
2014
ANNUAL REPORT
UNIVERSITY OF
ARKANSAS
INSPIRATION | INTEGRATION | TRANSFORMATION
Office for Sustainability

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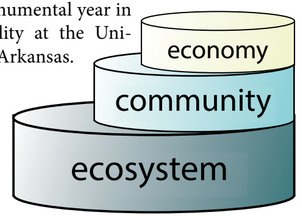
Executive Summary

At the University of Arkansas, **we believe** that creating a prosperous future for our campus, our state and the world requires a new way of thinking about connections and change. **We know** that our challenges are big: expanding population, limited resources, fragmented communities, and loss of biodiversity, to name a few. **We understand** that a prosperous economy depends on a vibrant, diverse community; that both the economy and community require a stable, resilient, and productive ecosystem. **We value** the science of sustainability as a tool to expand human prosperity while confronting resource limitations and biosphere impacts.

Our vision for a prosperous future for Arkansas is comprehensive. Innovation resides in the spaces between the humanities and technology, the arts and engineering, design and analysis. We work together to create a culture of innovation and creativity, where new ways of thinking about human enrichment and fulfillment are explored, tested, and implemented. Students, staff, faculty, administration, and Arkansans are all partners in this journey. The Office for Sustainability has engaged the University of Arkansas community in addressing these challenges through the UA Sustainability Council, an executive committee of representatives from each academic and auxiliary unit, in addition to student government, and community leaders.

In 2014 the Office for Sustainability expanded campus sustainability goals, grew participation in sustainability academics, and created more student opportunities through sustainability programs. Sustainability by the Numbers showcases the dramatic improvements across sustainability metrics at the University of Arkansas. We continue to make strides toward our goal of greenhouse gas neutrality, achieving our 2015 goal a year ahead of schedule. We adopted a goal to generate zero land-fill waste by 2021. Student enrollment in the Foundations of Sustainability minor increased 25%. Student interns implemented 47 projects, including food recovery, integrated pest management, measuring ecosystem services across U of A lands, piloting a Green Revolving Fund, and waste audits of key facilities. Finally, OFS sponsored six campus-wide sustainability events in 2014, reaching more than 5,000 students, staff and faculty. This report summarizes each of these activities, and celebrates the generous collaboration that created a monumental year in sustainability at the University of Arkansas.



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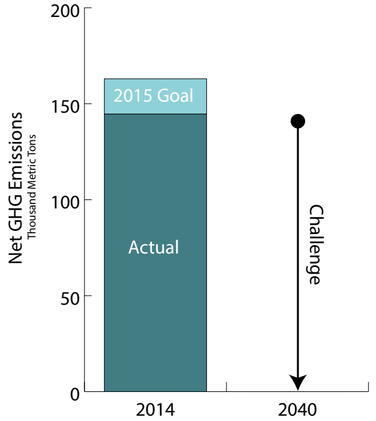
Introduction

The U of A Office for Sustainability empowers students, faculty, and staff to explore sustainability strategies throughout the campus community. The Office for Sustainability (OFS) was established in 2007 when the University of Arkansas signed the American College and University Presidents' Climate Commitment (ACUPCC) to be carbon neutral by 2040. The OFS leadership team includes Executive Director Marty Matlock, Ph.D., P.E., B.C.E.E., professor of Biological and Agricultural Engineering; Academic Director Steve Boss, Ph.D., Professor of Geosciences; Director Carlos Ochoa, and Administrative Specialist Cassandra Gronendyke. The OFS is a combined administrative unit of the Provost's Office and the Office of Facilities Management. Housed in the historic Sustainability House at 238 Harmon Avenue, the OFS is centrally located on the U of A campus, providing a venue for engaging students, faculty, and the community.

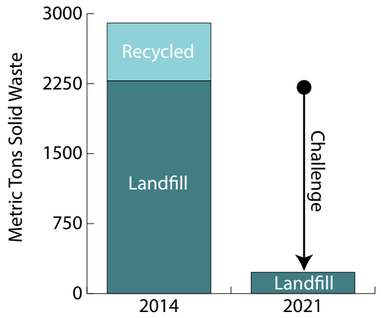
The mission of the OFS is to coordinate and implement sustainability programs across the U of A campus. The University of Arkansas Sustainability Council (UASC) provides a multi-stakeholder platform for review of activities and development of program strategies to the OFS. The UASC comprises representatives from all academic units, students, staff, and the City of Fayetteville. The UASC is organized by workgroups focusing on activities for the U of A's Built, Managed, Social, and Natural systems. The UASC reviews and approves all sustainability program recommendations from the OFS to the Office of the Provost.

Sustainability by the Numbers

Goal 1: Carbon Neutral by 2040



Goal 2: Zero Waste by 2021



Programs

13 interns

20,000 pounds food recovered

47 projects

12,000 metric tons CO_2 sequestered

19 summer research fellows

$50,000 Green Revolving Fund

Academics

25% growth in Sustainability Minor

180 students in Foundations course

15 capstone projects completed

64 total graduates with Sustainability Minor

10 students pursuing Graduate Certificate in Sustainability

The University of Arkansas Sustainability Plan

In 2014 the Office for Sustainability worked with the Sustainability Council to revise and update the University of Arkansas Sustainability Plan. The revised plan is based on a continuous improvement process that includes 1) defining goals, key performance indicators (KPIs), and their metrics; 2) benchmarking and measuring KPIs; and 3) implementing strategies to improve KPIs over time. This approach advances the science of sustainability through testing of improvement strategies followed by data analysis and reporting. The KPIs drive strategies for innovation; the metrics are their measurable characteristics. We select metrics for the KPIs based on the following four criteria:

1. Science Based
2. Outcomes Driven
3. Technology Neutral
4. Transparent

This approach ensures that outcomes-based performance, rather than ideology, drives decisions on sustainability strategies at the University of Arkansas.

Sustainability Vision

Our vision is that the University of Arkansas will implement education, research, outreach, and demonstration strategies and practices that meet the needs of the present while enhancing the ability of future generations to meet their own needs. This vision will be achieved through the iterative process of setting and achieving goals.

Aspirational Goals

Aspirational goals are long-term goals that frame programmatic decisions in very simple terms to clearly define expected outcomes. The U of A Sustainability Plan includes the following four Aspirational Goals:

1. The University of Arkansas will become a global leader in sustainability education by developing a comprehensive School for Sustainability that will administer a BS in sustainability, an undergraduate minor in sustainability, graduate programs (MS and PhD) in sustainability, and graduate certificates in sustainability.

2. The University of Arkansas will become a global leader in sustainable facilities by transforming the U of A campus to a living-learning laboratory for sustainability technologies and practices.

3. The University of Arkansas will continue its global leadership in sustainability research and innovation through collaborative discovery in technology, business, and informatics that drive sustainable transformation of the global economy.

4. The University of Arkansas will continue to expand its global impact through sustainability partnerships across each program area with industries, communities, and universities across Arkansas, the US, and the world.

Strategic Goals

Strategic goals are measurable elements of aspirational goals, with time frames for achieving benchmarks. The U of A Sustainability Plan focuses on two strategic goals:

1. The U of A will be carbon neutral by 2040, with intermediate benchmarks, and

2. The U of A will be a zero waste campus by 2021.

These strategic goals provide a focus for activities for the Sustainability Council workgroups and OFS interns.

Measuring and Reporting Results

Measuring performance for each strategic goal requires benchmarking the metrics, developing reduction goals, and developing implementation strategies to meet those goals. Implementation is achieved through collaboration with programs and units across the U of A community. The OFS implements these strategies through coordinated projects with interns, capstone projects from students in the sustainability minor and Honors College, and graduate student research. This process creates the opportunity for student-led innovation, and integrates activities across the Aspirational Goals.

Results of the performance for each KPI are reported annually to the UASC through OFS Technical Reports and to the U of A campus at large through this Annual Report. In addition, GHG reduction metrics are reported to the ACUPCC every two years, and elements of both GHG and solid waste reduction goals are reported to AASHE through the STARS program each year. Where appropriate, the methods and results of sustainability strategies are documented through publication in peer-reviewed scientific journals.

Strategic Goal: Carbon Neutral by 2040

The U of A Sustainability Council approved the University of Arkansas Climate Action Plan Version 2.0 in 2014, which includes updated goals and projects designed to achieve carbon neutrality by 2040 and highlights the U of A's accomplishment of all short-term objectives.

Benchmark, Goals, and Emissions

1990 Benchmark: 125,000 Metric Tons

Short-term goal: 1995 Levels by 2014: 163,000 Metrics Tons

Mid-term goal: 1990 Levels by 2021: 125,000 Metrics Tons

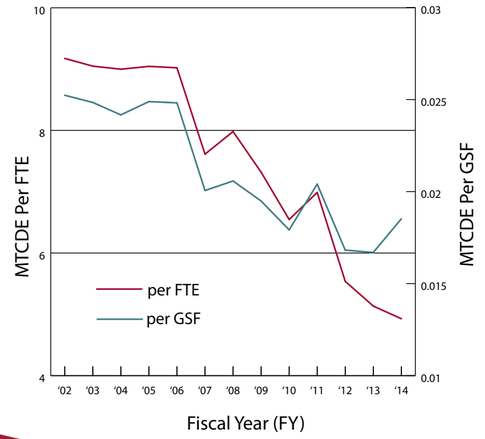
Long-term goal: 2040: 0 Metrics Tons

2014 Actual Emissions: 144,596 Metric Tons

The combined full time equivalent of the campus population has grown 6% and the gross square feet has risen 52% since 2007. However, Greenhouse Gas emissions have declined by 2% during that same time period. In 2014 the University of Arkansas reached its short-term goals of achieving the 2005 Greenhouse Gas emission levels. The main driver has been the Energy Savings Performance Contracts that have resulted in reduced emissions of approximately 30,000 Metric Tons of GHG and annual savings of $5-6 million.

As of 2014, there were six green buildings certified by a third party verification system, four of which are LEED certified. Nearly 216,000 gross square feet of green building space was added to the U of A campus between fiscal years 2004 and 2014. Additional buildings are scheduled for certification in the future. In 2007, the university committed to building all new construction and major renovation projects to meet LEED Silver requirements.

Metric Tons of Carbon Dioxide Equivalent (MTCDE) Per Combined Full Time Equivalent (FTE) and Gross Square Foot (GSF).



Summary

The University of Arkansas has experienced unprecedented growth over the past decade. During that time, we have reduced carbon emissions per FTE and GSF.

GSF Increase since 2007: 6%

FTE Increase since 2007: 52%

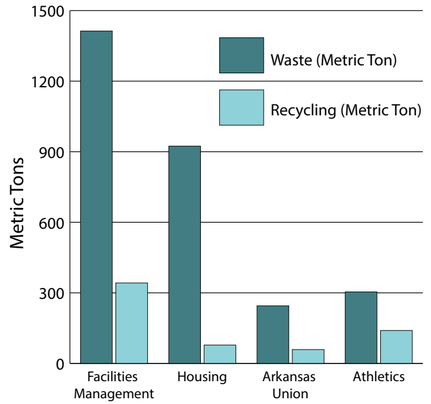
GHG Decrease since 2007: 2%

Strategic Goal: Zero Waste by 2021

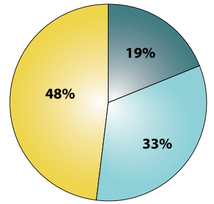
The University of Arkansas Sustainability Council approved the goal of becoming a zero waste intuition by 2021. This means that the entire U of A campus will reduce the waste it sends to the landfill by 90% by 2021. Although the goal is lofty, the University of Arkansas will leverage all of its facility resources, industry and municipal partnerships, and academic programs to achieve it.

In 2014, the Office for Sustainability aggregated Class IV solid waste and recycling data from Housing, Athletics, Facilities Management and the Arkansas Union. Preliminary data suggests the campus sends approximately 2,800 metric tons of waste to the landfill and recycles approximately 618 tons of class IV waste annually.

The majority of waste is being produced within Education and General Purpose Buildings, which are managed by Facilities Management. University of Arkansas Housing is a close second with 32% of total campus waste. Similarly, Facilities Management manages 55% of all recycling, followed by Athletics with 23%. The Office for Sustainability also conducted several waste audits to determine the amount of recyclable, non-recyclable and organic matter in the waste stream. We concluded that 28% of all material in the waste stream can be recycled, 31% can be composted, and 40% could not be composted or recycled at the present time.

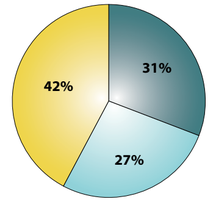


University of Arkansas 2014 Class I Waste by Sector

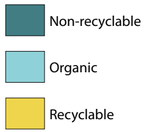


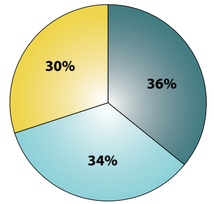
Kappa Kappa Delta

Waste Composition of Audited Campus Buildings



Mechanical Engineering





Walton College of Business

Sustainability Academic Programs

Sustainability Minor

The U of A began offering the Foundations of Sustainability undergraduate minor in 2011. Designed to be relevant to students from any major, the minor is interdisciplinary, creating a framework for students to find the connections between sustainability, their major, and other disciplines across the institution. In addition to three core sustainability (SUST) courses, students select three courses from an extensive menu of electives approved by the Sustainability Curriculum Steering Committee (SCSC).

Enrollment Growth

With 111 students enrolled, the sustainability minor was the 12th most popular minor offered at the U of A and experienced approximately a 25% growth in enrollment during 2014. The three core sustainability courses each saw record enrollment as well. This is due in part to recruitment efforts by Office for Sustainability staff, in addition to growing popularity of the courses through word of mouth.

Interdisciplinary Appeal

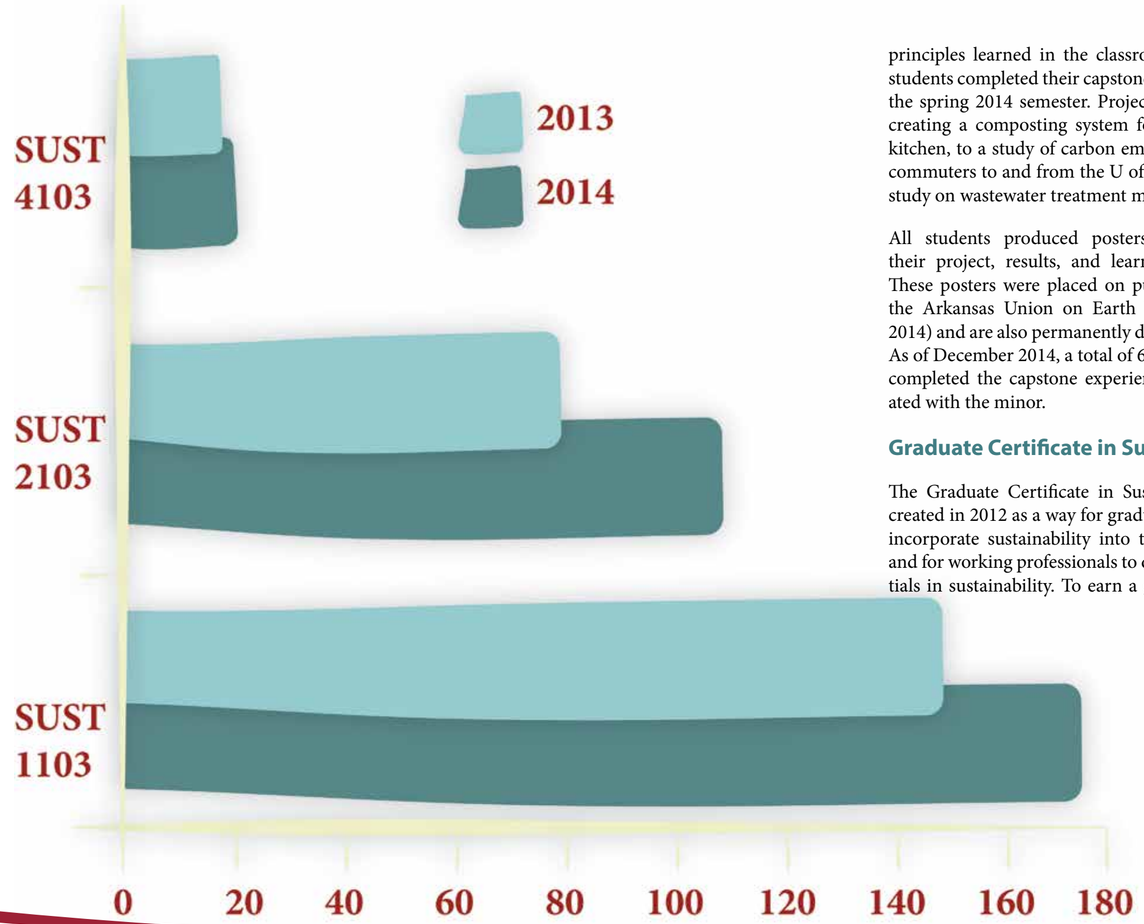
The sustainability minor is designed to teach students to recognize the interconnectedness of systems. This type of thinking is crucial to understanding the challenges of sustainability. The first two courses, Foundations of Sustainability (SUST 1103) and Applications of Sustainability (SUST 2103), achieve this through incorporating team teaching and guest lectures to expose the students to a broad range of expertise and insight.

The success of this approach is reflected in the diversity of the students in the classes and in the minor. In a typical class, as well as in the minor, each baccalaureate-granting college of the university is represented. This includes students from as many as 49 majors in one classroom, encouraging them to learn from one another as well as from instructors.

Capstone Experience

The final requirement of the sustainability minor is the Capstone Experience in Sustainability (SUST 4103). Students must complete a research project, internship or community service project and submit a report connecting it to the principles learned in the classroom. Seventeen students completed their capstone experience for the spring 2014 semester. Projects ranged from creating a composting system for a local soup kitchen, to a study of carbon emissions from all commuters to and from the U of A campus, to a study on wastewater treatment methods.

All students produced posters documenting their project, results, and learning outcomes. These posters were placed on public display in the Arkansas Union on Earth Day (April 22, 2014) and are also permanently displayed online. As of December 2014, a total of 64 students have completed the capstone experience and graduated with the minor.



Graduate Certificate in Sustainability

The Graduate Certificate in Sustainability was created in 2012 as a way for graduate students to incorporate sustainability into their education, and for working professionals to develop credentials in sustainability. To earn a graduate certificate, students must take Sustainability in Business from the Walton College of Business as well as four courses selected from an interdisciplinary list of electives approved by the SCSC for providing cross-cutting content and discipline-specific depth.

In its second year, there were 10 students actively pursuing the Graduate Certificate in Sustainability program, and four students completed the program, bringing the total number of graduates to five.

Research and Scholarship

In October 2014, the U of A sent four representatives to the Association for the Advancement of Sustainability in Higher Education (AASHE) annual conference in Portland, OR. One sustainability student and OFS intern, Katharine DeRossette, attended. Carlos Ochoa presented a poster on research conducted in 2013 on zero client virtual computing. And Professors Steve Boss and Tahar Messadi led a day-long workshop on sustainability research methods for the second consecutive year.

The workshop had 24 attendees from universities and colleges in the United States, Canada, and Saudi Arabia. AASHE also accepted proposals from Professor Boss and Professor Messadi to host a one-day, pre-meeting workshop on research methods in sustainability and a symposium on sustainability research to run concurrently at the 2015 AASHE Conference and Expo in Minneapolis, Minnesota in October 2015.

The Science of Sustainability

The University of Arkansas is an international leader in exploring and developing the science of sustainability. Interdisciplinary research teams across campus conduct research to better understand and solve complex problems at the interface of food, water, and energy systems. The complexity of sustainability problems in the 21st century demand the combined wisdom and knowledge of the sciences, arts, humanities, and design disciplines in order to identify opportunities for innovative solutions. These questions include:

How do we produce enough food for the 9.5 billion people coming to dinner in 2050 without using more land, water, or energy?

✓ How do we intensify agricultural production on existing agricultural lands without increasing pollution from those lands?

✓ How do we improve water quality while producing biofuels?

✓ How do we design power grids that connect 21st century distributed power sources while maintaining the resiliency of the 20th century system?

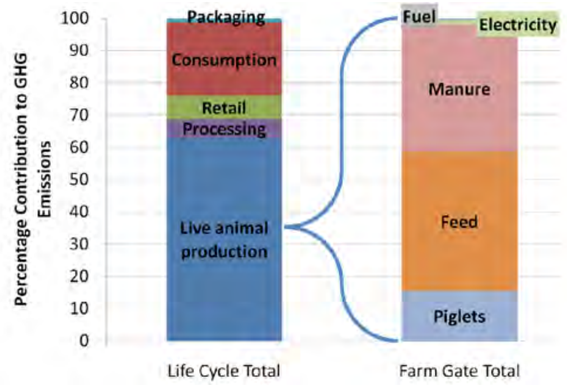
More than 35 percent of all research conducted at the University of Arkansas supports sustainability initiatives. The annual expenditure for sustainability research exceeds $20 million, making sustainability the largest research category on campus. Notable accomplishments in the nexus of Food, Water and Energy systems include:

Sustainable Food Systems

Measuring what matters is the first step in sustainable agriculture. A team of scientists from across the University of Arkansas worked with multiple sectors of agriculture to develop and improve the metrics of sustainability for the global food value chain. Dr. Greg Thoma led the Life Cycle Assessment research team that completed assessments of the impacts of US pork production on greenhouse gas emissions, land use, and water resources. Dr. Marty Matlock serves on the Board of Directors of Field to Market: the Alliance for Sustainable Agriculture, where he developed a sustainability framework that drives continuous improvement from the farm to the plate. The UA team leads programmatic adoption of this framework for national producer groups for soybeans, cotton, peanuts, rice, poultry, pork, dairy, beef, and fish. The sustainability framework was adopted as a draft ANSI standard in 2014.

When California runs out of water, where are we going to get our strawberries? In 2014 the Center for Agricultural and Rural Sustainability (CARS), an education, innovation, and outreach center for the UA System Division of Agriculture, moved into year two of a two-year, $4.5 million research program to improve strawberry production across the US. This project, led by Dr. Curt Rom (pictured below) funded by a grant from the Walmart Foundation and administered by the University of Arkansas

GHG Emissions from Life Cycle Stages of US Pork Production



System Division of Agriculture Center for Agricultural and Rural Sustainability, engaged more than 20 university research teams across the US to increase the sustainability of strawberry production. The goals of the project were to expand the regional diversity of US strawberry production, reduce chemical and energy inputs, conserving water and improve soil health in production, and reduce post-harvest losses. (strawberry.uark.edu)

Sustainable Water Systems

Improving water quality by producing biofuels is a double win. A multi-disciplinary team of investigators is turning swine waste into biofuels by cultivating microalgae for the production of biodiesel and butanol. Led by Dr. Jamie Hestekin, Associate Professor of Chemical Engineering, students are making the microalgae production process more economically viable by capturing nutrients from local waste streams, including wastewater from the U of A swine farm in Savoy, AR. They use ultrafiltration technology to remove biological contaminants from the wastewater in order to capture and utilize the large amounts of nitrogen and phosphorus that are present in the waste in the cultivation of microalgae. They have also developed a method for the extraction of oils and carbohydrates from algae in order to produce high value biofuels.

Sustainable Energy Systems

The National Center for Reliable Power Transmission (NCREPT), led by Dr. Alan Mantooth, a professor in Electrical Engineering, celebrated its five-year anniversary in 2014. NCREPT was established for the purpose of investigating solid-state solutions for high voltage applications such as the electric power grid including both protection devices as well as energy storage applications. NCREPT's state-of-the-art facility, the most comprehensive university facility of its kind in the US, provides a platform for testing advanced power electronic circuit and package designs for distribution-level voltages (15 kV-class) and high currents (3000 A at 480 V AC 3-phase). NCREPT partners with two dozen industry leaders, including manufacturers, power utility companies, national research laboratories, and others, as well as eleven US and international academic research partners. (ncrept.uark.edu)

REU students working on energy conservation technology for NCREPT

Student Internship & Leadership Programs

Student Internship and Leadership Programs

The Office for Sustainability (OFS) employed 14 student interns to work on projects within built, managed, natural and social systems in 2014. This program provided students with experiences in a wide range of activities, such as research, reporting and sustainable innovation. Although it is not a requirement, most of the student interns were enrolled in the Foundations of Sustainability minor. By working in the OFS, they encountered a variety of opportunities to see principles learned in the classroom at work in real-world applications. This included not only identifying problems and implementing solutions, but discovering and addressing obstacles and working with other offices and individuals on campus to achieve mutually beneficial goals.

OFS interns worked on projects essential to our operations. Under the guidance of the OFS staff, a group of interns conducted a project to assess the carbon sequestration potential of the campus's trees.

Interns provided assistance with much of the research and data analysis involved in tracking KPIs and were the major drive behind our outreach programs and events throughout the year.

As part of the student internship program, the OFS also engaged four students in sustainability leadership roles on campus. The OFS supported students designated to the positions of Associated Student Government Sustainability Director and Residents' Interhall Congress Director of Sustainability through collaboration and mentorship. This empowered student leaders to have a greater influence among their peers while aligning projects and initiatives closely with U of A sustainability goals and OFS activities.

Meet the Interns

Jeremy Baker—graduate student, agricultural and food law. He created the Food Recovery Blog, which provided coverage of the School of Law's Food Recovery Project.

Erin Cooper—sophomore, chemical engineering. She collected data for and contributed to drafting the Carbon Sequestration Report.

Katharine DeRossette—graduate student, higher education administration. She coordinated volunteers for the Game Day Recycling Challenge and coordinated waste reduction strategies for campus Greek Life.

Theresa Ehrlich—graduate student, public administration. In addition to student outreach, she coordinated the creation and adoption of the Green Revolving Fund, created the website bike.uark.edu, and spearheaded the Bike Fest event.

Katie Ferran—sophomore, biology. She coordinated vendor participants and facilities for the 2014 Earth Day event, worked on two urban forestry research projects, and helped in drafting a Campus Carbon Sequestration Report.

Kate Hurlbut—sophomore, geography earth science. She conducted waste audits and developed source reduction strategies for the Walton College of Business and Mechanical Engineering buildings.

Merissa Jennings—freshman, biological engineering. She conducted a study of metrics for the Living Building Challenge.

Cory Johnson—senior, crop science. He assisted in the creation of the Integrated Pest Management Plan.

Rachel Kraus—senior, international relations and Spanish. She gathered and analyzed data for Key Performance Indicators and assisted with the AASHE STARS reporting process.

Madeline Meier—sophomore, chemistry. She conducted a feasibility study and crafted a recommendation for the development of a Green Labs program at the U of A.

Lauren Hake—sophomore, elementary education. As the 2013–2014 Sustainability Director for Residents' Interhall Congress, she procured five new Hydration Stations and two Bike Fix-It Stations for University Housing.

Elizabeth Hood—senior, political science. As the 2013–2014 Director of Campus Sustainability for Associated Student Government, she assisted with the development of the Green Revolving Fund.

Cameron Baker—senior, earth science. As the 2014–2015 Associated Student Government (ASG) Director of Campus Sustainability, he created a resolution mandating zero waste events for all ASG activities, authored a bill supporting the U of A's zero waste goal, and developed a suite of waste reduction and recycling related strategies for adoption by ASG.

Kenneth Hamilton—junior, psychology. In his position as the 2014–2015 Sustainability Director for Residents' Interhall Congress, he led recycling programs in two residence halls, procured "smart power strips" for one hall, and led a sustainability think tank at the Southwest Affiliate of College and University Residence Halls conference. He also procured thirty new recycling containers for University Housing and two new Bike Fix-it Stations.

Sustainability Research Experience for Undergraduates

Background

The Office for Sustainability has worked with faculty across the U of A for the past seven years to provide summer Research Experience for Undergraduates (REU) programs. These programs focus on sustainable agricultural systems, funded by United States Department of Agriculture (USDA), and the assessment and sustainable management of ecosystem services, funded by National Science Foundation (NSF).

Structure

During the summer of 2014, 19 undergraduate students from across the country attended the program. The program begins with a three-day immersion course in Experimental Design and Exploration of Sustainability Ethics and is followed by an eight-week Research Experience. The program concludes with a science communications symposium, where students present their work to one another and to their faculty mentors.

The goal of the REU program is to expose undergraduate students to the scientific research process by taking them through the steps of developing testable hypotheses, data collection and analysis, and scientific communication in the form of oral presentations and written manuscripts. Each student is paired with a University of Arkansas faculty member and works on projects in fields ranging from biofuel development and carbon sequestration to life cycle analysis and certified organic growth medium production.

Fostering Community

Participants were purposefully selected from a variety of schools and backgrounds. Students were not segregated by preparedness but rather encouraged to use the full resources of the U of A to tackle obstacles in small groups, discovering strengths in each other and the wisdom of their mentors. By the end of the program, several participants remarked that their research experience taught them the importance of building relationships within a scientific community. Specifically, one student commented that "success in science comes from hard work and collaboration with others." Others mentioned that their peers taught them useful skills and how to communicate scientific concepts more effectively through discussion. Another student remarked that their experience "clarified how much of a community there is for research."

From its inception, this REU program has sought to provide research opportunities for students who are underrepresented in science, technology, engineering and mathematics (STEM) fields, including Native Americans, African Americans, and women. Moreover, this program aims to foster stronger ties between the University of Arkansas and other colleges and universities across the US.

Outcomes

The success of the group to work as a cohesive unit demonstrated the value of the diversity that the program sought to achieve. By the end of the summer, all students were able to present their findings and take questions from their audience. Each student took away a refined set of skills enabling them to apply the scientific method to their areas of study. The program has matriculated more than 100 undergraduates as of 2014, and many have gone on to pursue graduate degrees in science and engineering fields.

Food Recovery Initiatives

Background

The Office for Sustainability has been proud to support one of the signature programs of the U of A Volunteer Action Center, Razorback Food Recovery (RFR). RFR was launched in February 2014 when it began recovering food from retail sites on campus (Phase 1). Phase 2 began in the fall semester and expanded recovery efforts to campus dining halls. As of November, the group, made up mainly of students, had recovered around 20,000 pounds of food.

What is Food Recovery?

Food recovery is an issue that has been receiving increasing attention on a national level, as it addresses the dual problems of food waste and food insecurity. To do this, sources of edible food waste must be identified and partnered with to divert that food from the landfill and deliver it to hungry people. Typically food is donated to local food pantries and soup kitchens who are already engaged in efforts to feed the hungry. Razorback Food Recovery works with local food service agencies as well as the U of A Full Circle Food Pantry, another Volunteer Action Center program, to distribute recovered food to families and individuals who may be struggling with food security.

The Food Recovery Project

Razorback Food Recovery's tremendous strides would not have been possible without the U of A School of Law's Food Recovery Project, which paved the way in 2013 when it published The Legal Guide to Food Recovery. This document is a brief, easy to understand guide for food vendors to grasp the legality of food recovery. Often, vendors have concerns about legal liability involved with food donation, but this is a common misconception. In fact, there are already legal protections and guidelines in place to support these kinds of activities.

Recognition

During the summer, Razorback Food Recovery and the Full Circle Food Pantry received a $35,000 grant and a freezer truck from Tyson Foods, Inc. to enable them to expand their operations.

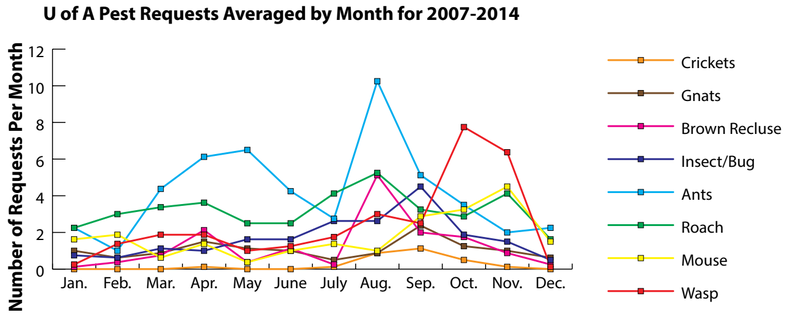
In recognition of the food recovery work being done on campus, the U of A received a 2013 Achievement Award from the United States Environmental Protection Agency. Carlos Ochoa of the OFS and Nicole Civita of the Food Recovery Project accepted the award at the Arkansas Recycling Coalition Conference in October.

Integrated Pest Management Plan

During the spring of 2014, the Office for Sustainability worked with Donn Johnson, professor of Entomology, to analyze current pest monitoring, treatment(s) and practices on the University of Arkansas campus and develop an integrated pest management plan (IPM). The purpose of the IPM is to reduce negative impacts on the campus and surrounding environment from chemical pesticides and improve the health and safety of the campus community.

The Integrated Pest Management Plan is a document that lists pests of concern and includes a cost comparison of current pest management programs for grounds and buildings with more sustainable IPM programs. The development of the plan was funded by the OFS and was completed in collaboration with University Housing, Facilities Management, University Grounds, Orkin Pest Control and the Entomology Department.

Integrated pest management is an effective and environmentally sensitive approach to pest management that relies on a combination of common-sense practices. IPM programs use current, comprehensive information on the life cycles of pests and their interaction with the environment. This information, combined with available pest control methods, is used to manage pest damage by the most economical means and with the least possible hazard to people, property, and the environment.



The IPM plan outlines a number of practical approaches to accomplishing these goals. Education of the campus community on pest identification, prevention and appropriate reporting steps is emphasized. The plan recommends developing an online identification guide for campus users that would include all relevant information.

The IPM plan contains an introduction to campus pests, monitoring and management, which lists each of the common pests found on campus, how to identify them and steps that can be taken to prevent and manage them. In all cases, the plan stresses that chemicals should be used only as a last resort, when prevention, traps and bait have not been effective. This approach also aims to place restrictions on the use of chemicals that are especially harmful to the environment and people. Additionally, the IPM plan lists actions that can be taken by University Housing and Facilities Management to improve pest management.

The IPM plan was presented to the University of Arkansas Sustainability Council at its April 2014 meeting. The Plan was approved by the Sustainability Council in September and subsequently approved by Provost Sharon Gaber for implementation as the first entry in a new Best Sustainable Practices Policy Series.

Measuring Ecosystem Services

Ecosystem services are the benefits we derive from the biosphere that support human activities. The most common framework for ecosystem services categorizes them as Supporting, Provisioning, Regulating, and Cultural services. Supporting services include the basic processes that support all other services, such as nutrient and carbon cycling, soil formation, and photosynthesis. Provisioning services are those products directly obtained from ecosystems, such as food, fresh water, and genetic materials. Regulating services are benefits obtained from regulation of ecosystem processes. Cultural services are non-material benefits obtained from ecosystems, such as spiritual value, education, and cultural heritage. Understanding how our decisions on campus impact ecosystem services provides opportunities for improving them over time.

We began measuring ecosystem services at the U of A by measuring a regulating service: carbon sequestration from forested lands. Student interns worked with graduate students and faculty across the U of A community over the past two years to measure carbon sequestration potential of over 600 acres of Ozark Plateau woodlands owned and managed by the U of

Provisioning Services

Products obtained from ecosystems

- Food
- Fresh water
- Fuelwood
- Fiber
- Biochemicals
- Genetic resources

Regulating Services

Benefits obtained from regulation of ecosystem processes

- Climate regulation
- Disease regulation
- Water regulation
- Pollination

Cultural Services

Nonmaterial benefits obtained from ecosystems

- Spiritual and religious
- Recreation and ecotourism
- Aesthetic
- Inspirational
- Educational
- Sense of place
- Cultural Heritage

Supporting Services

Services necessary for the production of all other ecosystem services

Soil formation Nutrient cycling Primary production

A. Carbon sequestration is the processes of capturing carbon dioxide from the atmosphere and storing it in non-greenhouse gas form. Forest ecosystems are natural carbon sequestration systems, storing atmospheric carbon in tree woody biomass. This carbon can be bound in trees for over 200 years. Forest ecosystems also provide other ecosystem services, including water storage and treatment, nutrient cycling, and habitat for numerous species.

The students measured key characteristics of 2,290 trees across the site as representative samples for the forest. These statistical samples were projected to the entire site, estimating a total population of 113,585 trees. The carbon sequestration potential of this population was simulated using a US Forest Service carbon sequestration model. Results suggested that this forested resource provides carbon storage of more than 76,000 metric tons of carbon as woody biomass (above and below ground), and sequesters nearly 12,000 metric tons of CO2 per year.

Forest Composition

The most common tree species were members of the White Oak Group, including White Oaks, Post Oaks, and Swamp Chestnut Oaks (28%), followed by the Red Oak Group, including Black Oaks, Northern Red Oaks, and Blackjack Oaks (14%) and the Elm family, including Winged Elms and American Elms (14%). The age and distribution of tree species is currently being analyzed to evaluate long-term management options. Management of U of A forested properties represents a core strategy to meet the campus goal of zero net carbon emissions by 2040.

Green Revolving Fund

Green Revolving Fund

The Office for Sustainability, Associated Student Government, and Facilities Management collaborated to launch the University of Arkansas Green Revolving Fund (GRF) during the fall 2014 semester. The GRF provides financing for implementing energy efficiency, sustainability and other cost savings projects on campus.

What are Green Revolving Funds?

Green Revolving Funds are internal funds that finance cost-saving energy efficiency, renewable energy and other sustainability projects. These savings are tracked and reclaimed to replenish the fund for the next round of green investments, thus establishing a sustainable funding cycle while cutting operating costs and reducing environmental impact.

Vision

The mission of the University of Arkansas Green Revolving Fund is to facilitate campus-wide engagement, interdisciplinary collaboration and student-led initiatives that demonstrate environmental leadership and economic benefit. The GRF provides financing for implementing energy efficiency, sustainability and other cost-savings projects. Projects will result in energy efficiency, greenhouse gas reduction, waste reduction or other sustainability-related benefits and have a demonstrated return on investment.

Initial Phase

In the fall of 2014, the university dedicated $50,000 over the next five years to the newly developed Green Revolving Fund. The $50,000 fund is an investment by the U of A campus to support student-, staff- and faculty-led sustainability projects and to facilitate campus-wide energy conservation.

The first round of GRF applications was accepted in November 2014. Three project proposals were submitted during the application period. The applications will be reviewed by the Managed Systems Working Group of the University of Arkansas Sustainability Council, and project recommendations will be made to the Council in the spring of 2015. Implementation of the first GRF funded project(s) will take place by the end of the 2015 fiscal year. The applicants themselves will be primarily responsible for the implementation of the projects while the OFS will provide necessary administrative support.

Applications will be considered on the basis of several key criteria. Projects will need to show a simple payback period of five years to ensure that project savings are paying back into the fund after the final $10,000 contribution is added in the fifth year. This will allow the fund to become self-sustaining. Educational value is another important factor in the selection of projects. As part of an institution of higher education, our projects should help to raise awareness and understanding among students and provide the opportunity to see sustainability principles in action.

As a pilot project for the fund, the OFS changed several CFL light bulbs in the Sustainability House to LED bulbs. The LED project represents minor energy savings for the university and provides a small-scale example of the type of projects students could propose in the future.

Model Green Revolving Funds

The U of A joins dozens of other institutions, including Harvard, Stanford and Arizona State University, in the implementation of a Green Revolving Fund. Examples of GRF-funded, student-led projects at other campuses include high-efficiency lighting, low flow showerheads, power cogeneration units, photovoltaic solar panels and greenhouse gardens for dorms.

Sustainability Events, Competitions, and Outreach

Campus Sustainability Day 2014

Attendees learned about the benefits of eating insects while sampling some themselves at the 2014 Campus Sustainability Day "Lunch & Learn" event.

Bike Fest

An event aimed at promoting bicycling on and around campus, Bike Fest included food, bike races, prize giveaways, and the "fix-a-flat" contest.

Earth Day 2014

The Office for Sustainability at the University of Arkansas held its third annual Earth Day Fair on Tuesday, April 22. The fair was well-attended by community and campus organizations and businesses who all share a common interest in sustainability. Fayetteville Mayor Lioneld Jordan (pictured above, center) addressed the vendor fair audience, presenting a proclamation for Fayetteville's Earth Day.

RecycleMania

RecycleMania is an annual nationwide competition for universities to reduce waste and increase campus recycling rates, sponsored by the nonprofit organization RecycleMania, Inc. The 2014 competition began February 2 and ended March 29. The U of A placed fourth in the competition, with an 18.7% diversion rate.

Campus Conservation Nationals

Campus Conservation Nationals, a three-week energy reduction competition among campus residence halls, began on March 31 and ran through April 20 at the University of Arkansas. The competition is part of a nationwide effort at colleges and universities worldwide promoting electricity and water reduction. The event is jointly organized by the U.S. Green Building Council, Lucid, National Wildlife Federation, and the Alliance to Save Energy. The U of A Residents' Interhall Congress (RIC) hosted the competition among its 18 residence halls on campus. A hydration station like the one pictured above was awarded to the winning residence hall.

Project Clean Plate

During the spring of 2014, Chartwells, the U of A campus dining services provider, worked with the OFS to promote Project Clean Plate, an event to educate students on the U of A campus about food waste.

Project Clean Plate takes place over a five-week span in the spring semester each year. Volunteers were stationed in the two dining halls to educate students about food waste and its impact on the environment; they also offered pledge cards for students to pledge to reduce food waste. Each week the pledge cards were entered into a raffle.

Office for Sustainability

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