facilitate the visioning process with multiple scheduled faculty, staff and stakeholder meetings
4. A meeting dedicated to discussing the most current visioning plan is held with the DFAC and the Director’s Staff Advisory Council (DSAC), along with Bill Lockwood, current president of the SNR Advisory Council Exec Board, and Greg Snellen, current president of the SNR Alumni Group in the Fall of 2017
5. The most current version of the document is shared with SNR faculty and staff by DFAC in late Fall 2017 in a special faculty/staff meeting with the request to focus on the goals and the action steps to refine them further
6. Director Jose establishes “Champions” in December 2017 to lead the visioning process goal-by-goal and to further refine the goals and come up with specific achievable action steps

2018
1. Action steps are further refined and finalized and faculty hiring priorities are finalized in summer 2018.
2. Measurable metrics are identified for each goal by DFAC and DSAC and approved by faculty and staff and the Strategic Planning Document is finalized in fall 2018.
## APPENDIX B

New and Former Degree Programs in the School of Natural Resources

<table>
<thead>
<tr>
<th>New Programs</th>
<th>Former Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Degree</strong></td>
<td><strong>Degree</strong></td>
</tr>
<tr>
<td>Environmental Sciences</td>
<td>Soil, Environmental and Atmospheric Sciences</td>
</tr>
<tr>
<td><strong>Emphasis Areas</strong></td>
<td><strong>Emphasis Areas</strong></td>
</tr>
<tr>
<td>Atmosphere</td>
<td>Atmospheric Science</td>
</tr>
<tr>
<td>Land and Soil</td>
<td>Environmental Science</td>
</tr>
<tr>
<td>Outreach and Education</td>
<td>Soil Science</td>
</tr>
<tr>
<td>Water</td>
<td></td>
</tr>
<tr>
<td><strong>Degree</strong></td>
<td><strong>Degree</strong></td>
</tr>
<tr>
<td>Natural Resource Science and Mgt.</td>
<td>Fisheries and Wildlife Forestry</td>
</tr>
<tr>
<td><strong>Emphasis Areas</strong></td>
<td><strong>Emphasis Areas</strong></td>
</tr>
<tr>
<td>Fisheries and Wildlife Sciences</td>
<td>Forest Entrepreneurship and Business</td>
</tr>
<tr>
<td>Forest Resources (SAF)</td>
<td>Forest Resources Mgt. (SAF)</td>
</tr>
<tr>
<td>Human Dimensions</td>
<td>Urban Forestry</td>
</tr>
<tr>
<td>Terrestrial Ecosystems (SAF)</td>
<td></td>
</tr>
<tr>
<td><strong>Degree</strong></td>
<td><strong>Degree</strong></td>
</tr>
<tr>
<td>Parks, Recreation and Sport</td>
<td>Parks, Recreation and Tourism</td>
</tr>
<tr>
<td><strong>Emphasis Areas</strong></td>
<td><strong>Emphasis Areas</strong></td>
</tr>
<tr>
<td>Natural Resource Recreation Mgt.</td>
<td>Natural Resource Recreation Mgt.</td>
</tr>
<tr>
<td>Recreation Administration</td>
<td>Leisure Service Mgt.</td>
</tr>
<tr>
<td>Sport Mgt.</td>
<td>Sport Mgt.</td>
</tr>
<tr>
<td>Tourism Development</td>
<td>Tourism Development</td>
</tr>
</tbody>
</table>
APPENDIX C

Specific Timeline for Undergraduate Degree Restructuring

3/23/2016:
The SNR Undergraduate Degree Restructuring Committee first proposed moving to a three degree structure during a special School-wide faculty meeting and feedback was solicited.

4/14/2016:
The proposal was revisited at a regularly scheduled School-wide faculty meeting and additional feedback was solicited. The SNR Undergraduate Degree Restructuring Committee also proposed potential names for the new degrees and feedback was solicited.

4/19/2016:
The SNR Policy Committee sent an electronic ballot measure to SNR Faculty requesting faculty approval for restructuring of the SNR undergraduate degrees from four degrees to three degrees that involved merging of the Forestry and Fisheries & Wildlife degrees.

4/26/2016:
Voting on the movement from four to three degrees closed. The SNR Policy Committee certified the vote and reported that 90% of the faculty submitting a vote were in favor of the change.

5/5/2016:
Special faculty meeting was held to revisit proposed names for the three degrees.

5/13/2016:
The SNR Policy Committee sends an electronic ballot measure to SNR Faculty that requested faculty approval for the degree names (Natural Resource Science and Management; Environmental Sciences; and Parks, Recreation and Sport).

5/20/2016:
Voting on the new degree names closed. The SNR Policy Committee certified the vote and reported that 90% of the faculty submitting a vote were in favor of the proposed degree names.

8/1/2016:
Faculty leaders associated with each of the proposed degrees submitted degree program proposals to the SNR Associate Director. Prior to submission, proposals were approved by faculty who self-associated with the proposed degree programs and worked to develop structure, key competencies, content and proposals for the degrees.

8/9/2016:
The SNR Undergraduate Restructuring Committee and SNR Undergraduate Curriculum Committee met to review and vote upon the degree proposals. Voting was as follows:

SNR Undergraduate Restructuring Committee Voting
Environmental Sciences approved by a 9 to 0 vote in favor.
Natural Resource Science and Management approved by a 9 to 0 vote in favor.
Parks, Recreation and Sport approved by a 9 to 0 vote in favor.

SNR Curriculum Committee Voting (committee of 5 faculty):
Environmental Sciences approved by 5 to 0 vote in favor.
Natural Resource Science and Management approved by a 5 to 0 vote in favor.
Parks, Recreation and Sport approved by a 5 to 0 vote in favor.
Faculty Hiring Priority

Background Statement
The School of Natural Resources (SNR) is a diverse unit within the College of Agriculture, Food, and Natural Resources (CAFNR) at the University of Missouri. The school has been reorganized recently around three central themes as explained elsewhere in this document: water resources, terrestrial ecosystems and environment and society. The school offers a diverse range of research topics such as recreation and tourism, sport management, forestry, fisheries and wildlife sciences, water resources, human dimensions, soil and environmental sciences, and atmospheric sciences. These topics are ordered under three undergraduate degrees, and one graduate degree (MS and PhD level). The school will grow over the next five years as new opportunities arise to leverage resources to meet the State of Missouri’s research needs. It is envisioned that two-to-five tenure-track lines will become available during this five-year period. The following positions represent areas of opportunity identified by the entire SNR faculty to meet these needs, while at the same time maintaining critical disciplinary expertise that may be necessary to meet the recommendations of accrediting bodies. These positions would also strengthen the mission of SNR by taking advantage of existing synergies within the school in order to meet the societal needs in a changing natural environment. This document also positions the SNR faculty to respond better to campus initiatives such as Preparing Future Faculty.

The positions requested below are all school priorities, which will maintain critical strengths, while at the same time positioning the school to meet the challenges of tomorrow. The rankings below represent the faculty consensus with respect to immediate needs, but does not preclude additions further down the list that may become available as opportunities arise. This list will be revisited annually by the SNR Director’s Faculty Council (DFAC).

Tourism
MU does not have a dedicated faculty to support the study of tourism, yet this is one of the top industries in Missouri. Addition of a tenure track line would support growing enrollments in recreation and tourism for undergraduate and graduate students. This position would have synergies with agriculture, hospitality, sport management and human dimensions of natural resources.

Fish Ecologist
We currently have an F&W Emphasis Area with no full-time, MU-salaried, fish biologists who are perceived to have a broad, agency-supported, research or teaching program. This is a fundamental and critical problem with numerous implications for the long-term direction and stability of SNR in that agency support is guided strongly by perceptions of SNR strengths and weaknesses. The position would have the potential for strong synergies with Sport Management (though sport fishing), Human Dimensions and Water Resources.
**Forest Health**
Within forestry, this position is critical to maintain our professional Bachelor of Science accreditation with the Society of American Foresters, to offer high quality instruction within the Natural Resource Science and Management Degree, and to support existing and future research programs. This position has the potential for a wide diversity of emphases that constitute additional teaching and research needs such as in topic areas of forest health, tree physiology, forest management, and fire ecology and management. Broader synergies with this position exist across SNR and are likely to include climate science, watershed management, human dimensions, and soil and environmental sciences.

**Hydropedologist/Soil Hydrogeomorphologist**
This individual would have an emphasis on (1) understanding historic and contemporary anthropogenic changes (e.g., global climate change and land use change) influencing the development of physical and biological aspects of the landscape, (2) elucidating ecosystem services (provisioning and regulatory services) provided by the landscape and influenced by anthropogenic forces, and (3) adapting soil-landscape management systems to sustain and maximize ecosystem services in locales of intensive land use (e.g., agroecosystems and urban ecosystems). Provisioning services to be investigated may include long-term freshwater, food, biofuel and fiber availability; regulatory services to be evaluated comprise waste disposal and detoxification, carbon sequestration, water purification, natural hazard management, etc. (currently Pedology/Soil Genesis and Soil Conservation). Would provide synergies with water resources, human dimensions, fisheries and forestry.

**Climate Modeler**
With expertise in climate dynamics and numerical modelling and broader impacts, this position would have synergies with disciplinary programs school-wide.

**Community/Restoration Ecology Position**
There is a strong need in SNR for an individual with expertise in larger-scale terrestrial or aquatic restoration ecology and with an emphasis on organismal community ecology. Such a position would have the potential for synergies with many areas in SNR as well as outside SNR. Further, many faculty in SNR have an interest in this topic, so adding an individual in this field would help build a significant programmatic strength in the school. This position has robust potential for agency support and collaboration.

**One Health/Environmental Health**
Recognition that pathogens of plants and animals (including humans) are intimately linked with the broader terrestrial and aquatic community and environment makes having a person with a keen understanding of how diseases are maintained in population, and how they move between populations and species, critical. This position would have expertise in environmental and ecological sciences and provide opportunities for collaborations across CAFNR and across college boundaries such as Arts and Sciences, Medicine, or Veterinary Medicine.

**Tree Physiologist**
We prefer an individual for this position with expertise in molecular biology and/or physiological process modeling. This position would have synergies with atmospheric science, soil science, and hydrology through surface-atmosphere mass and energy exchange studies.
Soil Conservation / Ecologist
With a bigger push from Biological Sciences to move away from ecology/evolution, the rising importance of soil health, and the focus of soil science shifting toward ecology, health and sustainability, a soil ecologist would serve as a utility player across the division, college, campus, and other universities in the UM system. This person ideally has a background across pedologic and edaphic disciplines in soils, which makes them quite adaptable to help fulfill various teaching needs in soil science and ecology, develop new courses or co-teach courses with other faculty that introduce and explore soil ecology through various ecosystems, or as an ecologist, able to connect and to collaborate across multiple disciplines that are shifting foci to soil development, function, and health/quality. As technology continues to develop and improve, more opportunities are coming into view for looking at soils and their contributions to overall structure, function, cycling, and community/system composition/assemblages and interactions.

Land-Surface/Biometeorology
This person should have expertise in boundary-layer meteorology including exchange processes between land-surface or water-surface and atmosphere exchange. This position would have synergies with soil and environmental sciences, forestry, hydrology and climatology.

Recreation/Sport Management
This individual should have expertise in sport programs, sport communication and policy. The current expertise in these areas is not tenure track, and in order to maintain accreditation in our large program, a tenure line position is a priority. This position is also critical for the development of an online Master’s degree program in Sport and Recreation, as part of our strategic plan to increase SNR enrollment. This position would have synergies with recreation and leisure studies, human dimensions, fisheries and wildlife, and water resources.

Molecular Ecologist
This position could work on fish, wildlife, plants, microbes, etc... These are pressing needs given the near retirement of Lori Eggert (Bioscience), with whom many in SNR have collaborated. Dr. Eggert’s collaborative and multi-taxon and multi-system approach to conducting research projects would be an ideal model for the position. It does not really matter if this is a fish or wildlife or plant person, but rather that the person be open to broad collaboration across programs. This position has potential synergies with many Emphasis Areas.
“Conservation is a state of harmony between humanity and the land.”
- Adapted from Aldo Leopold