NC STATE UNIVERSITY

NORTH CAROLINA STATE UNIVERSITY

ANNUAL SUSTAINABILITY REPORT

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"Most worthwhile achievements are the result of many little things done in a single direction."

- Nido Qubein

A Letter from the Campus Environmental Sustainability Team

NC State University continues to advance sustainability on multiple fronts. Recent efforts to advance sustainability include: 1) signing the American College and University Presidents Climate Commitment; 2) a commitment for new campus buildings to meet LEED Silver Certification; and 3) the creation of new courses addressing sustainability issues.

As part of this Annual Sustainability Report, we want to update you on the new document, *Foundations for Advancing Sustainability; A Strategic Plan for NC State University*, hereafter referred to as the Sustainability Strategic Plan (SSP). The Provost and the Vice Chancellor for Finance and Business requested that the Campus Environmental Sustainabilty Team (CEST) develop the SSP. The work of the CEST included creating working groups, organizing a rigorous meeting schedule, and creating a process of planning and writing that was open to all those at the University. The goal of the SSP was to further institutionalize sustainability as a core value for our academic community, our partners, and campus neighborhood. The SSP positions the University among the national academic institutions taking leading roles for advancing sustainability on their campuses.

The SSP provides a foundation that creates and embraces a culture of sustainability. This sustainability culture will extend to all manners of campus activities, including campus operations, academic and research programs, engagement activities, and the personal behaviors of each individual. The SSP establishes the foundation by engaging students, faculty members, and staff members in the planning process. The community that created the SSP also reflects diversity, fiscal responsibility, and institutional values that extend beyond campus boundaries.

Within this sustainability community and culture, every campus member has a role. Faculty members will develop courses, curricula, and research needed for students to become literate about sustainability. Students will take sustainability forward as a way of thinking in careers and post-graduate education. Staff members will make day-to-day decisions in the operations and efficient use of resources at the University. In addition, all those at the University will make personal decisions on how their activities on campus play into the larger effort to make sustainability a core, institutional value. Most importantly, the University is now focused more than ever on leveraging the activities of discovery, learning, and engagement to produce new technologies and industries that will employ workers, align with a new economy, and create value for the wise use of energy and other resources.

The progress noted in this Annual Sustainability Report is evidence of the power that results when the University community joins hands to build the foundational values of sustainability into our culture. As Co-Sustainability Officers for the University we ask that you join us in this new community and participate in the endeavor to advance sustainability at NC State University.

Jack K Colby
Assistant Vice Chancellor
for Facilities Operations
CEST Co-Chair

William E. Winner
Professor, Department of Forestry and Environmental Resources
Coordinator, Environmental Sciences Academic Program
Coordinator, University Energy Council
CEST Co-Chair

In the fall of 2009, William Winner was appointed the Co-Sustainability Officer and Co-Chair for the Campus Environmental Sustainability Team. Jack Colby is also the Co-Sustainability Officer and Co-Chair. The appointments create a balanced leadership for sustainability at NC State and allow for expertise in both academics and operations to advance campus sustainability efforts.

A Note From the Sustainability Office

In following Chancellor Woodson's vision, NC State is continuing its path towards excellence in being "Locally Responsive. Globally Engaged." This vision is driving how NC State incorporates some of the most critical issues of modern times, with sustainability being one of these issues. What NC State does locally for sustainability, will make a large difference globally. Given that each local community and campus has specific characteristics, each will chart its own path towards sustainability.

NC State's path toward sustainability is resulting in a 44% decrease in water consumption since 2002. Last year campus energy consumption decreased even with the addition of one million gross square feet of building space. Campus is reaching the point where reusing, recycling, and diverting materials is overtaking waste sent to landfill. Enrollment in sustainability-related courses and research projects is increasing. These are only a few examples of how NC State is addressing sustainability locally. These local lessons learned apply to the global knowledge about sustainability. Additionally the cumulative impact of local action will result in positive global impact.

NC State is embracing sustainability as a part of the University's Wolfpack pride. Building upon these successes and moving NC State to become a leader in sustainability, is the responsibility of the entire campus. There are countless ways anyone can play a role in these efforts, such as joining the Campus Environmental Sustainability Team that is setting the campus vision and direction for sustainability, taking individual action, or initiating a sustainability project. NC State is an example of a community that is locally responsible and globally engaged around the issue of sustainability.

Tracy Dixon
Sustainability Director,
University Sustainability Office

A view of the belltower and downtown Raleigh from NC State campus. Photo Credit: Roger Winstead

Introduction

Each year as we collect sustainable projects, initiatives, and accomplishments for this report, one very important fact emerges - NC State is heading in the right direction. From impassioned grassroots efforts to University-wide commitments, NC State is making progress towards becoming a more sustainable University. The report features only a snapshot of success stories about sustainability on campus and yet it is clear that the University is making positive headway. Though NC State is reaching important milestones, the end of the road is not yet visible and the University must continue to adjust the compass towards a sustainable future.

One of the keys to successful sustainability efforts is the active involvement of a diverse group of campus participants. The role of the Campus Environmental Sustainability Team (CEST) is to help take sustainability to the next level at NC State. With the re-organization of the CEST, came the opportunity to engage a more comprehensive representation of the campus community. Last year, the CEST and the eight working groups began the important task of populating the groups with students, staff, faculty, and community members. In total, over 150 individuals participated in the working groups.

The first task of the CEST and its working groups was to develop a Sustainability Strategic Plan (SSP) for the campus to guide decision making and integrate sustainability into the framework of the University. Planning began in the fall of 2009 as the groups worked to create strategies that were achievable in a five year time frame.

The result is using the SSP as a foundation, CEST and the working groups assisted in the development of campus' Climate Action Plan (CAP). The CAP is a requirement of the American College and University President's Climate Commitment, a

pledge to work towards climate neutrality, which NC State signed in 2008. With the assistance of a consultant team, the CEST working groups were asked to look at their existing five year strategies through a carbon reduction lens as well as extend to a 40 year time frame.

In late spring, Energy Management and CEST began creating a Strategic Energy Management Plan (EMP) focused on conserving energy, improving efficiency, and reducing utility costs. The EMP addresses 41 strategic energy management components across five program areas. Essentially, the EMP provides a set of detailed goals for addressing energy use, also one of the primary focus areas of the SSP and the CAP.

In order to embrace the overlapping focus areas in each of the three planning efforts, an overarching document creates a road map for sustainability at the university and addresses the immediate need to take action to advance sustainability. The document entitled "Creating Our Future; Advancing Sustainability at NC State" and commonly referred to as the SSP, incorporates the CAP and Strategic Energy Plan as supporting documents. The SSP sets a vision for growing the intellectual and scholastic scope of the University while using fewer resources.

One of the important by-products of creating a comprehensive SSP is a collaborative community. The CEST and the working groups are creating the foundation of a new community and culture at NC State where students, faculty members, staff members, and community members work together towards a common set of sustainability goals. The 2009-2010 Annual Sustainability Report showcases examples of how NC State is advancing sustainability. Empowered by previous success, with the SSP as a road map, NC State is advancing sustainability.

Academics

New major, minor, and courses in Environmental Sciences

MBA STUDENTS THINK OUTSIDE THE BOX

Over the course of the past two academic years Lynn Ennis, associate director of the Gregg Museum of Art and Design and NC State instructor, has asked the University Sustainability Office to present a challenge to her Jenkins Masters of Business Administration (MBA) creativity class. A student's final grade is based on their work in small groups to develop 'outside the box' solutions to challenging organizational issues.

During fall 2009 seven individual groups chose to tackle the development of a new energy awareness campaign for NC State. The most creative solution, Change Your State, was further developed by the office with the help of Energy Management and the Communications working group of the CEST. The final campaign integrated elements of each MBA proposal and a campus-wide initiative is launching in 2010 - 2011 to reduce NC State's electric demand by 5%, which would result in a savings of $1 million.

FIRST GRADUATES OF RENEWABLE ELECTRIC ENERGY SYSTEMS CERTIFICATE PROGRAM ANNOUNCED

The Future Renewable Electric Energy Delivery and Management (FREEDM) Systems Center announced the first students to complete the Renewable Electric Energy Systems (REES) Graduate Certificate Program. Dr. Mesut Baran, college program director, presented the students with a certificate. Vivek Balasubramanian, Hossein Hooshyar, Zhuoning Liu, and Mengbin Yang successfully completed a minimum of 12 hours of coursework.

All students must take a course that focuses on the principles of renewable based generation technologies such as solar, wind, and fuel cells and integration into the power grid. Students have the flexibility to choose three other courses from a list which includes courses on power system operation and control, power electronics, power plants, solar systems, and electric vehicle systems.

The Electrical and Computer Engineering Department and the FREEDM Systems Center provide engineers with a comprehensive curriculum which encompasses all aspects of REES, such as systems theory, semiconductor power devices, secured communications, distributed grid intelligence, power electronics for high frequency and high voltage power conversion, and distributed energy storage devices.

PERMACULTURE EDUCATES THE MASSES

Dr. Will Hooker teaches a permaculture class, which broadcasts on the local educational TV channel. Permaculture is a sustainable living methodology that utilizes horticulture by relying on renewable resources and a self-sustaining ecosystem. Dr. Hooker's class takes a look at methodologies to provide physical needs, food, water, shelter, energy, etc., while doing so in an environmentally friendly and sustainable manner. The distance education section is specifically tailored to be broadcast to the local audience around Raleigh in an effort to upgrade the area's understanding of sustainability. "Introduction to Permaculture" is also available on iTunesU, a free international offering of courses. Additionally, people in other states and abroad have informed Dr. Hooker that they are using the course to meet continuing education requirements in various disciplines. In the fall of 2010, the course will be broadcast on the local educational cable TV channel.

Environmental Sciences Program Revised

The Environmental Sciences academic program takes an interdisciplinary approach, providing students and faculty members with opportunities to explore contemporary environmental themes with new courses and curricula. A Bachelor of Science degree in Environmental Sciences prepares students for careers and further educational opportunities in a broad range of fields that includes topics such as climate change, energy, and sustainability. The program also offers students a minor in Environmental Sciences that compliments many of the majors offered at NC State. Elements of the Environmental Sciences academic program include: an office and support staff, the Environmental Sciences faculty, support for student advising, four Environmental Sciences core courses, and six additional Environmental Sciences courses. Core courses in Environmental Sciences are accessible to all. The Environmental Sciences academic program is now designed to engage faculty members and students from across the campus in a flexible, rigorous program of study, and provides NC State with a comprehensive approach to Environmental Science.

Coleman's Eco-Car design that won first place in the Shell Eco-Marathon: Autodesk Real World Challenge

NC STATE STUDENT WINS NATIONAL ECO-CAR CONTEST

Sean Coleman, an industrial design graduate student, won the 2010 Shell Eco-Marathon (SEMA) Autodesk Real World Challenge contest. Every year the Shell Oil Company hosts a contest, challenging high school and college students to build "eco-cars" that can go the furthest on the least amount of fuel. In 2010, Shell was looking for a new design for their own eco-car (Shell Urban Concept Car) and teamed up with Autodesk, a company known for its innovative design software tools. Together they hosted SEMA, asking Autodesk online community members to design the best looking auto body for Shell's 2010 Urban Concept Car. Coleman was flown to Houston, TX to take part in the annual event that showcases fuel-efficient futuristic vehicles. A Houston-area body shop fabricated Coleman's design and unveiled it in a ceremony attended by Houston's mayor, who went for a spin in the concept vehicle. Coleman says the win was truly inspiring and has plans to tie sustainable small vehicles into his graduate thesis.

Dr. Bob Patterson explains how the nodules of the legumes planted in a class garden help to restore nitrogen levels to the soil.

PREPARING STUDENTS FOR GREEN BUILDING CAREERS

The School of Architecture's "Sustainable Buildings Seminar" is a graduate-level exploration of green building paradigms and theories that address philosophies, strategies, and metrics in green building design. Most recently offered in the first summer session of 2010, this seminar course has been overflowing for the last four years, illustrating the energy and enthusiasm that can be found in the School of Architecture for green themes. The Sustainable Buildings seminar is open to all NC State students and incorporates significant student participation and debate, partnered with critical reviews, site visits, and case studies. Students explore, discuss, and debate all grey areas related to design and sustainability, thereby enabling students to form their own positions on, and approaches to, the endless levels of green.

As a final project option, in June 2010, 12 of the 18 students chose to take the LEED (Leadership in Energy and Environmental Design) exam, with a pass rate of 100%. In addition to this offering, the School of Architecture is steadily increasing its emphasis on green themes across the curriculum, incorporating discussions in studios, lectures, and seminars.

CLASS CREATES GARDEN & DONATES HARVEST

In the spring of 2010, the members of the freshmen inquiry class, "World Population and Food Prospects," along with their professor Dr. Bob Patterson and teacher's assistants Adell Perry and Ellen Orabone, decided that they wanted a class garden. In order to accommodate as large of a project as planned, the garden was created in the front yard of a fellow professor who agreed the class could plant in the beginning of the semester and harvest near the end. The class took the opportunity to plant lettuce, various greens, broccoli, and many other fall species. The class donated the food to the Interfaith Food Shuttle, as well as a hunger banquet in which the class participated to learn about world hunger issues and how sustainable agriculture could be used to feed developing nations.

Dr. Marian Mccord holds the innovative chemical-free mosquito netting her research team developed.

Research

More than 20% of total research for the University focused on energy

Stopping Mosquitos Before They Bite

Dr. Marian McCord, associate professor of Textile Engineering Chemistry, Science and Biomedical Engineering at NC State, is working with graduate student Nora Knaul and colleagues Michael Roe, Charles Apperson, and Hoon Joo Lee, to stop the spread of malaria through a new type of mosquito netting. "Most mosquito nettings use some sort of pesticide on them – which is dangerous to manufacture and not that effective, since mosquitoes quickly become resistant to them," McCord explains. "What we're trying to do is find a way to injure mosquitoes without using toxic chemicals."

Their solution is soap. The new method requires soaking mosquito netting in surfactant (or soapy) solution. Once the mosquitoes land on the surfactant-laced netting, the soapy substance is transferred to their legs, making it nearly impossible for them to land on water, where mosquitoes lay their larvae. No more larvae means no more mosquitoes.

Predicting the Path of an Oil Spill

The Ocean Modeling Group (OMG), led by Dr. Ruoying He, a professor of Marine, Earth and Atmospheric Sciences, worked with NC State's high performance computing initiative (HPC) to provide ocean current predictions for the Gulf during the days of the devastating oil spill. Dr. He and the OMG team created a model of ocean circulation that gives an "ocean weather nowcast" and 84-hour forecast. The NC State ocean model was one of four models used by National Oceanic and Atmospheric Association (NOAA) in its official oil trajectory prediction.

Bayer CropScience Endowment Funds Sustainability Chair

Bayer CropScience created a $1 million endowment at NC State that will fund a chair of sustainable development. Dr. Tom Rufty, co-director of the Center for Turfgrass Environmental Research and Education at NC State and a professor of environmental plant physiology in the Department of Crop Science, became the first Bayer CropScience Professor of Sustainable Development during the "Stewards of the Future: Research for Global Sustainability" conference in January.

Dr. Tom Rufty, the first Bayer CropScience Professor of Sustainable Development

"We are honored to have Bayer CropScience as a partner in our research efforts to find solutions to the complex problems that issues like global climate change, population growth, and food and water shortages present," said Dean Johnny Wynne of the NC State College of Agriculture and Life Sciences.

Stimulus Grant Creates Oyster Habitat

The NOAA gave the NC Coastal Federation a $5 million stimulus grant to build two large oyster sanctuaries along the Pamlico Sound. The oyster reefs will use 54,000 tons of stone and cover over 46 acres. About $300,000 will go to NC State, NC Sea Grant, and the University of North Carolina at Wilmington for monitoring the project.

James Galloway (left) and his son Steven Galloway load bushels of oyster shells onto their Carolina skiff to be distributed in the marsh behind Wrightsville Beach. Photo credit: Paul Stephen - Wilmington Star

Scientists will measure four ecological aspects of large-scale oyster restoration: density, size, and frequency of oysters in existing and newly created habitat; settlement of oyster larvae on oyster shells over time to indicate whether populations are increasing; abundance, size, and diversity of other species that use oyster reefs as habitat, such as fish and crabs; and any positive changes to recreational fishing opportunities and catch-per-unit effort.

The science team will consist of about eight people and create 140 jobs over an 18-month period. Many of the jobs are in industries hard-hit by the economic downturn. Commercial fishermen, quarry workers, tug boat and barge operators, and fisheries technicians are among those whom the project will employ.

"We're proud to be part of something that can have long-term benefits for both the marine life and those who make a living from it," says lead investigator Dr. David Eggleston, director of NC State's Center for Marine Sciences and Technology and professor of Marine, Earth and Atmospheric Sciences.

Solving the Period Problem

For many women, their "time of the month" is seen as a hindrance to daily life. In impoverished and developing countries, however, monthly periods are a major cause for concern among women. The lack of affordable, quality sanitary pads results in females missing up to 50 days of school annually – thereby compromising their educational and professional potential. Researchers at NC State are helping to combat the problem by designing affordable pads made from natural, available materials that will allow for local production and sale.

"This is the kind of project I've wanted to be involved with for a long time – using my knowledge of textiles and the sciences to make a real impact in the underserved parts of the world," says Dr. Marian McCord.

Researchers in the Department of Wood and Paper Science at NC State – Drs. Lucian Lucia, Medwick Byrd, and Hasan Jameel – took banana stem fibers, which are easily accessible in Rwanda, and put them through a series of chemical treatments and mechanical actions in order to change their composition from coarse, waxy fibers into soft, billowy materials that are more amenable to absorbing liquid.

Students in a textile engineering senior design course, led by Dr. Russell Gorga, associate professor of Textile Engineering, then incorporated the material into comfortable, effective and environmentally benign covers to create the prototypes currently under evaluation. David W. Allen, a senior in Textile Engineering at NC State, produced the final prototype.

McCord partnered with Sustainable Health Enterprises (SHE), a social enterprise dedicated to developing a franchise model led by young women to manufacture and distribute affordable, high-quality and environmentally friendly sanitary pads in under-served parts of the world. Former President Bill Clinton named the SHE project one of the "commitments to action" at the Clinton Global Initiative's annual meeting in September 2009.

NC SEA GRANT TO STUDY SEA LEVEL RISE

The NC Sea Grant program at NC State received $30,000 from the National Sea Grant College Program of the NOAA. Projects funded through this initiative provide communities with credible, science-based information to help the communities consider alternatives, make informed decisions, and ultimately develop and implement customized solutions for local climate change impacts.

NC Sea Grant will use the grant to establish a community advisory committee to identify coastal vulnerability to sea level rise and develop adaptation strategy sessions for community leaders and residents, as well as develop digitized maps with embedded coastal vulnerability data.

STUDENT RESEARCHES WAYS TO SPEED UP DECOMPOSITION

Fiber and polymer science Ph.D. candidate, Brandi Keene and her research team are working to make materials called polyolefin nonwovens decompose more quickly in the environment.

Polyolefin nonwovens are ubiquitous, but are used in applications generally not considered by the average consumer. In addition to hospital gowns, polyolefin nonwovens are also used in "wipes, protective masks, hospital drapes, filters, surgical dressings, shoe linings, bags, automotive linings, and the list goes on," said Keene. Unfortunately, polyolefin nonwovens are not biodegradable.

There are two steps to decomposition: degradation and bio-degradation. In degradation, the first step, materials are made susceptible to attack by microorganisms, which in turn begin consuming the material. In the case of polyolefin fibers that naturally are not susceptible to attack by microorganisms, Keene modifies their surface with additives, atmospheric plasma and radiation.

Keene then feeds the fibers to worms to see if their modified state is biodegradable. NC State Fiber and Polymer Science professor Richard Kotek explains, "If the worms like the material, then you can tell that's biodegradation." The compost made from the biodegraded material is environmentally safe and produced without the potentially harmful side effects of incineration. Basically, worms and microorganisms turn garbage that would normally last indefinitely in the landfill into usable dirt. Keene appreciates the positive effects of her research. "I can see the direct impact of my work on the environment," she said.

Department of Energy Grant Creates a Nuclear Innovation Hub with NC State

The Consortium for Advanced Simulation of Light Water Reactors (CASL), was announced by the US Department of Energy (DOE) on May 27, 2010. A partnership including universities, national laboratories, and industry representatives, CASL will use advanced computer models to explore innovations in nuclear plant engineering and design. The DOE will fund CASL at a level of approximately $122 million over five years – with the possibility of contract renewal for an additional five years. NC State expects to receive approximately $11 million in CASL funding over the next five years. In all, 11 NC State faculty will be working with CASL, including members of the Department of Nuclear Engineering, the Department of Materials Science and Engineering and the Department of Mathematics. The CASL work will create opportunities for approximately 15 graduate students and five post-doctoral research associates.

A rendering of the James B. Hunt Jr. Library which will be completed in 2012.

Buildings

Eight Leadership in Energy and Environmental Design projects underway

LEED PROFILE: HUNT LIBRARY

The James B. Hunt Library will be one of the first Leadership in Energy and Environmental Design (LEED) Silver buildings completed at NC State. Sustainable features include a highly efficient chilled beam and radiant panel HVAC system, rooftop solar panels helping to provide hot water to the building, and efficient plumbing fixtures to reduce water use. An automated book retrieval and storage system has been incorporated into the building, providing efficient storage for two million volumes instead of stack space, and allowing the building footprint to be dramatically reduced. Site features include paving materials with a low solar reflective index and a rain garden. A green roof system located on a portion of the building helps to reduce heat load, and reduces stormwater runoff while also providing a beautiful view.

A rendering of the Student Health Center addition.

LEED PROFILE: STUDENT HEALTH CENTER ADDITION

The Student Health Center expansion hosts a myriad of sustainability features. Landscaping features include rain gardens and garden areas for outdoor enjoyment, reduced impervious surfaces and rain water capture in an underground cistern. The project also includes full cut-off exterior light fixtures, which reduce light pollution and maintain security and safety. In addition, a public shower is available in conjunction with bike racks to support alternate means of transportation.

GREEN ROOF INSTALLED ON CENTENNIAL CAMPUS

NC State completed the installation of a 3,780-square-foot green roof at Engineering Building III (EB III) on the University's Centennial Campus. The unique green feature, which tops the building's high bay annex, consists of 11 different drought

The green roof at EB III is visible from the 4th floor of the main building.

resistant plants and will save the University on heating and cooling costs. The roof creates a physically pleasing environment that retains more rainfall, eliminates the need for weed control and therefore negates the need to use harsh chemicals. In addition, green roofs can reduce noise pollution by an estimated 10 decibels.

The roof is part of an effort to reduce the greenhouse gas emissions of the University. EB III opened in summer 2010 and houses the Department of Mechanical and Aerospace Engineering and the joint NC State/ University of North Carolina – Chapel Hill Department of Biomedical Engineering. The James B. Hunt Jr. Library, which is under construction and scheduled to open in 2012, is next on the list to receive a green roof. NC State's first green roof, located at the Ruby C. McSwain Education Center at the JC Raulston Arboretum, opened in 2002.

Sustainable Building is the Standard

Eight LEED projects are in various stages of design and construction at NC State. LEED is a program of the U.S. Green Building Council and is the nationally accepted standard for green building, design, construction, and operations. NC State projects will achieve a minimum of a Silver rating but aim for higher ratings.

LEED Project	*Estimated Completion Date*
4H Environmental Education Conference Center	2010
Randall B. Terry, Jr. Companion Animal Veterinary Medical Center	2010
Student Health Center Addition	2011
The Pointe (new Chancellor's residence)	2011
James B. Hunt Library	2012
Centennial Campus Housing	2013
Greek Village Townhomes	2014
Talley Student Center	2014

Tucker Residence Hall competed in the US EPA's ENERGY STAR National Building Competition. Photo Credit: Roger Winstead

CARMICHAEL GYM GOES GREEN

The Carmichael Gym Complex has made numerous efforts to green their facilities in the past year. Included in these endeavors are various energy-saving techniques such as using T5 fluorescent bulbs, installing occupancy sensors, and the use of digital thermometers to better control the temperature. Water-saving measures were also established, such as installing low-flow shower heads in showers and sinks, recycling condensate from the Jordan Hall chillers to irrigate Miller Fields, and the placement of hand sanitizing solutions to cut back on water use. The use of green or recycled products has become a norm, including Green Seal foam soap, green cleaning supplies, and new partitions and benches made from recycled plastic or lumber. Carmichael also recycles most waste materials through Waste Reduction and Recycling.

In addition, the Carmichael Complex is a major component of the 13 building performance contract and under the contract will receive many upgrades, such as solar thermal water heating.

NC STATE RESIDENCE HALL COMPETES FOR ENERGY SAVINGS

NC State's Tucker Residence Hall was one of 14 commercial properties selected to take part in the first U.S. Environmental Protection Agency (EPA) ENERGY STAR National Building Competition. The competition launched April 27, 2010 with spokesman Bob Harper, of TV's Biggest Loser, asking contestants to "work off the waste."

Tucker Residence Hall reduced its energy use 10.3% in just one year. Installation of low flow fixtures reduced water usage by approximately 34% and reduced energy usage by 9.7%. The total amount saved annually from these fixtures was $12,693. In total, the 14 buildings that participated in the competition reduced their energy use by 44 million kBtu, saved more than $950,000 in utility bills and reduced carbon dioxide emissions equal to the electricity use of nearly 600 homes for a year.

Reusable Regatta winners Matt Peterson and Kyle Winters, members of the Inter-Residence Council, paddling to the finish line.

Community & Culture

85% of students surveyed think it is important for NC State to be a leader in sustainability

Reusable Regatta Creates a Sustainable Tradition at NC State

Last year, a group of freshmen Park Scholars imagined the Reusable Regatta, a race on Lake Raleigh using rafts made of plastic bottles, other recyclables, and a little bit of duct tape. The idea came to fruition in the spring of 2010 and attracted a group of students who were interested in the challenge of creating a boat made out of recyclables, as well as in the sustainability education the event provided. The winners, Matt Peterson and Kyle Winters, members of the Inter-Residence Council, fashioned their raft out of plastic crates and hundreds of plastic bottles and containers. Other groups used their creativity and skills to make impressive rafts and used items such as lunch trays as paddles.

The event is scheduled to be held again in April 2011 and hopes to become an annual tradition at NC State.

Engaging and Educating on Campus Sustainability Day

NC State expanded the annual celebration of Campus Sustainability Day with a brickyard celebration on Wednesday October 21, 2009. In conjunction with the Campus Farmer's Market, many campus departments, student groups and research centers participated in a fun and educational event on the brickyard.

The University Sustainability Office sponsored a tire pressure educational session where participants learned how to properly inflate their vehicle tires. Students learned that an under-inflated tire can contribute as much as 1.5 tons of greenhouse gases to the environment annually while reducing the life of a tire by over 9000 miles. The Advanced Transportation Energy Center, Facilities Operations and a student provided a car, truck, and motorcycle for hands-on training.

At the same time, the Inter-Residence Council sustainability committee encouraged good behaviors with a 'Pitch It' recycling game while the Wolfpack Environmental Student Association offered on-campus residents a chance to brighten up their room by making their own flower pot out of recycled materials.

The Society for College and University Planning started Campus Sustainability Day in 2003 as a satellite broadcast where leaders in higher education exchanged ideas and challenged colleges and universities to integrate sustainability practices into their campuses. This is the third year NC State has celebrated Campus Sustainability Day.

1ST RUBBAGE RIDE COMBINES SERVICE & STEWARDSHIP

As part of Service Raleigh, and in coordination with the Great American Clean-up, NC State hosted the first Rubbage Ride on March 27, 2010. The ride highlighted the value of individual action in maintaining a clean, beautiful, and litter-free community. Participants biked around campus and the surrounding community, picking up litter and placed it in a free backpack given at registration. Educational information on recycling, litter prevention and alternative transportation was available to the event attendees.

The partners who brought this service opportunity to NC State included: NC State Transportation Department, NC State Waste Reduction & Recycling, University Sustainability Office, Keep North Carolina Beautiful, and REI.

Participants sorted the 'rubbage' they collected into recycling bins.

Matt Shipman with supplies donated by NC State employees.

EMPLOYEE DONATIONS BENEFIT THE COMMUNITY

Matt Shipman, a public communication specialist in NC State's News Services office, is pleasantly surprised by the impact his "small contribution" makes monthly for Interact, a Wake County nonprofit organization that provides services for victims of domestic violence, rape, and sexual assault.

His effort to collect much-needed items for women and children utilizing Interact services was embraced by an ever-expanding network of NC State employees. In the first 14 months, Shipman conservatively estimates that NC State employees donated more than $3,000 in goods to the shelter. Shipman's effort – titled First Step Project NC – uses e-mail and social media tools like Facebook to keep donators informed of the shelter's monthly needs and his collection schedule. He crosses campus making collections and then loads all items up and drops them off at Interact about once a month.

The shelter's needs are constant, says Mandy Rucker of Interact. Common household goods, clothes, even simple items like toilet paper are in demand for battered or abused women trying to escape dangerous surroundings and reclaim their lives.

WINE TO WATER

Doc Hendley, a 2004 NC State graduate was named a CNN Hero for tapping into his bartending experience, "to save thousands of lives on the other side of the world." Hendley is founder and executive director of Wine to Water, an international faith-based organization in Boone, NC that installs running water and sanitation systems in the neediest parts of the world. Wine to Water raises funds by hosting benefit wine events, such as tastings, to support water projects around the world.

To date, Hendley's group has worked in five developing countries including India, bringing safe drinking water to more than 25,000 people in refugee camps, orphanages, schools, hospitals

Earth Day attendees constructed flower pots out of old plastic bottles.

and a leper colony, as well as directly into hundreds of homes through the installation of bio-sand filters. Wine to Water is also building two training centers in northern Uganda to teach locals how to access clean water without having to rely on international aid. "Water is by far the most important resource to life on our planet." Hendley says.

IT'S UP TO US

From the roof of Jordan Hall to the walkways of Holladay Hall, the University Sustainability Office was around campus this spring shooting a video to answer the question, "What equals sustainability at NC State?" The resulting product is a one minute video clip with students delivering the answers to the question in a variety of campus locations. Contracting with a local production company allowed the office to keep the dollars in the community while utilizing some of the most advanced equipment in the film industry. Interim Provost Warwick Arden delivers the final, resounding, statement, "Sustainability is not just our goal, its our legacy."

TAKING THE PULSE OF SUSTAINABILITY

The University Sustainability Office and Energy Management conducted a short student survey entitled, "Assessing Student Attitudes Toward Sustainability Issues." The survey was coordinated with the help of the University Planning and Analysis Department at NC State for the purpose of understanding student perspectives as they related to sustainability and environmental issues. 2,500 students were randomly selected and contacted via email to take this online survey.

68% of students who responded overwhelmingly think that climate change will be a problem in the future, more so for future generations than in their lifetime. Over 86% think it is important for Americans to conserve personal use of energy while over 85% think it is important for NC State to be a leader in sustainability and the environment. The results assisted in the development of a new NC State energy awareness campaign, *Change Your State*.

NC STATE CELEBRATES THE 40TH ANNIVERSARY OF EARTH DAY

NC State celebrated the 40th anniversary of Earth Day in a big way. NC State Earth Day, held on the brickyard on April 22, was the largest ever on campus, growing from 65 vendors in 2009 to nearly 80 in 2010. Campus departments, non-profits, and local businesses participated to celebrate and demonstrate how they are helping to make our community more sustainable. A fair-trade bazaar and the Campus Farmer's Market were two of the highlights.

A variety of events took place throughout the week of Earth Day. University Dining, as part of Earth Feast, served locally grown and organic produce in the dining halls. In its second year, the Enviro Movie Series doubled attendance and the showing of Garbage Dreams featured an engaging post-screening panel, sponsored by RE3.org, City of Raleigh Recycling, and NC State Waste Reduction and Recycling, discussing landfills and the trash trade in Cairo. In a formal ceremony, the University Sustainability Office, in association with CREE, presented the 2010 Earthwise Awards. As part of SEE NC State, 17 campus departments hosted 24 events during the spring semester.

For Earth day, the Wolfpack Environmental Student Association asked students to submit sustainable suggestions for campus.

NC State Earth Day is the result of many tireless volunteer hours by staff and students. Additionally, the event would not be possible without the help of sponsors such as the Union Activities Board (UAB), University Dining, UAB Films Committee, NC State Class Ring Collection, Energy Management, Waste Reduction and Recycling, and the University Sustainability Office.

'THINK OUTSIDE THE BRICK' FUNDING PROJECT LAUNCHED

In 2010, Student Government held the first 'Think Outside the Brick' Competition. A $1,000 project grant is awarded to the student or group with the best idea to help improve sustainability awareness and impact on campus.

Out of more than 30 submissions, the project selected was the "SOUL Garden" submitted by two students from the Wolfpack Environmental Student Association (WESA), junior Lauren Morris and sophomore Katie McNight. The SOUL Garden (Students for Organic, United Living) is a student maintained community garden located on Centennial Campus. SOUL Garden partners with the Campus Farmers' Market to give students access to a variety of fresh fruits and vegetables.

From Farm to Fork

A major project for the College of Agriculture and Life Sciences this year is the 10% Campaign; the effort by the Center for Environmental Farming Systems (CEFS) to encourage consumers, businesses, and organizations to spend 10 percent of their food dollars on local foods.

University Dining, along with Campus Enterprises pledged to take part in the 10% Campaign. By 2012, 10% of their existing food dollars will be allocated to foods produced in NC.

In addition to the CEFS support for these efforts, NC Cooperative Extension is participating by naming one extension agent in each county as a local foods coordinator. The coordinators will promote the campaign in their own counties.

Participants register through the campaign website and get weekly emails reminding them to register the amount of money they spent that week on local food. To date, more than 1,681 people and 148 businesses have enrolled and spent more than $1,733,145 on local food.

PackPulse displays energy usage in everyday metrics that students can easily understand.

Energy

Operating at 2002 energy consumption levels despite adding 3 million gross square feet since then

Energy Consumption Drops Despite Campus Growth

In fiscal year 2009/2010, NC State reduced overall energy consumption by 2.5%, despite adding more than 1 million gross square feet to the campus footprint. In addition, much of this additional gross square footage includes energy-intensive lab buildings. The campus also experienced extreme weather conditions during last fiscal year. When considering weather in the energy analysis, energy consumption dropped 10% from fiscal year 2008/2009. NC State will continue to develop programs for building improvements, expanded metering, data management and outreach. Overall energy consumption is trending downward, and the University's goal of a 30% reduction in energy consumption by the end of 2015, compared to the baseline year of 2003, is achievable.

PackPulse Project Educates Students About Energy Use

Developed by a team of students from various colleges, collectively Token Energy Club, PackPulse ains to provide NC State building residents with real-time detailed and useful energy feedback about how they consume energy. PackPulse is supported by University Housing, Energy Management, the Wolfpack Environmental Student Association (WESA), the Inter-Residence Council (IRC), University Sustainability Office, and Student Government. The pilot project for PackPulse launched in Owen and Syme residence halls in September.

The new Google mail system was celebrated by painting the Free Expression Tunnel.

GOOGLE FOR STUDENT E-MAIL MAKES A BIG IMPACT

Given the increasing use and importance of information technologies at NC State, it is no surprise that the Office of Information Technology (OIT) has been called upon to help improve the energy efficiency of IT use on campus. OIT began with a self-study in fall 2009 and found that many projects already in progress to reduce costs, improve operational efficiency, or enhance services also benefit campus sustainability efforts.

One 'Green IT' highlight is student e-mail. NC State students were pleased to learn last spring that their official University e-mail services would be out-sourced to Google Apps Education Edition. The service was launched for all students in fall 2010, enhancing campus computing resources with the features of Gmail, plus Google's Calendar, Docs and Sites collaboration tools. The students additionally received 7 Gbs of file storage, compared to the 350 Mbs of storage they previously received. The free Google service will save the University an estimated $60,800 annually in server and file storage equipment costs as well as save 304,000 kWh of electricity use.

Online communication and collaboration tools benefit the environment by reducing the need for travel and for paper-based mail and documents. Outsourcing to Google also reduces the energy used to provide these services to NC State students. Google increased their use of renewable energy sources, and they purchase carbon offsets to aid in their commitment to becoming carbon neutral.

OIT also launched a new Green IT web site to help students, faculty, and staff learn how to improve the energy efficiency of their own IT use.

Reducing the University's Climate Impact

As a part of signing the American College and University President's Climate Commitment, NC State is not only measuring greenhouse gases but creating a Climate Action Plan (CAP) which details how to reduce the University's impact on climate change.

The CAP process kicked off in January of 2010 and was completed in November. Input from staff members, faculty members, students as well as a team of consultants helped create a collaborative approach to this large scale effort. The plan details strategies for how NC State can work to reach climate neutrality by 2050. The first iteration of the plan focuses on strategies for implementation within the next five years. The CAP serves as a supporting document to the Sustainability Strategic Plan and serves as a road map to help guide decision making and planning.

NC State is already making significant headway in many of the identified strategies. Project examples include various green building projects, improved space planning, various energy conservation measures, a combined heat and power system, and a major behavior change campaign focused on energy conservation. Each of these efforts is moving NC State closer to climate neutrality.

Performance Contracting Creates Big Savings

NC State is currently undergoing a performance contract that will save the University $33 million dollars over 20 years. The unique financing structure of the deal ensures the tax payers of North Carolina will not spend a dime on the $19.7 million worth of campus improvements. The general contractor, Schneider Electric, expects to finish the project within two years.

Energy conservation measures are being implemented in 13 campus buildings, including: Cox Hall, Poe Hall, Tompkins Hall, Caldwell Hall, Winston Hall, College of Textiles, McKimmon Center, Research I, Monteith Research Center, Dabney Hall, Carmichael Gym, Structures Lab, and Monteith Research Center Parking Garage implemented energy conservation steps. Measures included sealing the building envelope, more efficient lighting, and expanding building controls systems. In addition, water conservation measures such as a solar thermal heating system and installation of pipes will help reduce NC State's carbon footprint. The project expects to reduce NC State's greenhouse gas emissions by 13,336 metric tons of carbon dioxide equivalent. Work on the 13 buildings is supported by a variety of campus departments, including Facilities Buildings Maintenance and Operations and Energy Management, as well as Mechanical and Aerospace Engineering

LEDs in Residence Hall Light the Way to Energy Reduction

In the summer of 2009, Bragaw residence hall became the largest dormitory on a college campus in the country retrofit with LED lights. With nearly 900 students, the lighting upgrade in Bragaw provides better quality lighting for the students while saving the University money and energy. The residence hall experienced a 16.7% reduction in total energy use as a result of the project. Additionally, the LED lights were purchased from CREE, a local company founded by NC State graduates.

University Housing has made a committment to sustainability by allocating $50,000 annually LED lighting upgrades, and other sustainble projects.

Energy Conservation Measures Save Money and Energy

The Building Maintenance and Operations unit within Facilities Operations planned and completed 13 Energy Conservation Measures (ECMs) during the 2010 fiscal year. Examples of ECMs include lighting systems upgrades, condensate recovery, changes in air change rate, modifying building operations schedule, HVAC retro-commissions, electrical peak shaving, and boiler replacements. The annual savings of the ECMs will be close to $100,000.

NC State Awarded 1.2 Million in Energy Grants

Utilities and Engineering, within Facilities Operations, was awarded $1.2 million in American Recovery and Reinvestment Act (ARRA) funds through the North Carolina State Energy Office. $778,000 of the funds will be used for energy conservation measures around campus, such as LED streetlights.

Additionally, Energy Management will add 10 energy fellowships with $478,000. The fellowship grant creates a partnership among Energy Management, FREEDM Systems Center, University Sustainability Office, NC Solar Center, and Advanced Energy. The fellows will work on collaborative projects among the five partners to help deploy energy programs at NC State and the State of North Carolina.

Floating islands at Lonnie Poole Golf Course naturally filter water and offer habitat for aquatic wildlife.

Land Use

Improving campus land through conservation and restoration

NC STATE CONSERVES TREES ON CENTENNIAL CAMPUS

The Centennial Campus Tree Conservation Plan is a plan to preserve and protect over 10% (nearly 97 acres) of the land area of Centennial Campus west of Centennial Parkway with wooded tree conservation areas. The plan is being developed in part to comply with the City of Raleigh's Tree Conservation Ordinance. All development, including buildings, utilities, and infrastructure, will avoid impact to the tree conservation areas identified in the plan. In cases where impacts to tree conservation areas cannot be avoided, the plans states that new tree conservation areas will offset the impact.

LONNIE POOLE GOLF COURSE HITS THE GREEN

The Audubon Sanctuary Certified Lonnie Poole Golf Course continues to be a beacon of sustainability on campus. Located on 200 acres in the southern-most area of Centennial Campus, the golf course utilizes native plants on over a third of the course as well as irrigates the majority of the grounds with grey water. More than 20 bird houses placed around the course offer habitat to local bird species. Creating habitat for some of the aquatic species are various floating islands made out of recycled plastic bottles that have native plants populating them. The plants' roots grow into the water and filter out excess nutrients and sediment, improving water quality as well as providing aquatic animals with necessary habitat.

The golf course established a relationship with the nearby Centennial Middle School to engage their science students. Programs on the golf course have taught the students about the ecology and sustainability of the course. The students helped to make the floating islands in the irrigation ponds. Additionally, the students learned about water quality by testing the water at various places around the course.

Phase III of the newly restored Rocky Branch runs behind the Student Health Center and Carmichael Gymnasium.

Rocky Branch Restoration and Greenway Completed

Rocky Branch is an urban creek that runs more than a mile through NC State's campus and drains into Walnut Creek, a tributary of the Neuse River. Nearly ten years ago, NC State partnered with NC Sea Grant to implement a three-phase restoration project of Rocky Branch which was completed in 2010.

The goal of the project was to create a safe and accessible outdoor teaching laboratory. Before the restoration began, the stream was narrow, deep, and suffering from severe erosion, as well as being an eyesore for the campus community. The creek project demonstrates how to stabilize a creek, improve water quality, and create aquatic and wildlife habitat, all while integrating the creek into the campus environment. Using natural channel design techniques, the restoration allows the stream to flow naturally through a newly created floodplain.

The project installed 6,000 feet of greenway path along the restored creek to provide a transportation alternative and bring people closer to the creek. A pedestrian underpass at Pullen Road allows safe passage for pedestrians and wildlife beneath a major thoroughfare. The underpass connects the path to Pullen Park and the City of Raleigh Greenway System. Interpretative signs along the greenway explain various restoration concepts.

University Housekeeping is testing new green cleaning technologies, such as a spray bottle that uses ionized water to sanitize surfaces.

Materials & Purchasing

Making commitments to increase sustainable purchasing on campus

Paint Shop Provides Healthier Environments

The Paint Shop within Facilities Operation's Repair and Renovations made the switch to GreenGuard Indoor Air Quality Certified, zero-VOC, interior paint. In addition to providing healthier work environments, and environmental benefits, the Paint Shop found the paint less expensive than previous paints. The Paint Shop also invested in a new wash system for paint brushes and rollers. The system manages water-based paint waste by separating leftover wash water into a small amount of solid waste and water. The waste is non-hazardous and the water can be reused.

Green Cleaning Puts New Technology to the Test

University Housekeeping is currently testing an ionized water-based technology that is effective in sanitizing and cleaning for general purpose applications. After five months of in-house testing, the technology appears to be successful and University Housekeeping will gradually implement this tool across campus. Upon implementation, the tool will help to significantly reduce chemical purchases. The device uses regular tap water and then electrically charges the water to lift dirt from surfaces. It is Environmental Protection Agency registered as a sanitizer and requires no additional general cleaning chemicals or chemical dilution stations, which also saves the University in purchasing costs.

University Housekeeping Implements Green Training Program

In the summer of 2010, University Housekeeping trained all of its employees about their Green Cleaning Program. Each training session discussed current cleaning systems and then offered green alternatives for chemicals, products, procedures, and practices. Training for employees included information on how conventional chemicals harmed the environment and may not be the safest for service providers. At the end of the training sessions, each employee expressed their commitment

to green cleaning by signing their name to a banner highlighting University Housekeeping's commitment to a safer and more environmentally friendly community. Staff provided an enormous amount of positive feedback.

"I am a green cleaner" signs are now displayed on staff cleaning carts. The signs highlight what staff members are doing in their daily duties to help in the green cleaning initiative.

NC STATE GOES FOR EPEAT GOLD

When the North Carolina state legislature passed a law requiring the University of North Carolina (UNC) system to save money by consolidating information technology purchasing, it opened an opportunity for NC State. As a result, the University was able to help all 16 institutions within the UNC system work towards environmentally responsible purchasing.

The UNC General Administration worked with UNC Chief Information Officers and other campus representatives to develop a new UNC Combined Pricing Initiative (CPI) for consolidating computer purchases. Building upon recommendations of NC State's Computer Procurement Task Force, the CPI program includes the requirement that desktop and laptop computers bought by universities with state-appropriated funds meet the Electronic Product Environmental Assessment Tool (EPEAT) Gold certification.

NC State owns more than 15,000 desktop computers. Every 100 non-EPEAT certified desktops replaced by EPEAT Gold computers, could save approximately 13,900 kWh of electricity and 26,300 kg of greenhouse gas emissions annually.

University Dining Partners with Green Food Service Providers

University Dining is doing their part to help NC State be more sustainable. They currently have several green food service partners who supply the dining halls with sustainable options.

→ *The dining halls began featuring pita bread, dinner rolls, and artisan sandwich bread from Neomonde Baking Company, a Triangle-based bakery and Mediterranean deli. Neomonde uses natural products with the highest quality ingredients. Neomonde's large variety of breads and strong shelf life reduces the company's cost and waste.*

→ *The Wilmington-based Port City Java franchise only serves certified Fair Trade and organic coffees.*

→ *US Food Service, University Dining's main food distributor, buys locally in season, including tomatoes, cucumbers, squash, zucchini, onions, strawberries, and collards. In addition, they provide employment for 600 people in the Raleigh area.*

→ *The Freshens franchise supports sustainable agriculture in Latin America, where it procures its Acai palm tree berries and bananas. It also sources strawberries primarily through a domestic supply chain that provides a variety of environmental, financial, ethical and food safety benefits. Freshens sources their blueberries solely through a domestic supply chain that uses information technology to monitor many environmental factors.*

Transportation

More students, faculty, and staff choosing alternatives for getting to, from, and around campus

NC State Continues to Provide Sustainable Transportation Options

The mission of NC State Transportation is to improve the quality of life for the community by providing seamless and sustainable transportation systems with excellent customer service. The University encourages alternatives to driving alone. In the 2009-2010 academic year, the University transit system, Wolfline, experienced ridership of 14,500 passengers per day and a 7.5% increase in passenger trips over last year's totals. The University encourages alternatives to driving alone. The campus Transportation Demand Management program, WolfTrails, provided incentives to more than 375 participants who chose to carpool, vanpool, take transit, telecommute, bike or walk instead of drive to work this year. Additionally, the NC State GoPass program offered free local and regional transit access to over 6,000 University students and employees.

Cooperative Extension Quantifies Benefits of Online Training

Through utilization of a tool called Eluminate Live!, the NC Cooperative Extension Service offers online trainings and meetings. In response to reduced operating budgets, Eluminate helps the group offer a low-cost alternative to face-to-face trainings. Extension Information Technology created a green event report as a way to capture the savings of money, fuel, drive time, and carbon emissions that employees would expend traveling to Raleigh for trainings.

Extension Learning Management System Green Event Report for 2009

Number of online "green" events	*216*
Number of people that attended all the events	*3,703*
Travel miles saved	*701,946*
Travel time saved (hrs)	*13,499*
Gallons of gasoline saved	*27,855*
Pounds of carbon dioxide (CO_2)not released into the environment	*537,365*

WolfWheels bicycles are stored and rented through the Outdoor Adventures office at Carmichael Gymnasium.

WolfWheels Bike Rental Program Supports Alternative Transportation on Campus

During the Spring 2010 semester, a collection of students and campus departments came together to launch an innovative campus bike rental program called WolfWheels. The program offers an affordable, healthy, and environmentally friendly transportation option to anyone with a campus ID. Bicycles are available for one-day, weekend, weekly, and semester-long rentals through Campus Recreation's Outdoor Adventures office.

WolfWheels has a great deal of support from the University administration and from the campus community. In the first five months, the program rented 272 bikes to 123 students, 117 employees, and 6 campus affiliates. WolfWheels continues to utilize the participation of students to help market the program and maintain the bicycles.

The NC State partners who helped develop the program include Campus Enterprises, Campus Recreation, Carmichael Complex Facitilies Operations, Transportation, Inter-Residence Council, Cycling Club, Sustainability Commission of Student Government, University Student Center Board of Directors, University Sustainability Office, and Energy Management.

Waste, Reduction & Recycling

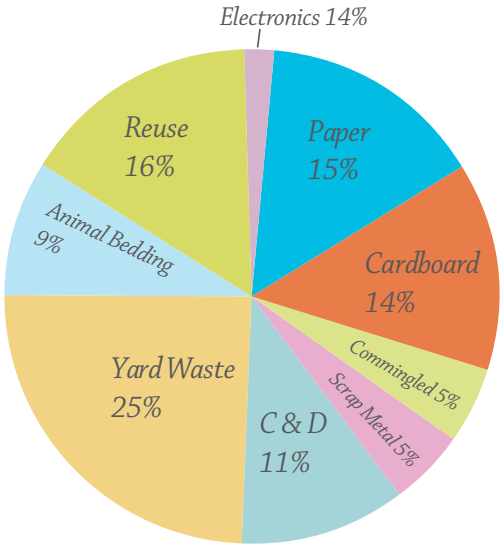
Converting nearly half of all campus waste to valuable resources through reuse, composting, and recycling

Reducing, Reusing, & Recycling Saves Money & Resources

The Waste Reduction and Recycling (WRR) office recycled 1860 tons of material during the 2009 - 2010 fiscal year with a revenue of $104,565 and an avoided landfill fee of $136,400.

Additionally, the University composted 1149 tons of material. Compost includes yard waste collected by Facilities Operations' Grounds Department, campus greenhouse material, and animal bedding from the College of Veterinary Medicine.

575 tons of reusable materials were diverted by University Surplus, University Housing and the Waste Reduction and Recycling office, with revenue from those materials totaling $126,637 for the 2009-2010 fiscal year.



Campus Events Go Green

Many groups on campus are doing their part to green their events. From reducing waste through recycling and composting, to providing re-usable water bottle filling stations to sustainable purchasing; campus events are reducing their environmental impact. Some of the major events include: Krispy Kreme Challenge, Friday Fest, Rec Fest, The Big Event, Earth Day, West Campus Jam, Race for the Cure, Aids Alliance, Service Raleigh, Rubbage Ride, Move-in, and Move-out.

The Union Activities Board's Friday Fest is held each year during Wolfpack Welcome Week. This year, the event planners went above and beyond to be sure the event was sustainable. WRR assisted in the coordination and sponsorship of composting at Friday Fest. All vendors were asked to incorporate sustainability into their displays and the food vendors were required to provide only compostable serving ware. The event diverted 82% of its waste from the landfill and the NC Division of Pollution Prevention and Environmental Assistance featured the event as a case study. In 5 hours of use, the water bottle filling station dispensed 275 gallons of water to 5,500 people, saving approximately 2,930 12-ounce disposable water bottles from being tossed. Additionally, the event featured sustainable T-shirts and made a contribution to the sustainability trust fund to offset carbon emissions from the event.

BOTTLE BAN BRICKYARD FREEZE MAKES A STATEMENT

In response to a newly implemented state ban on plastic bottles in the landfill, WRR worked with NC Department of Environment and Natural Resources (NC DENR) in utilizing social media to educate the campus. Event planners asked participants to stand completely still on the brickyard with a plastic bottle in hand for five minutes to draw the attention of passers by. More than 200 students, staff and faculty attended the brickyard freeze event which brought awareness to the importance of recycling.

Students with plastic bottles in hand during the brickyard freeze.

REUSABLE CONTAINERS MAKE IT EASY TO PACK & GO

University Dining launched a new sustainable take-out program in campus dining halls called Pack&Go. Eco-friendly containers are available for a one time $3 charge which covers any meal that fits in the container. A cup and lid for soup or a drink are provided as well as the option to take a piece of loose fruit. Users simply rinse containers and exchange them for a clean container or a token for a later date. The new program works with current meal-plans and contributes to the University's sustainability goals.

Composting Program Diverts Food Waste On Campus

WRR worked with University Dining to plan and coordinate the implementation of a full scale food waste composting program on campus. As a first step, a waste audit was performed for Fountain Dining Hall in order to better understand the waste stream of campus dining facilities. Additionally, a $10,000 grant was awarded by Wake County for commercial waste reduction, which targeted the diversion of dining hall organics from the landfill. Composting in each of the three dining halls on campus began in August 2010.

Water

Conserving water through a 44% reduction in usage from 2002

NEW TOOL MAY HELP EASE EFFECTS OF DROUGHT

Continued improvement of climate forecasts is resulting in better information about what rainfall and stream-flow may look like months in advance. A researcher from NC State developed an innovative water management framework that would take advantage of these forecasts to plan for droughts or excess rain in order to make the most efficient use of an area's water resources.

"By using climate forecasts for short-term planning, water managers can better plan for potential shortages due to drought," says Dr. Sankar Arumugam, an assistant professor of Civil, Construction and Environmental Engineering at NC State. For example, managers could encourage stakeholders to put water-use restrictions in place and launch a water conservation campaign before the drought even arrives. Managers could also use this approach to determine how best to take advantage of surplus water supplies. For example, hydropower facilities could generate additional power instead of spilling the excess water.

Arumugam notes that the use of forecasts for planning would also make water managers better able to account for increased water demands due to population growth.

NC STATE NAMED CENTER FOR WATERSHED EXCELLENCE

The US Environmental Protection Agency (EPA) designated NC State as a Center of Excellence for Watershed Management, making it the first such center in the Southeast. To become a recognized Center of Excellence, the institution must demonstrate technical expertise, conduct watershed research involving students, staff, and faculty, possess the range of relevant disciplines, demonstrate financial capacity, build effective partnerships, and garner support from the highest levels of the organization.

NC State manages the Water Resources Research Institute for the University of North Carolina system. The EPA and University officials signed a memorandum of understanding to help communities identify watershed problems and find sustainable solutions. The designation will allow NC State to continue to develop strong partnerships with other institutions, organization and agencies required to protect and restore watersheds. "We believe a watershed approach is the most effective framework to address today's water resource challenges," said Stan Meiburg, EPA acting regional administrator. Benefits of the designation include EPA technical assistance, grant support and opportunities in local and regional watershed issues.

BOTTLE FILLING STATION AT CARMICHAEL REDUCES WASTE

The Carmichael Gym Complex installed various water bottle refilling stations in their facilities. These machines encourage using reusable water bottles and discourage the purchase of water bottles from vending machines. Each station shows the user how many bottles of water the machine has filled, helping to quantify the savings. American demands for plastic water bottles require the use of more than 1.5 million barrels of oil annually, enough to fuel approximately 100,000 U.S. cars for a year.

NC State Achieves a 20% Reduction in Water Use in One Year

NC State made a commitment to reduce water usage by 20% in 2015 from a 2002 baseline. Currently, the University has far surpassed that goal by reducing water usage 44% since the baseline year. As impressive are the reductions this year, in which NC State reduced water usage per square foot by 20% since 2009.

The Repair and Renovations and Building Maintenance and Operations units of Facilities Operations assisted the campus in achieving the goal through various measures including low flow fixtures, reparis, and rain water capture. In 2009, the University reparied the hot water system at Reynolds Coliseum, saving more than 1.5 million gallons of water. Additionally, Utilities and Engineering developed a system for capturing rain water from the roof as well as water from the Yarborough Plant's vacuum separator to be used in the cooling towers. The system installed will be a model for future projects.

An Outdoor Adventures student director fills his water bottle at Carmichael Gymnasium

Events and Awards

SOCIETY, ECONOMY, ENVIRONMENT (SEE) NC STATE EVENTS

Wednesdays 10 am - 3 pm	Campus Farmer's Market
September 16, 2009	SEE NC State Webinar: Webinar on NC State's Greenhouse Gas Inventory
September 18, 2009	SEE NC State Podcast: Rick Gardner, associate director for Campus Activities at NC State
Oct 1, 2009	Bottle Ban Brickyard Freeze
October 2, 2009	SEE NC State Podcast: Analis Fulghum, outreach coordinator for Waste Reduction & Recycling at NC State
October 16, 2009	SEE NC State Podcast: John Bell, lead singer of the Athens, GA rock band Widespread Panic
October 21, 2009	Campus Sustainability Day
October 30, 2009	SEE NC State Podcast: Ariel Fugate, manager of the Campus Farmer's Market
November 13, 2009	SEE NC State Podcast: Anup Engineer and Stephen Roller, the two lead creators of PackPulse
November 25, 2009	SEE NC State Podcast: Tracy Dixon, director of the University Sustainability Office
December 11, 2009	SEE NC State Podcast: Natasha Herting, a senior in Industrial Engineering at NC State University and Chair of the Sustainability Commission for Student Government
December 22, 2009	SEE NC State Podcast: Music with a Message
February 12, 2010	SEE NC State Podcast: Paula Thomas, sustainability manager for the City of Raleigh
February 26, 2010	SEE NC State Podcast: Part II of interview with Sustainability Manager for the City of Raleigh, Paula Thomas
March 12, 2010	SEE NC State Podcast: Jim Cereznak, student body president for NC State
March 22, 2010	SEE NC State podcast: Lindsay Batchelor, program manager for USO
March 27, 2010	Rubbage Ride: Part of Service Raleigh and in coordination with the Great American Clean-Up
April 5, 2010	Enviro Movie Series - The Great Squeeze
April 6, 2010	Enviro Movie Series - Garbage Dreams
April 12, 2010	Sustainability Night at NOFO
April 15, 2010	Enviro Movie Series - Tapped
April 15 - May 15, 2010	SmartCommute Challenge
April 19-23, 2010	E-Waste Recycling Event
April 16, 2010	Earth Feast in Dining Halls

April 22, 2010	Earth Day on the Brickyard
April 26, 2010	SEE NC State podcast: John Bell, lead singer of the band Widespread Panic
May 17-21, 2010	REDD After Copenhagen: Emerging Practices and Policies, Sponsored by the International Society for Tropical Foresters
May 21, 2010	West Campus Jam Goes Green
May 14 - 21, 2010	Bike to Work Week
May 22, 2010	SEE NC State Podcast: Interview with George Smith, control shop supervisor, Building Maintenance and Operations

SPECIAL EVENTS

March 27, 2010	STEP State Competition: The annual Sustainable Transportation Energy Program competition
March 27, 2010	College of Natural Resources Arbor Day & Open House
April 17, 2010	Raleigh Earth Day
April 24, 2010	Reusable Regatta
June 23, 2010	WKNC - Benefit for the Food Bank of Eastern North Carolina

CONFERENCES & WORKSHOPS

September, 2009	4th Annual GreenNC Tradeshow: Sponsored by the NC Solar Center, and the Triangle Chapter of the US Green Building Council
February, 2010	Emerging Issues Forum: Sponsored by the Institute for Emerging Issues
March, 2010	Urban Design Conference: Creating Value – Designing for Resilient Cities: Sponsored by the NC State College of Design
April, 2010	7th Annual Sustainable Energy Conference Sponsored by the Industrial Extension Service
May, 2010	Mobilizing NC Conference: Sponsored by the NC Solar Center
	Innovation in Sustainability: Sponsored by the Center for Innovation Management Studies
June, 2010	World Environment Day: Sponsored by Red Hat

AWARDS

	3 Tar Heels of the Week named by the News and Observer - Will Hooker, Nancy Creamer, and Mike Giancola
February, 2010	NC State named one of the Top 5 'Coolest School in the Southeast' by Blue Ridge Outdoors Magazine
March, 2010	Waste Reduction and Recycling named Outstanding University Program by the Carolina Recycling Association
	2010 Earthwise Awards: Faculty Member: Francis de los Reyes, Student: Ariel Fugate and Staff Member: Jude Davis
	Tracy Dixon named Mix 101.5 Green Citizen of the Month
April, 2010	NC State design students Rebecca Lea Myers, Maria Papiez, Jeff Pleshek, and Matt Tomasulo won the Urban Land Institute's Urban Design Competition
	Greater Raleigh Chamber of Commerce Smith Seal Sustainable Business Award.

Looking Forward

The new Chancellor's residence, the Point, on Centennial Campus is incorporating many green features into the design including a fast charge plug in station for electric vehicles, a geothermal system, native plant species, LED lights, and locally harvested lumber.

Building on the increasing interest in cycling, the University will embark on a bicycle and pedestrian planning process in the 2010-2011 academic year to identify more opportunities to improve campus bikeability and walkability.

The Transportation department will initiate improvements to the University carpool program by offering better ride-matching services next year.

Plans to implement a green certification program on campus are underway. The program will be piloting the events certification first but it will later include certifications for departments and labs.

The University Sustainability Office and University Housing, with the assistance of English 332 students, are working to create a Green Living Guide to provide on campus students with tips on living a sustainable lifestyle.

Change Your State is a behavior change campaign focused on energy conservation that launches in the fall 2010. The first year goal is a 5% reduction in campus energy use.

Plans are underway for the installation of a combined heat and power at the Cates Power Plant. The project estimates a reduction of the University's greenhouse gas emissions by approximately 12%.

The University will explore car-share options with the City of Raleigh and Meredith College. A car-share program could enhance quality of life for on- and off-campus residents, as well as commuters who choose alternative transportation but still need occasional access to a car.

The NC State Energy Office granted NC State 1.7 million dollars to provide students with hands on training and experience for jobs in the state's energy economy, including green energy fields.

The University Sustainability Office is creating a sustainability tour to highlight sustainable locations on both main and Centennial campus. The tour can be taken using sustainable transportation including walking, biking or by bus.

As a part of the Change Your State campaign, energy competitions among residence halls will help to raise awareness about energy use while spurring friendly competition among the students.

NC State's campus will soon notice outdoor walkway recycling bins stationed next to outdoor trash cans starting in the fall of 2010. The outdoor recycling initiative will begin on the brickyard and branch out from there to cover the entire campus in the next two years.

The Electrical and Computer Engineering Department offers a new undergraduate concentration in Renewable Electric Energy Systems within the Bachelor of Science Electrical Engineering degree program.

The E. Carroll Joyner Visitor Center, will feature a Level II Electric Vehicle Service Equipment (EVSE) station. The EVSE station, in addition to being the first in the Raleigh area, features the latest J1772 interface and is capable of charging a compatible electric car in two to four hours.

Transportation will continue to build upon the success of the Wolfline transit system by expanding service to Centennial Campus, as the student and employee population there continues to grow.

Working in partnership with students from Mechanical and Aerospace Engineering, Energy Management will conduct a lighting survey of 30 campus buildings. The office received a $778,000 grant to replace 14,000 T12 light bulbs with T8 bulbs.

Dr. Andy Fox, an assistant professor of Landscape Architecture, received a grant from the Provost's office to design and build a rain garden for Syme Residence Hall. The College of Design partnered with Grounds Management to install it and will be partnering with them each summer on a project.

Centennial Campus is planning to implement a reuse water system that will service the Lonnie Poole Golf Course, parts of Hunt Library, irrigation for the Oval and the Centennial Cetral Utility Plant.

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