

NC STATE UNIVERSITY

College of Natural Resources

STRATEGIC PLAN 2016-2020

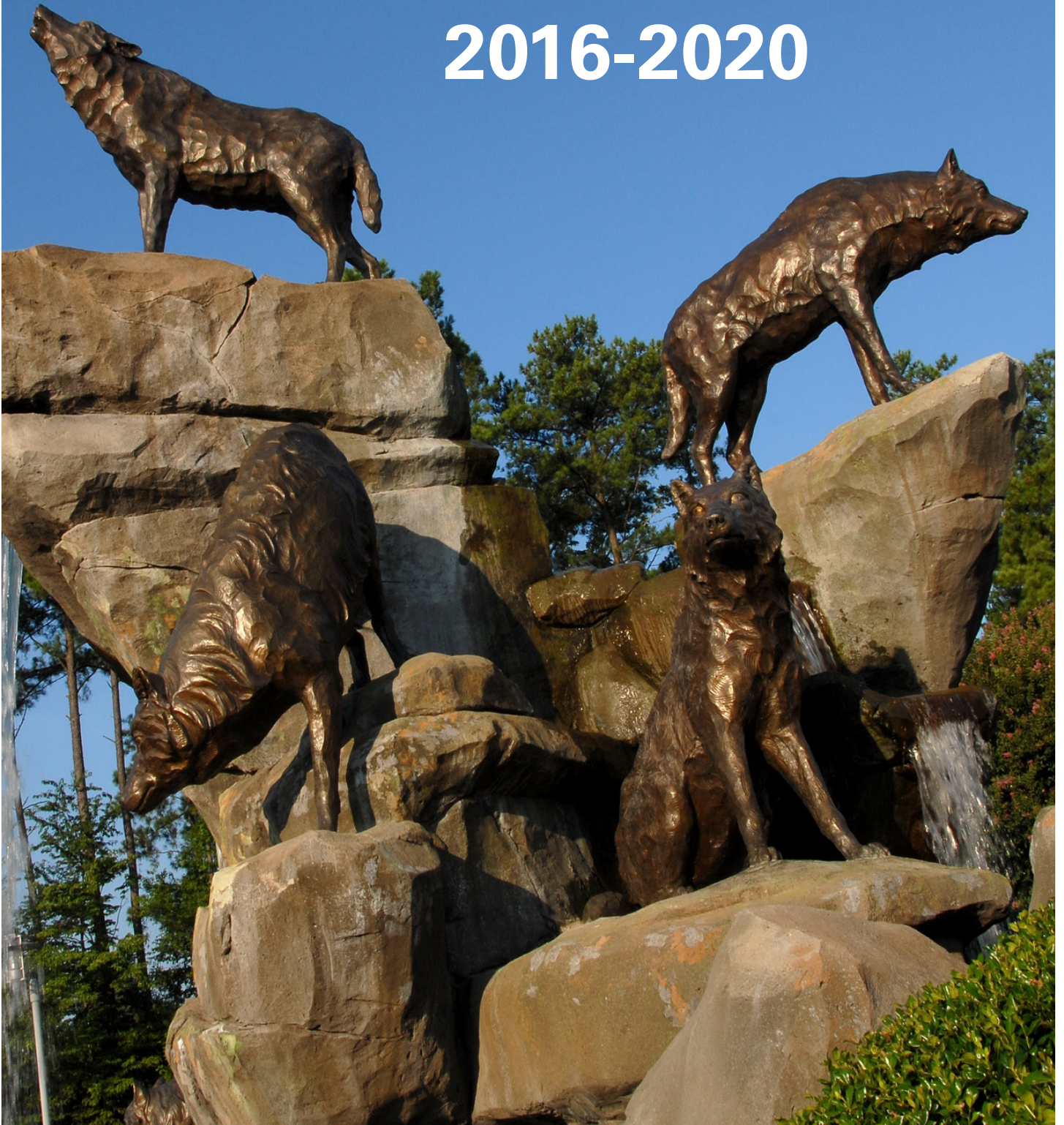


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Process Used to Refresh the Plan

In the fall of 2015, the College's three strategic faculty work groups were convened to prepare a roadmap for ongoing investments in our interdisciplinary themes. The work groups were also asked to identify the expertise that would add the most to the College's collaborations. These needs were discussed by the whole faculty and staff at the fall All-College Meeting and became the focus of an innovative internal cluster hire of three new faculty members.

January 2016 - The College leadership assessed progress on the goals and objectives in our 2013 strategic plan, noting significant progress in many areas.

February 2016 - The Dean and Executive Committee spent a full day in retreat to discuss priorities and plan the strategic plan update.

March 2016 - All faculty and staff discussed the College strategic goals and objectives and identified priorities for the strategic plan update in our spring All-College Meeting. This was followed by a Google survey, where faculty and staff could submit more detailed suggestions and ideas for action items for the next few years.

March 2016 - Dean held an open forum with students to get their input on what was working well in the College, where there was room for improvement, and ideas for the future.

April 2016 - The Natural Resources Foundation Board engaged in conversation with College leadership about our strategic priorities and the needs for funding in the coming capital campaign.

May 9, 2016 - Faculty-staff participated in a half-day retreat with focused discussion and gallery walk on priorities for the updated strategic plan.

June 3, 2016 - A draft of updated strategic plan was circulated to the College community for comment. Comments were accepted through June 13, 2016.

College of Natural Resources Strategic Plan

Introduction

The College of Natural Resources (CNR) has a proud history at NC State University, going back over 85 years to when a School of Forestry was established in 1929 in recognition of the importance of North Carolina's forests and wood products to the state's economy. In 1947-48, separate departments focusing on wood and paper products and on parks, recreation and tourism were added; the first recognizing the technology demands and economic importance of this industry, and the latter recognizing that parks and recreational amenities were almost completely absent in the rural communities of North Carolina.

Today, the College fully embraces the University's Land Grant Mission, and our research and outreach programs create jobs and economic value across North Carolina. CNR is proud to serve some of the largest economic sectors in the state of North Carolina, including the state's largest manufacturing industry, forest and wood products, the largest service sector, tourism (including golf), and more than half a million private forest landowners. The combined economic impact of these sectors approaches \$50 billion, with direct employment estimated at 558,500.

Our College takes a comprehensive approach to teaching, research and engagement that encompasses the many ways in which people's physical, economic and social needs are met while protecting our planet's natural resources for future generations. Nurturing the environment and engineering sustainable products go hand-in-hand with helping communities and enterprises thrive. Our three departments, Forestry and Environmental Resources (FER), Parks, Recreation and Tourism Management (PRTM), and Forest Biomaterials (FB), are nationally ranked and many of our faculty members have earned international recognition in their disciplines. Each department has strong academic, research and extension programs that serve diverse stakeholders.

A cornerstone in all of our academic programs is engaged learning. All of our students learn not just in the classroom, but also in state-of-the-art research laboratories and in the field through regular trips to nearby Schenck Forest, at summer camp at Hill Forest, and in many other locations around the state. Our students participate in internships, cooperative work rotations with industry, study abroad, research projects with faculty, professional development activities, and other practical experiences that prepare them to graduate ready for the career of their choice. Innovations come from seeing problems and creating solutions. We take our students off campus and into the world where they truly think and do.

Parks, Recreation and Tourism Management programs prepare planning and management professionals for the fields of parks, recreation, tourism, golf and recreational sports. PRTM faculty teach students skills that are applicable across a wide range of potential careers, preparing them to be the leaders in their fields. PRTM research and engagement is breaking new ground and providing new solutions to interdisciplinary problems. For example, PRTM's People First Initiative in equitable and sustainable tourism is the only program of its kind in the US and now has branches in several international locations. This program focuses on alleviating rural poverty by empowering citizens with tools to expand tourism opportunities and enhance their livelihoods. PRTM's research program on health, well-being and physical activity is showing how joint-use agreements between public schools and local parks and recreation

boards can improve wellness and address environmental justice issues through access to public facilities.

The **Forest Biomaterials** department is uniquely positioned to create sustainable economic growth, producing renewable materials for bioenergy, engineered wood products, and value-added biomaterials. The faculty play a critical role in the education and hands-on training of undergraduate engineers for both the pulp and paper industry and the wood products industry. Our world-class researchers have created interdisciplinary research programs that create fundamental science, applied engineering, and integrated life cycle and modeling analytical tools to provide solutions that consider economic, environmental and social drivers. These solutions are deployed through a variety of traditional and innovative corporate and community partnerships as well as a statewide extension program focused on wood products.

The **Forestry and Environmental Resources** department has the largest number of faculty in the college encompassing a range of disciplines from the basic to the applied. From historical strengths in tree breeding, economics and silviculture, including strong industrial research cooperatives, the department has diversified to cover social sciences, geospatial sciences, biotechnology, loblolly pine and Christmas tree production, land-use change, wildlife management and conservation, and environmental protection. With five undergraduate majors and five graduate programs (four of which are shared with other academic units), FER exemplifies a department taking interdisciplinary approaches to education, research and extension and engagement.

NC State and CNR have a strong national and international reputation in production forestry based on the work of its industrial research and technology transfer cooperatives that have been operating for decades. The NC State Cooperative Tree Improvement Program (breeding cooperative for loblolly pine), The Forest Productivity Cooperative (silviculture and management), Camcore (international germplasm conservation and domestication), and the Southern Forest Resource Assessment Consortium (comparative economics and timber supply) are world leaders in research and applications. Cooperative members contribute dues to support the research, help to set the research agenda, and use the research findings to promote profitability and sustainability of forest ownership.

CNR faculty, staff and students also deliver innovative solutions to complex problems using traditional and new extension and engagement approaches. Some CNR faculty support NC State's Cooperative Extension Service network of county agents and specialists, while others work directly with community and industrial partners. In many cases, CNR faculty have created new strategies and partnerships that have generated funding and the innovative applied research results to solve new problems. Examples include our partnerships with the military, community-based tourism, and the biomass power industry.

CNR will continue to offer strong programs in areas of strength, including paper science and engineering, forest management and natural resource conservation, and park planning and tourism management. We will not diminish or step away from what we do well. Our vision is to build on these strengths and leverage new partnerships and collaborations that will address the increasingly complex grand challenges of society. These challenges demand a systems approach, with transdisciplinary perspectives and methods of analysis. They form the basis for the **three interdisciplinary themes** where additional focus and activity is occurring. These themes are appearing in our teaching, research and scholarship, and engagement activities. They will allow us to have greater impact and to become the go-to place for solutions to natural resource challenges in both the built and natural environment.

SIGNIFICANT ACCOMPLISHMENTS SINCE 2013

In the three years since implementing our 2013-2020 strategic plan, the College of Natural Resources has made significant strides toward meeting our goals. Our faculty and staff have shown great commitment in supporting our areas of investment. After collectively reviewing our progress toward each goal and objective, we are pleased to highlight the most significant accomplishments toward each goal area.

Achieving Excellence in Thematic Areas

- Held a **“Building Interdisciplinary Strengths in Thematic Areas”** internal \$300,000 RFP to build cross-departmental research collaborations in our thematic areas and to support our graduate programs by funding Ph.D. students. The successful project, titled **“Socio-ecological Solutions to the Salinization of Albemarle-Pamlico Peninsula: An Interdisciplinary Assessment of Land Resources and Community Climate Readiness,”** was in the Land and Water theme and includes partners from all three CNR departments as well as other collaborators. Five Ph.D. students are funded in multiple CNR graduate programs.
- Concluded the search for **three new faculty members**, one in each department, who will bring strong expertise in the departments and contribute to the College’s interdisciplinary thematic areas.
- Significantly increased the College’s research portfolio in interdisciplinary research. About 20% of our portfolio is collaborative research that includes faculty members from more than one Natural Resources department and can be related to one of our research themes.
- Developing a Ph.D. Program in Geospatial Analytics, which was identified as an area of growth that will support industry, government and academia career pathways. The program proposal has been submitted to the Board of Trustees and UNC-GA for final approval and will likely enroll its first cohort in the fall 2017.

2013 Goal Area 1: Enhance student success through educational innovation, both within CNR and through collaborations across the NC State campus

- Bringing the Environmental Science undergraduate program, currently housed in DASA, into the College, where many co-curricular and support services will now be available to students; additional faculty are also being brought into the delivery of the curriculum.
- Leading the First-Year Program in Environmental Science Task Force with DASA, which will introduce first-year students to all the ways they can study the environment across NC State.
- Holding an annual **“College Connections”** program at Schenck Forest for all incoming first-year students in all majors during Welcome Week. The goal is to connect students across programs, build community and introduce them to our outdoor classroom and the many ways it can be used.
- Awarded 36 scholarships in summer 2016, the inaugural year of a new donor-created enrichment fund established to support participation in high-impact learning experiences.

- Engaging undergraduates in “Jumpstart,” an incentive-based professional development program created by students to encourage students to attend workshops offered through the Career Development Center, CSLEPS and other campus partners. Jumpstart also promotes student participation in special programs offered directly through the College such as interview training, resume creation, workplace conduct, salary negotiation and many other important workplace skills.
- Established a new “Diversity and Environmental Justice” course now offered every semester. This class meets the GEP Diversity requirement and links issues of race, culture and social justice to the natural resource fields.
- Convened a Transfer Student Task Force to look for gaps in support for transfer students and launched a new orientation model as well as support programs targeted to these students.
- Appointing a College Diversity Committee to focus on recruiting, climate, professional development and other initiatives.
- Leading in the implementation of the externally funded Doris Duke Conservation Scholarship Program for undergraduates with a demonstrated interest in environmental issues and cultural diversity to receive training, support, mentorship, and more than \$10,000 over two years for paid research experiences and internships.
- Providing increased knowledge of natural resources and developing interests in STEM and natural resource career pathways through the Neighborhood Ecology Corps, which reconnects middle schoolers with the natural world.
- Leading the EnvironMentors Program, which matches high school students of color with mentors in industry, government and NC State to do independent study projects in the environmental sciences.
- Providing an alternate path for students who applied but were not accepted to majors in the Department of Forestry and Environmental Resources through the CONNECT program. The program provides individualized pre-advising and two 3-credit hour classes on the NC State campus during Summer Session II. The following fall, the students enroll in another 2- or 4-year institution (generally a local Community College) and the following spring, if they have earned a 3.0 GPA or higher, they are automatically admitted to transfer to NC State in any FER major beginning the next fall semester.

2013 Goal Area 2: Increase interdisciplinary research around themes that engage CNR faculty broadly, leverage cross-college collaborations, and contribute to ecological and socioeconomic sustainability

- Participating in the Sustainable Cities Consortium with interdisciplinary faculty from six other NC State colleges to address the way our cities grow, change and remain viable.
- Conducted the CNR and CALS Cross-College Enrichment Grants Program, a jointly funded internal RFP to build interdisciplinary partnerships across our colleges. Two rounds of this competition were conducted, and four joint projects were funded.
- Co-sponsoring the annual Dr. Norman E. Borlaug Distinguished Lecture with College of Agriculture and Life Sciences to bring high-profile speakers to campus.
- Developing an interdisciplinary study abroad course on sustainability, which will be delivered in the spring 2017 in Costa Rica.

- Joined the Center for Integrated Research, Teaching, and Learning (CIRTL), a national network of universities that are committed to advancing the teaching of STEM disciplines in higher education and to helping Ph.D. students and post-docs become excellent teachers.

2013 Goal Area 3: Expand and foster CNR external partnerships by leveraging the impact of research, academic and engagement initiatives

- Training more than 30,000 natural resource professionals, landowners, general public and youth about sustainable utilization of forests and other natural resources each year through Cooperative Extension Service, which provides distance education, certificate programs, workshops, short courses, publications, field days and other educational tools.
- Responding to more than 10,000 requests for information and consultations in forestry, wood products, recreation and tourism annually from individuals, communities, state and local governments, and businesses around the world.
- Promoting economic development in the Christmas tree industry through best management practices and sound business skills, and providing research and guidance to more than 2,000 Christmas tree growers across N.C. who harvest more than 19 percent of the nation's Christmas trees annually.

2013 Goal Area 4: Strengthen and enhance infrastructural support across the College of Natural Resources

- Developing a long-term comprehensive space plan by:
 - Implementing a space committee composed of representatives from throughout the College.
 - Establishing college-wide guidelines for space allocation and setting priorities for renovations.
 - Offering two college-wide listening sessions to hear ideas around use of current space.
 - Conducting a space inventory to assess efficiency of current usage.
- Completely renovated a large lecture hall and a 34-person teaching computer lab in Biltmore Hall.
- With funding from the Provost's office, renovated three research laboratories and graduate student offices on the first floor of Biltmore Hall.
- Hired a new Director of Marketing and Communications, a half-time Social Media Specialist, and full-time Marketing and Communications Specialist.
- Systematically revised communications to be on brand, including new web pages, three social media channels, new marketing materials, and a series of e-newsletters.
- Increasing functionality of College's website to better support the dissemination of news and integrate social media.

- Formed the Business Processes Advisory Committee, which is implementing recommendations and has:
 - Created a Business Service Directory to clarify roles and responsibilities.
 - Hired new HR Director to coordinate HR services college-wide.

2013 Goal Area 5: Reorganize CNR Development to better support the College's strategic plan

- Restructured the College Advancement office to focus on marketing and communications, external relations, major gifts fund-raising, and the coming capital campaign.
- Hired the College's first Assistant Dean for Advancement.
- Hired the College's first Executive Director of Forest Assets.
- Re-structured the College's Foundation Board of Directors and recruited new members to better support College Advancement.

The following sections of this updated strategic plan build on these accomplishments and chart a course for action through 2020. The College community remains firmly committed to our three interdisciplinary themes. Based on our accomplishments to date and needs looking forward, we have restructured our other goals. Although Goals 1 and 2 are fairly similar to those in the 2013 version of our plan, the remaining goals have been revised. To highlight its importance, we have made enhancing diversity in people and programs the focus of revised Goal 3. Our infrastructural goals have been coalesced into our new Goal 4, and Goal 5 focuses on engagement and partnerships at the local and global levels.

CNR Mission, Vision and Values

MISSION

Our mission is to provide solutions to the challenges of natural resources management, social and ecological sustainability, and human health and well-being by educating new leaders and professionals, generating new knowledge and technology, leveraging transdisciplinary insights, and engaging with communities in North Carolina, the nation and the world.

VISION

Our vision is to be a world leader among universities that are creating a healthy and more sustainable future for all people. By 2020, we will become the go-to place for solutions to natural resource challenges in both the built and natural environment.

VALUES

We value:

- Human health and well-being, natural resources and sustainable biomaterials, and the environment.
- Our students, staff, faculty, alumni and friends.
- Diversity of people, places, perspectives and ideas.
- Academic excellence in all of its forms—the scholarships of discovery, teaching, information transfer and scientific integration.
- Engagement with communities in North Carolina, the nation and the world.
- Fundamental and translational science/research that is innovative, transdisciplinary, relevant and high impact.

We intend to make the world a better place for this and future generations.

THE PATHWAY TO THE FUTURE

The College of Natural Resources fully embraces the core values and guiding principles as expressed in the University's 2011-2020 Strategic Plan and updates. Our three themes and our goals and objectives are fully aligned with the five goals articulated in "The Pathway to the Future:"

1. Enhance the success of our students through educational innovation.
2. Enhance scholarship and research by investing in faculty and infrastructure.
3. Enhance interdisciplinary scholarship to address the grand challenges of society.
4. Enhance organizational excellence by creating a culture of constant improvement.
5. Enhance local and global engagement through focused strategic partnerships.

In the following sections, we present our strategic plan in two parts. The first part, entitled "Achieving Excellence in Three Interdisciplinary Themes," presents our new focal areas. The second part of our plan, entitled "CNR's Programmatic Goals and Objectives," includes goals and objectives to enhance student success and satisfaction, to build a world-class portfolio of

disciplinary and interdisciplinary research and engagement, to continue to enhance diversity across the College, and to improve our College operations and have greater engagement and impact in the world. At the end of our plan, we present a summary table that cross-references our goals and actions with the five overarching goals in NC State's Pathway to the Future.

Achieving Excellence in Three Interdisciplinary Themes

THEME 1 – SUSTAINABILITY SOLUTIONS

Discussions about sustainability abound in businesses and on college campuses around the world, and yet in many ways, it is still an ambiguous concept. At its essence, sustainability refers to a way of living that ensures we leave our environment as good or better than we found it so future generations have the same opportunities that we have today.

Sustainability is perhaps most valuable as a framework for making difficult choices in a world where resources are finite and many conflicting social, economic and environmental goals must be balanced. There is no single "engineering solution" that will provide a sustainable future; instead a constantly evolving series of tradeoffs reflects our values and our commitment to a different kind of future. Understanding those tradeoffs requires a systems approach and new tools for quantifying and envisioning the future.

Achieving sustainability is as much a societal challenge as an environmental one. It will require a commitment to doing things differently—to thinking about development and innovation differently—with education, communication and equity as central concerns that are explicitly addressed. It will come only when we acknowledge the vast accumulation of unintended consequences that have resulted from piecemeal approaches to development and environmental management. Most importantly, sustainability will only become common currency in business, government and society when we create ways to measure, analyze and evaluate it.

CNR is uniquely poised to lead and collaborate with colleges across the NC State campus and beyond to address the challenges associated with developing and applying these new methods. Our research is already beginning to quantify the inputs and outputs of various socio-ecological systems. For example, our modelers have developed new techniques to bring social considerations into life-cycle assessment, which considers the full array of environmental impacts and costs, from supply chain to end-of-product life. Our engineering faculty members have worked with a leading sustainable paper producer, Domtar, to turn a by-product of pulp production into a value-added and sustainable chemical additive, diverting it from the waste stream. Our remote sensing and visualization specialists are developing total immersion technologies to assist small farmers with preservation and agro-tourism development goals and scenarios.

Across its campus, NC State excels in technologies and innovation that can be applied to the practical challenges of sustainability. Sustainability will not come with infinitely more detailed descriptions of how we got to the crises of today. It will come when we can use new tools and technologies to visualize and evaluate alternative scenarios for the future. Gaming technologies are one way to do this, but there are many other technologies as well, including big data analytics, visualization, geospatial analysis and modeling, system integration and life-cycle analysis, computational social science analytics, integrated policy, planning and economics analysis, and partnership and community development.

In the realm of land management and the natural and built environment, CNR excels in approaches to sustainable management of forested ecosystems—for biomass and energy, wood production and new bio-product development, sustainable and equitable tourism, and holistic management of landscapes where biodiversity protection, carbon sequestration, water management, food, recreation and other goals can and should be considered.

Monetizing the values of these goods and services (the so-called ecological services), and using market-based methods to help achieve environmental goals are increasingly accepted approaches to conservation and environmental management. However, the models and methods to support these approaches and the appropriate values—both short- and long-term costs and benefits—have not yet been developed and accepted. CNR is well positioned to work in this area, building on our strengths in resource economics, life-cycle analysis and full-cost accounting, and ecological foot-printing.

Communication and a different mode of public education are also key parts of sustainability that NC State can address. Over the last several decades, scientists have lost credibility because they have failed to communicate in ways that others can understand. This must change, and with partnerships in CHASS, COS and the NC Museum of Natural Sciences and Nature Research Center, we have unique opportunities to drive that change.

As we lead the development of a research portfolio that addresses the many aspects of sustainability, we will also continue to infuse sustainability across our curricula. While we are already bringing sustainability into specific majors and minors that address energy, sustainable wood products, resilience of rural communities and other specific applications, the concept of sustainability can be abstract until it is connected to specific places.

Place-based approaches to sustainability, natural resources management, and environmental problem solving—as well as education—can transcend from concept to reality. As we live in and learn the story of particular places, we understand in a deeper way how living systems work in those places; we become immersed in the culture and develop a shared sense of responsibility for the quality of the community. With that community of businesses, natural resources professionals and citizens alike, we can develop solutions that work.

To bring this back to an educational context, students must know **how** what they are learning is positioning them to work **for** and **in** a more sustainable world. Educational activities focused in a specific place, where culture and context can be experienced and real bonds are formed, have the power to be transformative, turning concepts into real learning and real change.

By expanding and building new interdisciplinary and collaborative teaching, research and engagement programs around the theme of sustainability, CNR will develop practical approaches for quantifying, visualizing and analyzing alternative scenarios for a more sustainable future. With our partners, we will train a new generation of sustainability leaders and professionals that can bring real-world solutions to sustainability challenges and help keep businesses profitable, contributing to economic growth and development in North Carolina and the world.

THEME 2 – LAND AND WATER

Freshwater supply and management is the most pressing natural resource issue in the 21st century. Clean and affordable drinking water is a basic human right, but as much as 80% of the world's population does not have water security, defined as the availability of sufficient quantity and quality of water to support human health and livelihoods, ecosystem services and national security.

More specifically, about 1 billion people around the world do not have access to clean, safe drinking water; 2.5 to 3 billion people lack adequate sanitation; and half the patients filling hospital beds around the world suffer from water borne diseases. By 2025, about 2.8 billion people will face significant water scarcity as a result of population growth, rising economic expectations, political instability, climate changes and other factors.

Water is the ultimate renewable resource, cycling continuously among the atmosphere, land, rivers, lakes, groundwater reservoirs and oceans. Most of the world's useable freshwater falls first on land, meaning water management is intimately and inextricably tied to land management. These lands are under assault from the combined pressures of development, agriculture, energy extraction and mining, and increasing habitat fragmentation. Climate change has already begun to, and will continue to, exacerbate water shortages and present new water management challenges as both the amplitude and frequency of floods and droughts are increasing. Saltwater intrusion into low lying coastal areas and groundwater salinization are growing concerns across North Carolina and around the world. The only way to address the challenges of freshwater in the face of these pressures is through a landscape approach. While water scientists and engineers exist across the NC State campus, CNR is uniquely poised to approach water challenges through this lens.

In North Carolina, 60% of our water falls first on forested land, where it is absorbed and treated naturally before being conveyed to our rivers, reservoirs, lakes and estuaries. The demand for new housing sites, recreation, biodiversity protection, and the many wood products provided by these forests will only increase as the state's population continues to grow. A changing climate may result in more frequent and intense droughts, threatening agriculture, industry and domestic water supplies. Quite simply, the future prosperity of our state will only be achieved with improved and integrated water resource management.

In North Carolina, as in most of the world, integrated water resources management means coordinated multiuse management of forests. Keeping forested land forested will provide more water, and higher-quality water than developed land, at a lower cost. However, the economics of land conservation—the business case for conservation—has not yet entered the debate about water provision in most areas. CNR and NC State can lead in the development of the transactional infrastructure that will inform this debate. The recent political maneuvering surrounding Jordan Lake clearly illustrates the many entangled issues of environmental justice, supply, affordability, pollution and public health that are crying out for this kind of information. In addition, river basins across our state feed ecologically sensitive coastal habitats, and thus, management of water in central North Carolina can impact water systems hundreds of miles away along our coast.

Water is currently a \$400 billion global industry, with huge opportunities for growth. The world needs new technologies for advanced water treatment, including point-of-use treatment, water reuse systems (including gray-water systems), real-time monitoring and remote sensing technologies, storm water control and decontamination, and improvements in agricultural water

use in both irrigation and animal waste management. These challenges play to strengths across the NC State campus.

Equally, there is a need for better—and more equitable—policies for water management. Social science, economics and human behavior research are equally important to finding water resource solutions. Current water policies in the US do not incentivize new water technologies, manage water withdrawals or water quality, or protect and restore ecological integrity. Effective water management in the future will require a paradigm shift toward shared governance, using integrated, adaptive approaches. CNR social scientists, with partnerships across the NC State campus, can address these challenges as well.

By establishing a Land-Water Synthesis Center to bring a landscape perspective to water resource issues and forming interdisciplinary teams across the NC State campus and beyond, CNR will focus new energy on the challenges of water security. Working across political, societal and economic boundaries, we will educate new integrated water resource managers and develop holistic solutions to the challenges of freshwater supply and management.

THEME 3 – URBAN ECOSYSTEMS AND THE INTERSECTION OF BUILT AND NATURAL ENVIRONMENTS

Urban areas in North Carolina, the Southeast and the world are expanding as the human population continues to grow. As the natural resource needs of this growing population become ever greater, there are enormous pressures on both local ecosystems and the remaining areas outside urban centers to meet human needs. Nowhere is this pressure more evident than in the areas where population centers and traditional natural lands intersect, sometimes called the wildland-urban interface or peri-urban environment.

Fragmentation of the landscape and disconnection of wetlands, forests, streams and floodplains that accompany urban development create unique natural resource problems, including significantly elevated risks of wildfire, polluted air and water, and nuisance wildlife, as well as the spread of invasive species, zoonotic diseases and other problems resulting from interactions among wildlife, domestic animals and people. With impairments of ecological integrity come losses of biodiversity and reductions in the resiliency of natural systems to disturbances, including extreme climate and weather events like drought and floods.

Urban ecosystems need large amounts of material and energy to function. Urban lifestyles, poorly planned transportation networks, the pattern of urban land use, and the sprawl associated with the peri-urban environment can all reduce access to parks and green spaces, opportunities for physical activity, clean air, and the land and water people encounter in daily living. On the other hand, cities offer opportunities to reduce the per-capita human ecological footprint through economies of scale and reduced transportation needs; but generalizations along these lines are confounded by income and lifestyle patterns, with wealth highly correlated with consumption and ecological footprint. Finding the balance among these factors will be challenging.

These challenges have very real consequences for human health and well-being. As people are less connected to the natural world, psychological stresses can increase, understanding of natural processes decreases, and support for environmental stewardship can decline. Changes to the built and natural environments have also been linked to greater incidences of preventable

chronic diseases. In addition, the history of social and environmental injustices in the United States has further alienated some populations. As demographic shifts continue to occur across North Carolina and the nation, the need for reconnecting disenfranchised populations with natural resources and the environment will become even more important.

The challenges of wildfire are sometimes thought about only as a problem for the western states, but CNR leads research and engagement efforts around wildfire in the southeastern US. Here, fire has also been suppressed, with degrading impacts on ecosystem health and productivity and significant increases in risks to the built environment. Our natural and social scientists are using modeling to examine the spatial distribution of fire risk and ways to manage and use fire to protect people and restore the health of forest ecosystems that rely on fire as a critical ecosystem process.

The challenges of community development and sustainable housing are also being addressed in CNR projects focused on resilient housing and communities that bring together sustainable materials science and engineering, visualization approaches, social network analysis, and community partnerships. There are enormous opportunities to increase teaching, research and engagement in these areas.

The Triangle area and surrounding communities provide the perfect environment for research on sustainable urban design, urban ecosystem service assessments, watershed management, and the development of whole system models to explore different scenarios of management and environmental infrastructure to address urban problems. NC State led efforts to develop a NSF and USFS funded Urban Long Term Ecological Research (ULTRA-ex) site in the Triangle, with partners from Duke and UNC-CH. Although NSF was not able to move forward with their plans to make several of these interdisciplinary research sites permanent, Triangle ULTRA-ex was a successful program that continues to serve as a foundation for partnerships and urban ecological research in the region. Using funds from NSF's Office of International Science and Engineering, NC State has expanded its ULTRA-ex research efforts on urbanization to South Africa.

Additionally, faculty across CNR have been actively developing international partnerships to solve natural resource problems related to urbanization. For example, a growing number of faculty now collaborate on projects considering land cover change and human health in South Africa and have partnered with many institutions in the country including Cape Peninsula University of Technology, University of the Witwatersrand, University of Pretoria, Stellenbosch, and University of Venda. Other relevant international work includes research on using streets as public open space in urban South America. New efforts will capitalize on and internationalize these efforts across Africa, South America and other regions of the world.

By building new transdisciplinary collaborations across our departments and the NC State campus, CNR's research and engagement in this thematic area will help address the challenges of urban communities and the wildland-urban interface providing practical solutions that improve urban ecosystem services and support resilient, just and healthy community development and environmental stewardship.

ACHIEVING EXCELLENCE IN CNR'S THREE THEMATIC AREAS

To tackle the issues addressed in the three thematic areas, the College of Natural Resources will need significant new investments. Our priorities are:

- 1. Fund and establish one named distinguished professorship in each of our three priority areas.**
- 2. Fund and recruit 12-15 new Ph.D. students to conduct interdisciplinary research in our three priority areas.**
- 3. Create Synthesis Centers that bring together interdisciplinary expertise to find solutions to natural resource challenges in Sustainability, Land and Water, and Urban Ecosystems.**
- 4. Incentivize and build faculty capacity for interdisciplinary research in all three thematic areas.**

In addition, the College will need additional space to accommodate developing programs in these areas, as discussed under Goal 4.

GOAL 1. ENHANCE STUDENT SUCCESS THROUGH EDUCATIONAL INNOVATION

Student success requires a combination of challenging academic training and a supportive environment for individual personal and professional growth. Successful students should leave NC State University with discipline-specific academic knowledge, well-developed problem-solving skills, and the ability to both lead and serve.

The College recognizes the need to continually improve its academic programs to meet the natural resources, environmental and societal challenges of the state, nation and world. The College also recognizes the need to support the personal growth of students through effective advising and mentoring, engaged learning, and preparation and placement in rewarding professional opportunities upon graduation. With a committed faculty and staff, who are constantly improving the depth and breadth of academic content and its delivery, and a robust student support infrastructure, graduates from the College will be prepared to solve complex, interdisciplinary societal and natural resource problems.

There is a clear consensus across the College that both undergraduate and graduate students are best served when there is an effective balance of challenging academic programs, delivered by engaged faculty, connected to real-world problems. These real-world problems are reinforced with internships, service learning, study abroad, co-op and other capstone experiences. Out-of-class, real-world experiences are required for all of the degree programs within the College and are highly valued by students and employers. Although these experiences can sometimes increase the time to graduation, students and faculty agree that this is a small cost relative to the educational and professional value of these experiences. Simply said, students get better jobs and are better prepared for success because of these experiences.

The College has a number of degree programs that, within the state of North Carolina, are only offered at NC State. The College also has a well-earned reputation for being student focused

and for having committed faculty. Thus, the College tends to attract a number of NC State internal transfers, as well as first-year and transfer students from outside NC State. By welcoming these internal transfer students, the College plays an important role in supporting the University's overall retention and graduation targets.

There are enormous opportunities in many of our traditional undergraduate degree programs and in environment/environmental science and sustainability. The College is committed to providing interdisciplinary perspectives and engaged-learning opportunities to all our students regardless of academic program.

In the same way that undergraduate academic programs can be improved by linking to CNR's new themes and by focusing on interdisciplinary approaches, there are numerous opportunities for building graduate programs in these areas that combine CNR strengths and partnerships across the campus.

Strong advising is essential for all students to make the most of their college experience. The College of Natural Resources is committed to proactive advising and providing all students with co-curricular and professional development opportunities that improve success.

OBJECTIVE 1: ENHANCE UNDERGRADUATE ACADEMIC PROGRAMS BY EMPHASIZING INTERDISCIPLINARITY AND LEVERAGING OPPORTUNITIES FOR COLLABORATION AND ENGAGED LEARNING ACROSS THE CURRICULUM

1. Create interdisciplinary courses that provide opportunities for all CNR students to explore the complex array of environmental, economic and societal issues that underlie the sustainability of natural resources.
2. Lead a campus-wide effort to enhance the Environmental Science B.S. degree program. Co-lead the effort to establish a First-Year Environmental Science Program.
3. Review and enhance the structure of our Fisheries, Wildlife and Conservation Biology undergraduate program to fully support (or eliminate) options in Fisheries. Implement the structural and curricular changes necessary.
4. Create engaged-learning opportunities for CNR students that are progressively more challenging and rewarding, and that can be stacked over the course of a degree.
5. Fully engage the College's forest assets (Schenck Forest, Hill Forest-Camp Slocum, Hofmann Forest) to support teaching and learning across the curriculum.
6. Enhance and support service-learning initiatives that promote stronger connections to local organizations that serve diverse communities.

OBJECTIVE 2: ENHANCE GRADUATE PROGRAMS BY CREATING NEW OPPORTUNITIES THAT EMPHASIZE CROSS-CAMPUS COLLABORATION AND INTERDISCIPLINARITY

1. Launch the new Ph.D. Program in Geospatial Analytics.
2. Review and restructure the interdisciplinary Fisheries, Wildlife and Conservation Biology graduate program to leverage more effectively the strengths of CNR, CALS and CVM.
3. Work with the Graduate School and other NC State colleges to develop and fund a university-wide Ph.D. fellowship program that cultivates cross-campus collaboration and supports interdisciplinary scholarship.

4. Seek innovative solutions to the challenges of funding graduate student tuition and benefits.
5. Develop and deliver interdepartmental graduate seminar courses, symposia and workshops that highlight and promote interdisciplinary graduate student research and problem solving.

OBJECTIVE 3: ENHANCE MENTORING AND ADVISING OF UNDERGRADUATE STUDENTS ACROSS THE COLLEGE AND CREATE CO-CURRICULAR PROGRAMS DESIGNED TO IMPROVE STUDENT OUTCOMES

1. Expand the College's honors program to include incoming students in order to attract a more diverse group of students. This expanded honors program should include a specific individual to serve as the coordinator; workshops on research, outreach ethics and methods; and activities that increase students' global awareness.
2. Broaden the capstone honors experience to include a variety of research and outreach opportunities including international options.
3. Practice proactive advising across the College to help all students make the most of their undergraduate programs.
4. Develop and support strong college-wide career services programs that will create strong relationships with potential internship sponsors and employers and help students turn internships into careers.
5. Develop and deliver targeted programs to help transfer students connect, thrive and create a timely path to graduation.

GOAL 2: ENHANCE DISCIPLINARY AND INTERDISCIPLINARY RESEARCH AND SCHOLARSHIP IN AREAS OF CORE STRENGTH AND TO ADDRESS THE COLLEGE'S INTERDISCIPLINARY THEMES

Natural resources programs are by their nature interdisciplinary, requiring a mix of natural and social science perspectives and expertise as well as a range of skills in the areas of fundamental genetics and biochemistry, applied plant and soil sciences, wildlife and fisheries ecology, economics, policy and planning, human behavior, forest and environmental engineering, watershed science and management, wood product manufacturing, and pulp and paper chemistry and engineering. The challenge is to bring diverse disciplines together in successful partnerships and to grow the depth and breadth of these collaborations to address ever more complex problems.

CNR is keenly interested in continuing to build its portfolio of interdisciplinary research to address the grand challenges of society, especially in our three thematic areas. This must be pursued both across departments within CNR and across the campus with the other colleges on the NC State campus.

Our College envisions a larger research enterprise that builds on existing strengths and the genuine excitement that comes from self-identification of research priorities. A vibrant college should be comprised of a mix of disciplinary and interdisciplinary work. Disciplinary work helps create the foundation for interdisciplinary work; and the College's faculty is actively working to

define the right balance among these work areas. A mix of capacity building and incentives are needed to build a higher-quality and higher-impact portfolio of research.

CNR's current research portfolio addresses aspects of a number of society's grand challenges, and both individuals and research teams within CNR have already established substantive cross-campus collaborations. Recent examples include the Chancellor's Faculty Excellence cluster hires, involvement in the US Department of Interior's Climate Science Center projects, and collaborations around sustainable bioenergy. The faculty believes strongly that collaborations should be developed organically through a bottom-up process, however, CNR has strong scholarship and will take a leadership role in developing collaborations that emphasize our three new themes.

OBJECTIVE 1: STRENGTHEN RESEARCH AND SCHOLARSHIP CAPACITY IN AREAS OF CORE STRENGTH ACROSS THE COLLEGE

1. Continue to recruit new faculty in core research areas in accordance with departmental strategic plans and college priorities.
2. Conduct fundamental and applied research in forest science and economics, especially in the areas of tree genetics, silviculture and productivity, to enhance long-term forest systems sustainability.
3. Develop and promote innovative technologies for production and use of sustainable materials, biochemicals and bioenergy.
4. Conduct actionable research that supports conservation of biodiversity and enhances ecological services.
5. Provide leadership in managing protected areas and creating healthy and sustainable human communities through innovative research on human interactions within the built and natural environment.

OBJECTIVE 2: ENHANCE INTERDISCIPLINARY COLLABORATION AROUND THE COLLEGE'S THREE THEMES AND IN OTHER AREAS THAT BUILD ON FACULTY STRENGTHS, INTERESTS AND EMERGING AREAS OF SOCIETAL NEED

1. Invest in training and mentoring for faculty who want to lead interdisciplinary scholarship.
2. Fund and present a college-level seminar with high-profile speakers to help increase interdisciplinary scholarship and build the College's national reputation.
3. Hold a regular internal grant competition for faculty teams to develop interdisciplinary research projects. Resources available might include a funded graduate student, faculty summer salary (if needed), and modest operating funds.
4. Promote and support College research centers and consortia to build research programs and prominence.

OBJECTIVE 3: IMPROVE INFRASTRUCTURAL CAPACITY FOR RESEARCH AND SCHOLARSHIP ACROSS THE COLLEGE

1. Invest in core facilities and shared/collaborative spaces in key areas.

2. Provide resources for the College Research office to be more proactive in supporting needs associated with larger and more complex research projects, from idea generation through grant submission.
3. Fund a modest seed grant program for faculty with new ideas who need preliminary data for proof of concept in an extramural proposal.
4. Create a fund for cost-sharing that can be used for large competitive proposals where match is required.
5. Support and reward exemplary research and scholarship efforts at every step, e.g., position descriptions, hiring, annual evaluations, reappointment, promotion and tenure, and post-tenure review.

GOAL 3: CULTIVATE EXCELLENCE AND ENHANCE DIVERSITY AMONG THE FACULTY, STAFF AND STUDENT BODY

NC State University and our College seek to be champions for diversity and inclusion. We strive for a campus where all members of our community feel welcomed and supported and the dignity of all people is respected and valued.

Our society is increasingly connected and increasingly diverse. The success of our faculty, staff and students will be directly related to how well each person is able to build strong relationships with others who may not be like them. To address the grand challenges before us, our world needs the creativity and perspectives of all people. Through active inclusion and engagement, great innovations can come, and we will achieve the excellence we seek in teaching, research and outreach.

Although the College has made good strides diversifying our faculty, staff and student body, the College community does not yet reflect the full diversity of North Carolina or the nation. This goal underscores our commitment to work aggressively toward that full diversity. We are committed to preparing our students to live and work in a diverse and global society and to helping all of our faculty, staff and students to be culturally competent and to understand the links between environment, social justice and the natural resource professions.

OBJECTIVE 1: DEVELOP, IMPLEMENT AND CONTINUOUSLY IMPROVE RECRUITMENT AND RETENTION PLANS TO ATTRACT AND RETAIN DIVERSE FACULTY AND STAFF

1. Actively recruit underrepresented groups for all open faculty and staff positions.
2. Develop and implement programs to support and train faculty and staff in key aspects of cultural competency.
3. Provide career development opportunities for faculty and staff that promote excellence, provide a path for advancement, and increase retention.
4. Use the College's Diversity Committee of faculty, staff and students to develop programs that will enhance inclusion and support across the College.

OBJECTIVE 2: ENHANCE EFFORTS TO RECRUIT AND SUPPORT A STUDENT POPULATION THAT REFLECTS THE DEMOGRAPHIC DIVERSITY OF THE STATE OF NORTH CAROLINA AND THE REGION

1. Partner with local schools and other organizations to engage youth in activities that educate them about our academic programs and professions and highlight potential career paths.
2. Continue to build and extend EnvironMentors to match local high school students with faculty and staff of the College.
3. Actively link programs to create a ladder of opportunities for youth to learn about and explore potential pathways to our College and to careers in natural resources, recreation, tourism and sport management.
4. Fund and award scholarships to attract and retain diverse students across the College.

OBJECTIVE 3: INTEGRATE DIVERSE PERSPECTIVES AND CULTURAL UNDERSTANDING ACROSS THE COLLEGE

1. Continue to develop and promote cultural competency as a core expectation of all faculty, staff and students.
2. Continue to develop courses and content that link diversity issues to the environment and natural resource professions.
3. Embed diversity into all goals and objectives for enhancing student success through educational innovation, including service learning, study abroad, undergraduate honors and research, and other efforts.

GOAL 4: STRENGTHEN AND ENHANCE INFRASTRUCTURAL SUPPORT AND ORGANIZATIONAL EXCELLENCE ACROSS THE COLLEGE

For the College to achieve its ambitious academic, research and scholarship, and engagement goals, it must have robust and efficient infrastructure systems and facilities that can support the College's priorities. These include space for all activities, communications, business services, staff organization, and training and professional development.

Space is a critical challenge for CNR. According to NC State's central metrics, CNR lacks the space it needs for its current programs. In addition, the space it has is spread too broadly across the NC State campuses. Most critically, the distance between the Wildlife and Conservation Biology faculty in Turner House and the corpus of other faculty along Western Boulevard is an impediment to collaboration and student involvement with all aspects of the College. Across all of our academic programs, there is inadequate space for graduate students, and no space to support the needs of new hires coming into the College. Quite simply, the lack of space is a barrier to both growth and success. It threatens our ability to hire the best faculty and attract the best students into our programs.

Strong communications are essential to everything we do in the College. They support recruitment of students, faculty and staff, keep alumni connected with the College after graduation, support development activities, strengthen and build partnerships, and promote the good work and reputation of the College.

The College of Natural Resources staff is distributed among a central Dean's office, our three departments, and other administrative offices. The combination of the recent budget cuts and high workloads has led us to reflect on whether the delivery of business/financial, human resource, and research administration services could be improved by finding efficiencies in structure and process. Our Business team strives to provide the highest level of business/financial/HR/research services to all units and for all the various funding sources that include: state appropriations, trust funds, agency accounts, sponsored programs, foundations, and state and federal appropriations. The complexity of budgeting and accounting has created problems and the need for more centralized orchestration of business services.

Unlike other colleges at NC State, the work of CNR's Development office has been divided between fundraising for the College and overseeing and managing Hofmann Forest and the College's other forest assets. The College has recreated its Advancement office with a focus on strong communications, major gift fundraising, alumni and donor relations, and developing and supporting a Natural Resources Foundation Board that can serve as a critical sounding board and external advocate for the College. A new Executive Director of Forest Assets will handle all forest management activities, optimizing their value in supporting the mission and vision of the College.

OBJECTIVE 1: DEVELOP AND IMPLEMENT A LONG-TERM COMPREHENSIVE SPACE PLAN FOR THE COLLEGE

1. Continue to apply the college-wide space criteria to all office, laboratory and other spaces across the College.
2. Identify and pursue opportunities for renovating current space allocated to the College to better meet needs.
3. Identify the needs for new space and develop specific plans for a new building that will meet those needs.
4. Identify and obtain the resources necessary to implement the long-term comprehensive space plan for the College.
5. Create and equip new collaborative spaces and give explicit priority to interdisciplinary and/or interdepartmental working groups of faculty and graduate students.

OBJECTIVE 2: CLARIFY ROLES AND RESPONSIBILITIES OF BUSINESS OPERATIONS STAFF AND PROVIDE PROACTIVE SERVICE TO ALL PARTS OF THE COLLEGE

1. Continue to improve the Business Operations structure of the College to provide excellent service at all times.
2. Continue to enhance the College's Business Services web site and directory to provide useful information and links to services.
3. Build and implement additional Service Now modules to track services and ensure needs are met in a timely manner.
4. Provide targeted training for all employees, and work to retain employees that deliver excellent service across the College.
5. Continue to link grant and contract management with business and finance at all levels to provide proactive management of budgets and compliance requirements.

OBJECTIVE 3: PROVIDE BUDGET TRANSPARENCY AND ACCOUNTABILITY BY REGULARLY SHARING BUDGET INFORMATION WITH COLLEGE FACULTY AND STAFF

1. Continue to share college-wide data at All-College Meetings and whenever possible.
2. Support departmental efforts to share information with faculty and staff about resource distribution and decision-making.

OBJECTIVE 4: IMPLEMENT A COMPREHENSIVE AND INTEGRATED COMMUNICATIONS PLAN THAT ENHANCES THE COLLEGE'S REPUTATION AND IMPROVES OUR EFFECTIVENESS

1. Continuously write and distribute stories about the teaching, research and outreach of the College in local, regional and national outlets.
2. Improve communications to prospective students and the campus community to attract first-time first-year and transfer students to the College using social media, print and other materials.
3. Improve communications to alumni and potential donors to enhance the College's reputation, build support, and increase fundraising success.
4. Develop new internal communications strategies to connect the College community, improve operational efficiency, and enhance engagement and morale.

OBJECTIVE 5: PLAN AND IMPLEMENT A COLLEGE ADVANCEMENT EFFORT THAT SUPPORTS THE STRATEGIC PLAN AND SIGNIFICANTLY ENHANCES EXTERNAL RELATIONS AND INCREASES DONATIONS

1. Develop and implement a plan to increase alumni engagement and build broader external support for the College.
2. Identify and cultivate a network of potential donors to the College.
3. Implement a capital campaign for the College consistent with this strategic plan and University messaging and goals.
4. Build a strong and diverse Foundation board that actively advances the College.

GOAL 5: EXPAND AND FOSTER LOCAL AND GLOBAL PARTNERSHIPS THAT CREATE POSITIVE CHANGE AND CONTRIBUTE TO ECOLOGICAL AND SOCIOECONOMIC SUSTAINABILITY

CNR believes strongly in NC State's Land Grant Mission. CNR has a broad spectrum of external constituencies; and our extension and engagement programs are highly valued by partners in government, private sector and non-profits. CNR serves some of the largest economic sectors in the state of North Carolina, including the state's largest manufacturing industry, forest and wood products, the largest service sector, tourism and golf, and more than half a million private forest landowners. While these sectors have changed over the past decade, the long-term growth projections for North Carolina clearly show future demand for wood housing, recreation, freshwater and other products that require natural resources will only

increase, highlighting the need for innovative solutions to complex problems of natural resource management coupled with human health and well-being.

The College's many partnerships keep our academic programs strong, offer real-world internships, co-op opportunities and future employment to our students, and ensure that our research is relevant and shared with stakeholders who can use it. Building on our strengths, CNR has unique opportunities to create high-impact programs focused on sustainability, water, the urban-forest interface, bioenergy, and climate change adaptation and resiliency initiatives.

All CNR faculty members are encouraged to actively pursue opportunities to use their professional insights to solve real-world problems. These college-wide efforts are based on the long history of forestry as an applied science and on the current interests of the faculty who are motivated and engaged in many real-world problems.

Examples of the synergistic benefits of applied research and teaching developed by faculty with and without traditional extension appointments, but directed at specific industry and community problems, include market-based conservation initiatives with the military and other partners, biomass production on marginal lands such as municipal waste application sites, and evaluation of various payments programs for ecosystem services. Other examples include recreation resource impact monitoring, new programs to promote physical activity and community wellbeing, and assistance with high-efficiency biomaterials manufacturing and life-cycle analysis. In return, the research and teaching interests of many faculty are refined and improved as they better understand the real-world problems communities, and industrial and government partners face.

OBJECTIVE 1: INCREASE OPPORTUNITIES FOR ALL COLLEGE FACULTY, STAFF AND STUDENTS TO WORK WITH LOCAL PARTNERS ON APPLIED PROBLEMS

1. Create cross-campus and inter-institutional (e.g., Duke, UNC-CH, RTI, USDHHS and USDA) collaborations that lead to solutions to environmental and natural resource grand challenges.
2. Develop and apply tools for participatory research with stakeholders throughout North Carolina and beyond.
3. Build strategic local partnerships that support engaged learning and create opportunities for students.

OBJECTIVE 2: STRENGTHEN AND EXPAND OUR PARTNERSHIPS WITH THE COOPERATIVE EXTENSION SERVICE SYSTEM AND OTHER STATE PARTNERS

1. Strengthen and expand our participation in the NC Cooperative Extension Service through program development, agent-specialist partnerships, and other collaborative opportunities that strengthen our cross-college relationships and increase our impacts.
2. Document and prioritize the College's involvement in existing regional and local economic and community development groups and associations.

OBJECTIVE 3: FACILITATE, DEVELOP AND ENHANCE GLOBAL PARTNERSHIPS THAT BUILD THE REPUTATION OF THE COLLEGE AND SUPPORT OUR STRATEGIC TEACHING, RESEARCH AND ENGAGEMENT PRIORITIES

1. Develop an inventory of the College's international activities and a clearinghouse to help connect faculty and students to opportunities abroad in areas of core strength and interdisciplinary excellence.
2. Encourage, coordinate and invest in strategic international partnerships that facilitate faculty and student exchanges and long-term research and engagement, working collaboratively with OIA and other university offices.
3. Create an international fellowship fund that supports graduate student research abroad and supports international team research in areas of core strength and interdisciplinary excellence.

OBJECTIVE 4: ENHANCE COLLEGE CAPACITY FOR TRANSLATIONAL RESEARCH AND ENGAGEMENT WITH STRATEGIC LOCAL AND GLOBAL PARTNERS

1. Support public-private partnerships that align with the College strategic plan—using, for example, industry cooperatives, college research centers and consortia.
2. Engage external constituents in strategic planning, program development and assessment. Where appropriate, develop and coordinate formal advisory committees to provide focused guidance and support for key initiatives.
3. Build and fund programs that help synthesize knowledge, identify key questions, and provide a basis for integrative publications and interdisciplinary proposals.
4. Encourage faculty and students to publish plain language summaries of their work and explore mechanisms to assist with translating research results into policy and practice.
5. Using the highly successful "BioResources Journal" as a model, explore mechanisms to share research results internationally and raise the profile of the College in key areas.

RESOURCES NEEDED TO IMPLEMENT OUR PROGRAMMATIC GOALS AND OBJECTIVES

Although some of the College's strategic goals and objectives can be achieved simply by changing the way we work, many will require the investment of new – or redirected – fiscal and human resources.

As a College, **we are committed to ongoing evaluation of our efficiency and effectiveness and redistributing our current resources to meet part of the need associated with our strategic priorities.**

The following priorities will be implemented within our current resources:

- Small-scale renovations following our space plan.
- Programmatic initiatives around student success and diversity.

- Disciplinary hires in the departments for positions that have been vacated and are being refilled in accordance with departmental staffing plans and college priorities.
- Small-scale investments in building research capacity in areas of core strength and interdisciplinary themes.

Our highest priorities for new state funds are:

- Faculty and staff salaries (increases and new positions).
- Investments in doctoral education.
- Significant renovation to create more useable space, following the priorities in our space plan.
- Investments in the Environmental Sciences program.

We also hope to increase the external funds we can bring to our work, through our Advancement activities and NC State's capital campaign. In particular, the following priorities will be the focus of directed fundraising, following the four areas tentatively developed for the capital campaign:

1. Student Support
 - Fellowships for graduate students
 - High-impact student experiences, including internships, undergraduate research and study abroad
2. Faculty Support
 - Endowed faculty positions
 - Start-up package and equipment fund
3. Program Support
 - Natural Resources speaker series
 - Synthesis Centers in Sustainability, Land and Water, and Urban Ecosystems
4. Capital Support
 - Biltmore Hall renovation
 - Hill Forest – renovations and upgrades
 - Schenck Forest – full-service outdoor education center
 - A new building

MEASURES FOR SUCCESS

The following metrics will be used to assess our progress toward meeting our strategic goals:

ACHIEVING EXCELLENCE IN THREE INTERDISCIPLINARY THEMES

- Distinguished professorships established
- Graduate fellowships supported (Ph.D.)
- Percent research portfolio related to interdisciplinary themes
- Number of publications in high-impact journals that are related to interdisciplinary themes and coauthored by more than one college author

GOAL 1: ENHANCE STUDENT SUCCESS THROUGH EDUCATIONAL INNOVATION

- Undergraduate first-year retention rate
- Undergraduate six-year graduation rate
- Graduate degree completion rates
- Degrees awarded by level
- Participation in engaged-learning activities (summer camp, study abroad, undergraduate research, internships, co-ops)

GOAL 2: INCREASE DISCIPLINARY AND INTERDISCIPLINARY RESEARCH AND SCHOLARSHIP IN AREAS OF CORE STRENGTH AND INTERDISCIPLINARY THEMATIC AREAS

- Number of tenured and tenure track faculty, non-tenure track faculty
- Faculty awards and national recognitions (NAS, NSF Career Awards, APLU Award for Excellence in Extension, BOG Teaching Award, etc.)
- Research expenditures
- Percent research portfolio related to interdisciplinary themes
- Percent research portfolio in large, collaborative awards (three or more faculty members, \geq \$250,000)
- Number of publications in high-impact journals
- Follow-up proposals and funded projects from internal funding

GOAL 3: CULTIVATE EXCELLENCE AND ENHANCE DIVERSITY AMONG THE FACULTY, STAFF AND STUDENT BODY

- Demographics of the faculty, staff and student body
- Numbers of faculty in underrepresented groups; percentage of these faculty tenured and promoted

- Numbers of students in underrepresented groups; graduation rates of these students
- Measure of college climate and collegiality (COACHE survey)
- Number of courses with diversity content
- Awards received by faculty, staff and students

GOAL 4: STRENGTHEN AND ENHANCE INFRASTRUCTURAL SUPPORT AND ORGANIZATIONAL EXCELLENCE ACROSS THE COLLEGE

- Investments in renovation – or space renovated
- College stories featured in national and international media
- Social media and web site statistics
- Total gift receipts annually
- Total pledges and commitments annually
- Number of donors
- Endowment total (NR Foundation and Endowment Fund)

GOAL 5: EXPAND AND FOSTER LOCAL AND GLOBAL PARTNERSHIPS THAT CREATE POSITIVE CHANGE AND CONTRIBUTE TO ECOLOGICAL AND SOCIOECONOMIC SUSTAINABILITY

- Number of faculty-led courses abroad
- Number of students participating in study abroad
- Number of students working with community partners
- Number of public-private partnerships with formal MOUs
- Number of proposals that involve international collaborations
- Number of CNR Extension faculty and staff engaged in NC CES program teams
- Number of funded research projects that include community engagement – in NC, in the US outside NC, and internationally
- Percent of total project funds committed to community engagement – in NC, in the US outside NC, and internationally

THE CNR STRATEGIC PLAN ALIGNMENT WITH PATHWAY TO THE FUTURE

- NC STATE Goal 1: Enhance the success of our students through educational innovation.**
NC STATE Goal 2: Enhance scholarship and research by investing in faculty and infrastructure.
NC STATE Goal 3: Enhance interdisciplinary scholarship to address the grand challenges of society.
NC STATE Goal 4: Enhance organizational excellence by creating a culture of constant improvement.
NC STATE Goal 5: Enhance local and global engagement through focused strategic partnerships.

Achieving Excellence in Three Thematic Areas	NC STATE GOALS					START YEAR				Responsibility
	1	2	3	4	5	FY 17	FY 18	FY 19	FY 20	
1. Fund and establish one named distinguished professorship in each of our three priority areas		X					X			Dean, Assistant Dean for College Advancement
2. Fund and recruit 12-15 new Ph.D. students to conduct interdisciplinary research in our three priority areas.	X		X			X				Dean, Assistant Dean for College Advancement
3. Create Synthesis Centers that bring together interdisciplinary expertise to find solutions to natural resource challenges in Sustainability, Land and Water, and Urban Ecosystems.	X		X					X		Dean, Assistant Dean for College Advancement
4. Incentivize and build faculty capacity for interdisciplinary research in all three thematic areas.		X				X				College Leadership Team
GOAL 1: ENHANCE STUDENT SUCCESS THROUGH EDUCATIONAL INNOVATION										
OBJECTIVE 1: ENHANCE UNDERGRADUATE ACADEMIC PROGRAMS BY EMPHASIZING INTERDISCIPLINARITY AND LEVERAGING OPPORTUNITIES FOR COLLABORATION AND ENGAGED LEARNING ACROSS THE CURRICULUM	X					X				Associate Dean for Academic Affairs

GOALS, OBJECTIVES AND STRATEGIC ACTIONS	NC STATE GOALS					START YEAR				Responsibility
	1	2	3	4	5	FY 17	FY 18	FY 19	FY 20	
1. Create interdisciplinary courses that provide opportunities for all CNR students to explore the complex array of environmental, economic and societal issues that underlie the sustainability of natural resources.										
2. Lead a campus-wide effort to enhance the Environmental Science B.S. degree program. Co-lead the effort to establish a First-Year Environmental Science Program.										
3. Review and enhance the structure of our Fisheries, Wildlife and Conservation Biology undergraduate program to fully support (or eliminate) options in Fisheries. Implement the structural and curricular changes necessary.										
4. Create engaged-learning opportunities for CNR students that are progressively more challenging and rewarding, and that can be stacked over the course of a degree.										
5. Fully engage the College's forest assets (Schenck Forest, Hill Forest-Camp Slocum, Hofmann Forest) to support teaching and learning across the curriculum.										
6. Enhance and support service-learning initiatives that promote stronger connections to local organizations that serve diverse communities.										
OBJECTIVE 2: ENHANCE GRADUATE PROGRAMS BY CREATING NEW OPPORTUNITIES THAT EMPHASIZE CROSS-CAMPUS COLLABORATION AND INTERDISCIPLINARITY	X		X			X				Associate Dean for Academic Affairs, Directors of Graduate Programs
6. Launch the new Ph.D. Program in Geospatial Analytics.										
7. Review and restructure the interdisciplinary Fisheries, Wildlife and Conservation Biology graduate program to leverage more effectively the strengths of CNR, CALS and CVM.										

GOALS, OBJECTIVES AND STRATEGIC ACTIONS	NC STATE GOALS					START YEAR				Responsibility
	1	2	3	4	5	FY 17	FY 18	FY 19	FY 20	
8. Work with the Graduate School and other NC State colleges to develop and fund a university-wide Ph.D. fellowship program that cultivates cross-campus collaboration and supports interdisciplinary scholarship.										
9. Seek innovative solutions to the challenges of funding graduate student tuition and benefits.										
10. Develop and deliver interdepartmental graduate seminar courses, symposia and workshops that highlight and promote interdisciplinary graduate student research and problem-solving.										
OBJECTIVE 3: ENHANCE MENTORING AND ADVISING OF UNDERGRADUATE STUDENTS ACROSS THE COLLEGE AND CREATE CO-CURRICULAR PROGRAMS DESIGNED TO IMPROVE STUDENT OUTCOMES	X					X				Associate Dean for Academic Affairs, Department Heads
1. Expand the College's honors program to include incoming students in order to attract a more diverse group of students. This expanded honors program should include a specific individual to serve as the coordinator; workshops on research and outreach ethics and methods; and activities that increase students' global awareness.										
2. Broaden the capstone honors experience to include a variety of research and outreach opportunities including international options.										
3. Practice proactive advising across the College to help all students make the most of their undergraduate programs.										
4. Develop and support strong college-wide career services programs that will create strong relationships with potential internship sponsors and employers and help students turn internships into careers.										
5. Develop and deliver targeted programs to help transfer students connect, thrive and create a timely path to graduation.										

GOALS, OBJECTIVES AND STRATEGIC ACTIONS	NC STATE GOALS					START YEAR				Responsibility
	1	2	3	4	5	FY 17	FY 18	FY 19	FY 20	
GOAL 2: ENHANCE DISCIPLINARY AND INTERDISCIPLINARY RESEARCH AND SCHOLARSHIP IN AREAS OF CORE STRENGTH AND TO ADDRESS THE COLLEGE'S INTERDISCIPLINARY THEMES										
OBJECTIVE 1: STRENGTHEN RESEARCH AND SCHOLARSHIP CAPACITY IN AREAS OF CORE STRENGTH ACROSS THE COLLEGE		X	X				X			Associate Dean for Research, Department Heads
1. Continue to recruit new faculty in core research areas in accordance with departmental strategic plans and college priorities.										
2. Conduct fundamental and applied research in forest science and economics, especially in the areas of tree genetics, silviculture and productivity, to enhance long-term forest systems sustainability.										
3. Develop and promote innovative technologies for production and use of sustainable materials, biochemicals and bioenergy.										
4. Conduct actionable research that supports conservation of biodiversity and enhances ecological services.										
5. Provide leadership in managing protected areas and creating healthy and sustainable human communities through innovative research on human interactions within the built and natural environment.										
OBJECTIVE 2: ENHANCE INTERDISCIPLINARY COLLABORATION AROUND THE COLLEGE'S THREE THEMES AND IN OTHER AREAS THAT BUILD ON FACULTY STRENGTHS, INTERESTS AND EMERGING AREAS OF SOCIETAL NEED		X	X				X			Associate Dean for Research, Department Heads
1. Invest in training and mentoring for faculty who want to lead interdisciplinary scholarship.										
2. Fund and present a college-level seminar with high-profile speakers to help increase interdisciplinary scholarship and build the College's national reputation.										

GOALS, OBJECTIVES AND STRATEGIC ACTIONS	NC STATE GOALS					START YEAR				Responsibility
	1	2	3	4	5	FY 17	FY 18	FY 19	FY 20	
3. Hold a regular internal grant competition for faculty teams to develop interdisciplinary research projects. Resources available might include a funded graduate student, faculty summer salary (if needed), and modest operating funds.										
4. Promote and support College research centers and consortia to build research programs and prominence.										
OBJECTIVE 3: IMPROVE INFRASTRUCTURAL CAPACITY FOR RESEARCH AND SCHOLARSHIP ACROSS THE COLLEGE		X	X			X				Dean, Associate Dean for Research, Department Heads
1. Invest in core facilities and shared/collaborative spaces in key areas.										
2. Provide resources for the College Research office to be more proactive in supporting needs associated with larger and more complex research projects, from idea generation through grant submission.										
3. Fund a modest seed grant program for faculty with new ideas who need preliminary data for proof of concept in an extramural proposal.										
4. Create a fund for cost-sharing that can be used for large competitive proposals where match is required.										
5. Support and reward exemplary research and scholarship efforts at every step, e.g., position descriptions, hiring, annual evaluations, reappointment, promotion and tenure, and post-tenure review.										
GOAL 3: CULTIVATE EXCELLENCE AND ENHANCE DIVERSITY AMONG THE FACULTY, STAFF AND STUDENT BODY										
OBJECTIVE 1: DEVELOP, IMPLEMENT AND CONTINUOUSLY IMPROVE RECRUITMENT AND RETENTION PLANS TO ATTRACT AND RETAIN DIVERSE FACULTY AND STAFF.		X	X	X		X				College Leadership Team

GOALS, OBJECTIVES AND STRATEGIC ACTIONS	NC STATE GOALS					START YEAR				Responsibility
	1	2	3	4	5	FY 17	FY 18	FY 19	FY 20	
1. Actively recruit underrepresented groups for all open faculty and staff positions.										
2. Develop and implement programs to support and train faculty and staff in key aspects of cultural competency.										
3. Provide career development opportunities for faculty and staff that promote excellence, provide a path for advancement, and increase retention.										
4. Use the College's Diversity Committee of faculty, staff and students to develop programs that will enhance inclusion and support across the College.										
OBJECTIVE 2: ENHANCE EFFORTS TO RECRUIT AND SUPPORT A STUDENT POPULATION THAT REFLECTS THE DEMOGRAPHIC DIVERSITY OF THE STATE OF NORTH CAROLINA AND THE REGION	X					X				Associate Dean for Academic Affairs, Director, Community for Diversity
1. Partner with local schools and other organizations to engage youth in activities that educate them about our academic programs and professions and highlight potential career paths.										
2. Continue to build and extend EnvironMentors to match local high school students with faculty and staff of the College.										
3. Actively link programs to create a ladder of opportunities for youth to learn about and explore potential pathways to our College and to careers in natural resources, recreation, tourism and sport management.										
4. Fund and award scholarships to attract and retain diverse students across the College.										
OBJECTIVE 3: INTEGRATE DIVERSE PERSPECTIVES AND CULTURAL UNDERSTANDING ACROSS THE COLLEGE	X	X		X		X				College Leadership Team
1. Continue to develop and promote cultural competency as a core expectation of all faculty, staff and students.										

GOALS, OBJECTIVES AND STRATEGIC ACTIONS	NC STATE GOALS					START YEAR				Responsibility
	1	2	3	4	5	FY 17	FY 18	FY 19	FY 20	
2. Continue to develop courses and content that link diversity issues to the environment and natural resource professions.										
3. Embed diversity into all goals and objectives for enhancing student success through educational innovation, including service learning, study abroad, undergraduate honors and research, and other efforts.										
GOAL 4: STRENGTHEN AND ENHANCE INFRASTRUCTURAL SUPPORT AND ORGANIZATIONAL EXCELLENCE ACROSS THE COLLEGE										
OBJECTIVE 1: DEVELOP AND IMPLEMENT A LONG-TERM COMPREHENSIVE SPACE PLAN FOR THE COLLEGE				X		X				Dean, Department Heads, Assistant Dean for Finance and Business
1. Continue to apply the College-wide space criteria to all office, laboratory, and other spaces across the College.										
2. Identify and pursue opportunities for renovating current space allocated to the College to better meet needs.										
3. Identify the needs for new space and develop specific plans for a new building that will meet those needs.										
4. Identify and obtain the resources necessary to implement the long-term comprehensive space plan for the College.										
5. Create and equip new collaborative spaces and give explicit priority to interdisciplinary and/or interdepartmental working groups of faculty and graduate students.										

GOALS, OBJECTIVES AND STRATEGIC ACTIONS	NC STATE GOALS					START YEAR				Responsibility
	1	2	3	4	5	FY 17	FY 18	FY 19	FY 20	
OBJECTIVE 2: CLARIFY ROLES AND RESPONSIBILITIES OF BUSINESS OPERATIONS STAFF AND PROVIDE PROACTIVE SERVICE TO ALL PARTS OF THE COLLEGE				X		X				Assistant Dean for Finance and Business
1. Continue to improve the Business Operations structure of the College to provide excellent service at all times.										
2. Continue to enhance the College's Business Services web site and directory to provide useful information and links to services.										
3. Build and implement additional Service Now modules to track services and ensure needs are met in a timely manner.										
4. Provide targeted training for all employees, and work to retain employees that deliver excellent service across the College.										
5. Continue to link grant and contract management with business and finance at all levels to provide proactive management of budgets and compliance requirements.										
OBJECTIVE 3: PROVIDE BUDGET TRANSPARENCY AND ACCOUNTABILITY BY REGULARLY SHARING BUDGET INFORMATION WITH COLLEGE FACULTY AND STAFF				X		X				Dean, Assistant Dean for Finance and Business
1. Continue to share college-wide data at All-College Meetings and whenever possible.										
2. Support departmental efforts to share information with faculty and staff about resource distribution and decision-making.										
OBJECTIVE 4: IMPLEMENT A COMPREHENSIVE AND INTEGRATED COMMUNICATIONS PLAN THAT ENHANCES THE COLLEGE'S REPUTATION AND IMPROVES OUR EFFECTIVENESS				X		X				Assistant Dean for College Advancement
1. Continuously write and distribute stories about the teaching, research and outreach of the College in local, regional and national outlets.										

GOALS, OBJECTIVES AND STRATEGIC ACTIONS	NC STATE GOALS					START YEAR				Responsibility
	1	2	3	4	5	FY 17	FY 18	FY 19	FY 20	
2. Improve communications to prospective students and the campus community to attract first-time first-year and transfer students to the College using social media, print and other materials.										
3. Improve communications to alumni and potential donors to enhance the College's reputation, build support, and increase fundraising success.										
4. Develop new internal communications strategies to connect the College community, improve operational efficiency, and enhance engagement and morale.										
OBJECTIVE 5: PLAN AND IMPLEMENT A COLLEGE ADVANCEMENT EFFORT THAT SUPPORTS THE STRATEGIC PLAN AND SIGNIFICANTLY ENHANCES EXTERNAL RELATIONS AND INCREASES DONATIONS				X		X				Dean, Assistant Dean for College Advancement
1. Develop and implement a plan to increase alumni engagement and build broader external support for the College.										
2. Identify and cultivate a network of potential donors to the College.										
3. Implement a capital campaign for the College consistent with this strategic plan and University messaging and goals.										
4. Build a strong and diverse Foundation board that actively advances the College.										
GOAL 5: EXPAND AND FOSTER LOCAL AND GLOBAL PARTNERSHIPS THAT CREATE POSITIVE CHANGE AND CONTRIBUTE TO ECOLOGICAL AND SOCIOECONOMIC SUSTAINABILITY										
OBJECTIVE 1: INCREASE OPPORTUNITIES FOR ALL COLLEGE FACULTY, STAFF AND STUDENTS TO WORK WITH LOCAL PARTNERS ON APPLIED PROBLEMS	X				X	X				College Leadership Team

GOALS, OBJECTIVES AND STRATEGIC ACTIONS	NC STATE GOALS					START YEAR				Responsibility
	1	2	3	4	5	FY 17	FY 18	FY 19	FY 20	
1. Create cross-campus and inter-institutional (e.g., Duke, UNC-CH, RTI, USDHHS and USDA) collaborations that lead to solutions to environmental and natural resource grand challenges.										
2. Develop and apply tools for participatory research with stakeholders throughout North Carolina and beyond.										
3. Build strategic local partnerships that support engaged learning and create opportunities for students.										
OBJECTIVE 2: STRENGTHEN AND EXPAND OUR PARTNERSHIPS WITH THE COOPERATIVE EXTENSION SERVICE SYSTEM AND OTHER STATE PARTNERS					X	X				Associate Dean for Extension
1. Strengthen and expand our participation in the NC Cooperative Extension Service through program development, agent-specialist partnerships, and other collaborative opportunities that strengthen our cross-college relationships and increase our impacts.										
2. Document and prioritize the College's involvement in existing regional and local economic and community development groups and associations.										
OBJECTIVE 3: FACILITATE, DEVELOP AND ENHANCE GLOBAL PARTNERSHIPS THAT BUILD THE REPUTATION OF THE COLLEGE AND SUPPORT OUR STRATEGIC TEACHING, RESEARCH AND ENGAGEMENT PRIORITIES					X	X				College Leadership Team
1. Develop an inventory of the College's international activities and a clearinghouse to help connect faculty and students to opportunities abroad in areas of core strength and interdisciplinary excellence.										
2. Encourage, coordinate and invest in strategic international partnerships that facilitate faculty and student exchanges and long-term research and engagement, working collaboratively with OIA and other university offices.										

GOALS, OBJECTIVES AND STRATEGIC ACTIONS	NC STATE GOALS					START YEAR				Responsibility
	1	2	3	4	5	FY 17	FY 18	FY 19	FY 20	
3. Create an international fellowship fund that supports graduate student research abroad and supports international team research in areas of core strength and interdisciplinary excellence.										
OBJECTIVE 4: ENHANCE COLLEGE CAPACITY FOR TRANSLATIONAL RESEARCH AND ENGAGEMENT WITH STRATEGIC LOCAL AND GLOBAL PARTNERS					X	X				College Leadership Team
1. Support public-private partnerships that align with the College strategic plan. For example, industry cooperatives, college research centers and consortia.										
2. Engage external constituents in strategic planning, program development and assessment. Where appropriate, develop and coordinate formal advisory committees to provide focused guidance and support for key initiatives.										
3. Build and fund programs that help synthesize knowledge, identify key questions, and provide a basis for integrative publications and interdisciplinary proposals.										
4. Encourage faculty and students to publish plain language summaries of their work and explore mechanisms to assist with translating research results into policy and practice.										
5. Using the highly successful “BioResources Journal” as a model, explore mechanisms to share research results internationally and raise the profile of the College in key areas.										