

An aerial photograph of the Western Kentucky University campus. The Guthrie Clock Tower is a prominent feature on the right side, with a clock face and the name 'GUTHRIE' inscribed on it. The campus is lush with green lawns, winding pedestrian paths, and numerous trees, some of which are showing autumn foliage. Several red brick academic buildings are visible on the left side of the image. People can be seen walking along the paths, and the overall scene is bathed in the warm light of late afternoon.

Big Red, Small Planet: Sustainability at Western Kentucky University

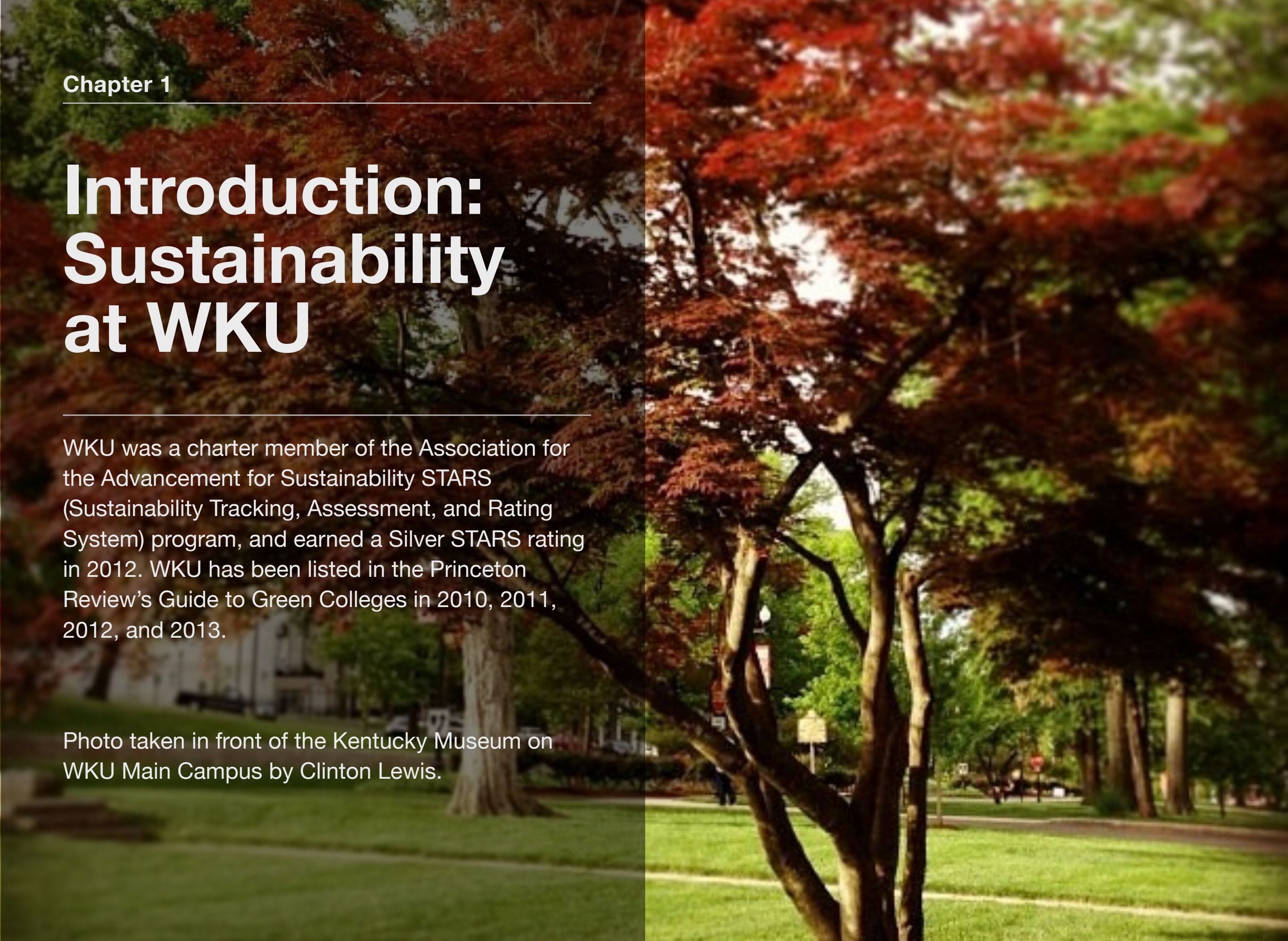
WKU Office of Sustainability

Chapter 1

Introduction: Sustainability at WKU

WKU was a charter member of the Association for the Advancement for Sustainability STARS (Sustainability Tracking, Assessment, and Rating System) program, and earned a Silver STARS rating in 2012. WKU has been listed in the Princeton Review's Guide to Green Colleges in 2010, 2011, 2012, and 2013.

Photo taken in front of the Kentucky Museum on WKU Main Campus by Clinton Lewis.



Introduction

FAST FACTS

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- **WKU has been listed in the Princeton Review's Guide to Green Colleges in 2010, 2011, 2012, and 2013.**

At WKU, “The Spirit Makes the Master”. Our commitment to continuous improvement is clearly reflected in our sustainability efforts. WKU’s commitment to sustainability, whether demonstrated in campus operations or in educational programs, helps to ensure that our graduates are prepared to address the complicated environmental, social and economic issues we face today. They will be able to think critically, solve problems creatively and be engaged citizens. If that’s all we accomplish then we will have achieved great success. But our sustainability commitment pays dividends, as it also leads us to reduce our environmental footprint, practice social responsibility, and conserve natural and economic resources. It encourages unprecedented cross-campus and community collaboration and partnerships. It supports our goal to be “A Leading American University with International Reach.” And, it brings renewed meaning to the other great Hilltopper motto: “Life More Life”!

This publication, created through partnership by the Office of Sustainability and the Hoffman Environmental Research Institute, offers a look into the impressive array of sustainability initiatives happening at WKU. While it is comprehensive, it is not exhaustive. There are still more sustainability successes to share and we will continue to realize accomplishments and make progress. It is for this reason that an iBook seemed the perfect venue for sharing our sustainability story. The dynamic and interactive platform allows readers to simply browse or to dig deeper

into any topic with photo galleries, live resource links, videos, and even audio clips. Work has already begun on the next edition to update and add content. We hope you will enjoy exploring the eBook, and that the stories inside inspire and enlighten.

-Christian Ryan-Downing
WKU Sustainability Coordinator

Sustainability Defined

“Capability of being sustained; 2a: of, relating to, or being a method of harvesting or using a resource so that the resource is not depleted or permanently damaged <sustainable techniques> <sustainable agriculture> 2b: of or relating to a lifestyle involving the use of sustainable methods <sustainable society>”

-Merriam-Webster, circa 1727

“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

-World Commission on Env & Develop, Brundtland Report, 1987

“...Then I say the earth belongs to each...generation during its course, fully and in its own right. The second generation receives it clear of the debts and encumbrances, the third of the second, and so on. For if the first could charge it with a debt, then the earth would belong to the dead and not to the living generation.

Then, no generation can contract debts greater than may be paid during the course of it's own existence.”

-Thomas Jefferson, Sept. 6, 1789

“No institutions in modern society are better equipped to catalyze the necessary transition to a sustainable world than Universities. They have access to the leaders of tomorrow and the leaders of today. They have buying and investment power. They are widely respected. Consequentially what they do matters to the wider public.”

- David Orr, The Last Refuge: Patriotism, Politics, and the Environment in an Age of Terror

“It is the duty of every American to plant more, produce more, save more, and give more.”

-Dr. Henry Hardin Cherry, WKU Founder and First President

"The broad effort of incorporating sustainable practices and concepts into our campus operations and academics has become an imperative in recent years. As an institution of higher education, we have a mandate to model and teach environmental stewardship and social responsibility. Each member of our campus community (faculty, staff, students and administrators) has a role to play in advancing sustainability at WKU".

– Dr. Gary Ransdell, WKU Strategic Guide for 2010-2012

Education for Sustainability

The mission of WKU is to prepare students to be productive, engaged, and socially responsible citizen-leaders in a global society. As a signatory of the Talloires Declaration, WKU recognizes the important role that higher education has to play in providing the leadership and innovation to help society transition to a sustainable future. In January 2010, a Resolution for Education for Sustainability at WKU was approved by the Board of Regents and adopted as a strategic priority.



Center for Environmental Education & Sustainability

FAST FACTS

- From 2008-2012, the CEES offered summer institutes, 53 workshops, Environmental Education Endorsement classes, and other professional development activities for 2,240 teachers and other participants.
- Through the CEES, WKU is the only university in the Commonwealth, and one of the few in the U.S., to have offered a graduate course on Educating for Sustainability and an Educating for Sustainability Summer Institute for educators.



CEES



Renamed in 2009 to reflect its increasing focus on educating for sustainability, the Center for Environmental Education and Sustainability (CEES) has been in existence at WKU for almost 30 years. The Center works with Pre-K through adult audiences and educators to design and implement programs and classes that are helping to improve awareness, attitudes, knowledge, and skills for building a sustainable future. CEES has become nationally and internationally recognized for many of its programs.

Mission Statement

The CEES works in partnership with WKU and a broad set of stakeholders to provide resources and leadership to advance environmental education and education for a sustainable future.

EE Endorsement

The Environmental Education (EE) Endorsement provides persons interested in environmental education with the opportunity to have training that meets national standards developed by the North American Association for Environmental Education. These standards have been adopted by the Kentucky Education Professional Standards Board.



The EE Endorsement is 12 credit hours and can be integrated into many graduate programs. Two required courses and two electives comprise the program. For classroom teachers, this endorsement is added to their teaching certificates. Environmental Education courses may also be taken by those not seeking the EE Endorsement.

WKU-HFH Durbin Project

In 2010, the CEES was awarded a 3-year, \$655,000 grant from the Kentucky Division of Water (KDOW) to work in partnership with Habitat for Humanity Bowling Green-Warren County (HFH BG-WC) and many other community partners, to create an integrated green infrastructure as Phase I toward building a

model green affordable housing community as a statewide demonstration. The project will demonstrate low impact development (LID) techniques that absorb, filter, and reuse storm and rainwater and can be broadly replicated. Other goals are to provide community education and professional training in NPS pollution and LID techniques, involve residents and the community in the project to build a shared sense of stewardship, and seek green infrastructure policy revisions for KY HFH and the state.



In 2012, a \$294,000 extension grant was awarded by KDOW to put in the road, utility, and associated green infrastructure for Phase II of the project. The community will eventually comprise up to 43 residential units for mixed-income and mixed-use, a community center, shared green space and gardens, and many other community-building features.

Professional Development

The CEES hosts professional development opportunities for educators at various times throughout the year. The Center's



Director and Program Coordinator are certified to facilitate educator workshops for the following programs: Project WET™, Project WILD™, Project WILD Aquatic™, Flying Wild™, Project Learning Tree™, and Food, Land and People™. Each project has

an educator's guide for teachers to use in their classroom; however, teachers must attend a six-hour educator workshop to receive the guide.

If you would like to submit a request for a particular workshop, please contact the Center at cees@wku.edu. The CEES may be able to facilitate the workshop or, if necessary depending on scheduling, will refer you to another agency that can accommodate you.

BG Schools Partnership

During the 2011-2012 school year, the CEES signed a formal agreement to work with Bowling Green Independent School District to provide their elementary teachers with resources for science instruction. The Center's Program Coordinator is working with the district to provide instructional support and science lab experiences to science teachers. This partnership is designed to help teachers plan instruction for science more easily and will also allow more opportunities for the children to learn science concepts through environmental education. With the great success of the first year of the agreement, in 2012-2013 the partnership has been expanded to include new initiatives.



Hoffman Environmental Research Institute

FAST FACTS

- Established in 1980s, dedicated to study of environmental resources, water, climate, karst.
- Comprised of over 25 faculty, staff, and students, along with commercial dye tracing lab.
- Engage in environmental education and outreach, sustainability research and service learning all over the world.



Hoffman



The Hoffman Environmental Research Institute, established in the 1980s, is one of twelve research centers at WKU. It is housed within the University's Department of Geography and Geology. At the time of its establishment, it was among one of the first centers dedicated to research and education about environmental problems, particularly those related to cave and karst environments, in the United States and internationally. It has continued this initial mission through its history and has now been involved in virtually all aspects of basic and applied cave and karst research.

The Hoffman Institute is comprised of three full-time faculty members, a graphics designer, laboratory manager, environmental research specialist, and multiple graduate and undergraduate student employees who work on a variety of research projects, maintain the technological interfaces for the Institute, and assist in the Institute's Crawford Hydrology Laboratory, Karst Field Studies Program, and EnviroLOS sector. Several affiliate faculty members from within the University, as well as other domestic and international institutions, also help contribute to the

breadth and quality of projects pursued by the Institute. Although it is supported by WKU, it is largely dependent on external funding provided through grants and other awards to support its projects.

The mission of Hoffman Environmental Research Institute is to be a leader in basic and applied research that aims to better understand landscape/atmosphere/water/human interactions. The Institute involves post-doctoral, graduate, and undergraduate students in all aspects of this work to increase their critical thinking skills and technical expertise in the environmental discipline, and, through extensive international collaborations, prepare these students for success in a global society. The Institute has attracted outstanding students from around the world, including multiple regions of the United States. Past center research associates have been very successful in obtaining positions with both government agencies and private firms throughout the United States and internationally.

Collectively, the objectives of the Hoffman Institute are:

- to be a research center dealing with all aspects of environmental studies, with particular emphasis on solving environmental problems associated with karst landscapes and groundwater
- to provide educational experiences and opportunities for undergraduate- and graduate-level students

- to promote outreach and provide educational materials about environmental issues to both adult and children members of the general public
- to provide public national and international service by assisting individuals, private firms, and government and non-government agencies with environmental problems and management

Gallery 2.1 Above & Below



Geography & geology class studies diverse landscape history of Ozarks



Visit hoffmanworld.org to learn more about the exciting research projects and education programs currently underway. Like us on [Facebook](#).

Environmental Education - EnviroLOS

Education is a pillar of the Hoffman Institute, and, therefore, the Institute continually pursues education research and outreach projects through its EnviroLOS, Environmental Learning Outreach Studios, sector. Our team combines expertise in informal education, geocognition and eye-tracking, graphics design, and project branding and messaging to help bridge gaps in environmental understanding, build project capacity, and sustain knowledge. For example, faculty and graduate students are currently working to examine how observers visually process complex karst diagrams, infographics, and photographs, and the effect this processing has on the interpretation and understanding of these materials. Specifically, through the use of stationary eye-tracking technology, the team is working to identify the characteristics of instructional visualizations that most successfully communicate about karst and examine the effectiveness of varying instructional karst visualizations to improve observers' understanding about the development and interconnectedness of karst landscapes and their relationship to groundwater resources.

Other education research and projects actively being pursued by the Institute include the development of a children's activity book and accompanying website, "Karst for Kids", hosting interactive groundwater workshops and 'conversations' for both professionals and members of the general public, partnering with show caves to train guides, researching karst learning through

Gallery 2.2 Education & Outreach



Jason Polk and Gary Schindele in a dry cave that once was water-filled in west-central FL. The Hoffman Institute's Dr. Jason Polk was featured in a recent news expose on "Florida's Vanishing Springs" by environmental journalist Craig Pittman in the Tampa Bay Times.



guided tours and interpretation centers at show caves and springs worldwide, partnering with the Caribbean Community Climate Change Centre to enhance awareness of climate change risk and adaptation, and developing a series of infographics, interpretative signs, and multi-media productions, amongst many others.

The Institute is also creating Ukarst, an online instructional and resource tool and database being developed to help community leaders, non-profit groups, governmental agencies, citizen scientists, and educators better assess data availability in karst regions and measure the amount of anthropogenic impact on karst landscapes (caves, springs, sinkholes).

Karst Field Studies

The Karst Field Studies program is a summer-based program offering one-week cave and karst classes for those with an academic, professional, or personal interest in all aspects of caves and karst systems. Since its initiation in 1979, undergraduate and graduate students, teachers, college professors, cave guides and interpretive staff, cave and karst managers, geologists, and hydrologists have participated in courses taught by leading experts in their respective fields (often by instructors who “wrote the book” about the subject). The classes offered through the program vary from year-to-year and sometimes in location, but all provide hands-on field experiences.

Visit karstfieldstudies.com for more information on the program and this year's class offerings. Like us on [Facebook](#).

Crumps Cave Preserve

The Crumps Cave Research and Education Preserve is located approximately 25 miles northeast of the Western Kentucky University campus near the town of Smiths Grove, KY. The

Gallery 2.3 Crumps Cave Preserve



Chris Groves explains details of groundwater monitoring equipment to Chinese scientists within WKU-owned Crumps Cave. (Photo by Jason Polk)

preserve protects the entrance to a two-kilometer-long cave system known for its large passageways and significant archaeological deposits. In 2008, the Hoffman Environmental Research Institute applied for a grant from the Kentucky Heritage Land Conservation Fund to purchase the property. The Institute took ownership of the 2.1 acre preserve in October of 2008.

Since acquisition, numerous inventories have been conducted at the preserve to identify and document the floral, faunal, archaeological, and biospeleological resources located in and around the cave. A world-class research facility has been established at the cave, which allows for examining karst processes and the impacts of agricultural activities on the quality of karst groundwater. An extensive monitoring network has also been established both in and outside of the cave to measure atmospheric/weather conditions, water chemistry parameters, cave microclimate, and bat activity. In short, at the Crumps Cave Preserve the Hoffman Institute has created a site, unique amongst many universities and research institutions, where cave and karst processes can be studied and opportunities for education and outreach are utilized to create a better understanding of the importance of these fragile ecosystems.

Crawford Hydrology Laboratory

The Crawford Hydrology Laboratory provides professional consulting and field and laboratory services regarding

groundwater tracing in karst and non-karst areas. CHL specializes in groundwater investigations with the use of fluorescent dyes and utilizes techniques developed and enhanced over the past 30 years. CHL provides quality supplies and analyses for groundwater traces and conducts full field investigations. The Laboratory has extensive experience conducting dye trace investigations for commercial clients as well as government agencies. Visit dyetracing.com

Gallery 2.4 Crawford Hydrology Laboratory



Crawford Hydrology Laboratory Manager Lee Anne Bledsoe investigates a cave.



envirolos

environmentallearningoutreachstudio



crumps cave



crawfordhydrology
laboratory

1906 College Heights Blvd #31066 Bowling Green, KY 42101-1066
270-745-9224 www.dyetracing.com

McChesney Research Station

FAST FACTS

- The McChesney Field Campus was a gift made by the McChesney family honoring H. F. McChesney Sr., who taught foreign language on the Hill from 1928 – 1959.



McChesney

McChesney Research Station

The McChesney Field campus, a 140-acre site along the Green River in northern Warren County, offers a unique experiential outdoor learning environment that is utilized by numerous academic disciplines at WKU. Access to the Green River also provides opportunities for environmental research, outdoor leadership and recreation classes. The field campus can be utilized for applied learning in academic disciplines throughout the WKU campus community, including recreation administration, outdoor leadership, physical education, public health, cave and karst study, geology, geography, biology, chemistry, teacher education, environmental science, agriculture, horticulture, environmental health, construction,

Gallery 2.2 Photos of McChesney Field Campus, September 2011, by Christian Ryan-Downing.



engineering, history, public relations, marketing, advertising, graphic design, sustainability and more. Recreation students have constructed trails, installed trail signage, developed campsites, built a canoe access, and made a variety of other improvements to the property.

Gallery 2.3 McChesney Field Campus Project 2011. Recreation Resource Mgmt REC 430-430G Fall 2011.



The fall 2011 REC 430 students built a canoe access at the confluence of Indian Creek and the Green River.



Gallery 2.4 McChesney Field Campus Project 2010. Recreation Resource Mgmt REC 430-430G Fall 2010.



Old home site prior to clearing saplings.



Upper Green River Bio Preserve

FAST FACTS

- The Preserve works within the USDA Green River Conservation Reserve Enhancement Program (CREP) to re-establish riparian corridors and native grasses, both on site and regionally, to mitigate historic and current agricultural impacts on water quality.



Bio Preserve

Green River Preserve

The Upper Green River Biological Preserve comprises 800 acres of land located on both banks of the Green River in Hart County, Kentucky, about 2 miles upriver of Mammoth Cave National Park.

The mission of the WKU Upper Green River Biological Preserve is to foster knowledge and protection of this diverse region and our natural heritage through research, education, and conservation. Education is a strong emphasis of activities at the preserve, including community involvement in cleanups, canoeing expeditions, field trips by middle school students, teacher education programs, and active involvement with undergraduate and graduate classes, and student participation in research projects.

The Preserve cooperates with Mammoth Cave National Park through a mussel rearing facility that should help improve populations of freshwater mussels, including endangered species, in the Green River. Additional projects include restoration of blight-resistant American Chestnut, American Elm, Butternut, Switchcane, and herbaceous plants to appropriate habitats.

WKU Honored for Work at the *Upper Green River Biological Preserve*:

Biological Preserve Maps: *Map 1* and *Map 2*

Office of Research

FAST FACTS

- **RESEARCH:** The discovery of new knowledge which leads to the development of new technologies, methods, materials, and/or uses. Students can significantly enrich their academic experiences at WKU by engaging in research.
- The WKU Office of Research has sponsored Graduate Assistantships in the Office of Sustainability allowing for student engagement in sustainability projects such as AASHE STARS data collection and submission.



Office of Research

WKU Office of Research

Research advances knowledge to create innovations that improve lives. The WKU Office of Research encourages research and fosters interdisciplinary cooperation among faculty and students to enhance and improve the research infrastructure.

Research encompasses a broad array of disciplines to include arts and humanities as well as the sciences, since all disciplines contribute to the quality of life in our community.

Sustainability Research

Sustainability research leads to innovations that support ecological vitality, social well-being and economic prosperity. It may focus on key principles of sustainability (such as finite and renewable resources and environmental justice), address sustainability challenges (such as waste reduction, food production, energy policy, internalization of externalities and climate change), or further our understanding of systems and the interconnectedness of environment, culture, and economy.

Visit the Office of Research website to learn about Faculty involvement in sustainability research and to find a list of **sustainability related courses**.

MA in Social Responsibility & Sustainable Communities

FAST FACTS

- The M.A. in Social Responsibility and Sustainable Communities is the only graduate degree offered in the state of Kentucky—or in the country—focusing on the intersections of social justice & responsibility, environmental sustainability, and community-based research.



MASTER of ARTS in
SOCIAL RESPONSIBILITY
and SUSTAINABLE COMMUNITIES
Western Kentucky University

Master of Arts

Sustainability Master's Program

The Master of Arts in Social Responsibility & Sustainable Communities is an interdisciplinary program of study that provides students with the tools to lead communities toward social justice and sustainability. It is designed especially for students inclined toward the humanities, social sciences, and related fields. Students take a core set of courses that provide interdisciplinary grounding in social justice and sustainability, economic and policy issues, leadership issues, community-building, and community-based research. Students may focus their elective courses on environmental sustainability, women's & gender studies, intergenerational studies, or other issues—depending on their interests, on availability of courses, and in consultation with their advisor. Students in the MA in Social Responsibility & Sustainable Communities will cultivate the skills and knowledge necessary to encourage and lead for economic, political, and social change for more just and sustainable communities. Learn more about the SRSC here: [**Master Program**](#)

Study Abroad in the SRSC

We have two locations for SRSC students to study abroad in order to focus on environmental and social justice issues, from international perspectives: Peruvian Amazon and Belize.

Peruvian Amazon

During the January term (usually beginning in late December), Dr. Jane Olmsted takes a group of students to the Peruvian Amazon. We are in the early stages of planning the next trip, for 2013-14. Our goals for Place, Leadership, and Community on the Amazon Frontier are:

- To provide students with an opportunity to examine human-environment interactions in urban and rural settings.
- To employ experiential learning “City as Text” as a means to understand the dynamics of place and community.
- To analyze leadership practices in an international setting.
- To develop students’ field research skills through individually designed projects.

When I first heard about the opportunity to go to Peru as part of the Amazon 2012 trip, I immediately filled with excitement. For most of my life I had dreamed about visiting the rain forests in South America. Combined with my love for the environment and outdoors along with being a part of the SRSC program, it was a perfect match. The trip was an unforgettable experience. Being submersed in a completely different culture with exposure to the various communities and ways of life in the region is something I continue to cherish. In fact, the trip provided me with the kind of meaningful research project I wanted—the impact of oil drilling

along the Amazon. This is what I did on my 2013 trip. I spoke with leaders and citizens in Iquitos and in the communities down river, as well as with two employees of an oil company. My conclusions show that even when drilling operations do not occur in the communities I visited, the potential for danger is being felt, both in terms of the environment and social dynamics. -Chad Green , 2013



Movie 2.1 Watch the video to meet Program Director Jane Olmsted and learn more.

Western Kentucky University's
Cohort Programs offers an
online degree in Master of Arts
in Social Responsibility and
Sustainable Communities.

Gallery 2.5 Study Abroad in Peru



Peru 2012 Study Abroad group aboard the Nanita.

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Originally I titled my thesis for the SRSC program “Plain and Simple: Living Sustainably in an Unsustainable World.” Since starting the field research progress I have discovered that my thesis is a study of American women who are defining sustainability and “the good life” for themselves and how they have come to that definition. I am staying with each of the women for one week at their homes, observing and interviewing them in

the process of working alongside them in their daily routines. My research has been made possible because of the preparation I have received in the core classes of the SRSC program. These along with the faculty and staff in the program have been instrumental in the networks I have formed and projects I have been asked to be a part of. My research will highlight women who are a powerful example of the roles women are taking in the sustainability movement and how they have come to shape and define those roles. –Brandi Button, 2013



I am a student of the Master's program in Social Responsibility and Sustainable Communities. I am excited to have found a program that aligns so much with my academic interests as well as my personal beliefs about society and ways of making social change. I am working on a certificate in Gender and Women's Studies, which supplements my Master's so well. My thesis project is an ethnography of an activist group, Mountain Justice, which has been working to end Mountaintop Removal mining in Central Appalachia since 2004. The ethnography is participatory, and my thesis will include a mapping component with the stories of activists involved in the movement. The written portion of my thesis will focus on three pedagogical outlines for teaching

workshops and classes on the following subjects: Appalachian Cultural Awareness, Conflict Transformation, and Activist Self



Care. These areas are pivotal to the work done by Mountain Justice, and many organizations working towards similar goals. I hope my thesis will help Mountain Justice, as well as other radical communities working with conflict transformation to foster more sustainable activism. - Emily Gillespie 2014

Belize

In March, Dr. Molly Kerby leads a group of students to Belize, an initiative called IMPACT Belize. The WKU program has taken place annually in the village of Gales Point, Belize since January of 2005. This program differs from traditional study abroad programs in that faculty and students live in the community and work with the people of the village to solve community problems. Because we adhere to the principles of service learning and combine those practices with a focus on social responsibility, this program is truly unique and provides an excellent opportunity for student engagement. As a result, students develop a clear understanding of the connections between their service, social interactions, and real-life applications.



WKU MBA & Sustainability

FAST FACTS

- **WKU features the only MBA program in the state offering an emphasis in sustainability. The MBA program sees a key linkage between business and sustainability.**
- **WKU's MBA courses in sustainability are designed to help students face some of the most complex social and environmental problems around the world.**



MBA

In 2009, a group of faculty met to discuss the possibility of creating a series of courses which might form a concentration in “business sustainability.” This meeting was initiated by the expressed interest in students, faculty, programs at aspirational schools, and activities across WKU’s campus. Interested faculty members from a range of academic preparations inside and outside of business were identified and a series of courses were created which became a concentration in business sustainability in 2010-11. A diverse set of 26 full-time MBA students formed the first class: about 50% of the class was international students; about 50% of the class was female (females are often underrepresented in MBA programs nationally).

The business sustainability courses were modified slightly for 2011-12 with the central topics being: Sustainability in Business Overview, Sustainability Metrics and Reports in Business, Entrepreneurial Opportunities in Business Sustainability, and Social Entrepreneurship. During this year, another diverse MBA class studied the sustainability concentration: 60% of the class was international students; nearly 50% of the class was female. This class was the first class with students who stated they were interested in the WKU-MBA at least in part because of the sustainability concentration.

For 2012-13 a course in “Sustainability in Operations” was added to the concentration. The class was smaller due to a decrease in international students:

about 30% of the students were international; about 40% were female. During this year, MBA students in the concentration won awards and honors for presentations and ideas related to business sustainability.

With the insights drawn from offering business sustainability courses at the MBA level for 3 years, and after seeing the attractiveness of these topics to MBA students, the MBA program decided to move the concentration to its larger program – the Online MBA program. The online program is 2-3 times the size of

the full-time program and reaches a much wider geographic area. Discussion is underway to offer a “Certificate in Business Sustainability” through the Online MBA sustainability courses being offered.

For more information please contact the MBA office mba@wku.edu or 270-745-5458. Like the **WKU MBA on Facebook**

Gallery 2.7 The 2012 MBA students celebrate Earth Day at the annual Earth Day



Gallery 2.6 On June 13 2012, the Fulltime MBA cohort went to the Romanza Johnson park and nearby creek to examine water quality. Instructors Brian Sullivan and Christian Ryan-Downing, along with Robin Hume and Terry Wilson from the Center for Environmental Education and Sustainability, led the excursion.



Chapter 3

Culture of Sustainability

At WKU, sustainability is more than conserving resources or green buildings. Hilltoppers embrace sustainability as part of our campus culture. Students lead the way through organizations like GreenToppers and Americans for an Informed Democracy, and collaborative sustainability events like the annual Earth Day Festival, Campus Sustainability Day, and Food Day provide opportunity for sharing and celebrating our sustainability stories.



Office of Sustainability

FAST FACTS

- The WKU Office of Sustainability was established in 2008.
- The Office of Sustainability is located at 503 Regents Ave in a house that will serve as a best practice demonstration home.
- The Office of Sustainability is home to Big Red Bikes and the WKU PowerSave interns.



WKU Office of Sustainability

It is the mission of the Office of Sustainability to promote a culture of sustainability at WKU, integrating principles of ecological integrity and social equity into academics, practices, and partnerships. Our goal is to ensure that WKU is an institution that provides innovative solutions to global challenges, prepares students as engaged and responsible citizens, and observes best practices in campus operations and services. Like the ***Office of Sustainability on Facebook.***

The functions of the Office of Sustainability include:

- Manage internal and external communications about sustainability efforts and foster information sharing among campus and regional community members.
- Engage university wide stakeholders to develop policy and to identify and implement best practices to institutionalize sustainability principles and goals.
- Track and report progress with measurable indicators and communicate progress through production of an annual WKU Sustainability Report.

- To encourage cross-campus collaboration and partnerships, bridging academics and operations using the campus as a living laboratory where ideas can be practically implemented.
- Develop education and awareness outreach materials, programs and projects.
- Provide a clearinghouse of information and resources relating to sustainability.
- Advise leadership on issues relating to sustainability in conjunction with the WKU Sustainability Committee.
- To promote and celebrate WKU sustainability initiatives.

The Office of Sustainability oversees such programs as Big Red Bikes, WKU PowerSave, the Local Food for Everyone initiative, and events such as Campus Sustainability Day, Food Day, and the annual Earth Day Festival.

View **Sustainability Reports** for 2009, 2010, and 2011.

In 2012, the Office of Sustainability moved into a new location at 503 Regents Avenue. The house will be transformed into a sustainability best practice demonstration



home, with a goal of net zero energy use. Best practices will include sustainable landscaping, solar generated electricity, rainwater collection, and much more!

Meet the WKU Sustainability Coordinator

Christian Ryan-Downing works with students, faculty and staff to advance sustainability in university culture, operations, and academics. She received her B.S. in Wildlife Conservation



and Management from Missouri State University and upon graduation, worked for the National Park Service as an Interpretive Park Ranger for several years before earning a M.S. in Biology/Ecology at WKU. She is presently a doctoral student in the WKU Educational Leadership program, focusing on post-secondary education. Christian is certified by the Commonwealth of Kentucky as a Non-formal Environmental Educator and she is a Leadership in Energy and Environmental Design (LEED) Accredited Professional. Photo by WKU photojournalism student, Abbey Oldham.

View Christian's Masters Thesis: **Sustainability of Western Kentucky University: An Examination of Campus Environmental Policy, Performance, and Potential for Change.**



South-east facing side of house with out. Exterior brick can reach temperatures of close to 145 degrees in the sun, resulting in high cooling costs as the heat transfers into the dwelling.



South-east facing side of house with Green Screen. The trellis system supports the plants so that the root won't damage the structure. It really makes it a 'Green House'

Green Screening

The main reason for green screening is to significantly reduce solar gain absorbed by the structure. This results in less heat being bounced back into the atmosphere as well as keeps down cooling costs in the hot summer months. These systems utilize a trellis system that attaches to the structure and does not contribute to damage by the plant roots. These systems are used all over the world for these reasons and the aesthetics. It gives a modern look with a forward thinking approach to cooling.



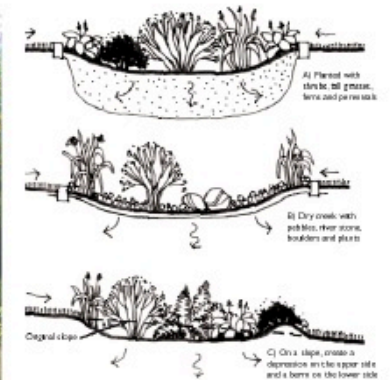
Back yard before BMP is implemented, requires frequent mowing and has a poor ability to slow or filter runoff.



Back yard after BMP is implemented, requires no mowing and has a excellent ability to slow and filter runoff. it also creates habitat value and is aesthetic appealing.

Best Management Practices

Two approaches to best management practices are integrated storm water management and no-mow areas. The BMPs are very important for biodiversity and low to no costs for maintenance. This approach to storm water management slows and filters storm water runoff before it reaches the injection well site. The second benefit to this approach is no mow areas. These areas can be maintained without the use of fossil fuels therefore reducing the carbon footprint.



Fair Trade

FAST FACTS

- **WKU became the fourth Fair Trade University in the United States in 2011.**
- **Fair Trade coffee can be found at all coffee shops on the WKU campus.**



Fair Trade

Fair Trade

In 2011, the United Students for Fair Trade (USFT) hosted its 7th Annual National Convergence at WKU. The theme of the three day conference, 'Igniting a Movement: Fair Trade Universities' was appropriate, as the event launched America's "Fair Trade Universities" campaign, an initiative which began in the U.K. in 2003. That weekend WKU became the fourth Fair Trade University in the United States. Student organizers welcomed over 100 of the nation's top student leaders working on Fair Trade for a weekend filled with expert panels and workshops focused on Fair Trade and student activism. Featured guests were the **Beehive Design Collective**. The bees "de-construct the complex and overwhelming issues that are shaping our world, using bio-regionally accurate depictions of animals and insects as metaphors to link cultural and ecological diversity".

A Fair Trade University commits to raise awareness among students and staff about Fair Trade and the benefits it offers to producers in developing countries, while ensuring that Fair Trade products are sold & served at university owned and operated outlets. Learn more about Fair Trade at www.usft.org

View the **WKU Fair Trade Resolution**

Gallery 3.1



The Fair Trade convergence participants pose in front of a drawing by the Beehive Collective.



AASHE STARS

FAST FACTS

- **STARS research provides opportunity for student engagement. Students assisted with the 2011 and 2012. STARS reports by collecting data and conducting greenhouse gas emissions research. The real-world learning experience builds professional skills and encourages active citizenship.**



AASHE STARS

The Association for the Advancement of Sustainability in Higher Education – AASHE

In early 2010, Western Kentucky University became a charter member of the Association for the Advancement of Sustainability in Higher Education's Sustainability Tracking, Assessment and Rating System (STARS). STARS is a voluntary, self-reporting framework that provides a guide for advancing sustainability in all sectors of higher education. WKU leaders and Sustainability Committee members recognize that STARS is a common standard of measurement for sustainability in higher education and that it can serve as a tool that promotes a comprehensive understanding of sustainability.

AASHE's STARS program is the only one of its kind that involves public reporting of comprehensive information related to a college or university's sustainability performance. Participants report achievements in three overall areas: 1) education & research, 2) operations, and 3) planning, administration & engagement. **Western Kentucky University has received a *STARS Silver Rating* in recognition of our sustainability achievements from the Association for the Advancement of Sustainability in Higher Education (AASHE).** For more information about the STARS program, visit stars.aashe.org.

STARS has been developed by the higher education community through a transparent process. STARS is designed to:

- Create incentives for continual improvement toward sustainability.
- Provide a framework for understanding sustainability in all sectors of higher education.
- Enable meaningful comparisons over time and across institutions using a common set of measurements developed with broad participation from the campus sustainability community.
- Facilitate information sharing about higher education sustainability practices and performance.
- Build a stronger, more diverse campus sustainability community.

“WKU is particularly pleased to participate in the AASHE STARS program. The process of tracking and documenting our sustainability efforts has been an informing exercise, and measuring our progress will certainly prove to be helpful in our endeavors to improve and advance sustainability.” -Dr. Gary Ransdell, WKU President

About AASHE

AASHE is an association of colleges and universities that are working to create a sustainable future. AASHE’s mission is to empower higher education to lead the sustainability transformation. It provides resources, professional development and a network of support to enable institutions of higher education to model and advance sustainability in everything they do, from governance and operations to education and research. For more information about AASHE, visit www.aashe.org.

The Scoring System

- An institution’s STARS score is based on the average of the percentage of applicable points it earns in each of the three main categories of STARS credits (i.e. Education and Research, Operations, and Planning, Administration & Engagement). Any Innovation Credits earned are then added to this average determining the total STARS score.
- STARS Rating levels are not awarded for the score achieved in an individual category (i.e. If an institution earns an average of 50% for the Education and Research Category, it does not achieve a STARS Silver Rating in this category). STARS Rating levels represent the total score achieved by the institution.

- STARS is a sustainability-focused system; it does not only assess environmental factors but also social and economic factors.

The Three Main Categories of STARS Credits



WKU AASHE Scores



Earth Day

FAST FACTS

- In 2013, WKU hosted the seventh annual Earth Day Festival.
- The WKU Earth Day Festival is the largest Earth Day celebration in the area. It is attended by campus and community members from ages 1-100.

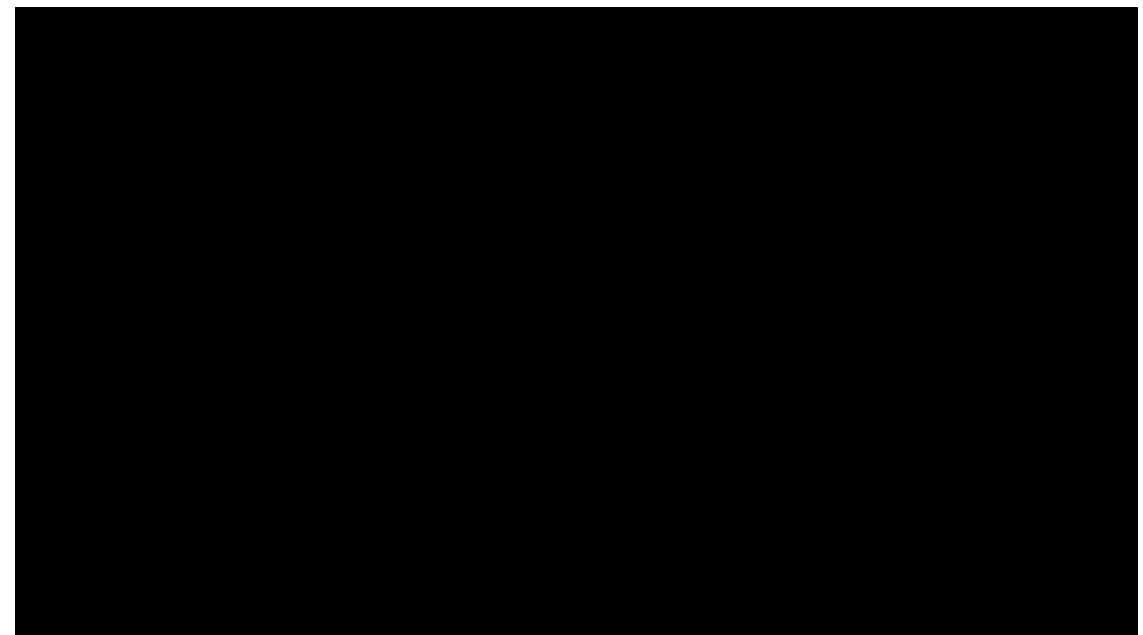


Earth Day

Earth Day

Since GreenToppers Students for Campus Sustainability hosted the first Earth Day festival in 2007, the Earth Day festival has been an annual tradition at WKU. The festival is attended by people from campus and community of all ages. Individuals and departments across campus share in the celebration, showcasing their individual sustainability efforts and inspiring us all. The festival includes all of the necessary components for an Earth Day celebration – music, art, food, awareness, and fun.

Movie 4.1



2011 WKU Earth Day Festival – video by Nick Brazinsky

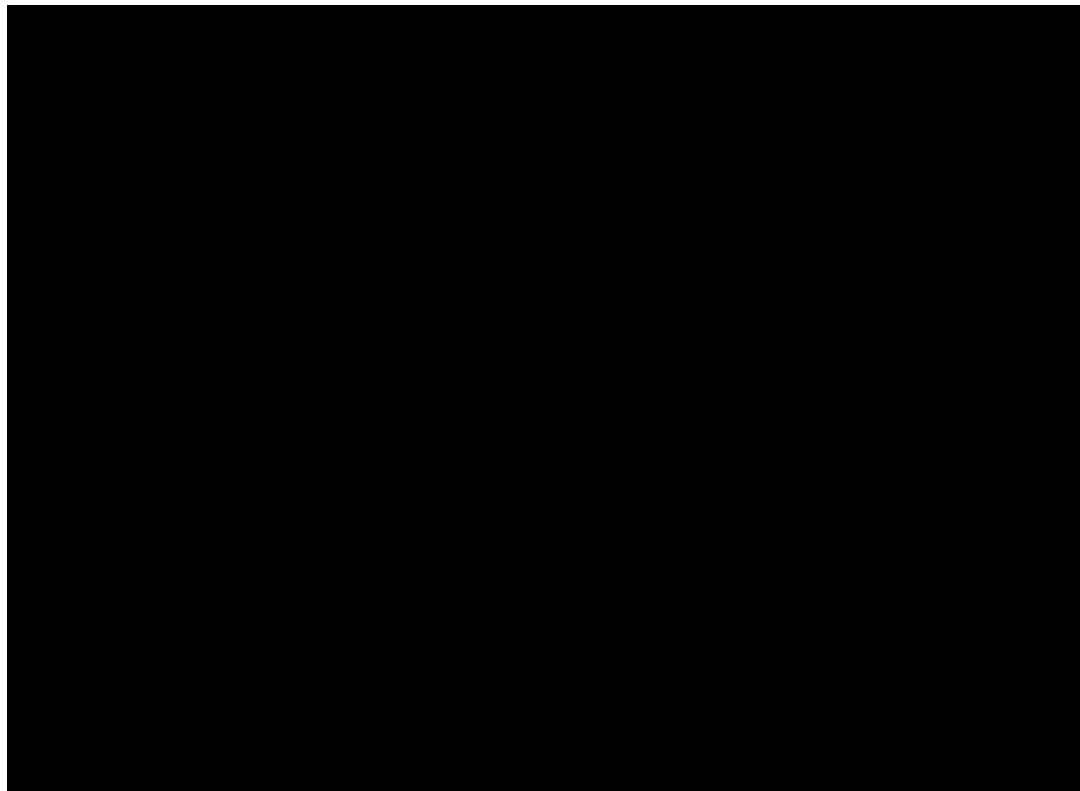
Gallery 4.1



Earth Days at WKU. Photo by Emily Twardowski '12.



Movie 4.2



2012 WKU Earth Day Festival – video by Eli Kleinsmith.

PowerSave

FAST FACTS

- In 2012, the PowerSave program resulted in savings of 37,500 kWh for the WKU main campus, reaching 2600 students, and saving \$3,384.00 in the University utility budget.



PowerSave

PowerSave Campus

WKU is a proud member of the PowerSave Campus Network, a program sponsored by the Alliance to Save Energy and Tennessee Valley Authority. The PowerSave Campus Network empowers college students to be tomorrow's energy efficiency leaders. It is a student-driven energy efficiency education program that promotes careers in the field, generates actual energy savings, increases awareness of the importance of energy efficiency, and encourages academic infusion of sustainability concepts. Follow the **PowerSave Campus Interns** on Facebook!

Gallery 3.2 Meet the PowerSave Campus Interns



*Ashley McCloughan, Team Leader
WKU Honors College, Biology Major,
Sustainability Minor*



The PowerSave Newsletter - The Live Circuit

Each month, the PowerSave Campus Interns publish The Live Circuit, a newsletter that features energy-related stories and information for the campus community and beyond. View past issues of the **newsletters**.

Energy Audits

The PowerSave Campus Interns can help you green your spot on the hill by performing energy audits of your dorm room, office, or classroom. Contact the Office of Sustainability to schedule an energy audit today!



PowerSave Interns hosted an acoustic concert to kick off the Campus Conservation Nationals Bluegrass Unplugged Edition in spring 2013.

Community Farmers Market & Local Food for Everyone

FAST FACTS

- The Community Farmers Market was voted runner up Kentucky Farmers Market of the Year in 2012.
- The Local Food for Everyone initiative partnerships include: the Kentucky Department of Agriculture, Kentucky Proud, Kentucky Public Health Association, Barren River District Health Department, Community Farm Alliance, University of Kentucky Cooperative Extension Service, HOTEL INC (local food pantry), CEDARS (refugee outreach), Sustainable Kentucky, Bowling Green Tourism and several other local non-profits.



localfoodforeveryone.org

Local Food For Everyone

In Fall of 2012, Western Kentucky University and the Community Farmers Market teamed up to receive a Farmers Market Promotion Program grant from the United States Department of Agriculture (USDA) to promote locally grown foods in South Central Kentucky. A portion of this grant is to benefit local farmers by helping develop business skills, brand their business, and assist them in finding a marketplace for locally grown foods. Another portion of the grant is to expand accessibility to new markets in South Central Kentucky. The idea is that Local Food For Everyone will be able to increase the customer base while developing the farmers to be able to meet demand.

Press About the Program

WKU receives USDA grant to promote “Local Food For Everyone” initiative

South Central, KY: Local Food For Everyone Initiative

USDA News Release

What People are Saying

“Our team is happy to receive these USDA funds to support and engage local farmers and ranchers. It is not intended to be exclusive to a single market, Bowling Green or Warren County, but will assist all producers in our region of the state. The focus of this grant is to increase the profitability of local farmers and ranchers by increasing their market penetration. The theme is ‘getting connected to local food.’ While the goal is to help producers, their success will be the success of the public, too.”

-Dr. Martin Stone, Leichhardt Professor of Horticulture in WKU’s Department of Agriculture

“There is such a powerful connection that a mom experiences to her child when breastfeeding. As my children grew older, I couldn’t help to believe that there should be more meaningful experiences and connection to our food than simply shopping at a supermarket. My husband was selling watermelons and heirloom tomatoes at a local farmers market and we started purchasing more and more of our food locally. We were soon challenging ourselves to buying as many foods locally as possible. I would visit farms all year long to



purchase our milk, meat, and eggs, fruits, and vegetables—sometimes driving long distances to do so.” -Michelle Howell, Local Food For Everyone

“Through Local Food For Everyone, we hope to accomplish exactly what our initiative states: making local food accessible to everyone—regardless of one’s socioeconomic background.

Local, fresh, healthy foods should not be a privilege reserved only for upper-middle and upper-class members of our nation. Also through LFFE, we are going to partner with area organizations to hold cooking demonstrations, nutrition education, and use these organizations as locations for our mobile market. We are going to work in partnership with existing programs in our area that are already doing such good work with healthy initiatives, and we think these partnerships will bring us the most success—working together to promote healthy food access.” -Brittany Ryan, Local Food For Everyone Outreach Coordinator



“I will be focusing on ways to bring together diverse partners like health department staff, farmers, and universities to assess the potential and barriers for developing a local food system through

a community food system assessment. I hope that this brings attention to Bowling Green as a new leader in local food system development in Kentucky. The diverse partners that are working to make the Local Food For Everyone initiative happen is a model for the rest of the state. In addition, I hope that this event is a catalyst for community action.” -Heather Hyden with Community Farm Alliance

This project has good timing as it has lined up with the goals and objectives of the BRADD Community Health Planning Council. The Local Food For Everyone initiative will be a key component to the efforts to address access and awareness of healthy food choices. The initiative will play a partnership role over the next three years with an emphasis in a reduction of childhood obesity. The group will be partnering with the Barren River District Health Department who is seeking assistance from Community Farm Alliance to pursue a Community Food Assessment. This assessment will help direct future efforts in efficiently meeting the local food needs of everyone in the community.



To learn more about the Local Food for Everyone initiative, visit localfoodforeveryone.org or connect with LFFE on Facebook.

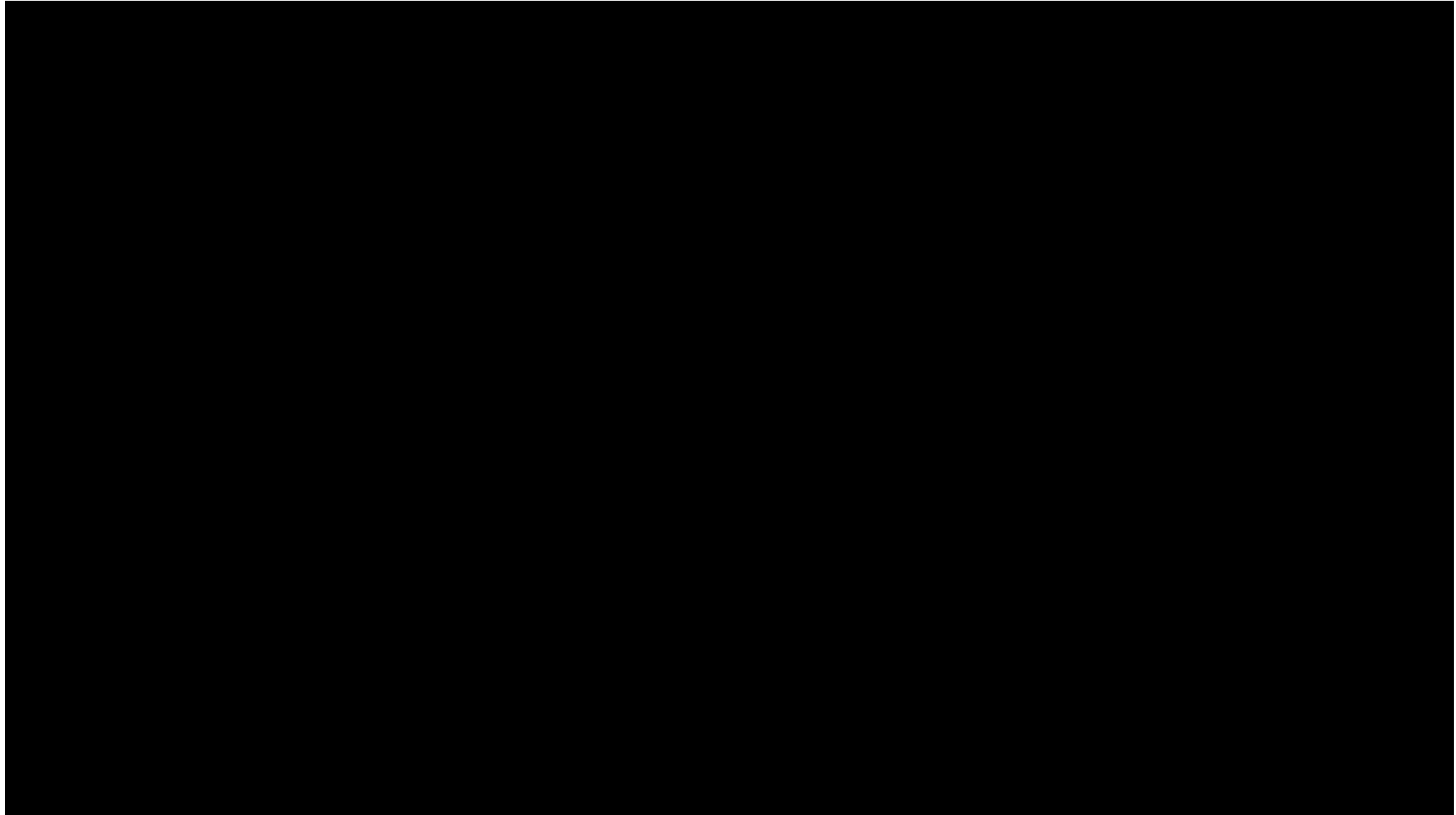
Links

[eat.] South-Central Kentucky's first local food directory.

The first local food directory for south-central Kentucky sponsored in part by WKU.



Movie 3.1



WBKO Go Local Farmers Market/Eat. release party

Sustainable Practices in Parking and Transportation

A large portion of a university's ecological footprint is related to accommodating personal vehicles. Traffic to and from campus contributes to air pollution and subsequent climate change. In 2007, the US EPA estimated that the transportation sector of the US economy is responsible for 10% of greenhouse gas emissions worldwide due to the combustion of fossil fuels. Further, impervious surfaces, such as roads and parking lots, have been identified as the single greatest source of water pollution in North America. In addition, large, uninterrupted expanses of asphalt cause habitat loss and contribute to heat island effects which alter local climates.



Parking and Transportation

PARKING AND TRANSPORTATION

Because so many ecological impacts are directly related to traffic and parking, substantial opportunities exist within Parking and Transportation Services (PTS) to reduce WKU's ecological footprint (see below). We are proud of what we've accomplished so far, but realize we still have a lot of work to do.

- Reducing Parking Demand: Promoting policies and programs which reduce the need to bring a personal vehicle to campus. These include active commuting, carpooling, car sharing, public transit and pricing strategies.
- Incorporating Sustainable Design in Parking Lots: Reducing the volume of impervious pavement by introducing permeable pavement and landscaping islands into newly constructed or renovated parking lots. Reducing the heat island effect by incorporating canopy trees into parking lot designs or using a high reflectivity sealant on the asphalt.

- Reducing Energy Consumption: Strategically closing parking lots and reducing night time lighting requirements. Utilizing highly efficient lighting and system controls.
- Reducing Emissions: Using biodiesel in transit buses and increasing eCommerce as a business practice.

Addressing Stormwater Runoff

The design of a parking lot influences its impact on the environment, particularly in relation to storm water runoff. Stormwater runoff from impervious surfaces, including asphalt or concrete parking lots, has been identified as the greatest threat to water quality in the United States. Oils and sediments carried into urban streams contribute directly to water pollution.

In addition, parking lots have higher rates of stormwater runoff than natural habitats, such as woodlands or grasslands. The resultant larger volume and speed of storm water run-off during storms increases erosion of urban stream beds and increases the sediment load of the water column. Sediments carried into urban streams degrade stream habitats in three ways: by altering the

temperature of the water column, by blocking sunlight and inhibiting photosynthesis, and by infilling habitat on the stream bed.

Sediments in the water column absorb heat from the sun and warm the water. Warm water carries less oxygen than cool water, so organisms in affected streams have less oxygen to breathe. Sediments also block sunlight from reaching the stream bed, which inhibits photosynthesis, algal growth and food availability for aquatic animals. When the sediments settle from the water column, they fill in the nooks and crannies between rocks and pebbles on the streambed that aquatic animals use for refuge. In short, heavy sediment loads significantly alter stream habitats for aquatic plants and animals.

Since water travels from streams to rivers to oceans, pollution and sediments that originate in one location can literally be carried for hundreds of miles downstream. In fact, it has been estimated that every two years, Puget Sound receives the amount of oil equivalent to the Exxon Valdez oil spill every two years from stormwater runoff from the surrounding watershed.

Because of the negative effects of stormwater runoff, it is important to minimize runoff to the extent possible. Incorporating a few simple sustainable features into parking lot designs can help.



Reducing asphalt area

The simplest way of reducing stormwater runoff is to reduce the total area of pavement in a parking lot. Efficient layouts utilizing ninety degree parking and two way traffic maximize the number of parking spaces in the existing land available. Orienting parking to take advantage of the long axis of the parking lot maximizes parking relative to real estate needed for turning movements. Installing landscaped islands at aisle end caps where parking would inhibit sight distances naturally reduces asphalt surface area and promotes safe travel through parking lots. Installing bio-swales and rain gardens captures stormwater runoff in the

parking lot and allows it to percolate into the ground water rather than running off the surface of the lot into the local stream bed.

On campus, when the North Chestnut Lot was reconstructed in 2009, the amount of asphalt was reduced from 1.31 acres to 1.10 acres by utilizing an efficient layout and incorporating landscape islands and bio-swales. Stormwater runoff was reduced by 41% in this lot by reducing the amount of paved surface area and utilizing permeable concrete. Similarly, when the Creason Lot was renovated in the summer of 2011, unusable asphalt was removed and replaced with green space. This reduced the amount of asphalt in the parking lot by 9%. In addition, the efficiency of the parking lot design was increased by using ninety degree parking and two way traffic. The efficiency of a parking lot is measured by square foot/parking space and is calculated using the total paved surface area of the lot divided by the number of parking spaces. A lower SF/space ratio indicates a higher percentage of asphalt in the parking lot is designated for parking relative to other uses, such as circulation or dead space. The efficiency parking in the Creason Lot increased from 359 SF/space to 333 SF/Space.

Incorporating Permeable Concrete

The use of permeable concrete in parking lots can also reduce stormwater runoff. Permeable concrete allows stormwater to penetrate the surface of the parking lot and be stored underneath the asphalt until it percolates through the ground into the groundwater. This greatly reduces the amount of surface runoff

from a parking lot and allows sediments and oils to be filtered out of the water by the ground before it reaches the groundwater. Permeable concrete was incorporated into the University Boulevard, North Chestnut, and Adams Street lots when they were constructed in 2009. One drawback to permeable concrete is that it must be vacuumed frequently to keep debris from clogging the pores in the concrete. If the permeable concrete is not designed or maintained properly, it will fail.

Reduced Parking Demand

FAST FACTS

- WKU Parking and Transportation Services encourages going car-free by providing discounted passes for Bowling Green public transit service, GObg. Unlimited full semester passes are available for only \$10.
- GObg transit pass sales have increased significantly in recent years: 2010 – 67, 2011 – 121, 2012 – 189, 2013 – 208



Parking & Transportation



Reducing Parking Demand

A critical step in reducing the ecological footprint at WKU is reducing the need to bring a personal vehicle to campus. With fewer vehicles on campus, there is less traffic, less traffic congestion and less emissions from fossil fuel combustion. With fewer vehicles on campus, less land must be devoted to parking cars. It can be left as natural habitat, or used for other educational purposes on campus.

Parking demand can be reduced in two ways: by policy or program. Policies can be used to reduce parking demand by limiting parking permit sales, limiting who is eligible to purchase parking permits, or raising the price of parking permits. Alternatively, programs can be used to reduce parking demand by meeting the

transportation needs of faculty, staff and students. These include promoting walking, biking, and the use of mass transit.

Rather than using policies to limit parking on campus, PTS has opted to introduce programs to meet the transportation needs of students to make it easy to get around campus and the adjoining community without driving a car. A critical challenge to overcome in this effort was the lack of infrastructure to support walking and biking. In the words of one faculty member during an open forum, “campus is surrounded on three sides by four-lane highways. It’s a hostile environment for pedestrians and cyclists alike.”

Promoting Mass Transit

When the Parking and Transportation Department was formed in 2005, the transit system carried 165,000 students a year on three different routes – 2 during weekdays, and 1 evening route that ran Friday and Saturday to off campus shopping destinations. The fleet of buses included repainted retired school buses, and the mechanic had to change the oil in the parking lot because there wasn’t a maintenance facility.

With the help of a \$3.1M FTA grant secured by Senator Mitch McConnell, the transit fleet was upgraded to include heavy duty transit buses, and a new maintenance facility was built. In addition, transit professionals were hired to manage the system and routes and schedules were updated to improve the frequency and reliability of the service. Students responded to the

investment in transit and ridership grew to over 500,000 passenger trips in FY12. An additional FTA grant is allowing us to complete the update of our fleet to heavy duty, low-floor wheelchair accessible buses.

Today, the Topper Transit system runs 6 different routes. During the day, 2 routes connect main campus and south campus, and 1 route serves the northwest quadrant of campus. During the evening, 1 route connect main campus, south campus and provide access to off campus shopping destinations, such as Kroger’s, Wal-Mart, and Barnes & Noble. One evening route introduced in the fall of 2012 connects campus with downtown. A late night service, also introduced in the fall of 2012, runs Thursday, Friday and Saturday nights and connects downtown, campus, and off-campus student housing areas. In addition to transit routes, an improved shuttle service to the Nashville International Airport was introduced in the fall of 2011.

In addition to improving the on campus transit system, WKU has worked closely with the Bowling Green public transit agency, GObg, to improve student ridership. In 2010, GObg introduced a route from off-campus student housing to campus. This has been a successful route for GObg. Coinciding with this route, PTS began selling student passes to the GObg system. Student pass sales continue to grow from year to year.

Gallery 4.1



The Ransdell Hall stop is the busiest bus stop on the WKU campus. In FY 12 Topper Transit picked up 94,574 passengers at Ransdell Hall. Today the stop is served by the White line, Green Line, and Yellow Line and 51,783 Topper Transit passengers used the stop during Fall Semester FY 13.

Looking into the future, the Campus Master Plan calls for a significant loss of parking spaces. One solution is to continue to invest in transit to provide access from off-campus student housing. Additional day time service to downtown can expand park and ride opportunities north of campus and provide access to jobs, shopping and entertainment during the day.

Increasing service to and from off campus destinations that meet the student's transportation needs decreases the need to bring personal vehicles to campus. This decreases the need to allocate valuable land for parking or storing cars.

WKU Shuttle Guide Brochure

Sustainable Design in Parking Lots

FAST FACTS

- In 2009, the Chestnut Street North Lot underwent a complete renovation. In the new design, green space was expanded, which reduced the surface area of asphalt from 1.3 acres to 1.1 acres. Permeable concrete was utilized in the lowest section of the parking lot. These two features have reduced storm water run-off from this parking lot by 47%.



Sustainability in Transportation

Sustainable Design in Parking Lots

WKU Parking and Transportation Services is supporting sustainability efforts on campus by using design features in parking lots which reduce stormwater runoff, the “heat island” effect, and energy consumption.

Reduce Heat Island Effect

The “heat island effect” is caused by asphalt absorbing heat of the sun during the day and releasing it at night. In urban areas, the heat island effect changes micro-climates, and in large urban areas, it can actually change weather patterns. To reduce the heat island effect, a highly reflective coating is applied to the asphalt. The coating



Image 4.1 Mimosa parking lot, facing Ransdell Hall.

helps to reflect the sun and heat energy so that it is not absorbed by the asphalt. In 2010, the Mimosa and Minton parking lots were treated with a reflective coating to reduce the heat island effect.

This contributed to the LEED status of Gary Ransdell Hall.

Reduce Storm Water Run-Off

Storm water run-off from asphalt parking lots carries oils and other contaminants into area streams. It also contributes to erosion by increasing the volume and speed of water flowing into urban streams. By incorporating design elements into parking lots which reduce storm water runoff, we therefore reduce water pollution and erosion.

- Permeable concrete – Rain water infiltrates the concrete and is stored below the parking lot until it seeps into the groundwater.
- Landscaping islands – Raised islands containing permeable dirt and landscaping replace and reduce the surface area of impermeable asphalt in parking lots.
- Rain gardens or swales – Depressed landscaping areas which collect rain water and often feature native plants.

In 2009, the Chestnut Street North Lot was completely reconstructed. Storm water run-off was reduced by 47% through the use of Landscaping Islands and Permeable Concrete.

Permeable Concrete, Landscape Islands and Rain Gardens were used to reduce storm water runoff in the Adams Street and University Boulevard lots as well.

Image 4.2 Chestnut St North Parking Lot
Permeable and Conventional Asphalt



Reducing Carbon Emissions

FAST FACTS

- During breaks and through the summer, the Parking and Transportation Department closes unused parking lots at dusk and turns out lights to conserve energy.



wku.edu/sustainability

Reducing Emissions

Reducing emissions is a principle goal of sustainability initiatives on campus. In 2007, the EPA estimated that 10% of global greenhouse gas emissions originated from the transportation sector of the United States economy. At WKU, transportation related emissions come from two sources: fleet vehicles and private vehicles.

PTS buses use a 5% biodiesel blend for fuel. Using biodiesel reduces the consumption of fossil fuel and reduces greenhouse gas emissions as well. Our goal is to move to a 20% biodiesel blend, the maximum allowed by engine manufacturers, by 2014.

PTS also offers services to reduce private vehicle use. While a ride-matching service is available to form carpools, the most impactful service we offer that reduces vehicle use is eCommerce. Nearly 40% of customer transactions now occur online, eliminating the need for customers to drive to our office, which is 2.5 miles south of campus, to purchase permits, or pay for or appeal citations. In FY12, this saved 13,605 trips to our office, an avoidance savings of 68,000 miles traveled. Click here for more information on ***Bowling Green Greenways***.

Gallery 4.2 Bowling Green Greenways



Pedestrians and Cyclists

FAST FACTS

- In Fall semester of 2012 there were 127 Big Red Bike rentals.
- Big Red Bikes received its second Kentucky Bicycle and Bikeway Commission Paula Nye Memorial Grant in 2013 (the first was received in 2010) to fund program expansion and improvements.



Pedestrians & Cyclists

Big Red Bikes

The Big Red Bikes bicycle lending program refurbishes abandoned or donated bicycles for loan to students, faculty, and staff at no cost. In 2007, GreenToppers started the program to promote bicycle use and awareness in Bowling Green and at WKU. Big Red Bikes remains a student-run project, but is managed by the Office of Sustainability and is supported with funding by the Department of Parking and Transportation, the Parents Advisory Council, and in-kind donations from the Outdoor Recreation and Activities Center and Department of Environment, Health, and Safety. In 2011, Big Red Bikes received the Paula Nye Memorial Education Grant from the Kentucky Bicycle and Bikeways Commission with funds generated from the “Share the Road” license plates, which allowed for significant upgrade to the mechanic shop and expansion of the program. The grant was written by WKU Alum and past Big Red Bikes Coordinator, Nick Asher.

In addition to lending bicycles, the program spreads bicycle awareness and knowledge throughout the campus community through bicycle maintenance and safety workshops. Anyone interested in learning more about bicycles or helping the program can volunteer and help manage, restore, and maintain the bicycle fleet; no previous experience is required. If you are interested in volunteering, have a bicycle to donate, or want to borrow a bike, please inquire with the Office of Sustainability. Like **Big Red Bikes** on Facebook.

Pedestrian Safety

WKU has taken a number of steps to make it easier for faculty, staff and students to walk on campus. The most visible evidence of this is the creation of Centennial Mall in the heart of campus. In implementing the Campus Master Plan, a road crossing campus was closed and several parking lots were removed. Centennial Mall was created in its place. Centennial Mall creates a pedestrian spine through the center of campus that connects the residence halls to the south to the academic buildings on the north end of campus. A student can now walk from the residence halls to many academic buildings on campus without crossing a single street.

Where pedestrians must cross roads, crosswalks have been improved. WKU partnered with the Kentucky Transportation Cabinet to install a mid-block pedestrian crosswalk on University Blvd., a heavily traveled four lane state highway adjacent to campus. Fencing and a pedestrian activated traffic light was installed to allow pedestrians to stop traffic and cross safely. WKU also worked with the city of Bowling Green to identify and mark heavily used crosswalks on city roads adjacent to campus. In road yield signs were strategically installed to remind motorists to yield to pedestrians in crosswalks.

On campus, on-street parking was removed to improve visibility of pedestrians in crosswalks. Traffic calming measures, such as

stop signs and speed bumps, were used to slow traffic on campus, particularly near congested pedestrian areas. Lighting has been upgraded throughout campus to improve safety at night. A number of sidewalk projects has expanded the width, improved the condition, and when possible, improved the barrier free accessibility of sidewalks throughout campus. Piece by piece, each project has improved the environment for pedestrians.



Gallery 4.3 I Want To Ride My Bicycle

Donated bicycles waiting to be made into Big Red Bikes.



Supporting Cyclists

The environment for cyclists on campus and off has improved as well. WKU worked with the city of Bowling Green to place Chestnut Street on a “road diet”, taking it from four lanes to three and using the remaining roadway for bike lanes. Chestnut Street is one block east of campus, but a major parking lot serving campus is located there adjacent to the President’s house. Historically, Chestnut Street carried a lot of traffic and required four lanes; but when the 31W by-pass was created, much of that traffic was diverted. The remnant four lane section of Chestnut Street was no longer needed with the lower traffic volumes, so when the road was repaved, it was marked as a three lane road with bike lanes on each side of the street. These became the first bike lanes in the City.

WKU also worked with the City on a grant funded project to construct a 10 foot wide Greenways Path that connects main campus to south campus. This is now a popular route for cyclists, runners and pedestrians. Another joint grant project will construct a bikeway connection from campus to downtown. As of 2012, it is under design.

A number of activities and programs on campus support biking as well. PTS has funded the installation of over 500 bike racks throughout campus. PTS also supports the student run Big Red Bikes bike sharing program on campus by funding the student

bike mechanic and donating abandoned bicycles. When Gary Ransdell Hall was built, a shower facility for cyclists was included as part of its LEED Gold certification. In addition, Outdoor Recreational Sports has opened a fully functional bike shop on campus.



Sustainable Practices in Energy Management

WKU takes responsible energy use seriously, recognizing that conservation of fossil fuels is an imperative for a healthy planet and positive future for our current and future students. WKU's approach to energy responsibility has been comprehensive and diverse, utilizing the skills and expertise of university operations staff and encouraging participation by the entire campus community. These efforts are paying off: the main campus uses 12% less energy than in 2008, decreasing our use of limited natural resources, reducing our carbon footprint, and saving university operating funds.



Parking Structures

FAST FACTS

- **WKU's energy conservation and efficiency efforts are comprehensive and include outdoor lighting and parking lots and structures. Parking lots are managed for energy conservation, and in 2010 lighting fixture upgrades to parking structures resulted in significant energy efficiency improvements.**



Parking Structures

Parking Structures

Not only is WKU Parking and Transportation Services supporting sustainability efforts on campus by using design features in parking lots which reduce stormwater run-off and the “heat island effect”, they are also reducing energy consumption in parking structures.

Reduce Energy Consumption

While keeping parking lots well lit is important for personal safety, it is a significant consumer of electricity on campus. Energy consumption in parking lots is reduced by closing parking lots and turning off lights when they are not in use and using high efficiency fluorescent, fiber optic, and LED lighting systems.

In December 2008, as part of a “conservation vacation”, several parking lots around campus were closed and lights turned off. This practice continues today when classes are not in session or when parking lots are not being used. In 2010, Parking Structures 1 and 2 were re-lamped using high efficiency fluorescent, fiber optic, and LED lights as part of the Energy Savings Performance Contract project across campus. The new lights provide more illumination than the fixtures they replaced, thus maintaining personal safety, but use far less energy.

Reducing Energy Consumption

Lights in parking lots are an integral part of parking lot design and contribute to a user's sense of safety when walking through parking lots at night. Well designed lighting has the following characteristics:

- Light is directed only to the areas where it is needed.
- Only the minimum amount of light needed to achieve desired light levels are used.
- High-efficient light bulbs are used to reduce energy consumption.
- Lighting systems allow lights to be turned off when not in use. This can include partial controls, such as turning off lights on the exterior lanes of parking garages during the day time when ambient light is adequate.
- Operationally, lights are turned off when not in use.

Light pollution occurs when light is emitted where it is not needed, such as towards the sky or when an area is lit above needed light levels. When light pollution occurs, energy and money are wasted. In addition, emissions associated with generating electricity increase unnecessarily. In some cases, light pollution has other negative effects, such as interfering with navigational aids of migrating birds or interfering with an astronomer's ability to view the night sky.

In parking lots at WKU, lighting systems were upgraded as part of an energy savings performance. In Parking Structures 1 and 2, low efficiency metal-halide and sodium lamps were replaced with high-efficiency T5 fluorescent bulbs and LED lights. This upgrade improved lighting levels while decreasing energy consumption, maintenance costs, and ultimately, operating budgets. In the surface lots, LED lights are installed in box housing to focus light down onto the parking lots and reduce light pollution spillover. Operationally, parking lots and structures are closed when not in use, such as when the University is closed or during the summer when parking demand is greatly reduced. Including the parking lots in a recent "conservation vacation" helped saved the University 1,000,000 kWh in energy consumption, which directly translated into budget savings of over \$600,000.

Looking into the future, Parking and Transportation Services is actively seeking grant funding to build a shelter over the bus parking area that will support solar panels. By installing an 18kWh system, the department hopes to generate 30% of the electricity it uses at its headquarters.



Gallery 5.1 WKU Parking Structures

High-efficiency lamps installed in Parking Structure 1 ramp save a significant amount of energy while improving lighting quality. Photo by Emily Twardowski '12 (photojournalism)



Solar Thermal Array

FAST FACTS

- **Energy conservation and efficiency have been the main focus of reducing WKU's energy use and carbon footprint, but renewable sources of energy will be increasingly important in achieving further success. The solar thermal array that helps to heat the swimming pool in the Preston Activities Center is an example of how we can use renewables in practical application.**



Solar Thermal Array

Solar Thermal Array

A solar thermal array on the Preston Activities Center roof uses the sun's radiant energy to pre-heat the indoor swimming pool. Each of the eighty-eight solar thermal collectors contain 3.7 gallons of fluid which transfers heat from the sun to the pool water via heat exchanger, keeping the pool a consistent 80°-83° Fahrenheit. The collectors perform 10 months per year, as measured by Solar British Thermal Unit (BTU) output. BTU output calculations are estimates based on low wind conditions and historical averages of daytime air temperatures and solar insulation levels for our region. Reducing the amount of natural gas required for heating the pool benefits the university's carbon footprint and energy

Gallery 5.2 Solar Thermal Array



Installation of the solar thermal array. Photo by Clinton Lewis.

budget. With an initial project investment of \$96,410, the annual savings result in a project payback of 8.8 years.

Solar heating for the pool isn't the only way the Raymond B. Preston Activities Center is green. Other sustainability features of the Center include bicycle racks just outside the main entrance, Green Seal Certified cleaning chemicals and hand soap, energy efficient lighting fixtures throughout the building, Light-Emitting Diode (LED) exit signs, low-flow faucets and shower heads in the locker rooms, occupancy sensed lighting controls throughout the building, recycling containers for paper, plastic, and cardboard, sensed toilet flushing in the locker rooms, and weather-stripping on exit doors.

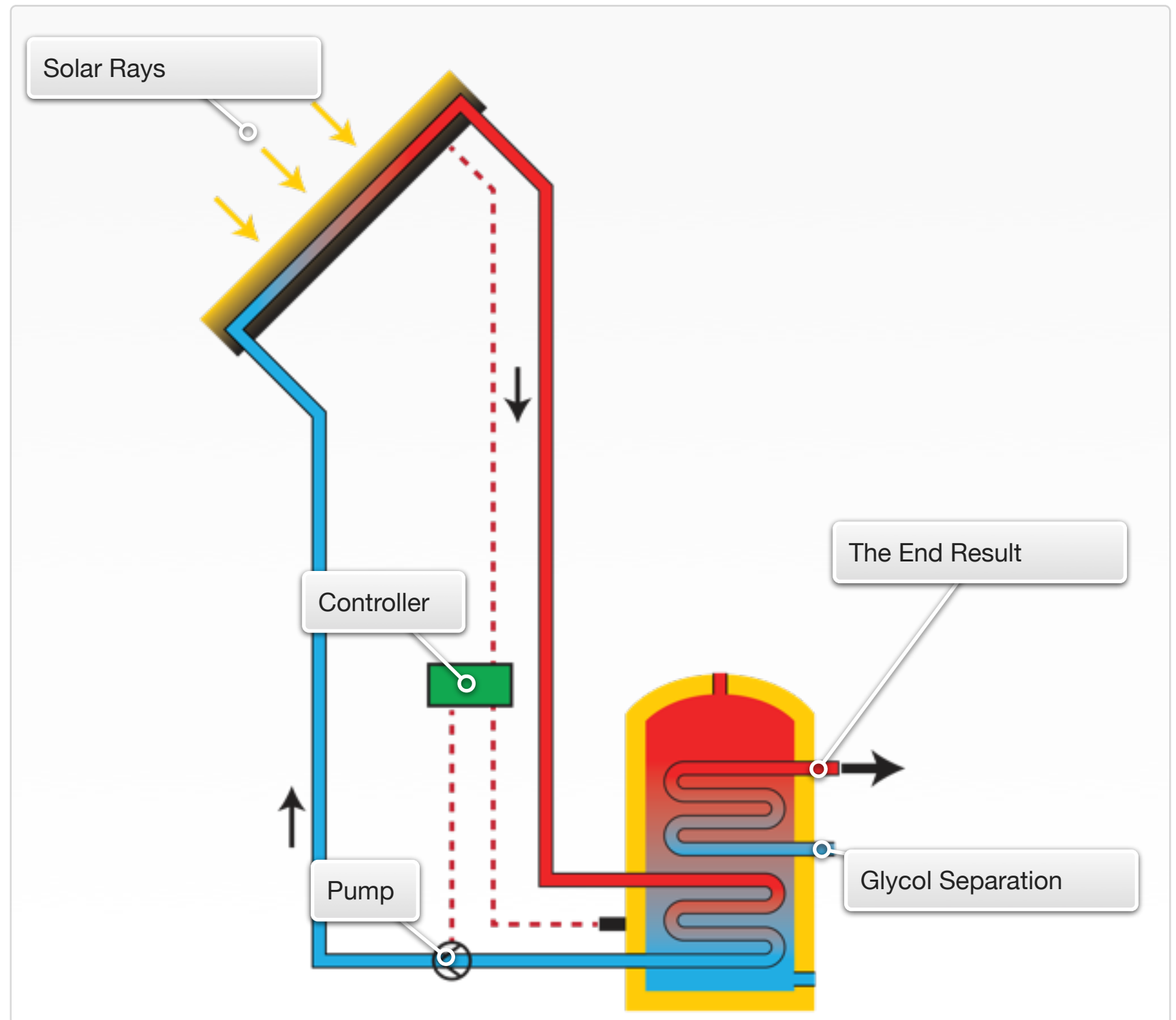


Diagram 5.1 The Solar Collector. Tap on the captions to learn more about the solar thermal process.

Central Heating Plant

FAST FACTS

- The Central Heating Plant has been burning coal to generate steam for heating campus buildings since 1927.
- In winter 2012, the Plant heated the campus entirely with natural gas. Today, the coal boilers are permanently decommissioned.
- The natural gas boiler upgrade was funded with utility savings resultant from low cost, no cost conservation efforts.



Central Heating Plant

Central Heating

The Central Heating Plant, completed in 1927, was designed by Louisville architect Brinton B. Davis, the “Hill Builder” responsible for the design of many of Hilltoppers’ most beloved buildings.

Upon completion the College Heights Herald reported: “No more will the student on cold rainy days enter the classroom and have icicles freezing on his coat or leave the room with an almost numb body”. Source- Historic Architecture at Western Kentucky University – Kentucky Library & Museum and the Kentucky Heritage Council.

Gallery 5.3 It’s Getting Hot In Here



The first of the natural gas boilers, being installed in 2010. Photo by Clinton Lewis. Click to read more about [WKU installing large natural gas boiler at Central Heat Plant](#).

The WKU Central Heating Plant has been providing steam to the main campus since 1927. High pressure steam is generated by boilers and distributed to buildings through approximately 3 miles of steam lines that loop around campus. Historically, steam has been produced through the combustion of coal, which is mostly sourced from deep mines in Eastern Kentucky. Utility savings resultant from energy conservation and efficiency initiatives across campus have been re-invested in upgrades to the Central Heating Plant. Two natural gas boilers were installed, one in 2010 and another in 2011. These two boilers are capable of providing steam to the entire campus, allowing for WKU to idle the two remaining coal boilers, which has greatly reduced WKU's carbon footprint.

Xeriscaping

The unique micro-climate of the Central Heating Plant is created by a combination of site features: the solar gain of the building, prevailing winds, and elevation. This micro-climate provided the opportunity to create a native Xeriscape garden (derived from the Greek “xeros” or dry). Xeriscape gardens use no supplemental irrigation, and typically use gravel or sand, rather than mulch, to cover the soil. This garden has numerous drought-tolerant native plants, including:

Yucca filamentosa (Adam's Needle)

Helianthus mollis (Downy Sunflower)

Silphium terebinthinaceum (Prairie Dock)

Xeriscapes present the opportunity to create beautiful, native gardens that require minimal annual maintenance.

Gallery 5.4 Xeriscape Gardens on Campus



The Xeriscape garden



Energy Kiosk-Reduce Your Use

Photo by Clinton Lewis.

FAST FACTS

- The first “Reduce Your Use” competition was between Bemis and Barnes Halls, conducted in 2007 by graduate student Christian Ryan-Downing as part of her thesis. The competition has become a tradition and now WKU competes nationally in the Campus Conservation Nationals.



Energy Kiosk

Energy Kiosk

Each year, students in the WKU Residence Halls compete to see which hall can most reduce their energy consumption for a three week period. The competition includes energy awareness activities and culminates with an ice cream party with President Ransdell in the winning hall. The web-based real-time energy dashboard allows students to track their progress.

Link to real time energy use for main campus buildings can be viewed anytime on the web-based WKU Energy **kiosk**:



Barnes Campbell Hall – 2009 Reduce Your Use winner

The Reduce Your Use bulletin board contest results in some awesome bulletin boards, like this one by Craig Lonas.



Reduce Your Use winners:

2007 – Bemis Hall

2008 – Barnes Campbell Hall

2009 – Minton Hall

2010 – Gilbert Hall

2011 – Bates Runner Hall

2012 (moved to national competition – Campus Conservation Nationals (CCN))

2013 – WKU beats UK, U of L, and Berea in the Bluegrass Unplugged regional throw down of CCN. Top reducer: Meredith Hall.

Gallery 5.5



The Reduce Your Use trophy – 2010. Awarded to Gilbert Hall



Conservation Vacation

Photo by Clinton Lewis.

FAST FACTS

- The first year that WKU observed the “Conservation Vacation” over winter break, more than 1 million kilowatt hours were conserved, enough to power 89 U.S. households for one year.



Conservation Vacation

Conservation Vacation

In 2008, WKU initiated the first annual Conservation Vacation, an effort to conserve energy over the winter break. After finals are over and grades are submitted, students and faculty are asked to turn off and unplug to reduce energy wasted over the break. The Department of Facilities Management staff then unplug vending machines, turn off water fountains, and to the greatest extent possible, power down the campus for the unoccupied period. In the first year, WKU saved more than 1 million kilowatt hours over the break. Now the Conservation Vacation is standard operating procedure at WKU, and other universities and colleges have adopted the practice.

Links

WKU lowers energy costs over break

"Conservation vacation" to Begin After Commencement Week

WKU Saving Money Through Energy Conservation Program

Sustainability Publications and Resources

Photo taken by WKU Photographer, Clinton Lewis

WKYU-PBS Studio

FAST FACT

- The award winning WKYU-PBS Studio One LED lighting installation has resulted in significant reductions in energy use, but more importantly, the project has allowed WKU broadcasting students to gain experience with the most innovative technology found in any television studio in the country.



WKYU-PBS

WKYU-PBS Studio

WKYU-PBS Studio One is on the cutting edge of lighting technology. In 2010, an LED (Light Emitting Diode) lighting system replaced an aging, 40-year-old incandescent system that regularly malfunctioned, required expensive specialized bulb replacement, wasted energy, and generated much unnecessary heat. The LEDs reduce energy consumption by 97%, and last tens of thousands of hours.

The instruments should never need to be replaced and produce only a small amount of heat. Most importantly, WKU broadcast production students have the opportunity to use the most innovative lighting technology found in a television studio. WKYU-PBS was honored to receive a Regional Emmy® Award for this installation, the first in this category to any Kentucky organization in the history of the chapter.

News release: *WKYU-PBS Receives National Award*

Gallery 5.6 Breaking News



Barbara Deeb interviews Kentucky Governor Steve Brashear in the first interview conducted under the cool LED lights. The lights generate very little heat, are much smaller, and offer ease of color change through a basic iPad.



WKU Energy Policy

FAST FACTS

- The WKU Energy Policy was created by a committee of students, faculty, and staff and approved by Departments across campus.
- The WKU Energy Policy has been adapted and adopted for use by other universities and organizations, including the City of Bowling Green.



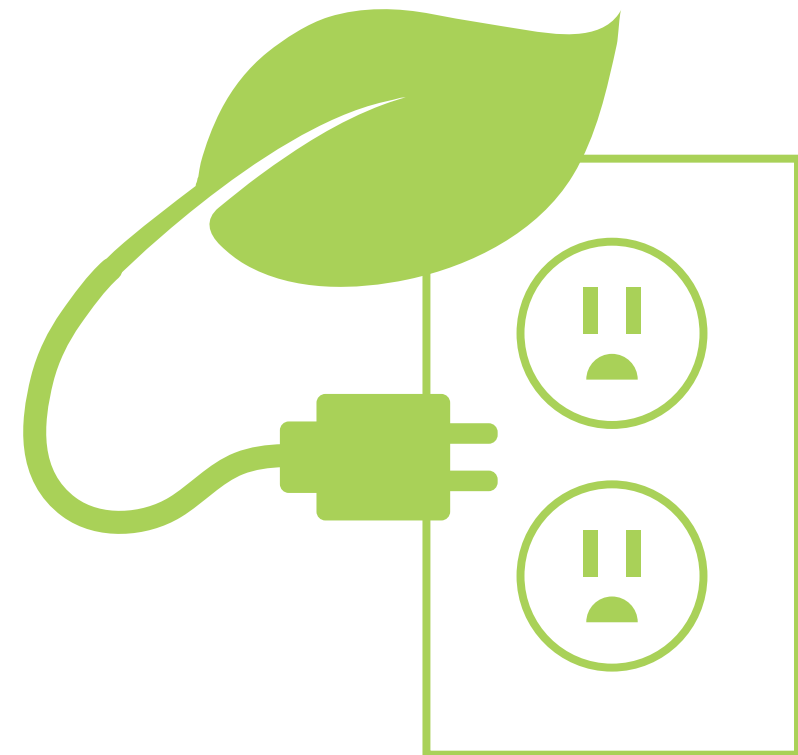
Energy

WKU Energy Policy

The WKU Energy Policy was created in 2009, and is comprehensive in scope, including an emphasis on personal responsibility, a commitment to LEED Building design standards, and energy efficiency in purchasing standards.

Sustainability Publications and Resources

WKU Energy Policy



Gallery 5.7



In 2009, Western Kentucky University adopted an Energy Policy outlining strategies for responsible use of energy through conservation and efficiency. The policy, created through collaboration with students, faculty and staff, was celebrated with a visit from Kentucky Governor Steve Brashear.

Photo by Clinton Lewis.

Chapter 6

Sustainable Practices in Landscaping

The campus grounds at WKU exhibit numerous types of sustainable initiatives including rainwater harvesting, habitat restoration, storm water BMPs and native plant selections.



Landscaping

Photo by Clinton Lewis.

FAST FACTS

- **The WKU main campus features 90 acres of green space, including extensive gardens that are created and maintained by a campus Gardener, Assistant Gardener, and five student gardeners.**
- **The WKU main campus is home to a diversity of urban wildlife, including our famous white squirrels and several hawks.**



Landscaping on Campus

Landscaping

At WKU we strive to establish a diverse ecosystem and to promote symbiotic relationships by installing native, drought-tolerant gardens, maintaining our urban forest and finding ways to increase the campus aesthetics while attracting more native birds and insects. We use locally sourced plants and trees and organic fertilizer recycled from waste. Our integrated pest management program minimizes pesticide and herbicide use. Water conservation efforts include an extensive “smart” irrigation systems and collection and use of rainwater for some irrigation. We are proud of our beautiful Hilltop campus and the fact that the beauty of our campus is often cited as one of the primary reasons students choose WKU!

Explore our sustainable landscaping initiatives further in the pages ahead.

Gallery 6.1



No the hill is not on fire...it is called Staghorn Sumac. This KY native was planted in the winter of 2011 and was part of campus wide safety initiative to eliminate steep slopes of turf and turn them into gardens or other low maintenance areas. We chose this particular plant because of its intense fall color, vertical growth structure and coarse leaf texture. It is located behind Ivan Wilson Fine Arts Center. The straight lines of the trunks of the sumac replicate the straight lines on the formed concrete exterior walls of the FAC building. This native urban forest provides habitat for numerous species of birds. Photo by Josh Twardowski



Tree Campus USA®

FAST FACT

- With a healthy and diverse campus forest and University President that is a lover of trees, Tree Campus USA certification is important at WKU. Trees add to the beauty of the Hill, provide habitat for our unique white squirrels and other wildlife, keep the campus cool in the summer, and provide many other benefits, making our trees a precious asset to Hilltoppers.
- WKU has been recognized as a TreeCampus USA by the Arbor Day Foundation in 2011, 2012, and 2013.



Tree Campus

Tree Campus USA

WKU places importance on the maintenance of a healthy campus ecosystem and strives to maintain a biologically diverse, garden-like atmosphere. Green space is continually enhanced across the campus, including the heart of campus where this sign is situated. In fact, from 2008 to 2011 more than 500 trees were planted at WKU, with approximately 25 percent of them placed in areas that were once covered with impervious surface such as asphalt. In 2010, WKU was honored with the distinction of TreeCampus USA certification.

Ransdell's Rule

For every tree cut down on WKU's Campus, two more will be planted.

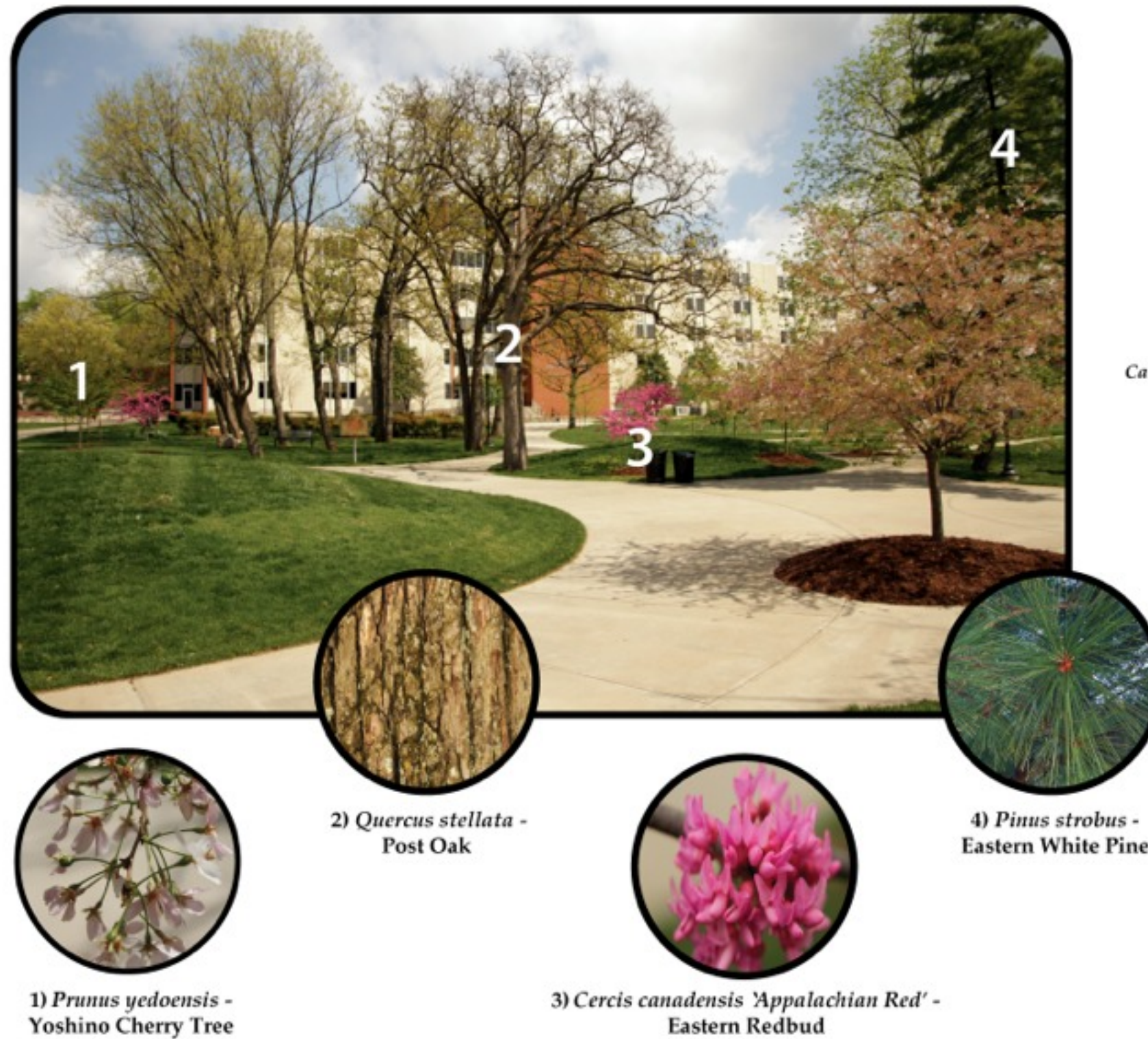
Gallery 6.2 Tree Campus Up Close:
Photo Credits: Adam Rzeszowski



Prunus yedoensis -Yoshino Cherry Tree

• • • •

Tree Campus USA at WKU



Tree Campus USA® Certification

Five Core Requirements

Campus Tree Advisory Committee
Campus Tree-Care Plan
Campus Tree Program with Dedicated Expenditures
Arbor Day Observance
Service Learning Project

Rainwater Collection

Photo by Clinton Lewis.

FAST FACTS

- On the main campus and at the University Farm, rainwater collection systems have the combined capacity to collect more than 19,000 gallons of water during a single precipitation event.
- A rain barrel made especially for the President's house by the Fall 2010 students in Environmental Education 560: Investigating and Evaluating Environmental Issues.



Campus Rainwater Collection

Rainwater Collection

Rain is a source of fresh water for drinking and irrigation. Rainwater harvesting refers to a variety of methods that are used to capture, collect, and store rainwater. Collecting and storing rainwater reduces demand on the existing water supply and protects the environment.

As periods of drought increase and human population grows larger, public water supplies are reduced. Rainwater harvesting offers another water source that benefits everyone and the environment. The community benefits by being able to use the stored rainwater for irrigating gardens and landscaping. This reduces the need to use treated drinking water for irrigation, saves the community and individuals money, and benefits the environment.

Rainwater harvesting also helps to reduce stormwater runoff and problems of flooding, soil erosion and surface water pollution. The captured



and stored rainwater is released slowly back into the soil through irrigation and open valves, so it can soak into the soil slowly. This helps to filter out pollutants the water may carry, which protects the quality of groundwater.

This 550 gallon rainwater collection cistern is part of WKU's water saving initiative. In 2010, rainwater harvesting systems were installed at two sites on the main campus, and at one site at the WKU Farm. Rainwater is collected from rooftops into the collection cisterns and the water is dispensed to drip lines that irrigate local gardens. On campus, one of the 550 gallon cisterns is located near the Department of Facilities Management and the other is at the Health Services building. On the Farm, two 1300 gallon cisterns collect water from the livestock barn roof. This water is used for several purposes, including spraying down the Expo Center arena floor to reduce dust.



This garden is irrigated with collected rainwater through drip irrigation lines.

Gallery 6.3 Buckets of Rain



Six, twenty-six hundred gallon cisterns collect water from the Department of Facilities Management maintenance barn. This water is put onto a water truck to fill irrigation bags around campus trees.

Karst Landscapes and Stormwater Management

FAST FACTS

- **WKU is situated on a unique landscape known as Karst.**
- **Karst environments are prone to flooding, so stormwater control is important.**
- **WKU uses a series of carefully constructed injection wells to minimize stormwater flooding and pollution.**



stormwater mgmt

Karst Landscapes

WKU is built on a distinctive landscape known as “karst.” These landscapes form over time as soluble rock below ground is slowly dissolved away by slightly acidic water (water becomes acidic when it mixes with carbon dioxide that is in the soil and atmosphere). As the soluble rock dissolves away, connected networks of sinkholes, springs, caves, underground rivers, and aquifers are created. The most common soluble bedrock karst forms in is limestone.

Karst covers about 12% of the world’s ice-free land surface and provides habitable conditions for more than 25% of the world’s population. The south-central portion of Kentucky is considered a karst landscape. Also, karst aquifers supply 20-25% of the world’s population with fresh drinking water.

Karst landscapes are highly vulnerable to groundwater pollution for two main reasons:

- 1) The surface and subsurface are more connected in karst areas than most other landscapes. Karst has natural openings on the surface and throughout



the rock below ground. These openings lead to connected networks of sinkholes, springs, caves, underground rivers, and aquifers. After every storm event, the natural networks allow trash and chemicals on the surface to easily enter and rapidly travel underground. So, human actions on the surface, such as applying pesticides or disposing of trash into sinkholes, can quickly damage the resources below ground.

2) The bedrock karst forms in (often limestone) is not very good at filtering pollution from water, so water and pollutants can spread long distances in a karst system without ever being cleaned.

Karst and Stormwater

Stormwater flooding is common in urban areas, such as Bowling Green, that are built on a karst landscape dominated by sinkholes. Sinkholes serve as natural drainage features in karst areas. However, urban development frequently alters natural water drainage:

- sinkholes are filled
- water drainage pathways are altered
- paved surfaces prevent water from easily seeping into the ground.

As a result of these changes, stormwater can quickly overwhelm any remaining drainage features.

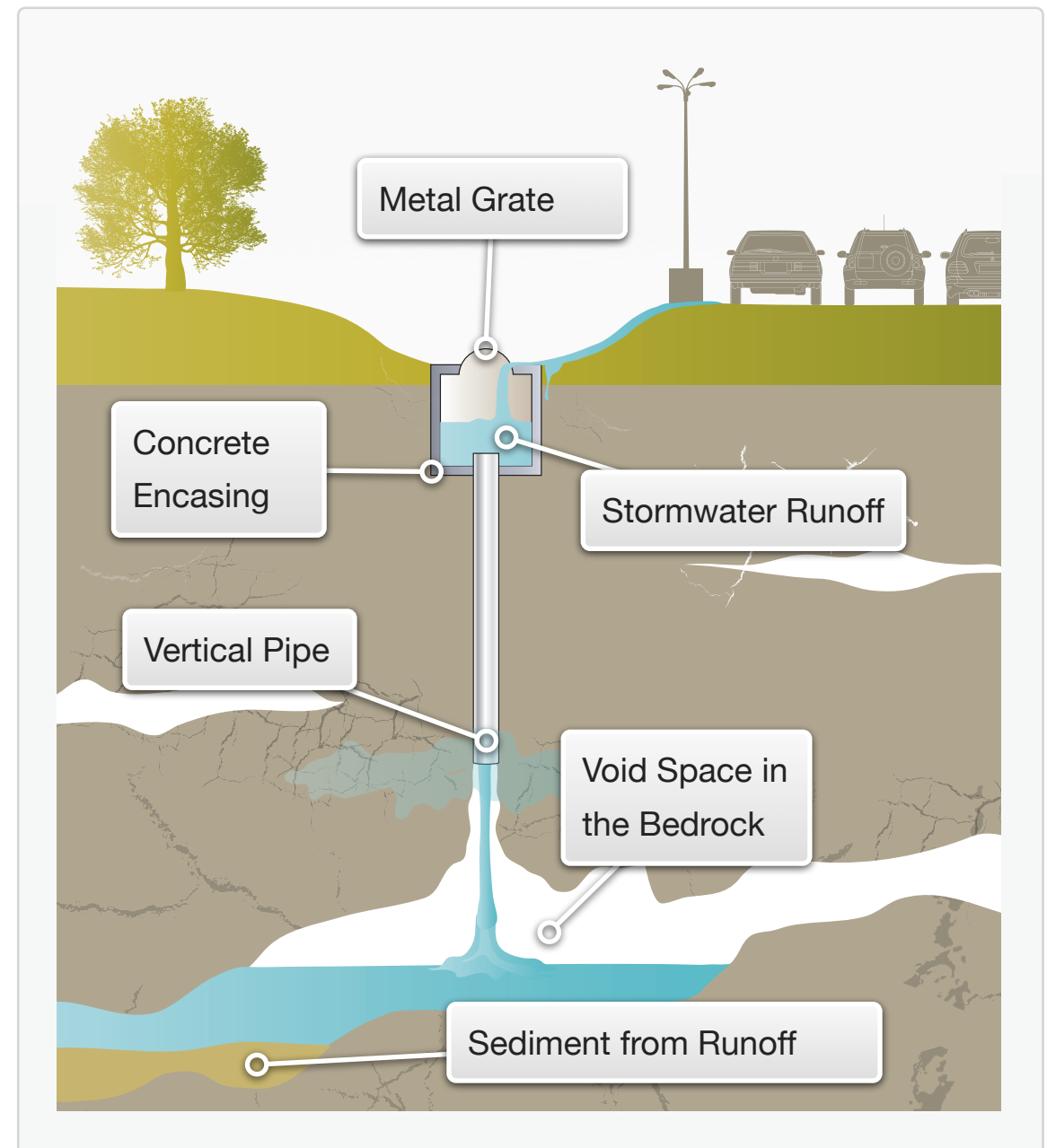


Diagram 6.1 The Injection Well

On the WKU campus, injection wells play an important role in preventing flooding. Injection wells consist of large vertical pipes, or casings, that permit stormwater to quickly drain in to voids in the ground and be diverted away from the surface. However, injection wells must be constructed carefully to minimize groundwater pollution.

If an injection well is clogged with debris or sediment, or develops cracks in the vertical piping, the well can fail and cause sudden sinkhole development. When this happens, the well should be cleaned or repaired, and the land around the sinkhole stabilized.

Stormwater Management Policy

WKU takes great care to repair and clean injection wells, as well as construct wells with expert advice so groundwater pollution is minimized and the benefits of the injection wells are maximized. INSERT the existing content under the stormwater management policy section, including the numbered list (but indent the numbered list more).

Links

To learn more about karst environments, groundwater, or stormwater management please visit:

WKU's Stormwater Management Policy

National Groundwater Association

USGS Karst Aquifer Research

USEPA Groundwater & Drinking Water

Gallery 6.4 Injection well located in the backyard at 503 Regents – Office of Sustainability



USEPA Groundwater Information

City of Bowling Green's Stormwater Program

Sustainable Building Practices

When it comes to green buildings, WKU was an “early adopter”, embracing the idea during the design phase of the new College of Education, which is now LEED Gold certified by the US Green Building Council. WKU has committed to build all new buildings and renovations to LEED standards, ensuring our buildings will be designed and constructed with energy and the environment in mind.

Section 1

Gary Ransdell Hall

FAST FACTS

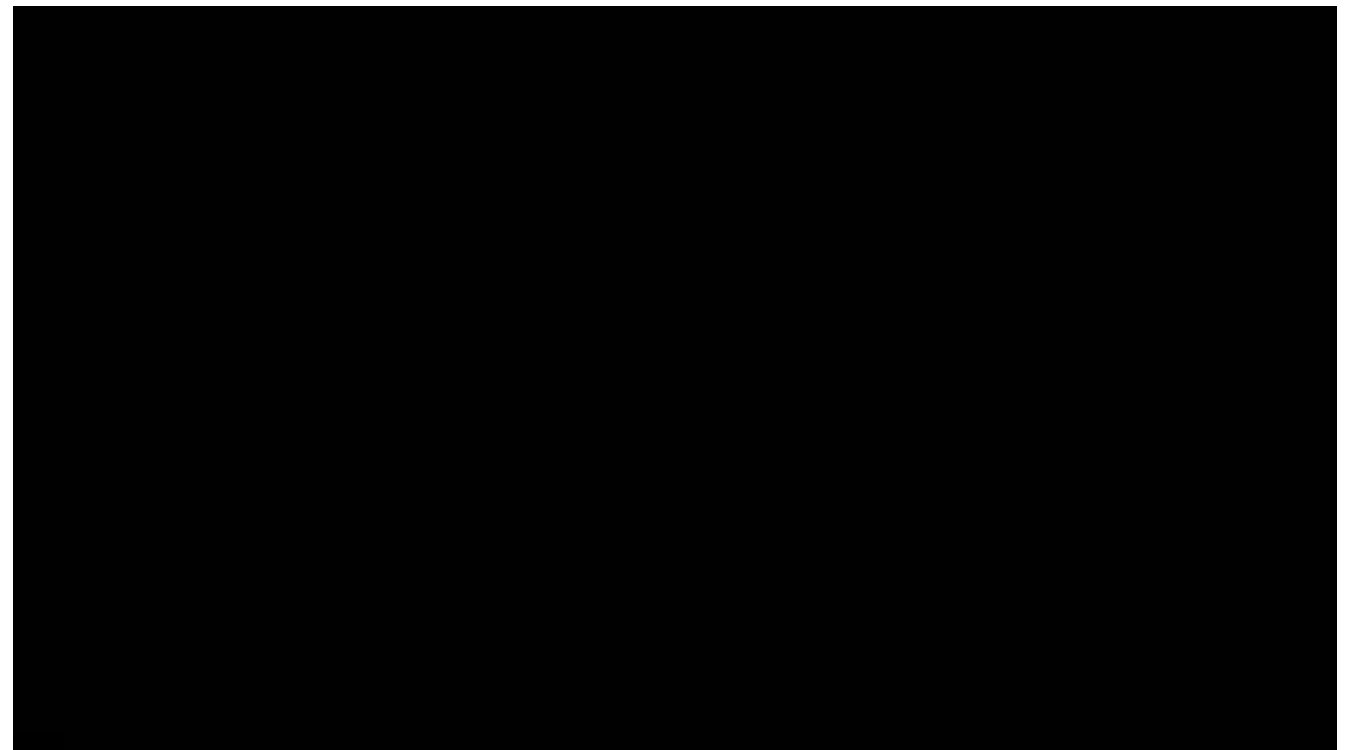
- In 2009 WKU committed to building and renovating to Leadership in Energy and Environmental Design. Since then we have earned LEED Gold for the College of Education and Behavioral Sciences and are expecting to earn LEED Silver certification for the Ivan Wilson Music Rehearsal Hall in 2013.
- WKU presently has 10 LEED Accredited Professionals on staff in Planning, Design and Construction, Facilities Management, and the Office of Sustainability.



Ransdell Hall

Gary Ransdell Hall

Movie 7.1 Gary A. Ransdell Hall: A Model for Sustainability



Links

[US Green Building Council](#)

Gary Ransdell Hall



LEED (Leadership in Energy and Environmental Design) is an internationally recognized framework that provides guidelines for sustainable building construction, renovation, and operations to foster high performance in human and environmental health. LEED certification level is based on performance in water and energy efficiency, materials selection, and indoor environmental quality. Gary Ransdell Hall (GRH) is a certified to LEED Gold standards.

Building Materials: The paints and finishes in GRH are low Volatile Organic Compound (VOC) substances, improving indoor air quality. Many materials were regionally sourced, and furnishings are made with recycled materials.



Roof: The white reflective membrane on the roof lowers the amount of heat energy absorbed by the building, which allows for more efficient cooling and reduces heat island effect.



Windows: High-efficiency double pane windows provide natural light and reduce energy use for heating and cooling. Natural lighting also contributes to the health and comfort of building occupants.

Transportation: Alternatives to help reduce carbon emissions include transit and bicycling. A transit stop and bike racks at the front door, plus showers inside, help to encourage these transportation alternatives.



Landscape: Most of the trees and shrubs near the building are native to Kentucky, and require no irrigation after the first three years, thus reducing water use. The small basin near the visitor parking lot is a rain garden. The soil mixture and plantings allow stormwater runoff to infiltrate slowly into the soil.

Green Cleaning: Cleaning materials used by Building Service Attendants are made from plant-based substances. Cleaning equipment and methods use minimal water.

Recycling and Surplus

The WKU Recycling and Surplus Department, within the Department of Facilities Management, provides recycling outlets for a variety of commodities, advertises and encourages the reuse of state purchased assets, materials, and equipment on campus, recovers revenue through surplus sales, increases waste diversion across campus, and strives to provide excellent customer service to the campus community. We are able to accomplish our goals through outreach, education, student employment and assistance from the entire DFM staff.

FRAGILE
HANDLE WITH CARE



Recycling and Surplus

FAST FACTS

- **WKU Recycling handles an average of 1400 pounds of single stream per day (paper, aluminum cans, and empty plastic bottles).**
- **Cardboard is recycled separately and the campus average is about 16,500 pounds a month. Most cardboard is generated in Dining Services.**
- **Glass is accepted at the community recycling bins, located behind the SSB building. In February 2013 alone 4,000 pounds of glass were recycled there.**
- **In February 2013, WKU recycled 12,866 pounds of e-scrap.**



Recycling & Surplus

Why WKU Recycles

To the average person recycling may be as simple as throwing their water bottle in the right container, but for WKU Recycling and Surplus, it's a way of life! WKU chooses to recycle not only because it is cost effective and makes sense financially, but because it is the right thing to do for the environment.

For every pound of recycling collected at WKU, that is \$.05 that WKU avoids paying in landfill cost. \$.05 may not seem like a lot of money, but considering we recycle tons of cardboard, plastics, aluminum cans and various metals, paper, and glass every year- it can add up fast! Avoiding the landfill means more than just saving money. Recycling means the prevention of methane being released from the landfill, slowing the depletion of natural resources across the globe, and contributing to economic growth and supporting green jobs.

When we think about recycling, we think about more than just the process of getting plastic in the right container. We think about the full life cycles of products like plastic bottles. Plastic bottles make up 1.5 million tons of waste each year and it can take some types of plastic bottles up to 1000 years to decompose in a landfill. When we choose to recycle commodities, we are closing the loop on these life cycles for some of the items.

The Process

Today, the process of recycling at WKU is a result of years of trial and error- and we are still a work in progress! In April of 2011, WKU transitioned to “single stream” recycling. This means that the most common recycled items (paper, plastic, aluminum, and small pieces of cardboard) can all be placed into one recycling bin. We continue to separate out larger pieces of cardboard and compact it at one of 2 cardboard compactors on campus.

Recycling is collected in multiple locations including Residence Hall lobbies, desk side recycling bins, in offices, exterior, “Victor Stanley” containers, game day/special event containers, community bins and finally the exterior building containers where the interior bins are emptied into.

Community Bins

Community bins are used heavily by businesses, homes, and numerous locations where curb-side recycling is not available. The bins provide three options for recycling: glass, cardboard, and single stream. Single stream recycling means you can put all of your recyclables into one bag — making recycling much simpler and more convenient!

The community bins are located behind the Service and Supply building on campus, at the intersection of University Blvd. and Russellville Road (diagonal to the baseball fields). If you live or work off-campus and don't have curb-side recycling, we hope

you'll take advantage of these bins. They are, after all, here for you!

Where the Recycling Goes

The collected single-stream recycling goes to a recycling company in Nashville, TN called QRS (Quality Recycling Solutions) www.qrsrecycling.com

Gallery 8.1 The Process



Residence Hall Containers

Once our recycling reaches their facility, it then goes through a series of conveyor belts where the items are separated and eventually bailed. From there, QRS strives to sell the materials to end users within a 4-state radius.

A note about glass...

Currently, we do not accept glass in the single stream recycling on main campus. We do accept it at the community bins and take it to a local facility. From there it is sent to a company called “Strategic Materials” where it is turned into a raw material called cullet. It is then sold back to bottle and jar manufacturers to be turned into new jars and glass.

Reduce and Reuse! Recycling also involves surplus operations at WKU

In August of 2011, WKU Recycling encompassed surplus operations on campus. Surplus operations involve a range of tasks, disposing of broken furniture to sale of automobiles.

In just 1 year, WKU Recycling was able to successfully create a computer donation and refurbishing program, a website called “Topper Trader” that allows for easy reuse of office items on campus, surplus sales that totaled over \$30,000, and a more sustainable way to dispose of un-usable items.

Gallery 8.2 Where the Recycling Goes



QRS Sorting Facility

• •

Reorganization of surplus includes the following improvements:

- **Designated office hours**

Recycling dedicates student workers to remain in surplus during designated open hours. This is a huge part of why surplus re-use increased significantly under Recycling. Because faculty/staff are able to see what items they may be able to use in their office or classroom without appointment any day of the week,

we have allowed for more opportunities for items to be reclaimed on campus.

- Topper Trader

Perhaps the most useful improvement of Recycling-managed surplus is the creation of a website, found at www.wku.edu/recycling, that allows for easy viewing and reserving of items that faculty/staff may be able to

use for their spaces. Currently, this is only open to WKU faculty and staff. We will also deliver the items to you free of charge.















- Computer Donation and Refurbish Program

One of the first objectives when Recycling took over surplus was to ensure the sustainable disposal of electronics that were obsolete. However, we quickly

Available Surplus Items

Items are available for viewing during normal surplus hours, which is Monday, Wednesday, and Friday from 8:30-4:00, or by appointment only. To make an appointment, please email surplus.sales@wku.edu.

Surplus computers that meet WKU IT standards are turned over to IT. Please call 270-745-7000 to see if they have a surplus computer for use on campus. The surplus department is not allowed to release computers back onto campus.

	Manufacturer, Make, Model	Material	Color	Quantity	Condition	Available Until	Reserve
	Computer Mouse			100	Good	11/06/2012	
	Dell USB KEYBOARDS			100	Good	11/06/2012	
	Gray Patterned Chair with Arms		Gray		Good	11/06/2012	
	Large Metal Table				Fair	12/10/2012	
	Multi-Patterned Chair with Arms		Multi-pattern	1	Good	10/31/2012	
	Power Supply Cables			100	Good	11/06/2012	
	Small White Table		white	1	Fair	10/31/2012	

Gallery 8.3 Computer Donation & Rerfurbish



Classroom set of computer monitors donated to Edmonson County Schools in Kentucky

found that items were being sent to be e-scraped that had plenty of life in them. In September 2012, Recycling dedicated a student worker with IT experience to sanitize and refurbish computers that we then work with Connect Kentucky (<http://www.connectkentucky.org/>) to donate to area non-profits.

Staffing

Currently, the Recycling and Surplus Department is made up of 3 FTEs and a crew of up to 9 student workers. Our setup includes:

Students (up to 10)

Recycling Associate and Surplus Associate (Full-time)

Recycling and Surplus Coordinator (Full-time)

Outreach and Community Involvement- Reduce Reuse Recycle REEDUCATE

The students and staff in the Recycling and Surplus department work with the community and on outreach when they are not running a business or collecting tons of recyclables! Initiatives have ranged from field trips for local schools and Girl Scouts to learn about the RRR's of recycling to Earth Day Festival demonstrations.

Cardboard Collection Drive

The first day of move in for students on campus is the first big opportunity to engage student in recycling efforts. We work with the grounds crew in facilities management to monitor 15 residence halls and ask students and parents to break down the cardboard. In the past we have also worked with student groups as volunteers to help facilitate the efforts.

The surplus staff created baggies of paperclips and sent them out to staff and faculty for free. Paperclips were from boxes of stationary in surplus. The objective was to raise awareness about the items in surplus. It was a great success!

At the Fair Trade Fair, surplus and recycling students took old maps from surplus and used them to create a free gift wrapping station while letting students know about GreenToppers.

Gallery 8.4 WKU Recycling and Surplus Department educates and spreads awareness in creative ways.

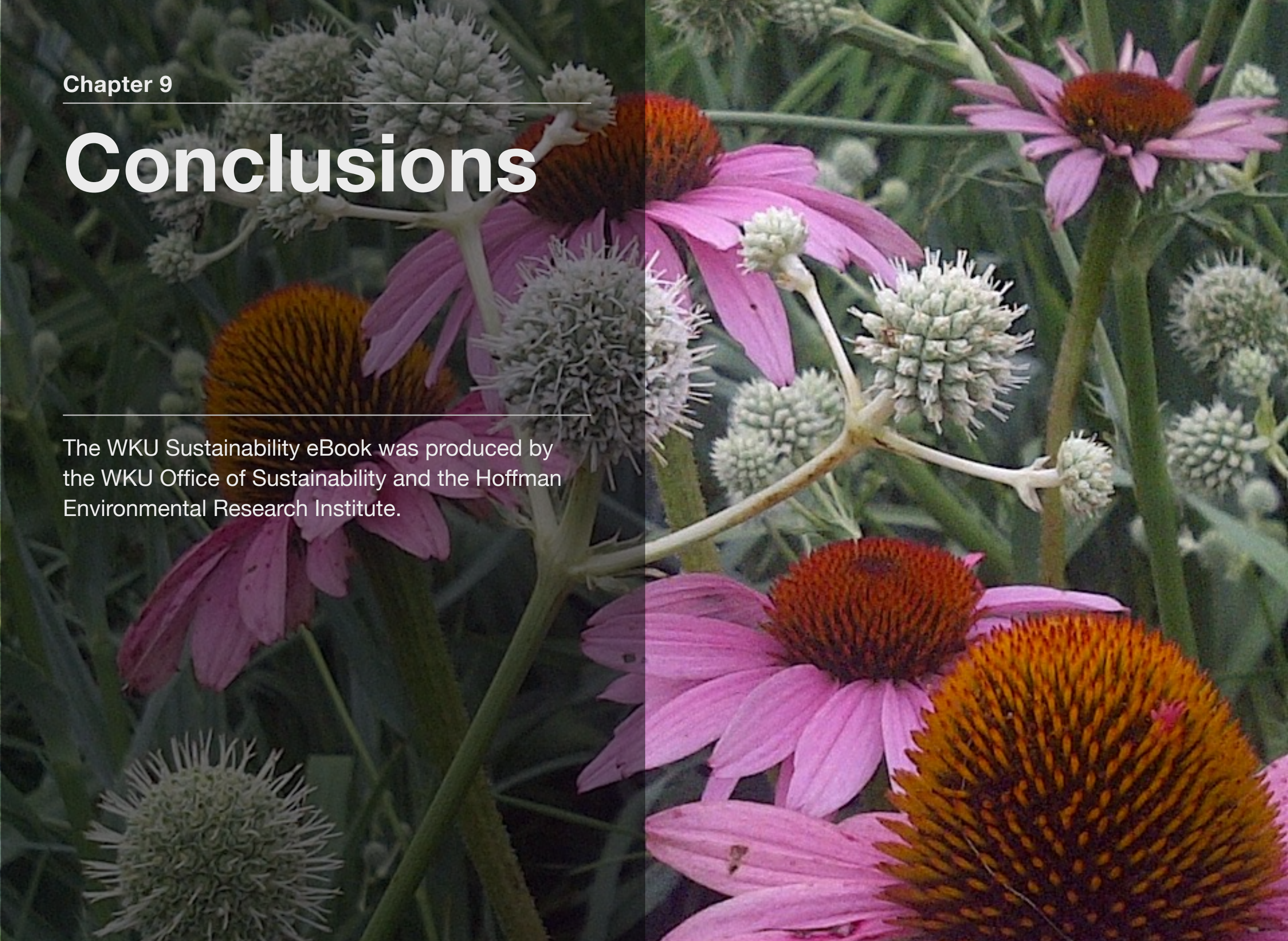


Community Outreach- Field Trips



Conclusions

The WKU Sustainability eBook was produced by the WKU Office of Sustainability and the Hoffman Environmental Research Institute.



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The project could not have been completed without content submissions by many individuals.

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This is the first edition of the WKU Sustainability eBook. The second edition is presently a work in progress and will include updates, additional content, and new special features. If you have a sustainability initiative or project to share for the next edition of the eBook, please contact Sustainability Coordinator Christian Ryan-Downing at Christian.ryan-downing@wku.edu