

TOWARD A SUSTAINABLE UGA:
DEVELOPING A COMPREHENSIVE FRAMEWORK TO ENHANCE CAMPUS
SUSTAINABILITY AT THE UNIVERSITY OF GEORGIA

by

KEVIN MICHAEL KIRSCHE

(Under the Direction of Judith Wasserman)

ABSTRACT

Sustainability of the college campus is a growing trend and complex pursuit. While The University of Georgia is making strides in several areas of campus sustainability, there is much more that can be done. Through defining sustainability, discussing its application to higher education, and reviewing current sustainability initiatives at UGA and other academic institutions, this thesis develops a comprehensive framework to enhance campus sustainability at the University of Georgia. Prioritized first steps are offered to meet the stated goals of the University administration.

INDEX WORDS: Sustainability, Campus Sustainability, University of Georgia, UGA, Land Resources, Water Resources, Built Environment, Historic Resources, Sustainable Building Design, Sustainable Site Design, Landscape Management, Construction Site Management, Energy Use, Renewable Energy, Campus Operations, Transportation, Food Service, Green Cleaning, Purchasing, Printing

TOWARD A SUSTAINABLE UGA:
DEVELOPING A COMPREHENSIVE FRAMEWORK TO ENHANCE CAMPUS
SUSTAINABILITY AT THE UNIVERSITY OF GEORGIA

by

KEVIN MICHAEL KIRSCHE

B.L.A. University of Georgia, 1998

A Thesis Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment
of the Requirements for the Degree

MASTER OF LANDSCAPE ARCHITECTURE

ATHENS, GEORGIA

2008

© 2008

Kevin M. Kirsche

All Rights Reserved

TOWARD A SUSTAINABLE UGA:
DEVELOPING A COMPREHENSIVE FRAMEWORK TO ENHANCE CAMPUS
SUSTAINABILITY AT THE UNIVERSITY OF GEORGIA

by

KEVIN MICHAEL KIRSCHE

Major Professor: Judith Wasserman

Committee: Alfie Vick
Mary Alice Smith
Dexter Adams

Electronic Version Approved:

Maureen Grasso
Dean of the Graduate School
The University of Georgia
August 2008

DEDICATION

This effort is dedicated to my children, Kai Berkley, Sierra Faith and Hadley Grace.

May you always find joy, beauty, grace, and wonder as you respectfully enjoy the Creation and honor the One who sustains us.

He makes springs pour water into the ravines;
it flows between the mountains.

They give water to all the beasts of the field;
the wild donkeys quench their thirst.

The birds of the air nest by the waters;
they sing among the branches.

He waters the mountains from his upper chambers;
the earth is satisfied by the fruit of his work.

He makes grass grow for the cattle,
and plants for man to cultivate—

bringing forth food from the earth:
wine that gladdens the heart of man,

oil to make his face shine,

and bread that sustains his heart.

The trees of the LORD are well watered,
the cedars of Lebanon that he planted.

May my meditation be pleasing to him,
as I rejoice in the LORD.

(Psalm 104: 10-16, 34)

ACKNOWLEDGEMENTS

I continue to find I am capable of little on my own.

Jackie, you hold me up, keep me together and make me smile.

Carol and Mike, the foundation is built of encouragement, faith and love.

Iris and Al, your generous love and example provide hope.

Thanks to the good folks at University Architects, particularly Danny Sniff for opening doors; Paul Cassilly for patience and design philosophy; Linda Henneman for encouragement that is always right on time; and Scott Simpson for friendship, grace and carrying the load lately.

Thanks to Lynne Sallot and the 2008 Campaigns Class for your energy and exhaustive research. And to Andrew and Christina for being inspired.

Thanks to my Committee: Judith Wasserman for investing in me, Mary Alice Smith for taking a chance with me, and Alfie Vick for inspiring me. Dexter Adams, mine are many words, yours is thoughtful action.

There are so many individuals on campus that have made it their job and passion to care for the campus environment and community, particularly the grassroots PPD Sustainability Committee. Thanks.

I want to acknowledge also that I have simply scratched the surface. Hopefully this will be a useful contribution toward a sustainable UGA.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	v
CHAPTER	
1 Introduction.....	1
Definitions of Sustainability.....	2
The Three (or Four) Es.....	9
2 Sustainability Trends in Higher Education.....	14
The College Sustainability Report Card.....	14
Benefits to Implementing Campus Sustainability	16
Organizations Devoted to Campus Sustainability.....	23
Sustainability Leadership	25
3 Sustainability and The University of Georgia	28
Stakeholder Interest in a Sustainable UGA	29
Barriers to Sustainability at UGA	32
The Necessity of Collaboration	32
4 Sustainability Initiatives at UGA.....	33
Sustainability Culture and Administration.....	34
Education and Outreach	35
Natural Resources.....	36
Built Environment	46

	Transportation	53
	Campus Operations	55
5	Sustainability and Our Peers.....	64
	Sustainability Culture and Administration.....	65
	Education and Outreach	69
	Energy Resources	71
	Land Resources	74
	Water Resources.....	74
	Built Environment	75
	Transportation	77
	Campus Operations	79
	Conclusion.....	84
6	Recommendations to Enhance Campus Sustainability at UGA	86
	Sustainability Culture and Administration.....	86
	Education and Outreach	87
	Energy Resources	89
	Land Resources	90
	Water Resources.....	90
	Built Environment	91
	Transportation	95
	Campus Operations	96
7	Conclusion	99
	REFERENCES	103

CHAPTER ONE

INTRODUCTION

Sustainability has become a widely discussed concept in many facets of today's global society. Dialogue regarding resource conservation, the effects of global warming, or the feasibility of alternative energy production can be heard among various media outlets and social settings. Concern for cultural and ecological preservation amid commerce and the manufacturing of goods and services is reflected in marketing strategies from boutique industries to large corporations. People, products, companies and institutions are seeking to define themselves as "green" in order to differentiate themselves from their competition. Similarly, many colleges and universities are marketing campus greening initiatives as expectations regarding a school's sustainability credentials have increased. In addition to academic reputation, many students have become concerned with the manner in which universities develop and operate in regard to environmental sustainability. Students, faculty and staff members on college campuses throughout the country are working to minimize their institution's environmental footprint and promote awareness of pressing global concerns. As a sign of the times, the University of Georgia administration is receiving requests and petitions from members of the university community to strengthen their campus sustainability commitment.

On November 29th, 2007, University of Georgia President Michael Adams delivered the keynote address at the second annual Academy of the Environment luncheon speaking on the topic of sustainability. In addition to recognizing some of the University's environmental achievements, President Adams echoed the call that has been brewing for years among members of the campus community – there is more to be done. A charge was made to members of the Academy of the Environment to develop

recommendations toward the advancement of environmental sustainability at the University of Georgia. (Adams).

This thesis participates in the sustainability movement at the University of Georgia (UGA) by developing a framework to assess and advance current campus sustainability initiatives. In the first two chapters, I will examine the definition of sustainability and discuss its importance to higher education. The following two chapters provide a review of sustainability initiatives at UGA and other institutions. To conclude, I will suggest a comprehensive framework of actions to advance campus sustainability at the University of Georgia.

DEFINITIONS OF SUSTAINABILITY

Sustainability is a broad and optimistic concept that addresses the central issues of our society. It is an organizing principle and common thread that links ecologic, social and economic concerns on a variety of spatial and temporal scales. Sustainability issues cross social and political boundaries to influence decision-making toward responsible stewardship of people and resources. Sustainability is most commonly referred to as the ability of this generation to meet its needs without compromising the ability of future generations to meet their own needs. This popular definition of sustainable development was first used in a 1987 document aimed at identifying strategies toward global sustainability, referred to as the Brundtland Report (The World Commission on Environment and Development). The meaning of the term *sustainability* continues to expand to include the restoration of natural and human systems and to promote better living for all.

The American Heritage Dictionary defines the noun sustainability by the verb sustain:

1. To keep in existence; maintain.
2. To supply with necessities or nourishment; provide for.
3. To support from below; keep from falling or sinking; prop.

4. To support the spirits, vitality, or resolution of; encourage.
5. To bear up under; withstand: *can't sustain the blistering heat*.
6. To experience or suffer: *sustained a fatal injury*.
7. To affirm the validity of: *The judge has sustained the prosecutor's objection*.
8. To prove or corroborate; confirm.
9. To keep up (a joke or assumed role, for example) competently.

(The American Heritage Dictionary of the English Language, Fourth Edition)

Recent definitions for sustainability, like that offered by Steven Wheeler in his article “Planning Sustainable and Livable Cities”, tend to be more inclusive than verbiage used in the Brundtland Report and the dictionary definition. Wheeler defines sustainability as “development that improves the long-term health of human and ecological systems” and describes the concept of sustainability as akin to “livability” (Wheeler 438). Sustainable practices tend to focus not only on sustaining but on making things better for all. During an engagement at the University of Georgia, William McDonough, a leader in the field of sustainable architecture, spoke of striving for fecundity and abundance as opposed to merely sustaining. He used the analogy of marriage stating that aspiring to a merely sustainable relationship is not a particularly inspiring goal. The Association for the Advancement of Sustainability in Higher Education (AASHE), describes sustainability as “encompassing human and ecological health, social justice, secure livelihoods, and a better world for all generations” (<http://www.aashe.org/about/about.php>).

EVOLUTION OF SUSTAINABILITY

The concept of sustainability and the complexity of issues it addresses have evolved over time. Following is a brief chronology of the development of sustainability, from the American transcendentalist movement to 20th century wilderness preservation and contemporary multi-national efforts, as described by Andres Edwards in *The Sustainability Revolution*. (Edwards).

At its roots, sustainability is concerned with the connection between humans and their environment. Partly in response to the Industrial Revolution, writers such as Ralph Waldo Emerson and Henry David Thoreau influenced a return to nature, literally and figuratively, among American thinkers in the 1800s. Transcendentalist philosophy called for simple living through the embrace and observation of nature, valuing the creation both as teacher and spiritual guide. This philosophy influenced later writers and naturalists, such as John Muir, who was instrumental in promoting preservation of the American wilderness. Muir connected the function of natural systems to the basic needs of humans including clean air and water, as well as a legitimate need for beauty and recreation to uplift the human spirit. Muir's efforts are attributed as the catalyst behind the first national parks in the United States established under President Theodore Roosevelt, beginning with Yellowstone National Park in 1872. (Edwards). In 1892, Muir and his colleagues established the conservation-minded Sierra Club, "to do something for wilderness and make the mountains glad" (John Muir Exhibit).

Building upon the work of Muir and others, conservation efforts of the mid-20th century served to coagulate an American environmentalism movement. In 1949, Aldo Leopold established an ethical basis for the conservation of natural resources on which all life depends. In his book, *A Sand County Almanac*, Leopold made the case for a land ethic to be regarded as an issue of morality by which actions and impacts to the local environment could be universally evaluated (Leopold). Similarly, in 1962 naturalist Rachel Carson described the damaging impacts caused by the release of toxins and pollution into the environment through human activity. In her book *Silent Spring*, Carson chronicled the ill-effects of agricultural pesticides on humans and animals and further illuminated the connection between human survival and ecosystem health (Carson). These two influential works, along with the efforts of many others such as former Wisconsin Senator Gaylord Nelson's founding of Earth Day in 1970, served to raise ecological awareness among the general public and expose the environmental impacts of our industrial society. The cumulative efforts of mid-twentieth century conservationists effectively led to the institution

of legislative controls such as the Clean Air and Water Acts and establishment of the U.S. Environmental Protection Agency. (Edwards).

In *The Sustainability Revolution*, Edwards refers to the body of works described above as “pre-sustainability environmentalism” (Edwards 14). He reiterates the effectiveness of the efforts undertaken during this period, both among the general public and on the official policy-making level, by identifying four specific areas of advancement: 1) awareness of the profound spiritual links between human beings and the natural world, 2) a deep understanding of the biological interconnection of all parts of nature including human beings, 3) an abiding concern with the potential damage of human impact on the environment, and 4) a strongly held commitment to make ethics a part of all environmental activism. Through propagating these issues and initiating specific reform, the “pre-sustainability environmentalism” provided a foundation for advancement of the contemporary environmentalism movement. (Edwards).

According to Edwards, the advent of contemporary environmentalism can be traced to the United Nations Conference on the Human Environment, a landmark event held in Stockholm, Sweden in 1972. Similar to Earth Day, but on an international scale, the conference focused on positive solutions to environmental concerns as well as strategizing for appropriate economic development. One of the specific and then-current issues addressed at the conference was acid rain resulting from industrial pollution in northern Europe. The effectiveness of the UN conference was similar to that of Earth Day in that it resulted in the creation of an agency to focus on environmental concerns. The United Nations Environment Programme (UNEP) was established to “provide leadership and encourage partnerships in caring for the environment by inspiring, informing and enabling nations and people to improve their quality of life without compromising that of future generations” (<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=43>).

Other milestones in the contemporary environmental movement of the 1970's and 80's expanded awareness of the need to implement sustainable industrial practices, particularly the disposal of hazardous materials which had conventionally been burned or buried under ground or water. In 1978, the status quo in waste disposal led to contamination of Love Canal. In response, U. S. President Jimmy Carter declared a state of emergency and the U.S. Congress created the Comprehensive Environmental Response, Compensation and Liability Act of 1980. CERCLA, or Superfund as it is commonly known, established the process to identify and restore hazardous waste sites and minimize their impact to people. The energy crisis of the period also spurred energy conservation and proliferation of solar oriented design and construction. Also in the early 1980's the published writings of Robert Allen and Lester Brown exposed to an increasingly wider audience the need for a more careful connection with the earth to ensure economic vitality. Brown's book, *Building a Sustainable Society*, acknowledged ecological limitations to methods of economic growth and offered a value structure for unifying ecologic and economic concerns. (Edwards).

Sustainability as commonly discussed today is an extension of the initiatives recorded during The World Commission on Environment and Development in 1983. Former Norway Prime Minister, Gro Harlem Brundtland, was appointed to lead the commission charged with identifying goals for long-term global sustainability, as well as strategies for achieving sustainable development by 2000. In 1984, the Worldwatch Institute began its annual "State of the World" reporting on the balance of resource use and economic development, stating that "we are living beyond our means, largely by borrowing against the future" (Edwards qtd. 17). In 1987, the Brundtland Report entitled "Our Common Future" coined the commonly accepted definition of sustainable development as "development that meets the needs of the present, without compromising the ability of future generations to meet their own needs" (The World Commission on Environment and Development). In addition to providing a concise and memorable definition for the broad concept of sustainability, Edwards points out that the report made two perhaps even more important contributions to contemporary sustainability:

While this definition is undoubtedly important, the Brundtland Report helped define the Sustainability Revolution in two even more significant ways. Institutionally, it created its first framework for concerted action to protect the Earth's life support systems while promoting both economic and social justice goals. Conceptually, the report contained the first articulation of the key to contemporary sustainability – the importance of evaluating any proposed initiative with reference to the interaction of three fundamental criteria: ecology/environment, economy/employment and equity/equality, known today as the Three Es. (Edwards 17).

Ecology and economy are becoming ever more interwoven – locally, regionally, nationally, and globally into a seamless net of cause and effects. [S]ustainable development requires meeting the basic needs of all and extending to all the opportunity to fulfill their aspirations for a better life. A world in which poverty is endemic will always be prone to ecological and other [i.e., economic] catastrophes. Hence, our inability to promote the common interest in sustainable development is often a product of the relative neglect of economic and social justice within and amongst nations. (The World Commission on Environment and Development).

Another significant event in the advancement of sustainability was the Earth Summit, held in Rio de Janeiro, Brazil in 1992. Earth Summit was the United Nations Conference on Environment and Development which assembled over 180 world leaders and delegates from international media and non-governmental organizations from around the world. Its purpose was to adopt the Rio Declaration and Agenda 21, a global program for sustainable development. The Rio Declaration identified twenty-seven principles “which respect the interests of all and protect the integrity of the global environmental and developmental system” (United Nations Conference on the Environment and Development).

Inspired domestically by the Earth Summit, US President Bill Clinton established the President's Council on Sustainable Development in 1993. Focusing on activities and actions undertaken within the United States, the Council's four-fold mission included innovation and collaboration on the economy,

environment and social issues; policy implementation to encourage sustainable development; public education; and evaluation of progress toward sustainable development. The Council's final document was an action plan entitled "Towards a Sustainable America: Advancing Prosperity, Opportunity and a Healthy Environment for the 21st Century." Released in 1999, the document addressed contemporary issues such as sprawl, climate change, urban renewal and corporate responsibility with an underlying goal of achieving "a dignified, peaceful, and equitable existence" (Presidents Council on Sustainable Development).

A final milestone considered by Edwards regarding the general advancement of what he calls the Sustainability Revolution is the World Summit on Sustainable Development held in Johannesburg, South Africa in 2002. This Summit built upon the Earth Summit held ten years earlier, with an even greater emphasis on economic and equity issues in addition to environmental responsibility. (Edwards).

CURRENT PERSPECTIVE

Through a historical overview of sustainability-related events, initiatives and policies, we gain a greater context for the buzzword spoken in contemporary conversation. This slightly deeper understanding of the term "sustainability" and the evolution of sustainable thought and action can be at once encouraging and discouraging. The concept is not new, and thus the continued dialogue regarding sustainability can seem tired or the need for the dialogue evident of a general ineffectiveness of the movement. On the other hand, however, knowledge that sustainability's roots run deeper than what some perceive as only a current fad or trend helps to validate its continued evaluation and pursuit. It is this continued wide-spread pursuit and action that led Andres Edwards to the conclusion that we are in the midst of a Sustainable Revolution, comparable to the previous Industrial Revolution, which is changing the way we view and interact with our world. This revolution includes an ongoing global breadth of input and interest in advancing sustainability as a vehicle for enhancing simultaneously for all people the Three Es - ecology, economy, and social equity – as well as education.

THE THREE (OR FOUR) Es

The traditional Three Es represent the core of contemporary sustainability. Management of the “triple bottom line” of people, the planet and profits helps to alleviate potentially harmful short-term-profit-driven decision-making that may create undue costs to individuals or the environment. At the same time, sustainability acknowledges the need for prosperity and economic viability. It offers the hopeful view that we can achieve all three, a healthy economy and environment and social equity, and asserts that the achievement of each one of these goals is contingent upon careful consideration of all three. To better understand and communicate these three core elements, I will expand slightly upon each - as well as education - a fourth and critical component to the advancement of sustainability.

ECOLOGY

Environmental or ecological sustainability requires a long-term perspective of the interconnected ecological systems on which humans depend. While these systems may be inherently restorative, the amount of human impact they can sustain is not limitless. Indeed, responsible management of ecological systems is critical for the survival of those systems and the life that depends on them. For example, we require clean air, clean water, sufficient shelter and food to nourish our physical bodies. Each of these basic human needs is dependent upon healthy, functional ecosystems. We must limit our impact to these natural systems and our consumption of natural resources to ensure their long-term viability. As Edwards states, “the existence of limits on ecosystems can be simply illustrated by the ecological crisis and long-term economic dislocation created by the destruction of oceans by overfishing, forests by clearcutting, and fresh water by toxins and pollutants” (Edwards 22).

ECONOMY

Economic viability is another leg on which sustainability rests. Unlike traditional environmentalism, sustainability acknowledges the need for secure employment and long-term economic

prosperity. There is a direct connection between the long-term viability of natural systems and the human economy. A healthy environment is foundational to an enduring and dynamic economy, indeed to life itself. This connection is asserted by Paul Hawken and Hunter and Amory Lovins in their book, *Natural Capitalism*, and in Hawken's book *The Ecology of Commerce*. In addition to the foundational argument regarding ecology and economy, there can be a direct connection between conservation of natural resources and economic stewardship. Life-cycle costing can be an effective method for evaluating the value of products and systems over time. While it is not uncommon for the initial cost of resource-efficient appliances or systems to be higher than conventional alternatives, the analysis of a payback period through life-cycle costing can prove that resource conservation makes longer-term economic sense. Energy recovery and an efficient building mechanical system, for example, can pay for itself over a time period of five to ten years. This sort of cost-benefit analysis can be taken even further to consider less direct impacts such as the embodied energy required to harvest, manufacture, and transport goods or the social conditions for all people involved in the process.

EQUITY

This brings us to the third aspect of the triple bottom line, equity, which helps to bring the focus of sustainability back to people and community:

At a fundamental level, members of a sustainable community understand that the well-being of the individual and the community are interdependent. Social cohesion, compassion and tolerance are more likely to thrive in an environment where all members of the community feel that their contribution to the whole is appreciated and where an equitable distribution of resources is recognized as essential for the long-term viability of the society. (Edwards 23).

One application of equity is in the fair trade movement, a system that provides third party verification that products are created in an environmentally and socially responsible manner, ensuring fair wages and working conditions for each individual involved in the process. According to the Fair Trade Federation:

Fair trade is a system of exchange that seeks to create greater equity and partnership in the international trading system by 1) providing fair wages in the local context, 2) supporting safe, healthy, and participatory workplaces, 3) supplying financial and technical support to build capacity, 4) ensuring environmental sustainability, 5) respecting cultural identity, 6) offering public accountability and transparency, 7) building direct and long-term relationships, and 8) educating consumers. (<http://www.fairtradefederation.org/ht/d/sp/i/2733/pid/2733>)

The third E of sustainability calls for the basic human needs of food, affordable housing, healthcare, and education to be sufficiently available to all. The just and equitable distribution of resources is viewed as not only ethical but essential for the well-being of the greater society. (Edwards).

EDUCATION

In *The Sustainability Revolution*, Edwards makes the case that education should be the “fourth E” added to the traditional list of ecology, economy and equity. Education is foundational to the advancement of sustainability, as it informs societal understanding and strengthens personal values. For example, one may not realize that privet is an exotic invasive whose presence is detrimental to native species of the Piedmont forest without being taught. Purchasing locally produced or certified fair trade materials becomes more meaningful after being educated on the wastefulness of transport and potential exploitation of people and land during the production of goods. These issues tend to become even more compelling when there is a direct connection with the people and faces involved. Education shapes the value structures by which decisions are made. Increased knowledge of the dynamics of sustainability helps an individual, and the global community, move toward long-term viability. (Edwards). The university campus, established to fulfill an academic mission, creates an ideal microcosm for educating and implementing sustainable living. Universities have the rare opportunity – and responsibility – to educate citizens both directly and by modeling an example worth emulating. The college campus must endeavor to inherently teach sustainable living by the way it develops, operates, and conducts business.

A SIMPLE EXAMPLE

As mentioned previously, sustainability is often referred to as the ability of this generation to meet its needs without compromising the ability of future generations to meet their own needs. The term has also come to infer innovative strategies aimed at restoring healthy ecosystems and better living for all through appropriate design of human systems and facilities. To cite an example of sustainable design, we can evaluate the production of electricity. Currently, the primary means of generating electricity in the state of Georgia is through the burning of coal, which is not a particularly sustainable practice. First of all, coal is a finite resource. The more we use today, the less our successors will have to use. In addition, there are many non-beneficial side effects inherent to the processes of mining, transporting and burning coal that negatively impact the health of people and the environment. Social equity costs include human health concerns, particularly increased rates of asthma in children and decreased drinking water quality, and a loss of community and connection with the landscape due to mountain top removal. Environmental costs include polluted air and water, disappearance of wildlife habitat, and compromised ecosystem health. While the initial economic costs to producing electricity through coal-fired power plants may be less expensive than alternative means of energy production, associated external costs to people and the environment are proving to be more expensive in the long run. An activity or process that causes people and the environment to become less healthy, and results in increased monetary expense, cannot be sustained long-term.

In contrast, harvesting solar power to create – or eliminate the need for - electricity is deemed a sustainable practice. As long as there is life on earth, there will be sunshine. There are challenges to using the sun's energy to fuel our lifestyles, such as current technological limitations and higher up-front costs of solar energy systems versus conventional systems. However, long-term benefits to solar energy can be measured by cleaner air and water, healthier people, and dollars saved. The more we learn - and

educate others - about viable renewable energy sources, the more sustainable our modern society can become.

This account of electricity production is an over-simplified example of a significant issue facing us today. The example illustrates how the application of sustainability can take into account environment, economy, equity and education when evaluating costs and benefits of human activities. These activities can range from global issues like energy production to the more mundane such as the selection of packaging materials used in take-out food containers. The more we seek to live sustainably, we find that it is a complex issue which affects all aspects of daily life and the choices we make.

CHAPTER TWO

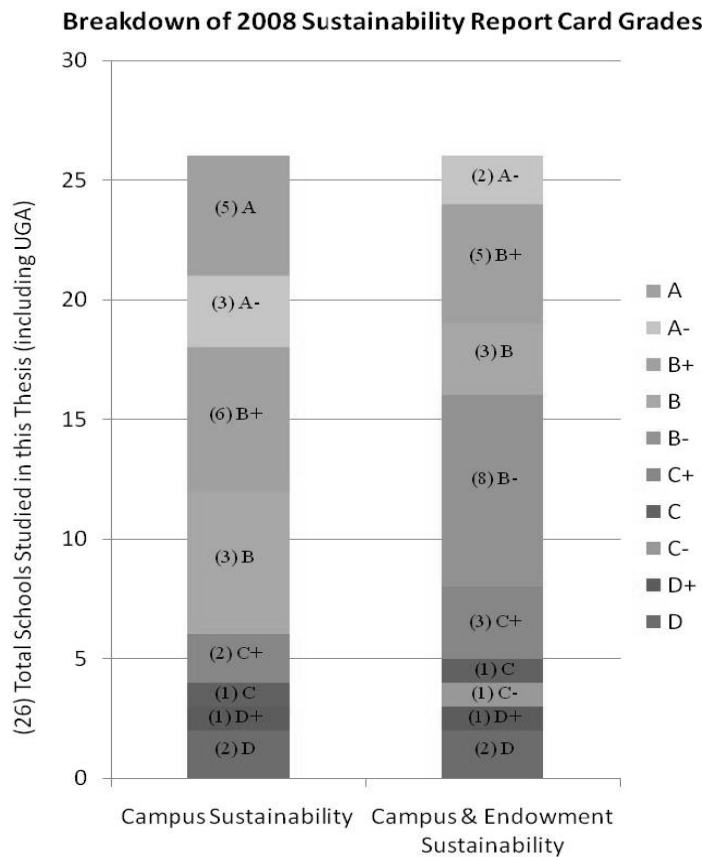
SUSTAINABILITY TRENDS IN HIGHER EDUCATION

Sustainability of college and university campuses is increasingly discussed and pursued among many constituents of higher education. In the January 2008 publication of “Trends in Higher Education”, the Society of College and University Planning (SCUP) observed that “Colleges, with a substantial push from their students, continue to report an increased focus on sustainability, and reduction of green house gases, in particular” (Society for College and Urban Planning). Faculty and staff members of individual institutions are attempting to use their influence to advance sustainability in the classroom and on campus. There has also been a groundswell of student activism and interest in ensuring that institutions teach and model sustainable practices. To borrow terminology from Andres Edwards, there seems to be a “sustainability revolution” brewing on college and university campuses.

THE COLLEGE SUSTAINABILITY REPORT CARD

In 2007, the Sustainable Endowments Institute created a College Sustainability Report Card “to encourage sustainability as a priority in college operations and endowment investment practices by offering independent yearly assessments of progress” (Sustainable Endowments Institute). The report grades 200 colleges and universities in the United States and Canada on a scale from A to F in the categories of Administration, Climate Change & Energy, Food & Recycling, Green Building, Transportation, Endowment Transparency, Investment Priority, and Shareholder Engagement. The second annual report card released in 2008, cites the following trends:

1. More than two out of three schools (68%) improved their overall sustainability grade.
 2. 50% of schools surveyed are addressing climate change through aggressive carbon reduction commitments, most notably through signing the American College and University Presidents Climate Commitment (up from 14% last year).
 3. 84% of schools report to purchase at least some food from local farms or producers (up from 63% last year).
 4. 69% of schools surveyed have instituted green building policies (up from 48% last year).
 5. 31% percent of schools invest endowment funds in renewable energy (up from 9% last year).
- (Sustainable Endowments Institute).



(Data derived from the Sustainable Endowments Institute, College Sustainability Report Card 2008)

The University of Georgia received a score of “D” on the 2008 College Sustainability Report Card, placing it among the bottom 8% of the institutions as part of this thesis. This third party assessment gives credence to the concern that the University of Georgia is lagging behind its peer institutions in the area of sustainability. To be fair, however, I do not believe that this score accurately reflects UGA’s current sustainability efforts and initiatives as it does not take into account many of the practices described in the following chapter. In addition to revealing that UGA can in fact do more to improve campus sustainability as others have done, a review of UGA’s profile included in the 2008 report illuminates two issues: 1) the data regarding UGA’s sustainability efforts is incomplete, and 2) research for the report card was primarily conducted online. The latter point is interesting to me in that it underscores the importance of a current, clear and informative sustainability website. In the case of UGA, the assumption seems to have been made that information not readily available online infers inactivity.

BENEFITS TO IMPLEMENTING CAMPUS SUSTAINABILITY

As inferred through trends observed in the College Sustainability Report Card, there are benefits to implementing campus sustainability initiatives. Institutions of higher education by nature embrace a core mission to educate citizens and to investigate solutions to pressing issues. Sustainable practices address such pressing concerns as ecological health, social responsibility and long-term economic viability. In addition, the implementation of sustainability initiatives can result in increased social equity and enhanced public relations. Following is a review of some benefits to implementing campus sustainability and their application to the University of Georgia.

EDUCATION / SOLUTIONS TO PRESSING ISSUES

Sustainability is a broad concept that affects all aspects of societal life and choices. Institutions of higher learning provide a means to educate citizens and to advance society by learning from the past

and seeking solutions to the problems and challenges of today. Higher education institutions are well equipped to address a range of issues through concurrent study of multiple academic disciplines. In addition to being a center for research and academic study, the university campus presents a microcosm for the practice and implementation of sustainable strategies. Universities employ all the people and resources required to house, feed, transport, heat and cool, and clean up after, as well as educate, an entire community of students, faculty and staff. Increasingly, members of the university community are concerned with environmental issues and the impacts that they - and their educational institutions - have upon the environment. Colleges and universities have an incredible opportunity to lead by example through implementing practices that promote environmental, economic and social responsibility. Education of future leaders can take place not only in the classroom but through a University campus and grounds that inherently teach. High-performance buildings with healthy interior and exterior environments can contribute to heightened environmental awareness and a healthier campus community. Environmentally, socially and fiscally responsible operations and maintenance practices increase quality of life on campus and beyond and set a positive example worthy of emulating. Through its mission to educate and need to operate, the University campus presents an ideal opportunity to study, practice, implement and evaluate sustainability initiatives.

This opportunity extends to the University of Georgia. In addition to the current interest in improving the campus environment, stewardship of Georgia's environmental and cultural resources has long been among the educational fabric of UGA. The University's academic mission states:

The University of Georgia, a land-grant and sea-grant university with state-wide commitments and responsibilities, is the state's flagship institution of higher education. It is also the state's oldest, most comprehensive and most diversified institution of higher education. Its motto, "to teach, to serve and to inquire into the nature of things," reflects the university's integral and

unique role in the conservation and enhancement of the state's and nation's intellectual, cultural and environmental heritage. (<http://www.uga.edu/profile/mission.html>).

As the state's flagship and land grant institution, the University of Georgia has an opportunity - and responsibility - to provide students with a quality educational experience and to prepare them to become effective leaders. Sustainability is a general concept and terminology commonly used to address a myriad of social, environmental and economic issues facing society currently. In order to effectively address mounting environmental, economic and social challenges, it is critical for the University to practice as well as espouse responsible use and management of the state's natural and cultural resources. In essence, the University of Georgia must remain committed to meet the challenge of practicing what it teaches regarding civic, social, economic and environmental responsibility. (Creighton).

ENVIRONMENTAL IMPACTS OF UNIVERSITIES

Colleges and universities tend to have a significant impact on the environment. The operation of a typical American college campus requires a tremendous amount of infrastructure and resources. It is not uncommon for a university to be one of the largest consumers of water, electricity, oil, and natural gas in its community or region. The issue of water use is intensified by current drought conditions in Georgia, illuminating UGA's responsibility to conserve water resources. Related to the high water use typical to universities, campuses also tend to place significant burden on community wastewater treatment facilities. Campus energy use represents another area of major consequence to the environment and the community. For example, the University of Georgia is such a large consumer of electricity that Georgia Power is willing to negotiate lower than average costs per kilowatt hour to the University, knowing that UGA will continue to require significant amounts of electrical energy. Unfortunately for colleges and universities, however, the generation and use of electricity stills remains costly and results in negative environmental impact. Physical campus development patterns and practices can also contribute to environmental degradation including loss of native vegetation and diminished quality of water and air.

Environmental impacts due to transportation issues on the university campus can be significant and far reaching when considering the consumption of fuel and emission of carbon required to move people and products throughout the campus. University campuses also purchase many products and services and generate large amounts of waste, both solid and hazardous. The operation of a university campus requires a significant amount of resources, placing direct burden upon local infrastructure and the natural environment upon which it depends. (Creighton).

In addition to the direct impacts of a university campus, there are indirect environmental impacts that extend beyond physical campus boundaries. For example, all purchasing decisions made by a university impact the people and communities involved in the areas in which the products were harvested, fabricated, transported and so on. Similarly, serving non-organic food in campus dining halls contributes to water quality concerns elsewhere due to the use of pesticides during food production. Use of electricity on campus that is supplied by coal-fired power plants contributes to water and air pollution in the area surrounding the power plant and beyond, not to mention potential increases human health concerns such as asthma in adults and children who live amid elevated levels of particulates in the air. Examples of indirect environmental impacts extend to everything from paper and carpet to laboratory equipment and appliances. Individual decisions and policies that inform campus practices have an impact on people and the natural environment. (Creighton).

While it cannot be denied that our actions, and the actions of an institution of higher education in particular, can produce negative environmental impacts, it can be far more inspiring and effective to recognize the opportunities for positive impact available to the '900 pound gorilla'. By virtue of its size in the community and its economic market, a university campus can serve as a catalyst for positive environmental change as it sets an example and commands sustainable goods and services from areas beyond its own political boundaries. All of the environmental issues listed above apply to The University of Georgia. Chapter Four will address some of these issues further. A more in-depth environmental

assessment of UGA is still required and recommended to quantify and track the University's ecological footprint in regard to consumption and restoration of natural resources.

ECONOMIC CONSIDERATIONS

A reduction in a university's environmental footprint can also work to save the university money. A typical approach to reducing environmental footprint is to focus on reduction of wasted resources. These resources can include everything from wasted water, electricity, light, heat, fuel, and chemicals to solid waste materials that could be reused, composted or recycled. Conserving energy directly correlates to saving dollars. Campus energy conservation projects can often be justified through life-cycle costing analysis that shows that heat wheel energy recovery, for example, can recover initial costs through savings in less than five years. In addition, the long-term costs of the resources on which we depend are continuing to rise. There are also grant opportunities available to colleges and universities for work in the practice of sustainability. Efficient and respectful use of resources can benefit the environment and the community and save money for the University. (Creighton).

The University of Georgia is the first land-grant institution in the United States. Established in 1785, UGA has been in existence for over 220 years. It is safe to assume that the University will continue to be here long into the future, and is therefore capable of longer-term accounting in economic decision-making. Life cycle costing is an appropriate tool when evaluating capital development projects. This is a strategy that takes into consideration factors such as operating and maintenance costs of a building system over time, in addition to the initial expenditure to purchase and install such a system. For example, if a highly efficient lighting or mechanical system costs fifty percent more up front, but those costs can be recuperated in five years or less, and monetary savings garnered for the remaining lifespan of the system, it would make good economic sense to invest in the near term to save more in the long term. This is the case with the heat wheel energy recovery system installed as part of the mechanical heating and cooling in the new Lamar Dodd School of Art building, which essentially borrows the temperature difference of

exhausted air to precondition fresh air that is brought into the building. The premium system is anticipated to save electricity annually and is on-track to pay for itself in approximately four years, saving money for many years there after. Similarly, recycling is a simple yet significant sustainable practice that can produce income and avoid landfill tipping costs to the University.

Considering the University of Georgia holistically, its economic impact is staggering. According to a 2008 study completed by the Selig Center for the Board of Regents' Office of Economic Development, UGA has an economic impact of \$2.1 billion dollars (http://www.uga.edu/news/artman/publish/080605_Impact_study.shtml). As such, the University is capable of driving market opportunities and ensuring that products purchased by the university are produced fairly and equitably. A nearby example of market transformation is currently taking place in Atlanta as Emory University endeavors to provide 75% local or sustainably grown food products to their campus community. In addition, Emory is using compostable serving utensils, instead of conventional plastic that cannot be composted and do not break down in the landfill. The direct benefit of such action to Emory includes reduced waste, satisfaction among the campus community, and market change to encourage profitable local and sustainable food production. In addition, Emory gains positive press and marketing opportunities through their sustainability efforts. (<http://www.emory.edu/sustainability.cfm>). Overall, sustainability influenced decision-making conforms to sound economic logic.

In addition to simple economic bottom line, it is important to consider the long-term result of our economic decision-making from both a social and ecological perspective. Energy conservation is a particularly attractive proposition in this regard because saving energy directly corresponds with saving money. There is a greater challenge however in the cases when the University may not directly see or benefit from the positive impact of investing for sustainability. Paying a premium for sustainably harvested and processed local or fair trade products for example would fall into this category. In order to justify such an action requires decision-making weighted by factors other than simply the monetary

bottom line. Similarly, investments made by University foundations should reflect and be accountable to the goals and values of the institution. Consideration of the University's legacy and the embodied energy or hidden impacts of our economic actions is required for truly responsible stewardship of our economic resources.

PUBLIC RELATIONS

A University can garner good press and help to distinguish itself from peer institutions through the implementation of sustainable practices on campus. Environmental sustainability is of increasing concern to students and the general public. During a telephone conversation with Emory University's environmental coordinator John Wegner, I asked him what he perceived to be the most valuable benefit to implementing certified green building standards on Emory's campus. Without hesitation he replied, "Front page articles in the Atlanta Journal and Constitution." Many online journals, reports and websites also promote campus sustainability initiatives. Implementing sustainability can provide many avenues for positive press, enhanced public relations, and improved town-gown relationships.

Implementing campus sustainability can also enhance public relations on campus and in the local community. Written petitions and proposals are being submitted to President Adams in support of advancing sustainability on UGA's campus. Advancement of sustainable initiatives provides encouragement and an enhanced sense of pride to the numerous individuals and groups represented by these documents. These efforts could also serve to promote town-gown relationships as University initiatives to enhance the local environment benefit the entire community. Public perception and "branding" of the University is important in the competition for the brightest students, faculty and other valuable resources. Campus sustainability seems to be an increasing factor in the selection of a college (Marshall). As evidenced by the "Student-Initiated Proposal for Sustainable Practices at the University of Georgia" submitted to UGA's senior administration in the fall of 2008, there seems to be a growing concern for the institution's sustainability credentials as well as its academic reputation.

SOCIAL EQUITY

Equity applied to the college campus often involves diversity, non-discrimination, and fulfillment of a living wage for all employees. The UGA Master Plan calls for creation of the optimal student environment. UGA has a responsibility to provide a safe, healthy, inspiring environment for all. One of my favorite expressions of this form of equity at UGA is the implementation of green cleaning. While the green cleaning program offers environmental and economic benefits, the most compelling benefit in my opinion is improved health for all, particularly the custodial staff no longer working with toxic chemicals. Paramount in regard to social equity at UGA is the University's involvement in Partners for a Prosperous Athens / One Athens, aimed at campaign "taking action to end persistent poverty in Athens-Clarke County" (<http://www.prosperousathens.org/>). The work of the Partnership is necessary to combat the dichotomous coexistence of the flagship institution, persistent poverty, and a struggling public education system. In many ways, sustainability is about quality of life for all. Improving campus sustainability largely amounts to improved quality of life for all members of the UGA community and provides positive example and influence regionally.

ORGANIZATIONS DEVOTED TO CAMPUS SUSTAINABILITY

In addition to individual campuses at work toward sustainability, several separate organizations of diverse background and membership are devoted to advancing sustainability in the realm of higher education. Following is a brief review of four such organizations.

The Association for the Advancement of Sustainability in Higher Education (AASHE) was founded in 2006 with the mission of promoting sustainability in all aspects of higher education, "from governance and operations to curriculum and outreach through education, communication, research and professional development" (<http://www.aashe.org/about/about.php>). In April 2007, AASHE released a

comprehensive annual review of sustainability in higher education which highlighted over six hundred sustainable initiatives on college campuses. The report documented a substantial increase in the depth of campus sustainability activities, support for sustainability by higher education associations and media coverage of sustainability-related issues in the *Chronicle of Higher Education* and *University Business* publications (<http://www.aashe.org/highlights/digest06.php>).

AASHE is a member of the Higher Education Associations Sustainability Consortium (HEASC) which began in 2005. Other notable HEASC members include the National Association of College and University Business Officers and the Society of College and University Planners, both of which are supported by the UGA administration. Through the HEASC, member organizations are working together to strengthen and fulfill their individual missions to create safe, vibrant and economically strong communities amid today's changing climate - literally as well as politically, economically and demographically. (<http://www.aashe.org/heasc/index.php>).

Second Nature is a non-profit entity that coordinates the HEASC and works with individual colleges to enhance their campus sustainability. Founded by Dr. Anthony Cortese in 1993, Second Nature has worked with over five hundred colleges and universities to advance sustainability initiatives on campus and within the local community. Second Nature's activities are driven by a vision of "a world in which all present and future humans are healthy, have their basic needs met, have fair and equitable access to Earth's resources, and have a decent quality of life"

(<http://www.secondnature.org/aboutsn/aboutsn.htm>). Second Nature created the Education for Sustainability movement, based upon the premise that higher education is critical to achieving a just and sustainable future and is best poised to lead in this endeavor. One of the most influential collegiate programs established by Second Nature is the American College and University Presidents Climate Commitment, a program designed to enhance sustainability and reduce greenhouse gas emissions on campus. As of June 5, 2008, the American College and University Presidents Climate Commitment had

five hundred and fifty-three signatories (<http://www.presidentsclimatecommitment.org/>). The University of Georgia is not among them.

Finally, a fourth organization that is raising awareness in campus sustainability is the National Wildlife Federation (NWF). The NWF mission includes “inspiring Americans to protect wildlife for our children’s future” (<http://www.nwf.org/campusecology/>). To this end, NWF developed the Campus Ecology program in 1989 to promote climate leadership and sustainability among colleges and universities. The NWF Campus Ecology program provides resources, technical support, networking opportunities and educational events to influence and improve campus sustainability. Largely geared toward college students, the Campus Ecology program incorporates multi-media outlets including podcasts, videos, blogs and Facebook to reach out to members and interested public. (<http://www.nwf.org/campusecology/index.cfm>).

SUSTAINABILITY LEADERSHIP

Many institutions of higher education are seeking to teach, promote and practice sustainability. Upon review of some of the existing actions and achievements undertaken by other universities, the task of sustainability leadership seems particularly daunting. While UGA has made many strides in the direction of campus sustainability, the University has not yet formalized a campus-wide sustainability policy or administrative commitment as compared to peer institutions. In order to provide effective leadership in campus sustainability, the University must develop a comprehensive vision for sustainability, strategic action plan for implementation, and a commitment to holistic sustainable decision-making on all levels.

In her book *Greening the Ivory Tower*, Sarah Hammond Creighton stated in 1998 that:

“The truly green university will need to undertake comprehensive implementation of [environmentally sustainable] actions... In the next phase of the campus environmental

stewardship movement, colleges and universities will see the long-term benefits and invest in capital projects with longer term payback, change curriculum to reflect holistic thinking, reduce or eliminate hazardous by-products, and examine each business decision in light of the quality of life and the quality of the natural world... The green university recognizes that it has a responsibility to lead rather than follow, try new solutions to old problems, and continuously improve its business of environmental protection.” (Creighton 9).

A leader in campus sustainability will bring to fruition the goals set by higher education associations devoted to advancing sustainability in the university setting. Comprehensive, combined and committed efforts will be required to work toward a “just and sustainable future” in which “all present and future humans are healthy, have their basic needs met, have fair and equitable access to Earth’s resources, and have a decent quality of life” (<http://www.secondnature.org/aboutsn/aboutsn.htm>). The institutional leader will continually listen, observe, partner, evaluate, and refine strategies for enhanced campus sustainability.

The Sustainable Endowments Institute 2008 College Sustainability Report Card presents key findings regarding campus sustainability leadership. The overall grade breakdown of all schools surveyed included: 3 percent As, 28 percent Bs, 41.5 percent Cs, 25.5 percent Ds, and 2 percent Fs. Six schools are recognized by the Sustainable Endowments Institute as College Sustainability Leaders for achieving an overall grade of “A-“ or better in both campus sustainability and endowment sustainability categories, including Carleton College, Dartmouth College, Harvard University, Middlebury College, University of Vermont, and University of Washington (the University of Washington is officially listed as an aspirational institution by the University of Georgia (<http://www.uga.edu/~irp/comps/aspeers.html>)). It is also notable that a total of twenty-five colleges received an “A-“ or better in the campus sustainability categories, including the following UGA peer and aspirational institutions: Arizona State University,

Duke University, University of California, University of Colorado, University of Florida, University of Michigan, University of North Carolina, University of Oregon, and University of Washington.

Perhaps the most widely accepted definition of sustainability leadership will be derived from a new campus sustainability rating system released by AASHE in 2007. In order to systematically and comprehensively compare the sustainability of higher education institutions, AASHE has developed the Sustainability Tracking, Assessment & Rating System (STARS). The voluntary STARS rating system is designed to provide a suitable framework for advancing sustainability in higher education, evaluate advances made over time, create incentives for improvement and facilitate collaboration through a strong campus sustainability community. (http://www.aashe.org/stars/documents/STARS_0.5.pdf). Results of the pilot program are not yet posted. Given the success of AASHE, I anticipate that STARS will become a respected metric of campus sustainability, much like the Leadership in Energy and Environmental Design (LEED) rating system has become the basis for sustainable design and construction.

In the following chapters I will review campus sustainability initiatives at UGA and other peer institutions. I will conclude by offering a comprehensive framework to enhance sustainability and support the objective of assuming a leadership role in the area campus sustainability.

CHAPTER THREE

SUSTAINABILITY AND THE UNIVERSITY OF GEORGIA

The University of Georgia is no exception to the sustainable awakening taking place on college campuses. The dialogue can be found in classrooms, conference rooms, residence halls and dining halls. Sustainability is formally addressed in academic coursework and is becoming written into academic and staff departmental policies. There is an increasing desire and expectation among members of the University community for UGA to lead by example in the arena of campus sustainability. Appropriate implementation of campus sustainability initiatives can increase the quality of life for all members of the UGA community and enhance a sense of pride in the institution.

Through my work and networking on campus, two observations are readily apparent. First, the University of Georgia is actually doing much good in the way of environmental sustainability. Many individuals on campus are dedicated to advancing sustainability at UGA and have effectively implemented a variety of sustainable practices. The second observation, however, is that there is a general sense on campus and in the community that the University is not doing enough in regard to sustainability. It is common for me to hear students, faculty and staff voice concerns that UGA is lagging behind others in the area of sustainability. I believe there are two primary reasons for this sentiment: 1) The statement is correct - there are many ways in which UGA can and should do more to improve campus sustainability; and 2) UGA has not done a very good job of promoting the sustainability efforts and initiatives that have been implemented on campus. This sentiment was communicated by President Adams during his keynote address to the Academy of the Environment when he said, “we do need a better way of organizing and disseminating information about sustainable practices across this campus” (Adams 4). When I give a presentation regarding UGA’s master plan or current campus sustainability

projects and initiatives, it is typical to receive an overwhelmingly positive response followed by a statement that the audience was unaware of the depth of campus sustainability activities at UGA. Reassurance that UGA is actively pursuing campus sustainability seems to enhance a sense of pride in the institution and hopefully will serve to motivate further action.

In this chapter, I will first document three important groups - students, faculty and staff - with invested interest regarding campus sustainability. Next, I will highlight current sustainability-related initiatives at UGA. Following each category studied, I will also begin to identify areas in which the campus can continue to improve upon its sustainability credentials.

STAKEHOLDER INTEREST IN A SUSTAINABLE UGA

In order to discern general views regarding campus sustainability among members of the University community, beyond conversations and anecdotes, I chose to review documents produced through unified, collaborative effort by students, faculty and staff members at UGA. An important stakeholder interest that I have not chosen to pursue, but is very worthy of mention, is donors. The University has begun to rely more heavily on private funding for facilities needs as well as other more traditional fundraising areas at UGA. It seems that many philanthropists and charitable organizations are interested in projects related to environmental sustainability and social equity. UGA could develop - and capitalize upon - a reputation of sustainability leadership to enhance fundraising efforts.

STUDENTS

For years, University of Georgia students have been advocates for heightened environmental policy and sustainable development. The most relevant activities, however, may be those undertaken in the last two years. In 2008, the Go Green Alliance was formed as an umbrella organization comprised of representatives from environmentally focused student groups on campus. Initially an outgrowth of Dr. Lynne Sallot's Public Relations Campaigns class, the group is focused on campus greening initiatives and

functions similarly to a student-run office of sustainability. (Sallot, Go Green. Live Red & Black.).

Another indication of student interest in campus sustainability is the drafting of petitions to request LEED Certification of the new Tate Student Center Expansion, expand recycling on campus, and hire a Sustainability Officer to be funded with student fees.

Beginning in 2006, a significant effort was launched by students to get the University to commit to LEED Certification of the Tate Student Center Expansion. The “Let’s LEED” campaign included a petition with over 670 student signatories (Durso and Faust). As a result, the University is tracking LEED credits for the project and plans to announce official certification of the building upon its completion. In the Fall of 2007, Students for Environmental Awareness obtained over 1000 student signatures in support of recycling and helped initiate increased recycling efforts in campus dormitories (Durso and Faust). UGA recycling efforts have increased in response. Recently during Spring semester 2008, the Go Green Alliance obtained signatures to petition senior administration to hire a Sustainability Officer to coordinate and advance sustainability on the UGA campus. As envisioned by the students, the position would report directly to the President with funding from an increase in student fees (Sallot, Go Green. Live Red & Black.).

Finally, a Student-Initiated Proposal for Sustainable Practices at the University of Georgia was drafted by members of the Go Green Alliance. The intent of the proposal is to communicate to senior administration student concern for sustainability and to recommend prioritized action toward a more sustainable UGA campus. Short-term priorities include expansion of the University recycling program; a Green Choice Initiative focused on green cleaning and purchasing; sustainable food service options; and recommitment to the Taillores Declaration signed by President Adams. In addition, the Proposal recommends four long-term priorities: 1) establishment of an Office of Sustainability, 2) enhanced environmental education, 3) a commitment to renewable energy, and 4) water conservation. (Durso and Faust).

FACULTY

The University of Georgia faculty is a catalyst for environmental thought and action on campus. All of the colleges and schools within the University offer environmental education of various forms, including traditional scientific research, applied science through design disciplines, environmental interpretation through the arts, the study of sustainable economic structures, and more. UGA faculty members have also formed the Academy of the Environment to enhance collaboration and advance environmental research efforts on campus and throughout the world.

The Academy of the Environment at UGA promotes collaboration among environmental faculty and researchers from various disciplines and departments. The mission of the Academy is “to address the complex, interdisciplinary environmental issues facing modern society by facilitating interactions across traditional academic disciplines, offering interdisciplinary training programs, and coordinating environmental research and service programs across department, school and college lines” (<http://www.academyoftheenvironment.com/aboutus.php>). In addition to faculty members, the Academy has allowed membership by interested UGA staff and administrators who work to advance sustainability on campus. With interest not only in the academic generation of environmental insight, but also in the application of such knowledge, the Academy has formally requested that the University of Georgia improve its own campus sustainability. In order to assist in this effort, the Academy is developing a series of recommendations to present to senior administration during Fall semester of 2008.

STAFF

Staff members at the University of Georgia have also been working to implement sustainability in many ways. From sustainable development in new construction projects to sustainable operation and maintenance practices in campus buildings and landscapes, many individuals and departments are working to reduce the University’s environmental impact and enhance the quality of life on campus.

BARRIERS TO SUSTAINABILITY AT UGA

Much is being done in regard to the implementation of sustainable practices on the University of Georgia campus. However, current efforts would be greatly enhanced by a unified effort and overarching focus on campus sustainability by University administration. Currently, there is no formalized mandate, policy or commitment to campus sustainability. Without such a commitment, it is challenging to prioritize sustainable strategies, even when long-term savings are demonstrated. For example, capital and operating budgets for campus facilities are funded separately; this minimizes departmental incentives to conserve energy and other resources during initial construction and renovation projects. There is also no specific structure in place to assist departments in the development and ongoing implementation of sustainable initiatives. In addition, sustainability efforts that are underway are not well communicated. Many within the University community are unaware of the individual initiatives and advancements in campus sustainability that are being made; thus momentum from successes is not fully appreciated.

THE NECESSITY OF COLLABORATION

It cannot be overstated that sustainability is all-encompassing and requires collaboration. This thesis only scratches the surface in regard to detailed information for the implementation of specific sustainability initiatives. However, it does bring to light a comprehensive approach to campus sustainability issues. It will be necessary for many within the campus community to work together to develop, refine, prioritize and re-evaluate effective sustainability strategies for UGA. The University must capitalize on the assets of interested and engaged students and faculty, including the Go Green Alliance and the Academy of the Environment. It is critical to connect the academic side of campus with committed staff members who work on sustainability-related issues daily at UGA, to apply academic research conducted and discussed in laboratories and classrooms to UGA's physical campus. Of course, for motivated and focused efforts to be sustained, University administration must also place continued priority on the goal of campus sustainability.

CHAPTER FOUR

SUSTAINABILITY INITIATIVES AT UGA

This chapter represents an effort to begin in essence a UGA State of the Campus Sustainability July 2008. The primary categories considered in regard to campus sustainability at UGA are: 1) Sustainability Culture and Administration, 2) Education and Outreach, 3) Natural Resources, 4) Built Environment, and 5) Campus Operations. Included in each category is documentation of existing sustainability initiatives and suggestions for additional efforts that could be undertaken. Information provided regarding current activities on campus was derived mostly through researching departmental websites and interviews with UGA staff members responsible for various aspects of the University. There is some duplication of information as initiatives apply to more than one resource or category of sustainable action. There is also important benchmarking information that is missing. This general assessment should serve as a starting point for follow up efforts to officially document campus sustainability at UGA. Many good models exist for the campus sustainability assessments, particularly the UC Berkley Campus Sustainability Assessment 2005 and the University of Virginia Sustainability Assessment 2006. It can be noted that the categories I selected do not directly correspond with those in the AASHE STARS program, but they are similar and cover most of the campus criteria applicable to UGA.

In evaluating current campus sustainability at the University of Georgia (as well as at other Universities to be discussed later), information is organized primarily by resources and general campus functions. Particularly in regard to campus sustainability, responsible management of natural resources is of primary concern. These resources cross political and departmental boundaries. Water, for example, has been described by UGA environmental engineering professor David Gattie as the common thread, or

currency, of sustainability. Literally everyone depends upon water resources. On campus, each department, to varying degrees of influence, affect the quantity and quality of water. Staff departments such as University Architects and the Physical Plant Division are responsible for designing, specifying, operating, and maintaining the campus systems that use water. Student Affairs departments such as Campus Housing and Recreational Sports, as well as Food Services within the Auxiliary Services Department, utilize water resources and have much influence over individual water use behavior within the campus community. Many academic departments not only study water resources but utilize much water in the operation of research laboratories on campus. For this reason, the analysis and recommendations for campus sustainability are largely organized around the resources and services upon which the University community depends.

CAMPUS SUSTAINABILITY CULTURE AND ADMINISTRATION

An increasing culture of sustainability is developing at the University. An evolving campus-wide conversation can be heard regarding sustainable issues and initiatives. In regard to public statements by senior administration, interest in campus sustainability was spoken most clearly at the Academy of the Environment luncheon on November 29, 2008. During the event, President Michael Adams praised current sustainability initiatives on campus and voiced a desire for UGA to do more (Adams).

Notable administrative actions to this effect include the establishment of the Odum School of Ecology, the first of its kind in the country; implementation of the Every Drop Counts water resources plan; participation in the state-wide sustainable energy management plan; support for environmental design and construction of recent campus buildings and landscapes; and recognition of the Academy of the Environment and the Go Green Alliance. Another specific action previously undertaken by President Adams is the signing of the Talloires Declaration, an action plan for incorporating sustainability and environmental literacy in teaching, research, operations and outreach at colleges and universities (http://www.ulsf.org/programs_talloires.html).

While there is an increasing groundswell of concern for sustainability on campus, with apparent interest from senior administration, current efforts are not particularly well focused or promoted among the campus community. While many sustainable initiatives are underway on campus, there seems to be no specific plan for implementation of the items outlined in the Taillores Declaration or sustainability in general. There is also not currently a specific administrative policy or mandate regarding campus sustainability, nor a particular point of contact on campus with responsibility for advancing sustainability initiatives. Development of a campus sustainability committee and adoption of a campus sustainability policy would begin to address these issues as well as Dr. Adams' interest in institutionalizing UGA's sustainability commitment (Adams 3). Promoting current sustainability efforts through websites, media releases, and a campus sustainability tour would help to get the word out regarding campus sustainability initiatives. A UGA campus sustainability awards program could inspire and encourage the University community. In the longer-term, a Director or Office of Sustainability could effectively promote and advance campus sustainability efforts. Coordination with Athens-Clarke County sustainability initiatives would also strengthen regional effectiveness.

EDUCATION AND OUTREACH

UGA has an environmental literacy requirement for all graduating undergraduates. Research efforts are positively influencing environments across the globe. The University is also home to the first School of Ecology in the country, named for its founder and the father of modern ecology, Eugene P. Odum.

As a land grant institution, outreach receives significant focus at UGA. The College of Agricultural and Environmental Sciences provides Cooperative Extension services throughout the state dealing with issues related to environment and sustainability. Many other academic departments including the College of Environment and Design have dedicated faculty, staff and students involved in service learning and outreach activities on campus and beyond (<http://www.servicelearning.uga.edu/>).

On campus, efforts to promote environmental awareness and influence personal behavior continue to increase. Water conservation tips are included on the University website homepage. Signs in restrooms and at water fountains on campus encourage water conservation. Bus cards are an effective means for advertising sustainability behaviors and events to campus transit users. Many initiatives have effectively promoted sustainability on campus, including residence hall competitions, light bulb exchanges, Earth Day activities, Myers Community Day, and Focus the Nation among others. An effective voice for campus sustainability is the student-led Go Green Alliance. UGA also took part in the 2008 Recycle Mania Competition established by the College and University Recycling Council (<http://www.recyclemaniacs.org/index.htm>). The UGA Physical Plant Division provided funding and support for many of these activities.

In addition to the efforts described above and others, more sustainability-related education and outreach activities can be implemented. Environmental literacy requirements could be re-evaluated and refined to remain current and effective. Campus sustainability initiatives can be promoted through all available media outlets, including newspaper coverage, a dedicated website for campus sustainability, awards given to effective individuals or departments for their efforts toward sustainable action, and focused campaigns for campus housing and new student orientations. A tour of campus sustainability could be created, literal or virtual, for interested people to gain knowledge of sustainable initiatives at UGA. Finally, the University campus itself could be intentionally designated for research and learning. Such a distinction would set UGA apart and enhance the notion of a campus that inherently teaches. Education is the core mission of the University. Teaching through modeling and promoting effective and sustainable decision-making reinforces the academic mission.

NATURAL RESOURCES

LAND

The University of Georgia's main campus is comprised of approximately 615 acres. Including main campus, UGA owns 4,737 acres in Clarke County and a total of 42,247 acres in the state of Georgia,

according to the UGA Fact Book 2007. The University also owns and operates studies abroad facilities in Cortona, Italy; San Luis, Costa Rica; and Oxford, England.

PHYSICAL CAMPUS MASTER PLAN

The Physical Campus Master Plan for UGA's main campus was adopted in 1998 and remains an effective tool for land management and smart growth development. The master plan provides for a significant increase in building density and greenspace. A primary strategy for increasing both building density and greenspace is the shifting of vehicular parking and circulation to the perimeter of main campus. Enhancements to the core of campus are underway, including historic restoration on UGA's historic north campus; student life amenities in the central precinct; science and teaching facilities on south campus; housing, the arts and recreation on east campus; and pedestrian improvements throughout. Guiding principles of the master plan include:

1. Create the optimal student environment
2. Extend the characteristics of north campus
3. Develop a connected campus
4. Define and provide for current and future facility needs
5. Provide for academic and student needs on contiguous land
6. Develop comprehensive solutions to traffic, parking, and infrastructure issues
7. Protect and Enhance Natural Resources
8. Participate in regional coordination
9. Prepare for sustained implementation



(2006 Master Plan, University of Georgia)

Over the last decade, the guiding principles of the master plan have effectively shaped the campus through its years of most rapid growth. Since 1998, over 5 Million square feet of building space has been added on campus, an increase of approximately 38%. During this period of unprecedented growth, the quality of natural resources has largely been preserved and enhanced. On main campus, the master plan loosely identified several landscape preservation areas to remain undeveloped, including Lumpkin Woods, Driftmier Woods, the east campus oak grove, Oconee Forest, and the Tanyard Creek, Lily Branch, and N. Oconee River riparian forest areas. Also central to the campus master plan is the preservation of cultural landscapes. One of the first major master plan implementation projects was the restoration of green space at Herty Field in 1999. The parking lot turned greenspace was dedicated in concert with the opening of the North Campus Parking Deck, a significant gesture to de-emphasize automobiles and enhance the pedestrian experience in the core of campus. Since that time, approximately 1.5 million square feet of asphalt have been removed and thirty-four acres of green space created. Other implemented green space projects include the UGA Memorial Garden, Coverdell Memorial Garden, and the Performing & Visual Arts Complex (PVAC) Corridor. The D. W. Brooks pedestrian mall on south campus, the largest green space project to date at UGA embodies the guiding principles of the campus master plan. Another significant gesture for the campus environment was the designation of the Campus Arboretum in 2000, with a current total of 3,635 designated arboretum trees.

Of the acres that comprise UGA's main campus, approximately 42% are impervious, leaving 58% that is vegetated. Since 1998, the overall square footage of academic space has increased by over 5 Million square feet or 38%, while the total area of green space has also increased by approximately 34 acres. The primary means for maximizing building density and green space creation is the construction of parking decks to stack vehicles on campus, enabling redevelopment of valuable land previously occupied by surface parking lots. This strategy works to create a safer, healthier and more pleasant campus environment.

While much good development has taken place, there is still much to do to improve main campus land areas and promote conservation on all of the University's valuable land resources. Updates to the UGA master plan should be made bi-annually to reflect current development priorities; the last one was completed in 2006. It is also important to continue advancement of valuable campus greenspace, particularly the northward expansion of D.W. Brooks Mall. Completion of the Green Mile, a safe pathway from the Arch to UGA's Intramural Fields, is another needed development. It may also prove beneficial to develop tree canopy requirements for new development, similar to the Athens-Clarke County Tree Ordinance. Updated sustainable building and site design guidelines can be developed and adopted to ensure positive growth and development practices now and in the future.

South Milledge Properties

Set apart from UGA's contiguous main campus is a large land area generally referred to as the South Milledge Properties. Specific individual land uses - including the State Botanical Garden of Georgia, UGA Soccer Softball Complex, Livestock Instructional Arena, Greenhouses, and intramural fields - have developed over time without a comprehensive master plan. In addition, much undeveloped land remains and pressure for campus expansion is exerted perennially. To ensure optimal and sustainable development, a strategic vision is required to prescribe how remaining South Milledge areas will – or will not – develop. It is also prudent to develop a comprehensive UGA properties conservation plan to protect culturally and ecologically significant areas. UGA can also develop a climate action plan, with input from academic partners, to mitigate the University's environmental footprint and strive for carbon neutrality. The South Milledge Properties should be integral to both county and climate planning as it currently acts as part of the green belt around Athens-Clarke County, contains significant forested areas, and requires transportation to connect with main campus. Participation in the A-CC Greenway Land Conservation Program could serve both campus and county goals to preserve valued greenspace as well as enhance alternative transportation options. Senior administration commitment to commuter rail in Athens could also significantly enhance campus and regional sustainability.

WATER RESOURCES

UGA demonstrates effective water resource management. In response to current drought conditions, an ad hoc task force on water resources was formed and the “Every Drop Counts” campaign was adopted. With the intent of achieving practical water conservation, the task force reviewed current efforts at UGA and other institutions. The report includes *short*, *sustained* and *worst-case* recommendations to UGA’s senior administration. *Short-term* recommendations were: increased public awareness, replacement of fixtures with low-flow varieties, partnership with manufacturers to provide low-flow fixtures to members of the University community cost-effectively, rainwater harvesting, enforcement of appropriate cooling level standards for buildings, water conservation competitions in campus housing, limited water use in maintenance activities, conducting water audits in campus buildings, encouraged use of personal water bottles and consideration of hand sanitizer versus hand sinks. Recommendations for *sustained* water conservation included actions in six categories: educational, research/laboratory, construction and equipment, landscape and irrigation, water supply, and administrative / operational. It is notable that establishment of an Office of Sustainability was recommended “to coordinate and promote campus-wide efforts in water conservation, energy efficiency, recycling and other areas” (Ad-Hoc Task Force on Water Resources). *Worst case* activities to be enacted in persistent, severe drought included: imposition of an Emergency Water Management Plan, closing of outdoor swimming pools, consolidate work and class schedules, use paper products in food service operations, close overnight food service, and stop provision of ice in beverages at campus food service operations. (Ad-Hoc Task Force on Water Resources).

In addition to the “Every Drop Counts” campaign, many water conservation activities have been on-going since before the current drought. Stormwater best management practices have been installed throughout campus, including most notably the Lumpkin Street Drainage Improvements project, rainwater harvesting at the UGA Memorial Garden and the Coverdell Center for Biomedical Research, and installation of low-flow fixtures in new building construction. UGA water resource stewardship is

also evident through storm drain stenciling and water quality monitoring of campus streams by Brown & Caldwell for the Physical Plant Division (PPD). Currently underway by the PPD Grounds Department is the restoration of historic Town Spring, a clean water source upon which the University and town were founded. The Town Spring Restoration Project will prove to be a model cultural and ecological rehabilitation effort. Also, the fourth and largest cistern installation on campus is nearly complete as part of the Tate Student Center expansion. The 75,000 total volume will provide 50,700 gallons of usable water for toilet flushing and irrigation. The Office of University Architects was recently awarded the 2008 Stormwater Steward Award from Athens-Clarke County for stormwater design of the Performing and Visual Arts Corridor and the Lamar Dodd School of Art site.

While UGA is making strides in the area of water resource management, there is more action that can be taken. To maximize water quality efficiencies, the University can commit to develop and implement a comprehensive stormwater master plan that would include restoration of surface waters and regionally appropriate stormwater best management practices. Progress in the “Every Drop Counts” campaign can be evaluated and updated annually. Increased education and outreach regarding water issues must remain a goal of the campus community. Strategies for enhanced awareness can include watershed boundary signage, continued storm drain stenciling, campus demonstration areas with interpretive signage, and staff training regarding chemical disposal. In addition, the UGA campus can engage the N. Oconee River and campus streams as amenities for the campus and community. All campus surface waters can be further studied, protected and restored including:

- 1) N. Oconee River
- 2) Middle Oconee River
- 3) Tanyard Creek
- 4) Lily Branch (aka Stinky Creek)
- 5) Town Spring (nearly complete Phase I restoration)
- 6) Lake Herrick

- 7) South Milledge Properties ponds and natural drainage areas
- 8) Floodplains and wetlands on UGA property

AIR, ENERGY, & CLIMATE ACTION

Air Quality

Primary outdoor air quality concerns on the UGA campus are related to the burning of coal to produce steam for heating campus buildings, emissions from automobiles, and the consumption of energy on campus. In order to minimize the harmful effects of these activities, the University is undertaking several actions. To address the release of unhealthy gases and particulate matter into the air from the campus steam plant, scrubbers have been installed to filter the exhaust from smoke stacks during the production of steam. The filter system, installed in 2007, was expected to reduce UGA's emissions of sulfur dioxide (SO₂) by approximately 50% and hydrogen chloride (HCl) by 90% (http://www.uga.edu/energy/news/article_35.html). To reduce the negative impact of automobiles on campus: 1) Campus and Athens Transit are made available to all members of the campus community, 2) Parking Services implemented a plan for designated parking areas on campus to limit vehicular circulation on campus and offers incentives for alternative transportation. 3) Biofuels in UGA transit and service vehicles minimizes oil consumption and results in cleaner emissions, 4) Master planned greenspaces have been developed to minimize vehicular traffic and increase beneficial tree canopy and vegetation on campus. Energy consumption on campus tends to results in air pollution elsewhere, particularly as most electricity used on campus is produced by coal-fired plants. Therefore, UGA energy conservation initiatives contribute to cleaner air.

To enhance existing efforts, additional strategies can be developed to improve air quality and reduce air pollution on the UGA campus. A plan must be made to wean UGA from fossil fuels. Although initial costs and political stakes may be high, in order to display leadership in sustainability UGA must develop an action plan to minimize the burning of coal and a commitment to increase

research, use and production of alternative energy sources. Solar power, low-impact hydro power, geothermal heating and cooling, and biofuels should be investigated as viable energy sources at UGA.

Transportation demand management is another area that can be enhanced at UGA. Limiting vehicles on campus reduces UGA's carbon footprint and creates a healthier air quality. Either restricting freshmen from having cars on campus or strongly encouraging them to leave their cars at home through other incentives could have a profound impact on the quality of the campus environment.

Simultaneously, it behooves the University to enhance promotion and support of alternative transportation choices.

Finally, green space is critical to improving the campus environment. For several reasons, including air quality improvement, carbon sequestration, reduction of urban heat island effect, energy conservation, stormwater and erosion mitigation, enhanced wildlife habitat and biodiversity, and creating a pleasant pedestrian environment, campus tree canopy must continue to be preserved and enhanced.

(<http://www.treesatlanta.org/benefits.html>). Green space projects must continue to be prioritized as UGA continues to develop.

Energy Use and Sources

UGA actively pursues energy conservation. In response to recommendations made by the UGA Executive Committee for Energy Conservation, the University hired an Energy Engineer to oversee a new Office of Energy Services and implement the UGA Unplugged energy conservation campaign developed by Dr. Lynne Sallot's public relations campaigns class. The Energy Services website provides conservation tips and feedback opportunity for the University community to share concerns or ideas for minimizing energy consumption on campus. Several campus events sponsored by Energy Services are aimed at increasing energy conservation. Light bulb exchanges have taken place in residence halls, the Grady College of Journalism, and Administration building. In the spring of 2007, the first residence hall student energy competition was held between Mell and Lipscomb Halls. Continued engagement exists

between UGA staff and students to promote energy conservation issues on campus.

(<http://www.uga.edu/energy/index.html>).

In addition to education and outreach efforts, a building metering program is being implemented to document and track energy use at individual buildings on campus. Building energy audits are being conducted by Dr. Tom Lawrence and UGA engineering students. Outdated lighting and heating ventilation and air conditioning (HVAC) systems are replaced with energy efficient systems as funds become available.

UGA efforts to conserve energy must continue, as many environmental and economic benefits can be realized. The building metering program should be fully implemented so that inefficiencies can be detected and improved. Once buildings are metered individually, UGA could consider restructuring the utility rate system to charge individual departments for utility consumption. Responsibility for payment and benefits from savings would encourage conservation. Building and Site Design Guidelines with energy efficiency standards can be developed to formalize a mandate to conserve as campus continues to develop. In addition, commitment to the use of alternative energy sources on campus would serve to diversify campus energy interests and promote a healthy campus infrastructure.

Climate Action

Many of UGA's current initiatives - including land and energy conservation, alternative transportation, sustainable building and site design, and waste reduction and recycling - would be considered positive action to address climate change. Another significant means to mitigate global warming is through the use of renewable energies. The American College and University Presidents Climate Commitment is an effective tool for establishing a climate action plan. Primary objectives are to eliminate global warming emissions and integrate sustainability into curriculum

(<http://www.presidentsclimatecommitment.org/>). It should be noted that the steps outlined in the Presidents Climate Commitment incorporate many of the issues discussed in this thesis. Well over 500 educational institutions have committed to this endeavor. The list of signatories increases daily. UGA

senior administration, after consultation with staff, should seriously consider signing the Commitment and fulfilling the required actions which include a comprehensive plan to achieve climate neutrality, immediate reduction of greenhouse gases, and public reporting of plans and actions. A commitment can also be drafted for signature by individual members of the campus community to do their part through a climate – and environmentally – friendly lifestyle.

BUILT ENVIRONMENT

Christopher Alexander, in his book *A New Theory of Urban Design*, established a simple and strong statement that can be applied to sustainable campus development: “Every increment of construction must be made in such a way as to heal the city” (Wheeler qtd. 443). A sustainable UGA campus will be constructed to heal and connect people and ecosystem processes.

CAMPUS MASTER PLAN

As stated previously, the current master plan has guided substantial campus growth since its adoption in 1998. The current campus master plan was developed by the Office of University Architects under the leadership of Danny Sniff, along with consulting architects and planners Ayers Saint Gross. Based upon a previous 1906 campus master plan developed by landscape architect Charles Leavitt, the current plan envisions the creation of pleasant outdoor spaces linked together and framed by campus buildings. The UGA Physical Campus Master Plan incorporates infill development, primarily on surface parking lots, and moves automobiles to the campus perimeter to create a pedestrian friendly environment. High-performance buildings and landscapes are designed to protect and enhance natural resources. Regular updates can be made to the master plan itself as well as presentations to the campus community.

HISTORIC RESOURCES

Preservation of historic structures is perhaps the most sustainable action the University can undertake. Cultural resources provide a sense of place, legacy and emotional connection to UGA. Preservation and reuse of historic structures diverts construction waste from landfills and avoids resources

that would be required to construct new facilities. The University of Georgia has been systematically restoring its most culturally significant historic buildings, primarily on UGA's historic north campus. Nine historic buildings have undergone significant restoration since adoption of the campus master plan in 1998: Administration Building, Candler Hall, Chapel, Demosthenian Hall, Meigs Hall, Moore College, Old College, Phi Kappa Hall, Terrell Hall.

In addition to historic buildings, UGA is blessed with historic campus gardens and landscapes. The campus experience and education derived through formal and informal interactions outdoors in the campus landscape may be equally as important as time spent in the classroom. Primary historic landscapes on the UGA campus include North Campus and its Franklin College Quadrangle, President's Garden, Founder's Club Memorial Garden, Young Harris Terraces, Herty Field and Old Athens Cemetery, as well as the Thomas Church designed landscape and courtyard at the Georgia Center for Continuing Education. The entire main campus is also designated as the UGA Campus Arboretum to preserve and protect campus trees as well as provide educational value to the campus community.

UGA is effectively managing the campus's historic properties, particularly under the direction of Scott Messer campus historic preservation officer in the Office of University Architects and Dexter Adams, Director of the Physical Plant Division Grounds Department. To assist these individuals, a campus heritage committee could be developed to advocate for campus preservation. To inform and promote the continued restoration of historic campus resources, a Campus Historic Resources Plan could be developed and implemented that documents historic structures and landscapes and formalizes appropriate management guidelines for each.

SUSTAINABLE BUILDING DESIGN

Major new construction and renovation projects at UGA are administered by the Office of University Architects (OUA). In 1998, as part of the Campus Master Plan, Building and Site Design Guidelines were adopted. Based largely on the master plan guiding principle to extend the characteristics

of north campus, the guidelines look to successful development of the past to inform the present and future. Appropriate scale and proportion of building facades and outdoor spaces, as well as intuitive circulation indoors and out, are key factors to the campus design guidelines.

Sustainable design has been infused in recent campus construction projects, particularly the Student Learning Center, Paul D. Coverdell Center for Biomedical Research, the renovation of Old College and the new Lamar Dodd School of Art. Additionally, the Tate Student Center Expansion and College of Pharmacy Addition currently under construction incorporate sustainable design. Most of these buildings incorporate the following sustainable design strategies, some to greater extent than others: redevelopment of an existing parking lot; passive solar and daylighting design; efficient mechanical system design with energy recovery; efficient water use and rainwater harvesting; local and low volatile organic compound (voc) materials; and 100-year durability construction methods. Particularly innovative strategies include sophisticated daylighting, heat wheel energy recovery, and a 3,360 square foot extensive green roof at the Lamar Dodd School of Art. To conserve water, a 75,000 gallon cistern for rain and condensate water harvesting is being installed at the Tate Student Center Expansion.

In general, sustainable building design incorporates environmentally sustainable site design, water conservation and efficiency, optimized energy performance and atmospheric considerations, appropriate use of materials and resources, and enhanced indoor environmental quality. To verify and quantify these sustainable or green building practices, the United States Green Building Council (USGBC) developed a standardized rating system. The Leadership in Energy and Environmental Design (LEED) Rating System documents various design and construction criteria within the topics listed above and provides third party certification for successful sustainable development projects. A project that participates in the LEED certification process receives points for implementation of sustainable design strategies and can receive a standard (certified), silver, gold or platinum rating based on the extent of sustainable design incorporated.

While many universities mandate LEED certification for new campus buildings, historically UGA has opted not to follow this approach. The general rationale was that UGA constructs quality long-term structures and money spent on third-party certification could instead be spent on sustainable design strategies or programmed space within the building itself. This logic is reasonable, although several factors may cause UGA to change its stance. First of all, the cost of certification is decreasing, particularly as the availability of sustainable products and design expertise has increased. Simultaneously, UGA's own environmental design expectations have become more stringent. Secondly, LEED offers a comprehensive framework to approach building design and requires a commitment to sustainability. The comprehensive framework ensures that many aspects of sustainable design are accounted for. The commitment is critical because it ensures life-cycle accounting for a healthy, efficient building that the University will operate in perpetuity. Potential long-term savings through efficient building systems for example, are not "value engineered" out of a project to buy more program space for the user group. In this way, LEED serves the campus by supporting long-term energy and cost savings. Furthermore, LEED certification provides positive press and enhanced public relations as an accepted standard in green building. Finally, LEED has become the accepted standard for green building and certification provides enhanced public relations. UGA students, faculty and staff have continued to request LEED certification for new projects. In response, UGA is currently tracking LEED certification for both the Tate Student Center Expansion and the College of Pharmacy Addition.

As an interim action, UGA can commit to LEED Silver level certification or higher for all new construction and major renovation projects. The maximum direct cost for registration and certification of a campus building is \$17,950. (<http://www.usgbc.org/DisplayPage.aspx?CMSPageID=65#fees>). Additional costs may be incurred if a LEED consultant is hired. In addition to pursuing LEED certification, the University can develop and adopt sustainable building and site design guidelines that are specific to UGA and address water and energy efficiency, renewable energy sources, local materials, and

healthy indoor environments. Design guidelines can incorporate life cycle cost analysis and the LEED design framework, as well as define a criteria for which projects require certification.

SUSTAINABLE SITE DESIGN

Sustainable site design seeks to restore ecosystem health while meeting the needs of people. The UGA campus is an ideal environment to design sustainable and functional landscapes that provide opportunities for beauty, culture, ecology, and education. Much of the educational experience afforded by UGA takes place outdoors through formal and informal cross-disciplinary interactions. Sustainable site design provides campus grounds that inherently teach. Components of sustainable site design included in LEED Version 2.2 are: site selection and community connectivity; alternative transportation access and amenities; habitat preservation or restoration; open space and biodiversity; stormwater quantity and quality control; heat island effect; light pollution; water efficiency; and innovative wastewater treatment. (U.S. Green Building Council).

The University of Georgia has been incorporating sustainable site design for years. In general, the University has been reducing impervious paving and creating greenspace, utilizing native plants and trees, actively improving stormwater quality, using efficient irrigation strategies, and restoring habitat. Overall, UGA has removed nearly 1.5 Million square feet of paved surfaces. (Adams 2). Several significant campus greenspaces have been created over former parking lots and roadways, including Herty Field, D. W. Brooks Mall, the UGA Memorial Garden, Coverdell Memorial Garden, and the Performing & Visual Arts Complex (PVAC) Corridor. D.W. Brooks Mall, the largest greenspace project to date on campus, transformed a former vehicular spine of campus into a vegetated pedestrian corridor modeled after UGA's historic north campus quadrangle. In regard to water quality site design for the treatment of stormwater runoff, UGA constructed its first "bioswale" to filter runoff from a parking lot at the Intramural Fields in 1998. Since then, many bioretention areas or rain gardens have been constructed on campus. The largest water quality management project to date is the Lumpkin Street Drainage Improvements project, a town-gown partnership with Athens-Clarke County. Another notable water

quality management project is the PVAC Corridor Improvement which treats runoff from a 51/2 acre drainage area before its release into Lily Branch on UGA's east campus. UGA uses efficient drip irrigation to serve most landscaped areas, and is poised to reuse harvested rain and condensate water in three locations on campus. The historic Town Spring Restoration underway by PPD Grounds Department is an excellent example of cultural interpretation and ecosystem improvement.

In addition to current sustainable site design initiatives at UGA, continued effort can be made to create inspiring landscapes that require minimal use of potable water and fossil fuels. Drought conditions persist and it is likely that UGA will never have the luxury of limitless irrigation water. Continued reduction in seasonal beds and turf areas could limit resource use and time spent mowing. Continued emphasis can be placed on creating and maintaining native tree canopy on campus. Further efficiencies in irrigation can be explored including centralized controls based on soil moisture content and evapo-transpiration rates as well as sub-surface drip irrigation. Restorative stormwater management can continue to be pursued, particularly where runoff results from roadways or parking lots. Finally, restoration of floodplains and campus streams can provide ecological amenities for the campus community.

LANDSCAPE MANAGEMENT

The University of Georgia is known for its beautiful campus. The UGA Grounds Department effectively manages the campus landscape to “contribute to an ethic of environmental stewardship and campus sustainability at The University of Georgia” (<http://gogreen.uga.edu/groundsdept.html>). On-going sustainable landscape management initiatives listed on the Grounds Department website include:

- Using native plants that require less irrigation and chemical application where appropriate.
- Conducting an inventory of the campus arboretum using Global Positioning Systems (GPS) and Geographic Information Systems (GIS) in order to manage UGA's tree canopy utilizing a whole system approach.

- Minimizing pesticide and fertilizer dependence through targeted applications and integrated pest management practices.
- Utilizing drip irrigation systems in campus landscape beds to reduce water consumption and voluntarily restrict water use during times of drought.
- Implementing and seeking opportunities to use stormwater best management practices by designing, constructing, and maintaining bioretention cells, pervious surface treatments and greenroof applications.
- Collaborating with the Department of Biological and Agricultural Engineering to operate the Bioconversion Facility to recycle plant wastes, animal bedding and other agricultural by-products.
- Reusing compost generated at the Bioconversion Facility to amend soils and mulch beds in campus landscape projects.
- Setting goals for long-term planning and future program development to integrate the principles of sustainable stewardship in our activities and services.

<http://gogreen.uga.edu/groundsdept.html>

UGA effectively manages the campus landscape. In light of persistent drought, it is prudent to develop an action plan for irrigation on campus. Enhanced Integrated Pest Management and minimized pesticide application may also be achieved through increased academic partnerships on campus.

CONSTRUCTION SITE MANAGEMENT

UGA has recently increased expectations regarding sustainable construction site management. The UGA Grounds Department developed a tree protection plan for construction sites. Erosion and sediment controls mandated by the county are strengthened through phase II of the National Pollution Discharge Elimination System (NPDES). In addition, construction waste and debris recycling is being mandated to divert a minimum of 50% of wastes from the ACC landfill, meeting the minimum LEED

requirement. This system was implemented recently on the College of Pharmacy Addition project to meet requirements for LEED certification. The Tate Student Center Expansion project is also participating. Asphalt, concrete and stone are crushed and reused in sitework applications. Gypsum wallboard, wood wastes and landscape debris are ground and composted at the UGA Bioconversion Center. Contractor-generated waste is recycled.

The recent construction waste recycling program diverts significant waste from the landfill and provides a useful product. The University can clarify and formalize the program for use in all construction efforts on campus.

TRANSPORTATION

Availability of mass transit on the UGA campus reduces the total number of vehicles on campus and county roadways, thus reducing overall carbon emission, improving air quality and reducing traffic congestion. According to Ron Hamlin of Campus Transit, UGA boasts the largest campus transit system in the country and the second largest ridership in the state of Georgia, second only to MARTA in metro Atlanta. In 2007, the UGA campus transit system efficiently transported over 9 Million riders. In addition, UGA Parking Services is the largest client and contributor to The Bus, the Athens-Clarke County mass transit, enabling anyone from the University community to ride the city's buses at no direct charge to the individual. (<http://www.transit.uga.edu/>). The campus transit system receives a portion of student fees, but actual usage is free to everyone on campus. With 37 buses on daily routes, Campus Transit provides a convenient transportation option.

In addition to moving many passengers in one vehicle as opposed to several individual autos (an avoidance of up to 9 Million car trips in 2007), campus buses are often fueled with twenty percent biodiesel to reduce fossil fuels consumption. UGA Campus Transit has also submitted grant proposals for hybrid engines to replace existing engines in several campus buses. While the proposals have been unsuccessful, the effort displays leadership. Unfortunately due to the current spike in fuel costs, UGA buses are back to using the conventional fuel source to avoid the additional 10% premium for biodiesel.

However, the six new buses purchased by Campus Transit last year continue to meet 2007 emissions standards and trap 90% more particulate matter than even the 2006 models.

In regard to other forms of alternative transportation, UGA Parking Services implemented the Alternative Transportation Program (ATP) in 2005 to encourage students, faculty and staff to walk, bike or carpool to campus. The intent behind the ATP was to provide incentives to those willing to walk, bike or bus to campus on a regular basis. The program offered twelve free parking passes per semester to any of the parking decks on campus to individuals that do not purchase a personal parking pass. Other incentives to leaving the car at home included convenient bicycle parking at most buildings on campus and avoidance of rising parking fees. Unfortunately, according to UGA Parking Services the Alternative Transportation Program was very susceptible to abuse by dishonest participants who registered for the program essentially to scam free parking for the first three weeks of the semester and then seek alternative parking options to continue driving to campus. In 2008, the ATP was updated to include the Extreme Green Program which targets individuals who are committed to alternative transportation and leading a more sustainable lifestyle, dubbed by the program as Super Low individual Carbon Emitter (SLiCE) commuters. Participants in the program are granted parking permits as needed for special conditions, as opposed to the previous 1-2 per month (<http://www.parking.uga.edu/ExtremeGreen.aspx>). In addition, the Office of University Architects, along with members of the Physical Plant Division and Parking Services, developed updated recommendations to enhance ease and safety of bicycle use on campus.

UGA Parking Services provides on-campus parking options for students, faculty and staff. Approximately 21,000 permits are sold annually for the approximately 18,000 parking spaces on campus. A parking system of specified lots by permit reduces traffic circulation on campus. In June 2008, vehicular circulation within the North Campus Parking Deck was reversed to improve traffic flow. According to Don Walter at Parking Services, the changes reduced average exiting times from 13 minutes to 3 minutes. The 10-minute reduction in idling results in a savings of 30 gallons per year for each individual vehicle. Annually, this amounts to a reduction of 700,000 pounds of carbon emissions.

While UGA has enacted positive steps to promote transportation alternatives on campus and improve air quality, there is room for improvement. The University can continue to pursue hybrid electric technologies for campus transit and service vehicles to diminish the effect of rising fuel costs. The University can also expand strategic partnerships to enhance bike circulation and facilities in town and on campus, including a potential bike-sharing program. Partnership with Athens-Clarke County to enhance Greenway connections to and through campus could result in a significant reduction of cars on campus. Strongly encouraging freshmen not to bring a car to the campus, especially in concert with a robust alternative transportation program, would support transportation demand management. Car sharing programs could potentially meet demand for limited personal vehicle use. Finally, it is also in the University's long-term best interest to support the implementation of commuter rail to, from, and within the UGA campus. The existing rail line extends along the entire eastern edge of campus and S. Milledge Properties as well as connecting to urban centers off-campus. Use of commuter rail could reduce daily traffic congestion and parking demand through reducing the number of vehicles on campus. In addition, commuter rail could effectively serve UGA football game days and other events on campus. The mindset within UGA administration and the campus community should become less focused on personal vehicle use and more upon alternative transportation solutions.

CAMPUS OPERATIONS

FOOD SERVICE

UGA has an award-winning Food Services department within its Auxiliary Services branch of Finance and Administration. The University community has access to a variety of food offerings at four primary dining halls and numerous other dining locations across campus. Each campus precinct contains at least one dining facility, ranging from full-scale dining hall operations to smaller "grab & go" facilities designed to afford quick, convenient service for patrons on the go. Each dining hall facility offers a variety of food options, and each has its own unique personality or menu options to emphasize a variety of dining options.

In addition to UGA Food Service operations, there are two other primary food providers. The Georgia Center for Continuing Education, an independently operated conference and hotel facility located on the UGA campus, offers several food service options. Most notably, the Savannah Room provides upscale dining to the University community and the general public. The second general type of non-UGA food service offered on the University of Georgia is outside vendors. These vendors range from portable kiosks to local and corporate food chain establishments. Many privately owned restaurants exist slightly off-campus in the city of Athens.

In regard to sustainability, the presence of several conveniently located campus eateries promotes a walkable campus environment. In terms of campus planning and development, the creation of viable live-work-learn communities reduces the need for automobiles, promotes a healthier lifestyle, and preserves natural environment. In light of current drought conditions in the southeast US, UGA campus dining operations have decreased water usage through operational changes. Food Services also promotes sustainability through a reduction in paper products and packaging waste; reuse of permanent dishes, glassware and flatware in dining halls; donation and reuse of food through participation in Full Plate, a local charitable food distribution organization to which UGA is the largest contributor; and provision of recycling opportunities for employees and customers.

<http://www.uga.edu/foodservice/aboutdining/sustainability.html>).

A pilot sustainable foods program is underway at the Savannah Room restaurant at the Georgia Center. Local organic foods, produced through a partnership with the UGA College of Agricultural and Environmental Science, are served as part of the Sustainable Fridays initiative in Georgia Center dining. Menus change weekly based on availability and harvest. According to Savannah Room staff, the response has been very favorable. Hopefully lessons learned in this program can be extended to the rest of campus dining operations. According to UGA Food Services, availability and quantity of local, sustainable foods may prove to be a challenge.

In addition to the provision of local organic foods in campus eateries, the use of biodegradable carry out packaging and composting of food and material wastes can improve campus sustainability in the area of food services. These preferences can be incorporated into environmentally preferred purchasing standards. On-campus sustainable foods production could also be considered as a partnership between Food Services, PPD Grounds Department and the College of Agricultural and Environmental Sciences. In addition, education regarding food production practices can be made available to diners in campus eateries.

PURCHASING

According to Chad Cox at the Procurement Office, UGA does not currently have an inclusive sustainable purchasing policy. Many items are on state contract, resulting in a cost savings to the University but with less control by the institution. The State of Georgia Recycled Product Purchasing program includes use of recycled paper products (up to 30%), use of retreaded tires on state vehicles, and use of compost and mulch on public lands. In addition, energy and resource efficient items can be purchased upon departmental request. The Physical Plant Services Department has begun to investigate options on their own for routine purchases such as paper and walk-off mats. Based on their research, it is possible for UGA to “piggy-back” on other University System of Georgia (USG) schools such as Georgia Tech or Valdosta State who are purchasing recycled content paper, for example. Careful investigation is required however to ensure that another institutions standards meet UGA’s needs and to avoid hidden costs such as increased shipping charges. According to UGA Procurement, the University can adopt its own environmentally preferred purchasing standards with adequate justification.

To improve campus sustainability through purchasing, UGA can develop its own environmental purchasing standard to include third-party verification by Energy Star, Green Seal, fair trade, and certified organic foods. Leveraging of UGA’s buying power could help achieve sustainable products at affordable pricing, reinforce a market for responsibly produced and resource-efficient products, and extend the benefits of sustainability throughout the supply chain.

RECYCLING AND WASTE MANAGEMENT

Amount of Waste generated by UGA in 2007: 8,258.07 Tons

Amount of Waste Recycled by UGA in 2007: 2,293.14 Tons (28%)

Dumpsters on campus: approximately 186

Trashcans in campus landscape: approximately 466

of Regional Recycling Stations on Campus: 11

of Retrofit Recycling Cans in campus landscape: 9

Recycling Figures for 2007 (provided by PPD Services Department)

Comingled bottles and cans: 66.01 tons

Mixed paper: 56.71 tons

Cardboard: 230.11 tons

Office paper: 794.83 tons.

Tires: 6.07 tons

Oil: 500 gallons

Antifreeze: 715 gallons

Leaf and limb debris and animal bedding: 1,140 tons

Inkjet/toner cartridges: UGA refurbishes approximately 1,800 toner cartridges

Automotive batteries: 184

Fuel filters: 15 fifty-five gallon drums full

Scrap metal: 170.18 tons

Pallets: 7.74 tons

Cooking oil: 6.72 tons

The University of Georgia generates approximately 650 tons of waste per month, 65 percent of which is made of paper. According to the Georgia Department of Community Affairs, a typical Georgia resident produces 7.52 pounds of trash per day. (Dawg Gone It, Recycle). The Athens-Clarke County

landfill is anticipated to exceed capacity in the next five years. The old adage “reduce, reuse, recycle” still rings true and should be a motto for campus waste management.

According to information provided by Andrew Lentini, UGA’s new recycling coordinator, 28% of the University’s waste was recycled in 2007. There are many benefits to minimizing waste generated on campus and developing a robust waste reduction and recycling program. Main Campus is currently served by numerous dumpsters, all of which require frequent and expensive trips to the landfill. The Services Department is actively pursuing transition to regional trash compactors that can reduce costs and greenhouse gas emissions associated with campus trash disposal. The University of Georgia has also made progress to enhance the campus recycling program. Previous complaints regarding too few and inconvenient recycling receptacles are being addressed. Many buildings now have interior recycling containers. Outdoors, there are currently eleven large container recycling stations dispersed throughout campus. In addition, the Physical Plant Division Services Department has begun converting outdoor campus trashcans to more convenient recycling receptacles. In the spring of 2008, the University of Georgia entered Recycle Mania, a competition among Universities to encourage waste reduction through increased recycling efforts. This contest provided an opportunity for students and staff to combine and focus their efforts on a common recycling goal. UGA placed third in the Gorilla Prize section of the partial campus division. (<http://www.recyclemaniacs.org/results.aspx>). Success in the contest illuminates the fact that the University community is willing and able to recycle.

These recycle efforts are paying off monetarily as well as improving the campus environment, according to Mr. Lentini. The current office paper program nets a profit which helps sustain the Georgia Building Authority’s recycling program. In exchange, the University is provided with recycling garbage trucks, saving approximately \$50,000 in vehicle leases each year. Since 2001, UGA’s overall recycling program, including paper, cardboard, bottles & cans and glass has produced a substantial cost avoidance of \$196,645.46 in landfill tipping fees (\$34 per ton).

Another form of recycling is the composting of organic wastes. The University of Georgia Bioconversion Center is a composting facility that provides practical and academic benefit to campus. Landscape debris is collected and transported to this facility where it is stored, ground, mixed and turned in windrows. The end result is rich composted mulch and soil that is reapplied to the campus landscape. This facility is also currently being used to compost construction materials from campus building projects including the College of Pharmacy Addition.

It is imperative that the University continue on the path of recycling and composting. Currently, recycling on UGA's campus effectively diverts approximately 28 percent of waste from the Athens-Clarke County landfill. This is positive, but UGA, the largest contributor of solid waste to the county landfill, must do better. Recycling must become more convenient and accessible to all members of the University community. Under current conditions on campus, it is much easier to find a trash receptacle than it is to find a recycling container. A fundamental shift needs to occur: 1) reduce the waste generated by UGA, 2) design systems and select product for reuse, 3) establish recycling facilities as the most convenient option for wastes.

GREEN CLEANING

of Green Cleaned buildings: 13

of green clean products used in a building: Approximately 3

of conventional cleaning products used in buildings: Approximately 16 (138 total previously used)

In 2006, upon the renovation and bicentennial of UGA's Old College building, the University's Physical Plant Division initiated the first certified green cleaning program in a building on campus. The program introduced three non-toxic cleaning chemicals that replaced the previous fourteen unhealthy chemicals, improved ventilation in programmed spaces including restrooms and storage areas, and established a new cleaning and communications protocol for janitorial staff and building occupants. The program, designed by John Chittom, president of Athens Janitor Supply, provides a healthier interior for building occupants, healthier working conditions for the custodians, and a cheaper bottom-line as the

green cleaning chemicals are both concentrated and bought in bulk at a significantly lower cost. Furthermore, anecdotal evidence suggests that the program is saving money through enhanced productivity and decreased sickness reported among cleaning staff.

The following benefits are listed on the UGA Physical Plant website as justification for implementing green cleaning standards in UGA buildings:

1. Enhance public relations by using environmentally sound chemical agents
2. Improve environmental hygiene by preventing cross contamination of microbes into sensitive areas
3. Improve indoor air quality (IAQ) by reducing chemical and particulate exposure
4. Decrease the number of cleaning agents (UGA specifically will decrease the campus wide number of cleaning agents from 325 various chemical products to 3 per building!)
5. Decrease cleaning expenditures - Cost analysis per building shows a 20% savings per building (Old College spent only \$200 on cleaning agents in fiscal year 2006!)
6. Centralized buying (Centralized buying from UGA's Physical Plant Warehouse will increase savings from vendors, which we can in turn pass along to UGA departments!)
7. Reduced chemical hazard exposure for Building Service employees
8. Update and simplify *Right to Know* program requirements

<http://www.gogreen.uga.edu/greencleaning.html>

As of Earth Day 2008, UGA Physical Plant Division Services Department reported that the first two phases of the green cleaning program is complete. Sixteen campus buildings, in what is being referred to

as the North Campus Green Corridor, are now using green cleaning supplies and methods: Old College (2006), Administration Building (August 2007), Terrell Hall (September 2007), and recently established green clean programs in Phi Kappa Hall, Candler Hall, Moore College, Meigs Hall, Gilbert Hall, Denmark Hall, Caldwell Hall, Lustrat House, Holmes/Hunter Academic Building, Demosthenian Hall, New College, Chapel, and the School of Law building.

The green cleaning program that began in UGA's Old College building was a successful pilot project. The response from all involved has been overwhelmingly positive, and interest in the program is evident through requests to expand the program to other buildings on campus and beyond. Therefore it is hard to understand why the program has not been expanded more quickly across campus. The rationale given for a slow expansion of green cleaning included the need to use up existing conventional cleaning products stored in UGA Physical Plant Division warehouses. This argument is sensible, but it was communicated to me that the current ordering system continues to replace the old chemicals when they are used up. An administrative decision should be made to discontinue ordering all cleaning products that are toxic or unsafe for humans and the environment, and a commitment made to systematically advance the green cleaning program across UGA's main campus as well as all satellite campuses and research stations.

In addition, Cleaning Industry Management Standard (CIMS) certification can be considered as a means to verify and enhance healthy indoor environments and to provide skilled training and credentials for UGA's janitorial staff. In addition to the reasons listed above, this certification could enhance UGA's role as a leader in campus sustainability, as currently the only other CIMS certified school in the US currently is the University of Michigan. (http://www.issa.com/?id=certified_organizations)

PRINTING

During an interview and tour of UGA's Central Duplicating Services, I found that they use 30% recycled-content paper and non-toxic toner in reusable containers. Apparently the department attempted to use 100% recycled paper in a pilot program several years ago, but encountered problems with the paper

crumbling and jamming in the printers. In addition to the reusable toner cartridges, used digital copier parts are also sent back to the manufacturer for reuse. All paper waste is recycled. Beyond standard operations, the staff is doing their part by limiting use of Styrofoam and using recyclable tableware for office parties.

The University Printing department provides full-service printing from concept to completion. According to University Printing, recycled-content paper is used in some publications. There is not a standard recycled-content paper used as clients have options to achieve various printing objectives. Similarly, some soy-based inks are used. If desired, recycled content paper and soy-based ink are provided.

To promote sustainability efforts both on and off-campus, UGA could promote the use of the highest functioning recycled-content paper and non-toxic soy-based inks on all publications. Every publication sent out by the University provides an opportunity to display the University's commitment to environmental responsibility. A simple graphic signifying that recycled-content paper and soy-based inks were used – and that the publication can be recycled - can leave the subtle impression that UGA is doing its part to care for the environment and encourage others to do the same. In addition, the University could connect campus tree planting initiatives to the amount of paper used in University publications. A plan can be developed to restore the tree canopy and oxygen production represented by paper used on campus. Finally, joint venture research and development opportunities may exist between the University and printer, paper and ink manufacturers to achieve economically advanced sustainable printing practices.

CHAPTER FIVE

SUSTAINABILITY AND OUR PEERS

UGA is not lacking for role models in regard to campus sustainability. There are several good examples of sustainability programs and initiatives at institutions to which UGA already compares itself. During the 2008 Spring semester, Dr. Lynn Sallot's public relations class researched campus sustainability. The class included an in-depth investigation of sustainability initiatives at twenty-five of UGA's published peer and aspirational institutions as well as regional and other applicable schools. (<http://www.uga.edu/~irp/comps/ugapeers.html>). Institutions were selected based upon the following criteria: inclusion on UGA's documented peer and aspirational lists; local or regional comparison; generally positive reputation for campus sustainability. A list of the schools studied is included on the following page. (Note: not all of UGA's peer, aspirational, or regional schools were included in this study). The structure for the research was a protocol developed by the Academy of the Environment for application to each institution (Sallot). The students' findings provide the basis for this assessment of sustainability at other campuses, with minor corrections made regarding initiatives attributed to UGA. I have evaluated and compared the students' data categorically. Within each area, general comparisons are made between UGA and the other schools studied. A list of particularly innovative or noteworthy institutional efforts within each area is also included.

UGA Peer Institutions

Arizona State University
University of California Davis
University of Colorado
North Carolina State University
University of Maryland College Park
University of Oregon
Texas A&M

UGA Aspirational Institutions

Duke University
Northwestern University
University of California Berkeley
University of Michigan
University of Minnesota
University of North Carolina Chapel Hill
University of Texas Austin
University of Virginia
University of Washington
University of Wisconsin Madison

SEC and other institutions

Auburn University
Emory University
Georgia Tech
Harvard University
Pennsylvania State University
University of Florida
University of Georgia
University of New Hampshire
University of Tennessee

SUSTAINABILITY CULTURE AND

ADMINISTRATION

Twenty-one of the twenty-six schools researched have an office of sustainability. Twenty-two institutions have a formally recognized environmental advisory committee. Twenty of the schools have a written environmental policy. Seventeen institutions signed the ACU Presidents’ Climate Commitment. Eleven institutions have completed a climate action plan. The University of Georgia has not implemented any of the above initiatives, but is among the ten institutions that signed the Talloires Declaration.

Regarding funding for campus sustainability initiatives, three schools have a sustainable initiatives enterprise fund. Sixteen schools have funded grants or endowments for campus sustainability, and twelve schools have energy funds. Six schools require their students to

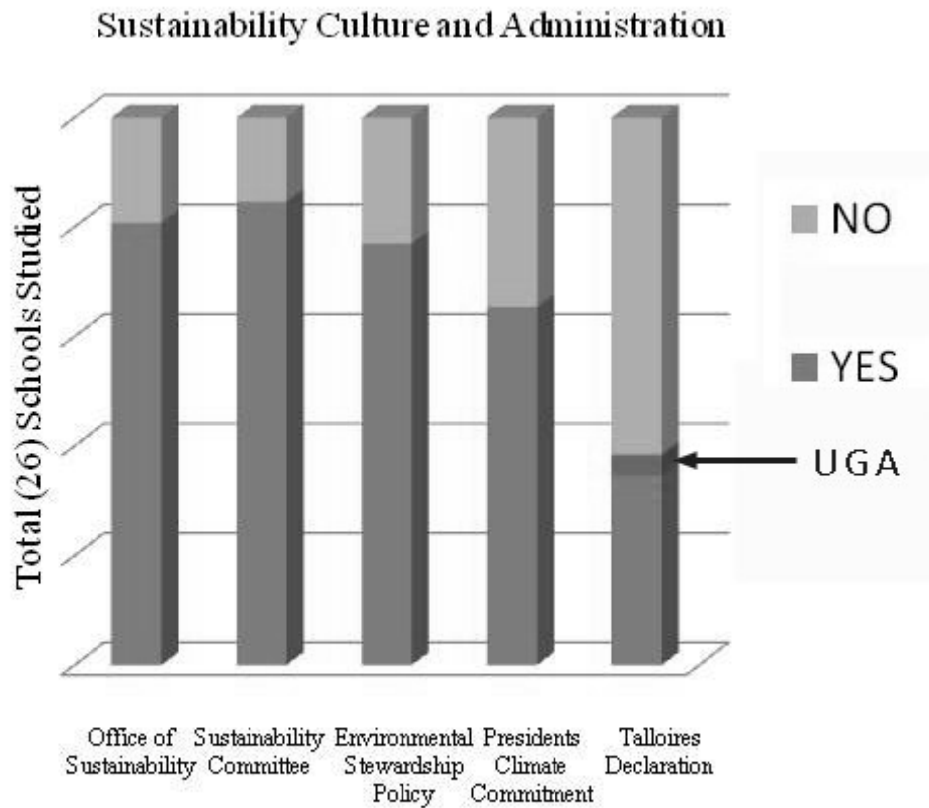
pay fees directed toward campus sustainability projects. UGA has no dedicated campus sustainability funding. (Sallot).

AMERICAN COLLEGE & UNIVERSITY PRESIDENTS CLIMATE COMMITMENT

Seventeen of the institutions researched have signed the American College and University Presidents Climate Commitment, which mandates development of a plan for carbon neutrality and greenhouse gas reduction as well as publicized implementation progress and results. To this end, Arizona State University developed a Carbon Neutral Strategic Plan that focuses on improved campus practices in regard to energy, water, buildings and grounds, food services, transportation, waste and recycling,

purchasing and policy. Similarly, the University of North Carolina is engaged in an innovative town-gown partnership for Community Carbon Reduction, which includes a targeted 60% reduction in green house gases (GHG) by 2050.

It should be noted that literal implementation of the ACU Presidents Climate Commitment would satisfy many of the environmental sustainability issues discussed in this thesis. Signing the Commitment would be largely synonymous with implementation of an environmental sustainability or climate action plan. (<http://www.presidentsclimatecommitment.org/html/commitment.php>).



Note: UGA has signed the Talloires Declaration, but has not implemented the other four categories listed.

(Data derived from Sallot, Institutional Research Report 2008)

Campus Sustainability – Reference Institutions per Category

Culture & Administration

Sustainability Category: Culture & Administration	Reference Institutions
Office of Sustainability	University of Colorado at Boulder University of Florida
Sustainability Committee	University of Washington
Sustainability Policy	University of North Carolina at Chapel Hill
Overall Commitment	Emory University University of New Hampshire Arizona State University Duke University University of California System University of Colorado University of Florida University of Michigan University of North Carolina University of Oregon University of Washington

OTHER NOTABLE CULTURE AND ADMINISTRATION PROGRAMS AND INITIATIVES

Campus Sustainability Committee

- The University of Washington is identified as a national leader in campus sustainability. The UW Environmental Stewardship Advisory Committee provides an annual Campus Sustainability Report and advises the school’s Provost and Executive Vice President.

Office of Sustainability

- The University of Colorado at Boulder instituted the first campus Environmental Center in 1970. The Environmental Center is student-directed with seven full-time staff, overseen by the

Environmental Board composed of (7) students, (2) community members and unlimited ex officio members. The Center focuses on improving campus sustainability.

- The University of Florida Office of Sustainability was established in February 2006 with the hiring of its first Director. The UF President created and funded the Office following Campus Sustainability Task Force, Ad Hoc Sustainability Committee, and Student Senate Resolution recommendations. Office staff includes a Director, Outreach Coordinator, and multiple student interns. The mission is to make UF a model of sustainability by integrating ecological restoration, economic development and social equity.

(<http://www.sustainable.ufl.edu/mission.html>).

Sustainability Policy

- The University of North Carolina Chapel Hill Sustainability Policy states that “University policies, practices, and curricula should, when possible, embody approaches that reduce life cycle costs, restore or maintain the functioning of natural systems, and enhance human well-being.” Strategies include continual improvement in all aspects of campus development and operations.

(<http://sustainability.unc.edu/Portals/0/Documents/Sustainability%20Policy.pdf>).

Overall Commitment

- Emory University administration identified sustainability as fundamental principle guiding the university, with 2007 priorities being energy, food, recycling and curriculum.
- The University of New Hampshire campus has been designated as a “Sustainable Learning Community” that “unites a spirit of discovery with the challenge of sustainability across its Curriculum, Operations, Research and Engagement (CORE).”

(<http://www.sustainableunh.unh.edu/>).

- In addition, the following peer and aspirational schools received an A Grade from the College Sustainability Report Card: Arizona State University, Duke University, University of California,

University of Colorado, University of Florida, University of Michigan, University of North Carolina, University of Oregon, and University of Washington.

EDUCATION AND OUTREACH

Only two of the researched schools, including UGA, have undergraduate environmental literacy requirements. UGA is also included in the twenty-four schools that have sustainability awareness campaigns, the twenty-five schools that have a sustainability website and the twenty-six schools that have sustainability-themed special events. Additionally, UGA and nine other schools have physical campus sustainability demonstration areas. (Sallot).

Campus Sustainability – Reference Institutions per Category

Education & Outreach

Sustainability Category: Education & Outreach	Reference Institutions
Academic Curriculum	Arizona State University Emory University
Sustainable Living Guide / Pledge	University of Florida University of Colorado
Campus Sustainability Tour	University of Oregon
Overall Education	University of New Hampshire

NOTABLE EDUCATION AND OUTREACH PROGRAMS AND INITIATIVES

Academic Curriculum

- Arizona State University established a School of Sustainability with undergraduate, graduate and PhD degree programs.
- Emory University continues to expand the “Piedmont Project”, an exemplary environmental curriculum.

Practical Sustainable Living Guide / Sustainability Pledge

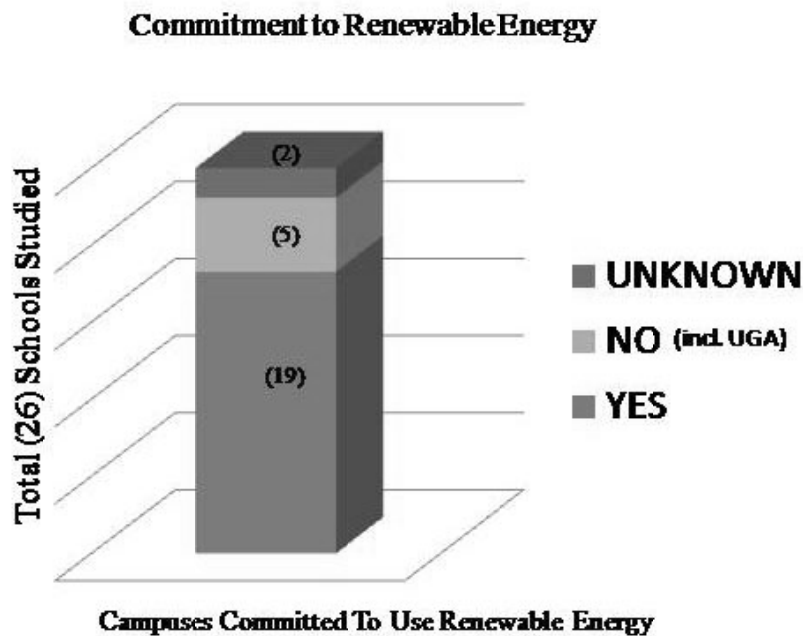
- The University of Florida Office of Sustainability circulates “Think Green: A Gator’s Guide to Sustainable Living,” which includes practical tips, a “Green Graduation Pledge”, and a map of sustainability initiatives on campus.
- The optional UC Boulder “Live Green Pledge” encourages individuals to “live green by informing and educating myself on decisions I make that impact others and the environment... to increase my understanding of environmental consequences of my behavior and seek sustainable options to create a better world” (Sallot).

Campus Sustainability Tour

- The University of Oregon developed a self-guided Sustainability Initiatives Tour on campus.

Overall Education

- The University of New Hampshire identifies sustainability education as a primary concern. Implementation of several student-oriented educational campaigns, including the Student Energy Waste Watch Challenge and Power Down!, resulted in significant energy savings.



Note: UGA is not currently committed to the use of renewable energy.

(Data derived from Sallot, Institutional Research Report 2008)

ENERGY RESOURCES

UGA is a minority in relation to the seventeen other schools that have committed to use alternative energies, primarily through signing the American College and University Presidents Climate Commitment. (Sallot).

Campus Sustainability – Reference Institutions per Category

Energy Resources

Sustainability Category: Energy Resources	Reference Institutions
Campus Commitment	University of Wisconsin
Campus Funding	University of Colorado
Individual Commitment	Duke University
Energy Reduction	Emory University Harvard University
Co-Generation	University of North Carolina at Chapel Hill

NOTABLE RENEWABLE ENERGY PROGRAMS AND INITIATIVES

Campus Commitment

- The University of Wisconsin, along with all Wisconsin state institutions, has committed to meeting 25% of electricity and transportation fuels through renewable sources by 2025.

http://www.wisgov.state.wi.us/journal_media_detail.asp?prid=2126&locid=19.

Campus Funding

- UC Boulder has developed a Sustainable Energy Initiative that includes energy commitments and targets. Funding commitments include \$50,000 annually for the purchase of wind power; \$250,000 for energy reduction, particularly electricity; and \$250,000 for greenhouse gas (GHG) reduction. In addition, a commitment is made to meet 10% of campus energy demands through renewable sources.

Individual Commitment

- Duke University instituted the Duke Green Power Challenge to encourage individual responsibility for environmental impacts. Those who sign the Challenge commit to purchasing green power.

Energy Reduction

- Emory University committed to a 25% per square foot reduction in energy use by 2015. Some of the already successful means to this end include providing individual energy bills to each school and energy competitions among buildings to encourage conservation. In addition, individual behavior is targeted through encouragement for all members of the campus community to turn off lights, take stairs instead of an elevator, and ride mass transit.
- Harvard University committed to a \$100,000 annual investment in renewable energy. Building energy use has been reduced by 30% through LEED certification. 10-15% energy reduction is attributed to student-focused and residence hall energy education.

Co-Generation

- The University of Texas Austin achieves 80% efficiency through on-campus co-generation of steam and electricity.

- The University of North Carolina reports twice the efficiency of a standard coal plant through co-generation. Although UNC is still using coal, they have committed to purchasing no coal produced from mountain top removal and recycling flyash for structural fill and sewage treatment.

Campus Sustainability – Reference Institutions per Category

Land, Water & Built Environment

Sustainability Category: Land, Water & Built Environment	Reference Institutions
Land Resources	University of Colorado Duke University
Water Resources	Duke University North Carolina State University University of Maryland University of North Carolina
Historic Resources	Duke University University of Colorado University of North Carolina
Building Design	Emory University Duke University Texas A&M Georgia Institute of Technology
Site Design & Management	Arizona State University University of Florida University of Maryland University of New Hampshire University of North Carolina University of Oregon University of Virginia University of Washington

LAND RESOURCES

UGA is one of 22 institutions that engage in land conservation planning; however, it does not have a land stewardship plan. (Sallot).

NOTABLE LAND RESOURCES PROGRAMS AND INITIATIVES

- UC Boulder implements the Colorado Open Lands land conservation program.
- The Duke University master plan includes campus Conservation Zones that include forested, fragile ecological, and riparian areas, as well as historic gardens and campus quadrangles. Duke also developed the Southern Center for Sustainable Forests, in partnership with NC State, which has certified 55,000 acres of forest land in North Carolina including the on-campus Duke Forest.

WATER RESOURCES

Many schools researched have a storm water master plan, and 20 of them, including UGA, have a water management plan. (Sallot). Particular details regarding other domestic water use at other institutions are not included in this report because it is well-covered in the UGA Every Drop Counts Report of the Ad-Hoc Task Force on Water Resources.

NOTABLE STORMWATER RESOURCES PROGRAMS AND INITIATIVES

- The Duke University Stormwater Master Plan includes a 14-acre restoration site providing water quality management for over 1200 acres of campus and community land.
- The University of Maryland campus includes a demonstration area for low impact development.
- North Carolina State University has implemented two significant urban stream restoration projects of Rocky Branch and North Creek.
- The University of North Carolina Stormwater Master Plan includes an ambitious goal of no increased volume, rate or pollutant load of stormwater leaving campus. The campus also has plans for a water reclamation system for non-potable campus water use. Water released from a

wastewater treatment plant could provide UNC with 750,000 per day, or 10% of the total campus water demand, initially and up to 3 million gallons per day long-term.

BUILT ENVIRONMENT

UGA joins 21 other schools with campus master plans. UGA is a minority in relation to the 17 other schools with a commitment to use alternative energies. Twenty schools, not including UGA, have LEED certified buildings. (Sallot).

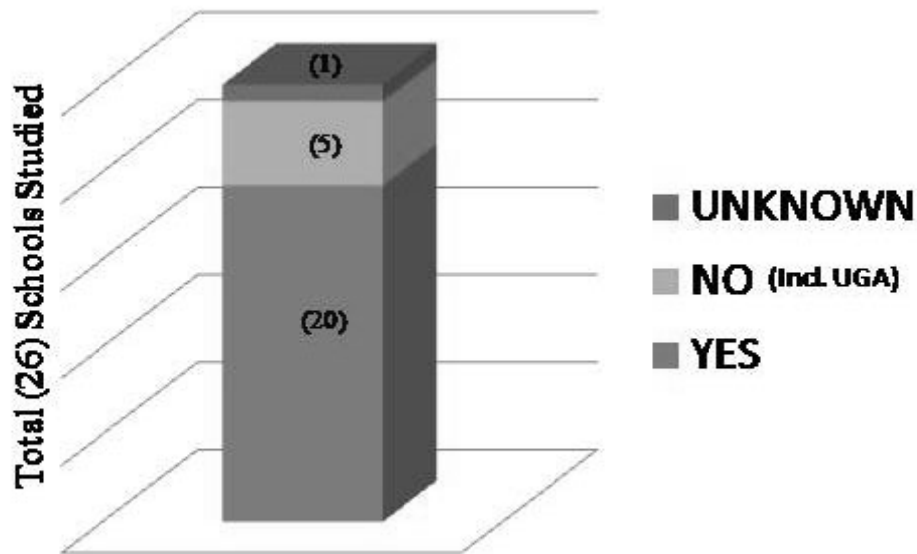
NOTABLE HISTORIC RESOURCES PROGRAMS AND INITIATIVES

- The University of Colorado Boulder established a Historic Resources Advisory Committee to assist their campus planning department.
- The University of North Carolina has a Chancellor's Task Force on Heritage Landscapes.
- Duke University completed a LEED certified renovation of historic Kilgo Quad Dormitory, originally constructed in 1931. (<http://map.duke.edu/building.php?bid=7713>).

NOTABLE SUSTAINABLE BUILDING PROGRAMS AND INITIATIVES

- Emory University Sustainable Design Guidelines require a minimum of LEED Silver certification, as well as published sustainability goals during the planning phase of each project. The campus has over 837,000 square feet of LEED certified space with thirteen additional buildings awaiting certification.
- Duke University mandates LEED certification of new buildings, stating that “every reasonable effort will be made to achieve LEED Silver or higher ratings,” and Life Cycle Cost Analysis of building design elements (Sallot).
- Texas A & M mandates LEED Silver certification with 30% energy reduction and 50% reduction of cold water use.
- The Georgia Institute of Technology incorporates “Yellow Book” design guidelines which require LEED registration for all projects with the option to pursue certification.

LEED Certified Buildings



Schools with at least (1) LEED Certified Building On Campus

Note: UGA does not currently have any LEED Certified Buildings on campus.

(Data derived from Sallot, Institutional Research Report 2008)

NOTABLE SUSTAINABLE SITE PROGRAMS AND INITIATIVES

- The University of Virginia and University of Washington adopted sustainable building and site design guidelines.
- Arizona State University implemented a Campus- Grown Food Program, administered by the Campus Grounds Department.

NOTABLE LANDSCAPE MANAGEMENT PROGRAMS AND INITIATIVES

- The University of New Hampshire is implementing a Sustainable Landscaping Master Plan to foster sustainable landscape design and management including habitat creation and biodiversity, minimal lawn areas, reduced fertilization and irrigation, and no use of pesticides.

http://www.sustainableunh.unh.edu/biodiv_ed/sust_landscape/characteristics.html.

- The University of Oregon incorporates Integrated Pest Management and uses the Rainbird Maxicon Irrigation Program based on evapo-transpiration (ET) rates to reduce irrigation water use by 30-70% .
- The University of Maryland utilizes Integrated Pest Management with limited chemical pesticide applications and the use of organic products, including horticultural oil for weed control.
- The University of Florida uses reclaimed water for 90% of campus irrigation needs.
- The University of North Carolina is implementing an ambitious stormwater plan and held a Stormwater Landscape Competition among landscape crews to design and install plans to beautify and increase infiltration.

TRANSPORTATION

All schools researched have an alternative transportation program, most of which include carpool and alternative fueled buses. Many schools offer a Care Share program. Eighteen schools are implementing a bike master plan, several of which include bike loan, rental, or repair programs. (Sallot).

Campus Sustainability – Reference Institutions per Category

Transportation

Sustainability Category: Transportation	Reference Institutions
Bike Loan & Alternative Commuting	University of Wisconsin University of New Hampshire Duke University
Car Sharing	Arizona State University University of Florida University of North Carolina

NOTABLE TRANSPORTATION PROGRAMS AND INITIATIVES

Bike Loan Program and Overall Alternative Commuting

- The University of Wisconsin reports that 50% of faculty and staff and 90% of students commute to campus through alternative modes of transportation.
- University of New Hampshire transportation demand management includes the Cat Cycles bike loan program in which those on campus can check out a bike with lock, fenders and cargo basket.
- Duke University's Duke Bikes program offers twelve free parking passes per year and a bike loan program in which students, faculty and staff can check out a bike just like they check out a library book.

Car Sharing Program

- The University of Florida has a Flex Car program with eight low-emission vehicles, three of which are hybrid Toyota Prius. The program is available to all in the UF community and costs \$5.50 per hour or \$55.00 per day. In addition, carpooling is coordinated online through UF Green Ride.
- Arizona State University offers a ride share program with four Zip Cars available to all members of the university community, as well as on-campus bike rental and repair.
- The University of North Carolina reports increasing interest in their four Zip Cars, available at \$5.00 per hour, as approximately ten new members sign up for the program monthly.

CAMPUS OPERATIONS

Nearly all schools engage in waste reduction or recycling, have sustainability-focused food service programs including local foods and waste composting, green cleaning programs, and adhere to landscape management guidelines. Nineteen schools, not including UGA, use green or sustainability focused purchasing standards. (Sallot).

Campus Sustainability – Reference Institutions per Category

Operations

Sustainability Category: Operations	Reference Institutions
Waste Reduction & Recycling	Duke University Emory University Northwestern University University of Florida University of Michigan University of North Carolina University of Virginia
Sustainable Foods Program	Emory University University of New Hampshire
Food Waste Composting	University of North Carolina
On-Campus Food Production	Arizona State University
Sustainable Food Education	Duke University
Certified Organic Kitchen	University of California Berkeley
Green Cleaning	Georgia Institute of Technology University of Florida
Green Purchasing	Duke University Georgia Institute of Technology Harvard University University of New Hampshire University of North Carolina

NOTABLE RECYCLING AND WASTE REDUCTION PROGRAMS AND INITIATIVES

(Note: Food Waste Composting is addressed under Food Service.)

- Emory University has set a goal of 65% waste diversion from landfills by 2015, with a focus on awareness particularly in residence halls.
- The University of Virginia reports 46% waste diversion through campus recycling efforts, largely improved by the assignment of Conservation Advocates to each first-year residence hall. UVA also implemented the Reusable Office Supply Exchange (ROSE) Program to make surplus office supplies available to individuals at no charge.
- The University of North Carolina reports a cost avoidance of \$210,000 in waste tipping and hauling fees during the 2006-07 academic year in which 43% of waste was recycled.
- The University of Florida reports 40% waste reduction and recycling, including 6500 tons recycled annually and 60% of deconstruction debris recycling.
- Northwestern University has a recycling program targeted at the Greek system.
- The University of Michigan supports a Residence Hall Move-Out Recycling Program which provides donations of clothes, bedding, toiletries, appliances and electronics to charitable organizations.
- Duke University offers 700 recycling locations and over 1950 recycling bins, including one in every dorm room.

NOTABLE FOOD SERVICE PROGRAMS AND INITIATIVES

According to the 2008 College Sustainability Report Card, one of the areas of greatest improvement this year was in sustainable food service. (Sustainable Endowments Institute).

Overall Sustainable Foods Program

- Emory University is implementing an ambitious Emory Sustainable Foods Initiative to achieve 75% local sustainable foods on campus by 2015. The initiative supports development of local sustainable food production, provides education regarding ethics and alternatives to industrial

food production, uses recycled and biodegradable serving products, and involves annual waste stream audits. Emory acknowledges that dollars spent on food purchases essentially cast a vote for a particular system of food production and distribution.

- The University of Maryland has implemented an impressive food service program that incorporates waste reduction, reuse, composting and recycling, green purchasing and education. The provision of napkins on tables instead of in serving lines has resulted in a 50% use reduction. Micro-filtration of cooking oil enables longer lifespan. Leftover food is donated to the DC Central Kitchen for homeless distribution. Approximately ten tons of food waste is composted monthly and cooking oil is used for biodiesel production. Food service green purchasing standards require evaluation of all packaging to reduce size, shipping costs, and fuel consumption.
- The University of New Hampshire implemented a Local Harvest Initiative to promote healthy food systems from farm to fork. The university also employs Compost Interns to pick up compostable food wastes. Approximately 25-40,000 pounds of food waste is composted monthly and sold.

Food Waste Composting

- The University of North Carolina provides only compostable straws so as to not contaminate food waste composting from kitchen and dish lines. UNC reports 428 tons of composted food waste through a system that uses a Food Pulper and Dehydrator. Also, 75% of milk and meat is provided through local sources.

On-Campus Food Production

- Arizona State University instituted a sustainable Campus Grown Food Program administered by Campus Grounds Department.

Sustainable Food Education Campaign

- Duke University operates the What's for Dinner? Campaign to provide sustainable food on campus and educate the campus community on environmental and health impacts of typical US food production, distribution and consumption.

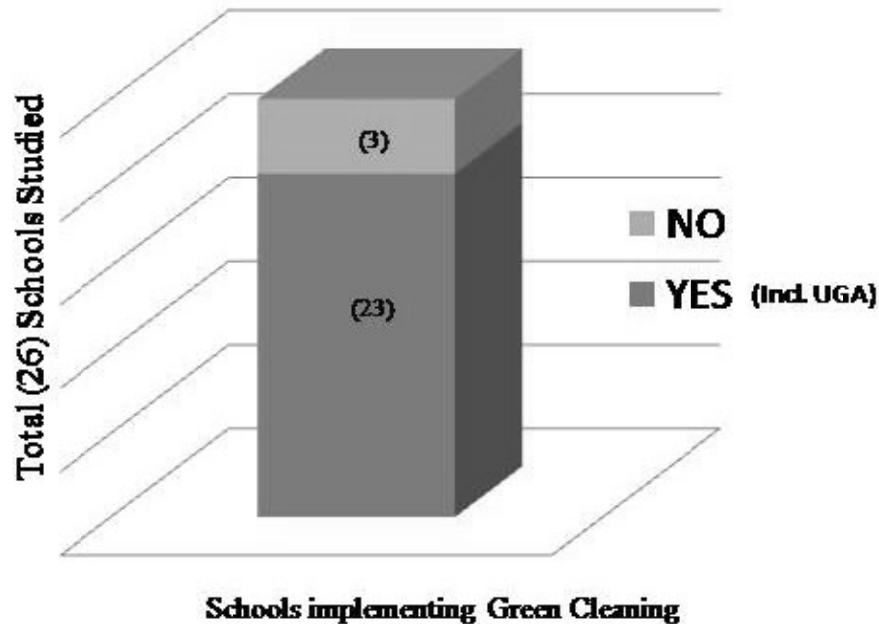
Certified Organic Kitchen

- The University of California Berkeley has established the first certified organic kitchen on a college campus. Crossroads Dining Commons is certified organic in its handling of all food products from delivery to service.

NOTABLE GREEN CLEANING PROGRAMS AND INITIATIVES

- The Georgia Institute of Technology (GA Tech) cleaning program is No Touch and Green Seal certified. Features include 100% post-consumer and 100% recyclable paper towels and toilet tissue, the use of Oxy Orange to replace general cleaning chemicals, green certified equipment such as backpack vacuums and scrubbers, and green certified pool deck cleaner for use at the campus recreation center.
- The University of Florida requires Green Seal certification for cleaning products and established preferred purchasing for recycled and ergonomic products.

Campus Green Cleaning Program



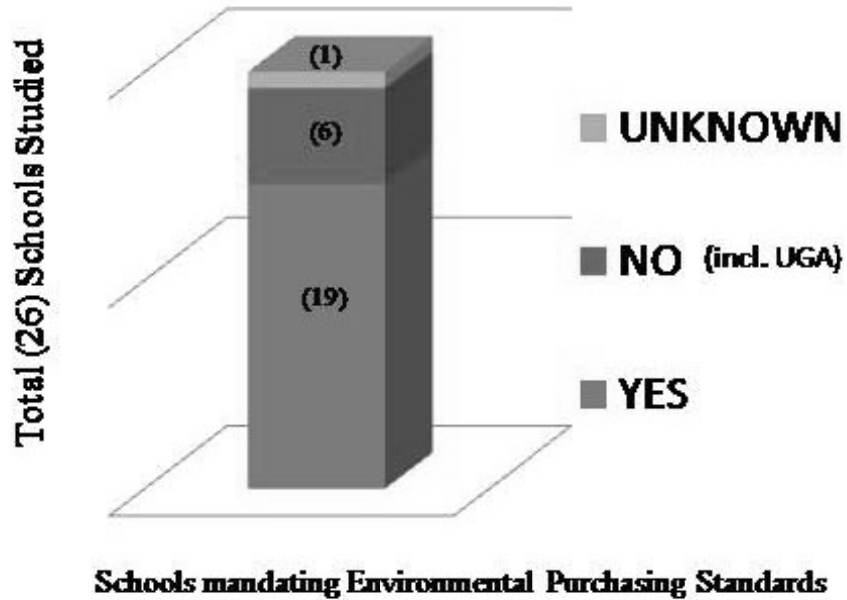
Note: UGA has implemented green cleaning in (13) campus buildings.

(Data derived from Sallot, Institutional Research Report 2008)

NOTABLE GREEN PURCHASING PROGRAMS AND INITIATIVES

- The University of North Carolina Energy Efficient Purchasing Policy includes Energy Star certification for all areas the ratings apply. UNC also has 100% and 50% non-chlorine bleached paper on contract, as well as recycled content flooring, bathroom dividers, and green clean products.
- Duke University established campus Environmentally Preferred Purchasing (EPP) Guidelines covering all aspects of campus operations.
- GA Tech mandates Energy Star certified products and appliances.
- The University of New Hampshire implemented the UNH Energy Efficient Product Standard which includes Energy Star standards in 2006 and reports an approximate 30% energy cost savings as a result.
- Harvard University purchased reusable shipping containers to limit cardboard waste.

Environmentally Preferred Purchasing Standards



Note: UGA currently does not mandate environmental purchasing standards.

(Data derived from Sallot, Institutional Research Report 2008)

CONCLUSION

For UGA to emerge as a leader in campus sustainability, comprehensive implementation of sustainability initiatives will be required. Many of the University's peer and aspirational institutions have effectively implemented sustainability programs and initiatives worthy of further study and emulation. The initiatives included in this chapter are valuable references as UGA's seeks to improve its own modes of operation.

Campus Sustainability – Institutional Comparison

Institution	Office of Sustain	Sustain. Committee	Sustain. Policy	Pres. Climate Commit.	Talloires Dec.	LEED Buildings	Renew. Energy	Alt. Trans.	Green Clean	Purchase Standard
Arizona State	●	●	●	●		●	●	●	●	●
Auburn	●	●	●			●		●	●	●
Colorado	●	●	●	●	●	●	●	●	●	●
Duke		●	●	●		●	●	●	●	●
Emory	●	●	●			●		●	●	●
Florida	●	●	●	●	●	●	●	●	●	●
GA Tech	●	●	●	●	●	●	●	●	●	●
Harvard		●	●			●	●	●	●	●
Maryland	●	●	●	●		●	●	●	●	●
Michigan	●	●			●	●	●	●	●	●
Minnesota		●	●	●	●	●	●	●	●	●
NC State	●	●	●	●			●	●	●	
New Hamp.	●	●	●	●	●		●	●	●	●
North Carolina	●	●	●	●	●	●	●	●	●	●
Northwestern	●	●	●	●		●	●	●	●	●
Oregon	●	●	●	●		●	●	●	●	
PennState		●				●	●	●	●	
Tennessee	●	●	●	●	●		●	●	●	●
Texas A&M	●	●	●	●		●	●	●	●	●
Texas	●	●	●			●	●	●	●	
UC Berkley	●	●	●	●		●		●	●	●
UC Davis	●	●	●			●	●	●	●	
Virginia		●	●		●			●	●	●
Washington	●	●	●	●		●	●	●	●	●
Wisconsin	●	●		●	●	●	●	●	●	●
Georgia					●			●	●	

Primary Source: Sallott, Institutional Research Report, 2008.

The chart above provides an at-a-glance comparison of UGA’s commitment to sustainability versus the twenty-six comparable institutions researched.

CHAPTER SIX

RECOMMENDATIONS TO ENHANCE CAMPUS SUSTAINABILITY AT UGA

After reviewing initiatives implemented by peer, aspirational and other applicable institutions, it is very apparent that there is more UGA can do. The preceding examples represent only a sampling of the ongoing initiatives at other schools. In the same way that UGA competes for academic and athletic standings, the University can resolve to implement innovative and responsible stewardship of the campus environment and to serve as a leader in campus sustainability. Based upon current initiatives at UGA and other institutions, following is a list of recommendations to significantly enhance campus sustainability at the University of Georgia. Leading by example will serve to educate students and the University community and to inspire further implementation of sustainable practices on campus and beyond.

SUSTAINABILITY CULTURE AND ADMINISTRATION

- 1. Develop an official Campus Sustainability Committee (CSC).** The committee shall be comprised of students from the Go Green Alliance , faculty members from the Academy of the Environment, and staff members from Student Affairs, particularly Campus Housing, and Finance and Administration. Departments from within F&A to be represented include the Office of University Architects, Physical Plant Sustainability Committee, Environmental Safety, Parking Services, Campus Transit, Food Service and Procurement. The committee should not be so large that it is ineffective, but it should include a representative from major departments or entities with direct impact on campus sustainability issues.
- 2. Develop and adopt a Campus Sustainability (or Environmental Responsibility) Policy.** The CSC can develop a list of values or principles, for Senior Administration approval, to be used to

evaluate and prioritize campus financial, development and operational decisions. Potential areas for inclusion are global and local environmental concerns, economic life cycle cost analysis, and quality of life for this and future generations.

3. **Formalize an annual Campus Sustainability Assessment.** The CSC can formalize a state-of-the-campus-sustainability report to establish a baseline for UGA and to track progress toward achievement of campus sustainability goals.
4. **Educate the University Community and Promote Campus Sustainability Initiatives.** The CSC can work with Go Green Alliance, the Academy of the Environment, Public Affairs, Senior Administration and others to develop effective means to tell the story of sustainability at UGA.
5. **Establish an Office (or Director) of Sustainability.** As a longer-term commitment, an Office of Sustainability can serve as the primary point of contact to coordinate, enhance and promote sustainability initiatives at the University of Georgia, within the community, and the University System of Georgia. Several administrative structures exist regarding an Office of Sustainability. Potential incorporation of the Go Green Alliance and the Academy of the Environment should be explored, as well as establishment of a separate office within UGA's Finance and Administration.
6. **Pursue a coordinated sustainability effort with Athens-Clarke County.** Investigate options to enhance regional sustainability through town-gown collaborations with the unified government.

EDUCATION AND OUTREACH

1. **Evaluate and enhance as needed the current undergraduate Environmental Literacy program.** Continue to support and develop sustainability-related courses and service-learning programs.
2. **Promote Resource Conservation and Campus Sustainability Initiatives through all available media outlets.** Forms of communication change continually. Creativity and collaboration, particularly with students, is required to effectively reach the campus community to educate and promote campus sustainability.

3. **Develop targeted educational campaigns for new student Orientation and Campus Housing.**
Provide information regarding campus sustainability efforts, impacts of individual behavior, and tips for sustainable campus living.
4. **Create a “Live Red Black & Green Pledge”.** Members of the UGA community who sign a pledge to live and act more sustainably can be recognized by the administration for their part in creating a sustainable campus and receive monthly tips for practical, sustainable living.
5. **Develop a Campus Sustainability Awards Program** to highlight and recognize efforts by individuals, groups or departments on campus.
6. **Designate University grounds as a Campus Laboratory (or Environmental Research and Learning Campus).** Similar to the Campus Arboretum, establishment of a campus environment lab could underscore UGA’s commitment to achieving campus sustainability and formalize the vision for a campus that inherently teaches.
7. **Install interpretive sustainability signage.** Educate the University community and its visitors regarding campus sustainability initiatives through standardized and discreet signage in buildings and the landscape.
8. **Develop a physical and virtual campus sustainability tour.** Provide maps for a walking tour of campus sustainability initiatives, as well as scheduled events. Create an on-line version of the tour with interactive map and video highlights.
9. **Develop a comprehensive green labeling program.** Consider labeling all campus products and services - including everything from buildings to buses, publications to events – to display basic environmental statistics such as carbon footprint, toxic or recycled material content, local material content, etc.

ENERGY RESOURCES

- 1. Commit to advancing Renewable Energy use and research on campus.** Develop and commit to an ambitious yet realistic, achievable and measurable goal for increased renewable energy use and production at UGA, to meet current and future demand. Consider a commitment to renewable energy in new construction projects based upon a percentage of building energy use or project budget (i.e. 10% of energy demand supplied by renewable sources).
- 2. Document existing campus Energy Use.** Continue the building metering program to identify energy use specific to all campus buildings.
- 3. Pursue energy use reduction goals and strategies.** Develop a goal for existing campus energy use reduction and energy standards for new campus development (i.e. 30% reduction in new building construction from typical energy use standards as outlined in ASHRAE 90.1). Continue building energy audit partnership with Engineering Outreach. Investigate feasibility of individual departmental utility billing to encourage conservation.
- 4. Limit Dependence on Non-renewable Energy Sources.** Develop a plan to minimize the use of coal on campus and dependence on electricity produced by coal burning power plants. Some potential energy sources include renewable options such as solar, low-impact hydro and geothermal or co-generation of electricity during steam plant operation.
- 5. Reduce greenhouse gas (GHG) emission.** Establish goals for the reduction of greenhouse gases (and other substances) which may contribute to climate change, including: Conservation of electrical energy and investment in renewable energy sources; Investigation of hybrid engine technologies for Campus Transit and UGA service vehicles; Implementation plan to replace campus chillers that use chloroflourocarbon (CFC) refrigerants; etc.
- 6. Sign the American College and University Presidents Climate Commitment** to realize the benefit of an additional framework and schedule to implement campus sustainability initiatives, particularly in the area of global warming. UGA should not have trouble complying with criteria

outlined in the program, but it is prudent to first ensure that administrative priority and a suitable structure are in place to fulfill the commitment.

LAND RESOURCES

1. **Update the Physical Campus Master Plan.** While the guiding principles of the master plan do not change, more detailed footprints and placement of buildings and greenspace evolve as strategic plans unfold. The master plan should be updated annually to reflect current conditions and refined vision for campus growth.
2. **Define the value of undeveloped campus land areas and develop strategies for preservation.** Document, evaluate and prioritize UGA's existing undeveloped land areas based upon biodiversity, ecosystem services, cultural significance, and repercussions of change. Develop appropriate campus Conservation Areas - with the help of students, faculty and researchers from academic departments - based upon above criteria for use as a planning tool in campus development. Also consider the value of forested land toward Carbon neutrality for the campus.
3. **Develop a strategic and physical master plan for UGA's S. Milledge Area.** Establish a vision for preservation and development on S. Milledge Properties, and define land use and landscape management strategies toward its fruition.
4. **Consider forest certification of campus lands.** Investigate the potential benefits of certifying Oconee Forest, Whitehall Forest or other campus land areas.

WATER RESOURCES

1. **Continue implementing the Every Drop Counts Campaign.**
2. **Develop a Campus Stormwater Master Plan.** Develop and implement over time a prioritized plan to improve and restore campus waterways, increase water quality, mitigate flooding and erosion, and increase stream base flows. Manage stormwater runoff rate, volume, velocity. Quality, flow path, frequency and duration to mimic undeveloped conditions to the extent possible. Identify opportunities for stream restoration as well as regional stormwater treatment to

improve the quality of water from campus and the surrounding community. Incorporate site design standards for appropriate stormwater management of new construction and redevelopment areas.

- a. Existing Campus (state) Surface Waters to protect and enhance:
 - i. N. Oconee River
 - ii. Middle Oconee River
 - iii. Tanyard Creek
 - iv. Lily Branch (formerly known as Stinky Creek)
 - v. Trail Creek
 - vi. Historic Spring
 - vii. Lake Herrick
 - viii. South Milledge Properties ponds and natural drainage areas
 - ix. Documented Wetlands

BUILT ENVIRONMENT

HISTORIC RESOURCES

1. **Establish a Historic Resources Advisory Committee.** The committee would assist University Architects in the effort to preserve the cultural resources which provide sense of place, legacy and emotional connection to UGA. These resources include historic buildings as well as landscapes.
2. **Develop and implement Historic Resources Plan.** Continue to seek grant funding to document UGA's historic structures and landscapes and to identify appropriate management guidelines. Incorporate environmental and long-term economic benefits for renovating and reusing culturally and historically significant resources.

BUILDING DESIGN

1. **Commit to LEED Silver level certification or higher for new construction and major renovation projects.** The University can immediately adopt LEED certification standards,

targeting Gold level certification with commitment to a minimum of Silver. Criteria can be developed to determine which projects are to seek certification and which projects shall follow guidelines without pursuing certification, based on project size and budget.

2. **Develop and adopt UGA Sustainable Building and Site Design Guidelines.** All new construction and major renovation projects at UGA shall follow updated sustainable design guidelines that incorporate LEED certification requirements, and address site, water resources, renewable energy, energy use, material selection, and indoor environmental quality. Site standards will incorporate passive solar design, restorative stormwater management, efficient irrigation and the use of native and drought tolerant plants. Reduced water use will be achieved through ultra low-flow fixtures and reuse of graywater, rain water and condensate water. Energy guidelines will mandate renewable energy supply targets and energy efficiency standards. Locally and sustainably harvested and manufactured materials will be prioritized, and product embodied energy will be considered. Low volatile organic compound (VOC) finishes will be required and indoor environmental quality standards established. In addition, UGA guidelines will incorporate the LEED framework and specify LEED points that must be achieved on campus and potential strategies for doing so.
3. **Incorporate life cycle costing to guide facilities decision making.** All consultants shall be required to provide life cycle analyses, and embodied energy information as available, for proposed building systems.

SITE DESIGN

1. **Support Greenspace Creation.** Creation of greenspace results in a healthier, more pleasant pedestrian environment. Support conversion of impervious surfaces to campus greenspace whenever feasible.

2. **Create multi-functional landscapes.** Integrate environmental functions into the built environment. Prioritize ecosystem restoration and habitat creation. Consider all “users” of a site to enhance ecological health as well as human experience.
3. **Prioritize infill building and passive solar orientation.** Whenever possible, site buildings along an east-west axis to maximize opportunities for daylight and solar energy harvesting.
4. **Incorporate restorative stormwater management and eco-revelatory design.** Improve stormwater quality, primarily through vegetated best management practices. Expose and enhance natural processes.
5. **Utilize appropriate native and drought-tolerant plants.** Native plants are given priority on campus for several reasons including ecological restoration, water conservation, and sense of place. It should be noted however, that native plants still must be sited appropriately for micro climate conditions.
6. **Prioritize native tree canopy.** Protect existing trees and incorporate new native canopy trees into the campus landscape.
7. **Minimize turf areas.** Turf grass is an important part of the campus landscape, but it requires much water and resources. It shall be reserved for specific locations.
8. **Utilize efficient irrigation systems and controls.** Specify subsurface drip irrigation and high-efficiency fixtures that can be used with campus standard irrigation equipment. Investigate controls options that measure evapo-transpiration and soil moisture content and fit within a master controls plan. Design landscapes to require no potable water use after one year.

LANDSCAPE MANAGEMENT

1. **Minimize potable water use for maintenance and irrigation.** Support and continue Every Drop Counts campaign. Endeavor to design inspiring landscapes that require no irrigation after one year. Utilize rain, condensate and gray water for irrigation to the extent practical.

2. **Prioritize native tree canopy.** The benefits of trees are numerous. Every effort shall be made to save existing trees and incorporate new native canopy trees into the campus landscape.
3. **Eliminate or reduce existing turf areas.** Turf grass is an important part of the campus landscape, but it requires much water and resources. It should be reserved for specific locations and can be minimized or eliminated in any areas deemed unnecessary.
4. **Maximize irrigation efficiency.** Retrofit and eliminate irrigation systems as much as possible. Consider subsurface drip irrigation and retrofit high-efficiency spray fixtures that can be used with existing campus irrigation equipment. Develop irrigation master control plan to include measurement of evapo-transpiration and soil moisture content. Ideally, landscapes should be planned to require no potable water use after one year.
5. **Incorporate Integrated Pest Management** to reduce use of chemical fertilizers and pesticides. Pursue effective academic partnerships.
6. **Compost all applicable food wastes.** Increase collaboration with Food Services to compost food prep and post consumer food and paper items from kitchen and dish lines.
7. **Investigate Campus Grown Food program.** Consider collaborative effort between PPD Grounds Department and academic colleges such as Agricultural and Environmental Sciences, Environment and Design, the Odum School of Ecology, and others.

CONSTRUCTION SITE MANAGEMENT

1. **Standardize UGA construction waste management criteria.** Formalize goals and process for construction waste and debris recycling and composting.
2. **Develop standards for construction site Indoor Air Quality.** Include exchange of mechanical system filters prior to issuance of a certificate of occupancy and consideration of a no smoking policy on UGA property.

TRANSPORTATION

1. **Support Transportation Choices.** Incorporate Transportation Demand Management to reduce automobiles on campus and create healthy and viable alternatives.
2. **Invest in Bicycle Infrastructure and Planning.** Adopt recommendations for a Safer, Easier, Connected Campus for bicycle commuters at UGA, including improvements to the bicycle network on and off campus. Partner with A-CC and the N. Oconee River Greenway and support Greenway connections to the UGA campus.
3. **Continue to support Campus Transit initiatives.** UGA's campus transit effectively transports the University community across campus and subsidizes University use of A-CC transit. In addition, consider support of upgraded hybrid technologies, enhanced biofuels, and best practices to reduce fuel consumption and costs.
4. **Promote Carpooling as a viable means of transportation to and from campus.** Develop and support online carpooling network.
5. **Investigate Car and Bike Sharing options for the University community.** Investigate feasibility of Zip Car and Flex Car programs at UGA, as well as bike loan program options.
6. **Increase Campus Housing and Encourage Residents (particularly Freshmen) not to bring cars to campus.** As part of the enhanced student experience, students who live on campus have less need for a vehicle. Consider incentives such as bike loan, free helmets, discount housing cost, etc.
7. **Support Commuter Rail and "Rail with Trail" Options.** Seriously evaluate long-term benefits to Norfolk Southern short line ownership and potential costs to change of rail line ownership.
8. **Continue to support master plan objectives for a pedestrian friendly campus.**

CAMPUS OPERATIONS

FOOD SERVICE

1. **Provide safe local, organic, and sustainably produced food.** Support sustainable agriculture through purchasing local produce and food items to the extent practical. Commit to a goal of local and sustainable foods and seafood in campus dining facilities.
2. **Reduce post-consumer waste generation.** Limit temporary serving containers and utensils. Use biodegradable, compostable service items when needed.
3. **Compost all applicable food wastes.** Increase collaboration with PPD Services and Grounds Department to compost food prep and post consumer food items from kitchen and dish lines.
4. **Investigate Campus Grown Food program.** Consider collaborative effort with academic departments including College of Agricultural and Environmental Sciences, Ecology, Geography and Environmental Design, Grounds Department, and University Architects.
5. **Minimize potable water use for non-consumption.** Support and continue Every Drop Counts campaign.
6. **Educate University community regarding conventional and sustainable food production.**

PURCHASING

1. **Establish UGA Environmentally Preferred Purchasing guidelines.** Mandate Energy Star and Green Seal rating for all applicable products and items. Also prioritize local and recycled materials and those with low embodied energy costs. Utilize industry-recognized third party certifications to the extent possible to save time and resources for University staff.
2. **Consider Partnerships with other schools in the University System of Georgia (USG) and the Board of Regents.** Explore other purchasing standards within the USG to see if UGA and another institution could maximize opportunities for savings.

WASTE REDUCTION AND RECYCLING

1. **Develop strategies to decrease solid waste significantly.** Set target waste reduction goals such as diversion of 60% of all domestic, construction and demolition waste from Athens-Clarke County landfills.
2. **Increase general campus recycling efforts.** It should be easier to recycle waste on campus than it is to throw something away. Establish target recycling goals such as 60% by 2015. Add recycling containers in existing campus buildings, including one per dorm room. Continue to retrofit existing exterior trashcans to recycling containers.
3. **Enhance Specialized recycling programs,** including enhanced Game Day, Residence Hall, and Greek system recycling. Focus educational efforts on residence hall recycling. Include one bin for every bedroom and a Conservation Coordinator in each dormitory to encourage sustainable behavior among students.

GREEN CLEANING

1. **Expand Green Cleaning Initiative to all campus buildings as quickly as possible.**
2. **Develop a plan for proper disposal of all existing toxic and non-green cleaning chemicals.** Immediately stop reordering or restocking such products.
3. **Establish Green Seal Certification requirement for all applicable cleaning products and supplies.** Utilize third party verification to ensure legality of purchasing standards and integrity of product claims.
4. **Establish ergonomic standards for new cleaning equipment purchases.** Maximize worker comfort and safety with well-designed equipment such as backpack vacuums.
5. **Continue green clean education and training program for custodial staff.**
6. **Consider participation in Cleaning Industry Management Standard (CIMS) certification program.**

PRINTING

1. **Utilize recycled paper and non-toxic inks** to the extent practical for all campus publications.

Verify maximum recycled-content paper that is not prone to printer jamming.

2. **Promote UGA sustainability commitment**, through subtle notation, on all campus publications.
3. **Offset UGA paper use** through tree planting and forest conservation.

CHAPTER SEVEN

CONCLUSION

There is a growing awareness and excitement regarding sustainability on the UGA campus. There also seems to be a general sentiment among environmentally concerned students and faculty that the University has not sufficiently embraced the goal of becoming a more sustainable institution. Many of UGA's peer institutions are significantly further along in the pursuit of a sustainable campus. Still, many groups and individuals within the campus community are eager to work toward enhanced sustainability at The University of Georgia. The Go Green Alliance student organization submitted a Student-Initiated Proposal for Sustainable Practices at the University of Georgia to senior administration on April 23, 2008. The Academy of the Environment plans to submit similar recommendations in the fall of 2008. Many staff members maintain a daily commitment to enhance campus sustainability through actions both large and small. The time is ripe for UGA to step forward with real solutions to pressing environmental concerns, and to lead.

In his keynote address to the Academy of the Environment, President Michael Adams expressed that UGA can do more in the field of sustainability. I agree and would challenge the administration to resolve not only to improve but to become a leader. The University of Georgia community must choose to make sustainability a part of its culture, a common thread that weaves throughout all departments and decisions. We must develop, share, refine, and continuously re-evaluate our commitment to responsible and respectful stewardship of all people and resources. The sustainable revolution must be embraced and encouraged at all levels of the University's organizational structure, with emphasis on individuals,

innovation and practicality. If embraced, the mission of sustainability has the potential to unite and inspire a renaissance in thought and action within the University community.

Sustainability leadership will require comprehensive implementation of a strategic vision. In this thesis, I have presented recommendations for a comprehensive approach to enhancing campus sustainability. The strategic vision still must be clarified and cast.

Approaching this end, Dr. Adams called upon the Academy of the Environment and the University community to develop a plan to: 1) institutionalize UGA's commitment to sustainability, 2) better organize and disseminate information regarding UGA's sustainability efforts, 3) reduce UGA's environmental footprint and 4) save money. (Adams 3-4). These goals provide a structure for prioritized implementation within the comprehensive sustainability vision. While all of the provided recommendations warrant consideration, the following actions could be implemented immediately, in addition to on-going campus initiatives, to begin to address Dr. Adams concerns:

- 1) To institutionalize UGA's commitment to sustainability, I recommend adoption of a **Campus Sustainability Policy**. The policy would serve as a written declaration that sustainability is a foundational guiding principle in UGA campus planning, development, operations, and business decision-making. The policy would be implemented through actions in every department on campus.

- 2) To organize and disseminate information regarding campus sustainability initiatives, a **Campus Sustainability Committee** can be comprised of students, faculty and staff. The Committee would serve as an interim solution until an **Office of Sustainability** is established, at which time the Committee would be maintained in support of the Office. Continued education of the campus community and promotion of campus sustainability efforts will be a primary objective of the Committee. Strategies include development of a

- UGA **Sustainability Initiatives website**, installation of **interpretive signage** in buildings and landscapes, and a **campus sustainability tour**. An **annual sustainability assessment** conducted by the Committee will also help to institutionalize and track UGA's sustainability commitment.
- 3) To most quickly reduce the University's environmental footprint, UGA can develop an **Environmentally Preferred Purchasing Standard**. Standards that favor local sources and mandate third-party certification - including Energy Star, Green Seal, Fair Trade, and organic certification - can be implemented quickly and would result in a significant decrease in UGA's environmental footprint both on and off-campus. Careful **water resource management** must remain a priority during the unprecedented drought and beyond. Goals and strategies can be developed for fossil fuel reduction and a **commitment to renewable energy**, including evaluation of The Presidents Climate Commitment for application and benefit to UGA.
- 4) To save money, the University can continue to focus on **energy and fuel conservation** for significant financial return, largely through cost avoidance. Education and behavior modification, as well as energy audits of existing buildings, are effective toward energy savings. **Sustainable building design guidelines** that mandate 30% or greater energy reduction in new facilities will ensure conservation into the future. Several institutions report 30% energy reduction through implementation of LEED design guidelines. **Green Cleaning** saves money and improves human and ecologic health. The program can be rapidly expanded to include all University facilities. **Waste reduction and recycling** will provide immediate monetary savings through avoided tipping fees and reduced transportation costs in addition to money made from the sale of recyclables.

Combined grass-roots energy and administrative commitment can affect sustainable change. As we proceed on the course toward sustainability, the University will benefit from educating the campus community and exposing its sustainability efforts and achievements. Highlighting the results of our sustainability initiatives provides encouragement, and encouragement tends to inspire further action. Inspired, committed and collaborative action by many will be required on this journey toward becoming a sustainable UGA. In return, President Adams is committed to work with us to make UGA “a little greener every day” (Adams 4).

The goal of this thesis is to advance the sustainability movement at the University of Georgia. This document highlights current campus sustainability initiatives and provides the framework for a practical, comprehensive plan to increase sustainability on the UGA campus. It is my hope that the framework established herein will provide a foundation for committed campus sustainability at The University of Georgia.

REFERENCES

Adams, Dr. Michael F. Academy of the Environment Keynote Address: "Sustainable UGA". Athens, GA, 29 November 2007.

Ad-Hoc Task Force on Water Resources. Every Drop Counts. Athens, Georgia: University of Georgia, 2007.

Alexander, Christopher. A New Theory of Urban Design. New York: Oxford University Press, 1987.

Association for the Advancement of Sustainability in Higher Education. Welcome! 2005-2008. 3 July 2008 <<http://www.aashe.org/index.php>>.

Association for the Advancement of Sustainability in Higher Education. AASHE Releases Review of Sustainability in Higher Education. 2005-2008. 3 July 2008 <<http://www.aashe.org/highlights/digest06.php>>.

— . About AASHE. 2005-2008. <<http://www.aashe.org/about/about.php>>.

— . About AASHE. 2005-2008. 3 July 2008 <<http://www.aashe.org/about/about.php>>.

— . Sustainability Tracking, Assessment & Rating System (STARS) for College and Universities, Version 0.5. April 2008.

Association of University Leaders for a Sustainable Future. Programs {Talloires Declaration}. 2001. 3 July 2008 <http://www.ulsf.org/programs_talloires.html>.

Carson, Rachel. Silent Spring. Boston, Massachusetts: Houghton Mifflin Company, 1962.

Creighton, Sarah Hammond. Greening the Ivory Tower: Improving the Environmental Track Record of Universities, Colleges, and Other Institutions. Cambridge, Massachusetts: The MIT Press, 1998.

Dawg Gone It, Recycle. Dawg Gone It, Recycle: A guide to Recycling Programs at the University of Georgia. Guide. Athens, 2007.

Durso, Andrew and Christina Faust. A Student-Initiated Proposal for Sustainable Practices at the University of Georgia. Athens, 2008.

Edwards, Andres R. The Sustainability Revolution: portrait of a paradigm shift. Gabriola Island, Canada: New Society Publishers, 2005.

Emory University. Office of Sustainability Initiatives: About Us. 2005-2008. 3 July 2008 <<http://www.emory.edu/sustainability.cfm>>.

Fair Trade Federation. About Fair Trade. 2007. 3 July 2008 <<http://www.fairtradefederation.org/ht/d/sp/i/2733/pid/2733>>.

Higher Education Associations Sustainability Consortium. HEASC Home. 2007. 3 July 2008 <<http://www.aashe.org/heasc/index.php>>.

John Muir Exhibit . "John Muir: A Brief Biography." Sierra Club. 17 June 2008 <http://www.sierraclub.org/john_muir_exhibit/life/muir_biography.html>.

Leopold, Aldo. A Sand County Almanac. Oxford, England: Oxford University Press, 1949.

Marshall, Christa. "Climate Wire." 1 July 2008. E&E Publishing, LLC. 1 July 2008 <<http://www.eenews.net/cw/>>.

National Wildlife Federation. Campus Ecology. 1996-2008. 3 July 2008 <<http://www.nwf.org/campusecology/index.cfm>>.

Partners for a Prosperous Athens. One Athens: Once Community. One Vision. One Athes. 3 July 2008 <<http://www.prosperousathens.org/>>.

Presidents Climate Commitment. American College & University Presidents Climate Commitment. 2007-2008. 3 July 2008 <<http://www.presidentsclimatecommitment.org/>>.

Presidents Council on Sustainable Development. Presidents Council on Sustainable Development (PCSD). 17 June 2008 <<http://clinton5.nara.gov/PCSD/>>.

Recycle Mania. Welcome to the Recycle Mania Website! 3 July 2008 <<http://www.recyclemaniacs.org/index.htm>>.

Sallot, Dr. Lynne. ADPR 5950 Public Relations Campaigns Institutional Research Report. Athens, Georgia, 25 March 2008.

—. Go Green. Live Red & Black. Athens, 2008.

Second Nature, Inc. Education for Sustainability. 2005. 3 July 2008 <<http://www.secondnature.org/efs/efs.htm>>.

—. Second Nature... 2002-2006. 3 July 2008 <<http://www.secondnature.org/index.htm>>.

—. Second Nature's Beginnings. 2005. 3 July 2008
<<http://www.secondnature.org/aboutsn/aboutsn.htm>>.

Society for College and Urban Planning. "SCUP Trends in Higher Education." January 2008 (2008): 5-6.

Sustainable Endowments Institute. College Sustainability Report Card 2008 - Executive Summary. 2007
October 2007. 17 June 2008
<<http://www.endowmentinstitute.org/sustainability/ExecutiveSummary2008.pdf>>.

The American Heritage Dictionary of the English Language, Fourth Edition. "sustainability". Houghton
Mifflin Company, 2004, 13 June 2008.

The University of Georgia. The Mission of The University of Georgia. 3 July 2008. 3 July 2008
<<http://www.uga.edu/profile/mission.html>>.

The World Commission on Environment and Development. "Our Common Future." 1987.

U.S. Green Building Council. "LEED for New Construction and Major Renovations Version 2.2." Green
Building Rating System. October 2005.

United Nations Conference on the Environment and Development. Rio Declaration on Environment and
Development. Rio de Janeiro, 14 June 1992.

United Nations Conference on the Human Environment. Report of the United Nations Conference on
the Human Environment. Stockholm: United Nations, 1972.

United Nations Environment Programme. About UNEP: The Organization. 3 July 2008
<<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=43>>.

University of Georgia Office of Institutional Research. University of Georgia Aspirational Institutions. 1
September 2004. 3 July 2008 <<http://www.uga.edu/~irp/comps/aspeers.html>>.

Wheeler, Stephen. ""Planning Sustainable and Livable Cities"." Richard T. LeGates, Frederic Stout. The
City Reader, Second Edition. New York, New York: Routledge, 1996. 434-445.