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GW ECOSYSTEMS ENHANCEMENT STRATEGY

FALL 2012



GW Ecosystems Enhancement Strategy

Fall 2012

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The George Washington University's Sustainability Vision and Mission

The university envisions a future with resource systems that are healthy and thriving for all. In an effort to enhance its campus, the nation's capital and the world at large, GW is building a greener campus, providing research and intellectual discourse on policies and pathways to sustainable systems and equipping students with skills and knowledge to contribute to a sustainable future.

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EXECUTIVE SUMMARY

BACKGROUND

Global trends related to planetary sustainability and societal well-being show how the world is changing. Perhaps the most significant of these changes is the loss of genetic diversity and its detrimental impact on the resilience of ecosystems. The rate of species extinctions has increased by as much as 1,000 times compared to background rates. The Earth's global average temperature is projected to rise between 3 and 7°F by 2100. Domestic energy security continues to be threatened, while costs increase. Adding to the complexity, financial markets face unprecedented volatility. Evidence shows that society at the global and local level is in need of better governance systems and stronger accountability. On the health front, non-communicable disease (i.e. cancer, diabetes, respiratory) is on the rise in both developed and developing countries in part due to diet and pervasive toxins. While these trends pose risks to institutions, countries, and the planet, the trends provide opportunity for innovation in emerging fields (e.g. clean technology) and effective policy that internalizes natural resource costs.

Smart organizations are taking into account the resulting risks and opportunities as they plan for the future in order to make their institutions and their operating environment more sustainable and resilient. Global sustainability trends have implications for the George Washington University (GW) in terms of its operations, business partnerships, research priorities, academic offerings, and outreach from the academy to practitioners. Organizations that understand the linkages between the trends, and plan systemic responses for the future will be at an advantage. The intention of the GW Ecosystems Enhancement Strategy is to begin to prepare GW for the sustainable development changes ahead.

SUSTAINABILITY AT GW

The university envisions a future with healthy and thriving resource systems for all. In an effort to enhance its campus, the nation's capital, and the world at large, GW is building a greener campus, providing research and intellectual discourse on policies and technologies for sustainable systems and equipping students with the skills and knowledge to contribute to a sustainable future. Starting in 2009, the GW Office of Sustainability began setting a strategy to integrate sustainability into academics, research, practice, and outreach. The office works with stakeholders to set goals and targets that address the university's impact and dependence on resource systems, and advances GW's sustainability related academic offerings and outreach efforts.

GW ECOSYSTEMS ENHANCEMENT STRATEGY

In this document, GW outlines its goals for incorporating sustainability into its operations and business decisions. The GW Ecosystems Enhancement Strategy is intended to build institutional understanding of, and commitment towards sustainability at GW, and engage GW's external stakeholders. This strategy also outlines potential connections with the academic mission of the university.

Ecosystems services are the benefits obtained by people from nature. Since ecosystems span environmental and social issues such as climate change, water scarcity, and human access to natural resources, GW is using an ecosystems services framework to encompass its sustainability goals. GW is in

a position to improve the state of ecosystem services from which GW not only draws benefits, but also the ecosystem services GW impacts via its business decisions and operations. The purpose of the strategy is to explore options to mitigate risk and seize opportunities for innovations that will benefit the university, society, and the planet in the long-run. As depicted in the figure below, GW is committed to adopting practices viable for the institution that also nurture ecosystem services that:



Under each of these strategic focus areas, GW articulates a series of long-term and short-term targets across the three scopes of ecological impact: on its campus, in the region, and globally.

The GW Ecosystems Enhancement Strategy lays out a vision to enhance the quality of the urban ecosystem in which GW resides by increasing natural space and creating urban gardens on campus. The strategy also provides direction on how GW can monitor global sustainability issues as we purchase products and invest our capital.

NEXT STEPS

GW will conduct additional research and gather further input from key stakeholders on the targets to ensure that the university is on a practical track and utilizing best practices to reach the goals. The GW Ecosystems Enhancement Strategy provides an overarching framework for possible future action plans such as a zero waste plan, a sustainable food plan, or a plan for sustainability in academics and curriculum. The GW Office of Sustainability is forming staff working groups to develop action plans to reach the targets. These action plans will include baseline assessments and detailed roadmaps that describe the specific projects, the financing mechanisms and the implementation timeline.

GW students and faculty will continue to play an important role in the development of the GW Ecosystems Enhancement Strategy. Students provide ideas, passion, and influence across the campus on sustainability issues. Faculty members across disciplines contribute their expertise and help integrate research and curricular aspirations into the sustainability strategy. The GW Office of Sustainability will also engage external stakeholders and develop partnerships with them during the implementation phase.

GW joins a handful of organizations exploring the ability of an institution to augment ecosystem services. The university will actively seek to share its experiences with, and receive learning from others.

INTRODUCTION

PURPOSE

In this document, The George Washington University's Ecosystems Enhancement Strategy, GW identifies and describes goals around major ecosystem services with which the university interacts: habitat and natural space, air and climate regulation, freshwater provision, food production, waste decomposition, and physical, mental and social well-being. The purpose of the GW Ecosystems Enhancement Strategy is to optimize the university's ability to enhance those ecosystems services, not only for the benefit of future generations, but also for the resiliency of the organization. By setting a vision across all ecosystem services, GW is considering a holistic approach to addressing planetary sustainability. The intent is for GW to consider the complexity of the system when it makes decisions so as to avoid unintended consequences and act on synergistic opportunities.

Herein, GW outlines its goals for sustainability in the operations and business decisions of the university. The GW Ecosystems Enhancement Strategy is also intended to engage GW's external stakeholders and build institutional understanding of, and commitment towards sustainability at GW. Given that the mission of higher education institutions is to deliver academic offerings and research findings, much of the suggested tactics and actions of the GW Ecosystems Enhancement Strategy intersect with the curricular and research activities of the university. The intent is to create opportunities to learn from doing, and for academic knowledge to inform best and next practice for sustainable business.

Furthermore, the ecosystems services approach is geared towards human interaction with natural resources such that society recognizes and manages to the limits of the system, and works to enhance the system so that it serves humankind in both an equitable and diverse manner. The goal of sustainable development is to serve all people across generations and across societal delineations such as economic, racial, and cultural strata. And so, the GW Ecosystems Enhancement Strategy begins to address the social aspects of sustainability and how the sustainability initiative supports the other strategic initiatives at GW.

Moving forward, the GW Office of Sustainability will look to internal and external partners to assess the state of and develop action plans for each of the ecosystems services affected by the university (habitat and natural space, air and climate regulation, freshwater provision, food production, waste decomposition, and physical, mental and social well-being). The previously written Climate Action Plan and GWater Plan provide a set of strategic actions to reach climate regulation and freshwater provision goals. The framework laid out in the GW Ecosystems Enhancement Strategy is an umbrella for such action plans. In the future, GW could potentially develop additional plans and policies related to zero waste, sustainable food, sustainable grounds, sustainable procurement, sustainable investments, academics and curriculum, research, and student engagement.

Finally, by publishing this strategy, GW joins a handful of organizations attempting to explore the ability of an institution to augment ecosystem services. We hope that others learn from GW and that they share their insights on improving GW's vision, implementation and monitoring of enhanced ecosystem services.

STATE OF ECOSYSTEM SERVICES

Humans have always depended on nature for survival and well-being. The natural world provides necessities such as food and fresh water, services such as storm protection and pollination, as well as spiritual and recreational benefits such as a connection to nature and space for physical activity. The term “ecosystem services” was coined to describe these benefits that people get from nature, such as fresh water, timber, climate regulation, recreation, and aesthetic values.¹ Beneficiaries of these services can be at the individual, local, regional, and/or global scale and may include future generations.

This approach to communicating societal dependence on ecosystems has emerged relatively recently. Its origin can be traced back to the late 1970s with the “utilitarian framing of beneficial ecosystem functions as services in order to increase public interest in biodiversity conservation.”² In 1997, a formative book entitled *Nature’s Services: Societal Dependence on Natural Ecosystems* was published by world renowned conservation biologist, Dr. Gretchen Daily. Since then, the term has been increasingly mainstreamed; the number of publications focused on ecosystem services across various academic fields has risen astronomically in a decade - from 255 publications in 1997 to 3,080 in 2007.³ Currently, the concept has come to refer to the “sustainability of natural resources in the context of how people use those assets.”⁴

Another major milestone in the evolution of the ecosystems services approach, the *Millennium Ecosystem Assessment*, which was launched in 2001 to assess the health of the planet. This collaborative international effort, chartered by the United Nations and involving more than 1,300 scientists from around the world, helped establish ecosystem services firmly on the policy agenda. The assessment defined four categories of ecosystem services:

1. *Provisioning Services* – The goods/products “obtained from ecosystems including food, freshwater, timber and fiber.”⁵
2. *Regulating Services* – Not to be confused with government interventions, these services are the “benefits obtained from an ecosystem’s control of natural processes such as climate, diseases, erosion, water flows, and pollination, as well as protection from natural hazards.”⁶
3. *Cultural Services* – These are the nonmaterial benefits obtained from nature such as recreation, spiritual values, and aesthetic pleasure.⁷
4. *Supporting Services* – These include the natural processes that maintain other services such as nutrient cycling and primary production.⁸

Humankind’s dependence and impact on ecosystem services has caused an unprecedented change in the structure and function of ecosystems. These changes have occurred more rapidly and extensively in the past 50 years than in any other comparable period of time in human history. Approximately 60% (15 out of 24) of the ecosystem services identified and evaluated in the *Millennium Ecosystems Assessment* are being degraded or used unsustainably. “The degradation of ecosystem services could grow significantly worse during the first half of this century” and have serious biological, ecological and economic ramifications for the global community. Future generations will face the challenge of reversing the degradation of ecosystems, while meeting increasing demands for the services of these same ecosystems.⁹

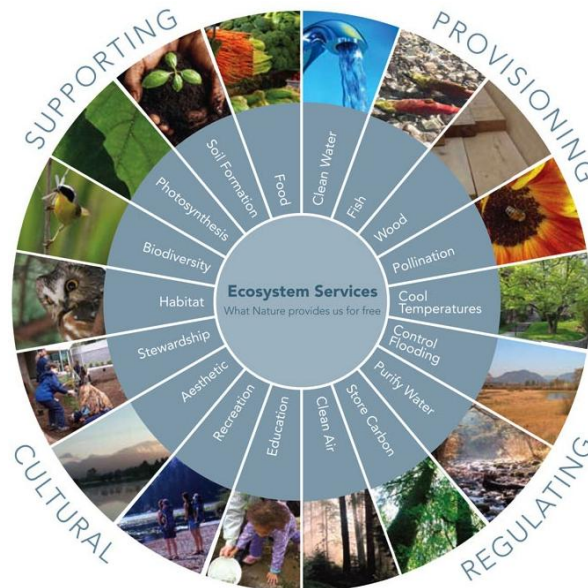
These changes (some of which are potentially irreversible) can cause significant harm to human well-being. Changes in land cover – cropland conversion, deforestation, desertification, loss of wetlands and

mangroves – have affected regional and local climates. In some cases, the capacity of ecosystems to serve as a buffer against extreme weather events has been reduced, making the populations that occupy such these areas more vulnerable to natural disasters.¹⁰

Perhaps the most significant of these changes is the loss of species and genetic diversity as it decreases the resilience of ecosystems. The rate of species extinctions has increased by as much as 1,000 times over background rates typical over the planet’s history, and 10 – 30% of mammal, bird and amphibian species are currently threatened with extinction.¹¹

None of these alarming trends of biodiversity loss and ecosystems decline can be viewed in isolation. Rather, each is interconnected to other major trends affecting society and the economy such as climate change, disease transmission, and energy security as shown in Figure 1. In most cases, “the causality runs both ways” and there are feedback loops from one negative impact to another.¹² Therefore, it is important that organizations understand these linkages and plan systemic responses for the future.

Figure 1: Categories of Ecosystem Services



Source: Metro Vancouver. (2011). *Ecological Health*. Retrieved September 2012, from Metro Vancouver: <http://www.metrovancouver.org/planning/development/ecologicalhealth/Pages/default.aspx>.

ECOSYSTEMS SERVICES APPROACHES TO BUSINESS PLANNING

Businesses and institutions depend on ecosystems services, which generate tangible value for the economy. Ecosystem services should be considered the capital assets of a nation, akin to natural resources such as mineral deposits and fossil fuels. However, since these services are not traded and tend not to be priced, they are difficult to value and often overlooked in traditional financial assessments.¹³

At the same time, businesses and institutions also have an impact on the ecosystems they rely upon through consumption, pollution, land conversion, and other activities. The degradation of ecosystem services represents the loss of capital assets or wealth of a country, but this cost is not captured in the national accounts. This is why, increasingly, there has been more interest in developing methods to estimate the economic value of ecosystems services.¹⁴

Given that institutions both impact and depend on ecosystems services, the degradation of ecosystems can present a number of risks and opportunities for an organization. These include:

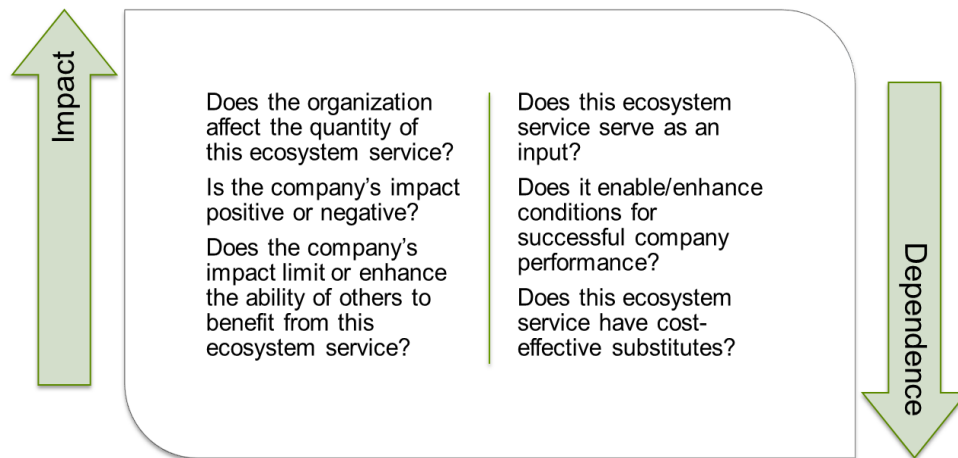
1. **Operational:** Risks such as scarcity of inputs, increased costs, reduced outputs or productivity, and disruption to business operations. At the same time, it provides an opportunity for organizations to improve their efficiency and develop low-impact manufacturing processes.¹⁵

2. **Regulatory & Legal:** Risks such as increased user fees, taxes and government charges. However, it also provides the organization an opportunity to engage the government on framing policy appropriately.¹⁶
3. **Reputational:** In some ways, these risks are the most dangerous as any damage to its image can challenge an organization’s social license to operate. Many organizations have also seized the opportunity that this represents to differentiate their brand and gain a market advantage.¹⁷
4. **Market & Product:** Demand for more sustainable products and markets are growing. This presents a huge opportunity for organizations to create new products or services, or create a market for ecosystem services. This has implications for higher education in the types of research that the university provides and the courses and degrees offered.¹⁸
5. **Financing:** As a result of ecosystem decline, there is a higher cost of capital and more rigorous lending requirements. However, there are a growing number of socially responsible investment funds and leaders who value investing in companies and organizations that are sustainably-minded and socially responsible.¹⁹

Furthermore, organizations face rising investor and stakeholder demand for broader and more transparent disclosure relating to environmental, social and governance performance issues. In order to mitigate these risks, seize new opportunities and meet these expectations, it is important to incorporate an ecosystems services approach to institutional planning and decision-making.²⁰

In recent years, many tools have been developed to incorporate ecosystem services into corporate strategy and planning. One of the first and most basic tools was the Corporate Ecosystems Services Review developed jointly by the World Resources Institute (WRI), the Meridian Institute and the World Business Council for Sustainable Development. In it, a starting point for an organization is to examine its own operations to identify the priority ecosystem services, i.e. those ecosystem services on which it has the greatest impact and dependency (see Figure 2), and understand the latest trends affecting these ecosystem services. This way, the organization can identify its most pressing challenges and opportunities and adopt strategies accordingly. WRI’s Corporate Ecosystems Services Review serves as the foundation used to frame GW’s ecosystems services enhancement strategy.²¹

Figure 2: WRI’s Corporate Ecosystems Services Review Framework of Impact & Dependence



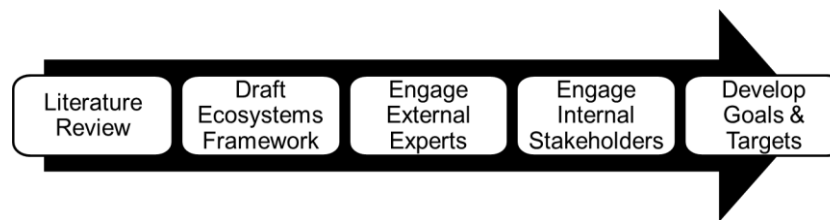
Source: Hanson, C., Ranganathan, J., Iceland, C., & Finisdore, J. (2008). Guidelines for Identifying Business Risks and Opportunities Arising from Ecosystem Change: Version 1.0. World Resources Institute.

FRAMEWORK FOR ECOSYSTEMS ENHANCEMENT

METHODOLOGY

The methodology for crafting the GW Ecosystems Enhancement Strategy follows a five-step process including an extensive literature review and an iterative goal-setting process that engages both internal and external stakeholders and experts.

Figure 3: Methodology to Frame GW Ecosystems Enhancement Strategy



Stakeholder Engagement and Partnerships

The GW Office of Sustainability is committed to engaging the GW community in its operational and business related sustainability efforts. During the framing of this strategy, the GW Office of Sustainability looked to various departments and major contractors on campus (Facilities, Grounds, Transportation, Procurement, Investments, Center for Civic Engagement, Colonial Community, Sodexo, Aramark), as well as faculty and student groups for expertise and insight on the practicability of the approach to improving ecosystems services. A complete list of internal stakeholders consulted can be found under the Acknowledgements section.

External partners have, and will continue to, play a central role in achieving the GW Ecosystems Enhancement Strategy. During the framing of the strategy, the GW Office of Sustainability closely monitored new concepts and models related to ecosystems services planning and met with some of the key thought leaders in this space such as the World Resources Institute, the World Business Council on Sustainable Development, Casey Trees, and Potomac Riverkeeper.

GW's footprint reaches across ecosystems at the local, regional, and global scale. Partnerships spanning across each scope are key to the success of GW's Ecosystems Enhancement Strategy.

The GW Ecosystems Enhancement Strategy is a living document that takes into account diverse perspectives on sustainability. While the GW Office of Sustainability facilitates the planning process, committed staff from across the university actually implement and hone the plan based on their experience and expertise. Additionally, GW faculty and students provide insight on, and inspiration for the vision and contribute innovative ideas for piloting new projects. External thought leaders keep GW abreast of best practices, provide encouragement, and point GW towards external resources to help reach its goals. The GW Office of Sustainability intends to expand and deepen its stakeholder engagement, and to be as transparent as possible on progress and challenges in reaching the sustainability goals.

Scope of GW's Ecological Footprint

GW's vision for sustainability is to "create resource systems that are healthy and thriving for all." To realize this vision, GW strives for ecological neutrality in its operations and business decisions.

The concept of ecological neutrality is based on a recognition that certain economic development activities will inevitably result in some residual impairment of biodiversity and ecosystem services on a given area of land, even with the best environmental mitigation and restoration efforts. However, these detriments can be offset by proactively taking actions to conserve or restore biodiversity and ecosystem services in other areas, with a view to maintaining the overall ecological integrity.

Given this approach, it is important to understand the scope and scale of GW's ecological footprint. Within urban environments, the ecosystems services depend on the natural space within the city, as well as that of peri-urban, suburban, and rural areas surrounding the city. Furthermore, given the global nature of today's economy, city residents and institutions leave ecological footprints that span the globe, and these impacts and dependencies must be taken into consideration as well.²² Similar to the process of conducting a greenhouse gas emissions inventory, GW identified three main scopes of ecological impact:

Scope 1: On GW's campuses

GW's operations and business decisions directly impact and depend on the ecosystem services provided by the various natural resources at GW's District of Columbia and Virginia campuses, plants and food provided by gardens and urban pollinators, healthy air augmented by green spaces and trees, as well as human-made infrastructure that provides resources such as freshwater.

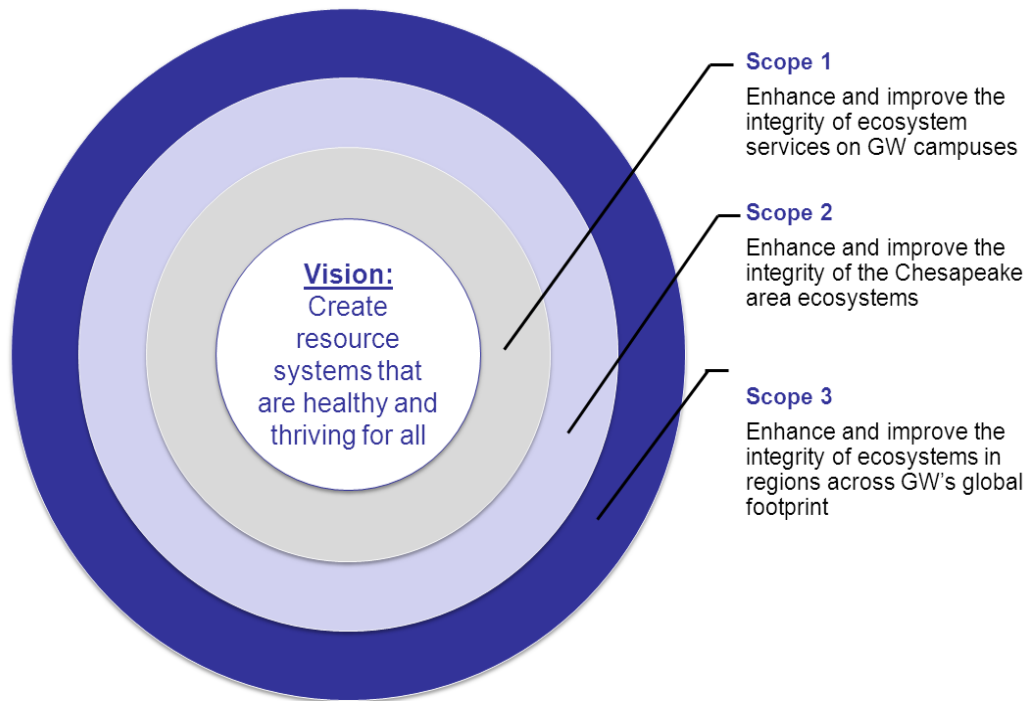
Scope 2: In the Chesapeake Bay Watershed

GW's operations and business indirectly impact and depend on the ecosystem services provided in the Chesapeake Bay Watershed, including stormwater management, nutrient cycling, food provision, and waste decomposition.

Scope 3: Across GW's global footprint

GW has an indirect impact and dependency on ecosystem services across other regions of the globe based on the reach of its supply chain, investment portfolio, travel, and influence through research findings and teaching.

Figure 4: Scope of GW Ecosystems Enhancement Strategy



Identifying the Strategic Focus Areas

GW is located in an urban area; in order to prioritize the opportunities and risks presented by ecosystem services, it is important to understand the nature of urban ecosystems. In a predominantly human-made urban environment, the channels for receiving and delivering ecosystem services to a dense human population in a city are a product of both physical infrastructure and social governance mechanisms. Therefore, it is harder to examine GW's impact and dependence on various ecosystem services in isolation. Instead, the university has identified six goals around which to focus GW's efforts to enhance and nurture the ecosystems services which it impacts and on which it depends.

As depicted in Figure 5, GW is committed to adopting practices and nurturing ecosystem services that:

1. Strengthen habitat and optimize natural space
2. Promote healthy air and climate
3. Foster clean and abundant fresh water
4. Support sustainable food production systems
5. Optimize waste decomposition and treatment
6. Encourage a natural urban environment that helps enhance physical, mental and social well-being

Figure 5: GW Ecosystems Enhancement Strategy Focus Areas



Setting Targets and Indicators

Under each of these strategic focus areas, GW articulates a series of long-term and short-term targets across the three scopes to form a goals-scope matrix, detailing GW’s vision for urban sustainability. The long-term targets articulate a desired state, while the short-term targets are interim milestones or practical actions that the university may take in order to demonstrate more immediate progress. As GW continues its progress, it may adjust long-term targets according to technological, policy, and market shifts, and also outline the next short-term step towards reaching a target.

STRATEGIES IN FOCUS

HABITAT & NATURAL SPACE

Habitat is the natural home or environment of an animal, plant or other organism. Within an ecosystem, there are habitats which provide ecosystem services and resources to almost all forms of life. In urban environments, green spaces provide important ecosystem services, including a natural habitat for indigenous species of plants and animals, regulation of local microclimate, water, pests, and pollination, as well as provide recreation and cultural value.²³

Modern cities are predominantly covered with impervious built areas which do not sustain life such as parking lots and buildings. As a result, urban green spaces are often isolated and fragmented, which hampers the movement – and in some cases the survival – of some indigenous species of plants and animals. This shortage, fragmentation, and isolation of habitat results in a loss of biodiversity, which adversely affects the ecosystem services on which humankind relies.²⁴

Furthermore, brightly lit urban areas have transformed the nightscape.²⁵ Light pollution is “the adverse effect of artificial light, including sky glow, glare, light trespass, light clutter, decreased visibility at night, and energy waste.”²⁶ It may disrupt some of the periodicity and diurnal rhythms of plants and animals with serious ecological and evolutionary consequences. Excessive night lighting may also have serious physiological implications for humans such as interrupting sleep cycles.

Conversely, focused human action can increase the diversity of urban nature. Urban environments have the potential to host a wide variety of green spaces (local parks and gardens, green roofs, living walls) which create niche habitats. This offers opportunities for enhancing the ecosystems through the persistence of native species, the importation of exotic but non-invasive species, and increased biodiversity.²⁷

Given these risks and opportunities, GW is committed to adopting practices and nurturing ecosystems services that strengthen habitat and optimize natural space on its campuses, in the Chesapeake region, and across its global footprint. A summary of GW’s targets for natural space is outlined in Figure 6.

Target 1.1 aims to increase green space on GW’s campuses. The indicator for this target is total permeable campus area (measured in square feet). In the near future, GW is committed to adopting design guidelines around outdoor space that are habitat friendly and promote the use of non-invasive plants. Some potential tactics to achieving these targets include:

- 1) Implement green infrastructure such as living walls, green roofs, etc.
- 2) Convert more impermeable space to green space
- 3) Boost incentives and options for public or alternative forms of transit for faculty and staff to reduce parking demand via single occupancy vehicle use
- 4) Convert former parking spaces to green spaces through the use of low impact development and permeable surface technology.

Figure 6: Targets for Goal 1

Scope 1	Scope 2	Scope 3
Goal 1 Strengthen habitat and optimize natural space		
<p>Target 1.1: Increase green space</p> <p>Short term Target 1.1A: Design guidelines around outdoor space that are habitat friendly and promote non-invasive plants</p> <p>Indicator: Total Permeable Campus Area (in sq. ft.)</p>	<p>Target 1.4: Research biodiversity in Chesapeake watershed and work with local conservation/preservation organizations</p> <p>Indicator: Amount of research funding (\$) for biodiversity-related projects</p>	<p>Target 1.6: Increase sourcing of products that minimize impact on biodiversity and natural space</p> <p>Short term Target 1.6A: Draft a sustainable procurement strategy for three major purchase categories (e.g., paper, electronics, water, furniture, food, vehicles, textiles) by 2015</p> <p>Indicator: % of new contract actions sourcing low-impact product alternatives</p>
<p>Target 1.2: Enhance the biological richness/diversity of the campus</p> <p>Short term Target 1.2A: Design guidelines around outdoor space that are habitat friendly and promote non-invasive plants</p> <p>Indicator: % of university spend on non-invasive and/or native plants</p>	<p>Target 1.5: Reduce light pollution in DC metropolitan area</p> <p>Short term Target 1.5A: Conduct on-site light pollution study with partner organization by 2015</p> <p>Indicator: Number of partners</p>	
<p>Target 1.3: Reduce interior and exterior light pollution from university owned & operated facilities</p> <p>Short term Target 1.3A: 40% of new construction and major renovation projects meet LEED light pollution reduction requirements by 2017</p> <p>Indicator: % or # of new construction or major renovation projects meeting LEED light pollution reduction requirements</p>		

A second target is to enhance the biological richness or diversity of the campus, measured by the percentage of university expenditure on non-invasive and/or native plants on the university grounds. In the short-term, GW aims to adopt habitat-friendly design guidelines around outdoor space that promote the use of non-invasive plants. Potential tactics to achieve this target include:

- 1) Encourage native/adaptive/non-invasive/drought-resistant plantings and pro-habitat landscaping practices using the following criteria for plantings - appearance, adaptability, security and survivability
- 2) Place more bird houses around campus
- 3) Encourage the use of systemic and pre-emergent pesticides and encourage the use of natural predators to manage pests
- 4) Maintain apiaries on campuses to encourage local urban pollinator species and encourage pollinator-friendly plantings on campus
- 5) Connect GW campuses to green ways within the region
- 6) Use the campus as a living laboratory for conducting a campus-wide habitat assessment
- 7) Partner with local NGOs such as Casey Trees to raise awareness about local urban ecosystems, indigenous species, and preservation tactics

The last target under Scope 1 is to reduce interior and exterior light pollution from university-owned and operated facilities. Under this target, GW commits to ensuring that 40 percent of new construction and major renovation projects meet LEED light pollution reduction requirements by 2017. Progress against this target will be measured by the percentage of new construction or major renovation projects that meet the LEED light pollution reduction requirements. To achieve this target, some of the following tactics can be adopted:

- 1) Install occupancy sensors to enable automatic shut-off of non-emergency interior lighting during non-operating hours (between 11PM and 5AM)
- 2) Install full cutoff luminaires on streetscapes and building exteriors
- 3) Use fully shielded outdoor fixtures that direct light downward when applicable
- 4) Ensure exterior lighting installations only as required for safety and comfort

For Scope 2, GW commits to encouraging its scholars to conduct research on biodiversity within the Chesapeake watershed in conjunction with local conservation and preservation organizations. An indicator for this is the amount of research funding allocated for biodiversity-related projects within the region.

GW is also committed to reducing light pollution in the greater DC metropolitan area. By 2015, GW aims to conduct an on-site light pollution study with a number of partner organizations. Some potential tactics to help achieve this target include:

- 1) Partner with the DC City Council, the District Department of Transportation, the District Department of Environment, the DC Zoning Commission, and/or other regional organizations to study and benchmark DC metropolitan area light pollution
- 2) Partner with the International Dark-Sky Association (IDA) to help inform minimum and maximum illumination guidelines suitable for an urban environment
- 3) Leverage partnerships and studies to inform the development of lighting criteria to reduce light pollution on university-owned land, while maintaining safe light levels and adhering to zoning and safety protocols

Finally, under Scope 3, GW aims to increase the sourcing of products that minimize impact on biodiversity and natural space. In the near term, GW aims to draft a sustainable procurement strategy for at least three major purchase categories (e.g., paper, electronics, water, furniture, food, vehicles,

and textiles) by 2015. Progress towards this target will be measured by the percentage of new contract actions sourcing low-impact product alternatives. Some potential tactics include:

- 1) Draft procurement strategies emphasizing sourcing materials with lower adverse impact on biodiversity and preservation of natural spaces (such as sustainably managed wood and paper products, encouraging the use of veneer over laminate for furniture, and sustainably managed feed stocks for textiles)
- 2) Standardize contract language stipulating sustainability requirements such as the use of green cleaning products for housekeeping and washing linens, organic materials in textiles, and recyclable content in paper, electronics, carpets, and furniture

HEALTHY AIR & CLIMATE

The George Washington University is well aware of the risk of climate change and is committed to achieving carbon neutrality. GW was the first university in DC, to join the American College and University Presidents' Climate Commitment (ACUPCC) in 2008. In 2010, the university published its Climate Action Plan in which it committed to becoming carbon neutrality across all three scopes of greenhouse gas (GHG) emissions by 2040. Carbon neutrality will be achieved by reducing university emissions through efficiencies and cleaner energy sources by at least 80 percent, and using credible, local offsets to negate the remaining emissions. This section expands on the commitments detailed in the Climate Action Plan by putting them within the context of GW's urban ecosystem.

Urban ecosystems experience a wide variety of local microclimates because of the varying landscapes they contain. As built infrastructure replaces natural space, surfaces become impermeable and dry and urban regions tend to retain heat more than their rural surroundings, resulting in a phenomenon called the "urban heat island effect."²⁸

Apart from the risks of heat island effect, urban environments commonly exhibit increased exposure to environmental pollutants within our built habitats. In recent years, scientists have concluded that the air within homes and buildings can be more polluted than the outdoor air in even the largest and most industrialized cities. Research also indicates that people spend approximately 90 percent of their time within buildings, making indoor air pollution one of the greatest risks to human health in the urban environment.²⁹

Given these risks, GW is committed to promoting healthy air and climate within the buildings on its campuses, in the Chesapeake region, and across its global footprint.

Under Target 2.1, GW commits to enhancing the tree canopy and green cover to help increase the carbon dioxide sequestration potential and outdoor air filtration capacity on its campuses. In the near term, the university commits to offset the square foot loss of existing tree canopy and green cover from natural causes or campus development with new plantings. GW's campus currently has a 10 percent canopy, which is comparable to the citywide canopy rate. Some potential tactics to achieve this target include:

- 1) Conduct annual campus tree surveys to establish baseline and measure progress

- 2) Factor green cover and tree canopy preservation and expansion into campus construction and development projects via landscaping, green roofs, etc.
- 3) Encourage the increased use of public transport by students, staff, and faculty to reduce demand for parking spaces
- 4) Create an urban/street-side arboretum

A second target under Goal 2, Scope 1 is to enhance the livability of indoor space and increase indoor air filtration capacity in university-owned and operated buildings. One indicator to measure progress towards this target is the number of plantings in indoor spaces. Some potential tactics to achieve this target include:

- 1) Encourage the adoption of interior green spaces (such as living walls and biophilic design) in new constructions and major renovation design
- 2) Encourage the adoption of potted plants or other greenery as part of the Green Office Program
- 3) Purchase materials and equipment comprised of non-toxic or less toxic components (e.g., low volatile organic compounds (VOC) carpets and paints, green cleaning products, Green Guard/Green Seal products, FloorScore hard surface flooring, Green Label carpeting)
- 4) Achieve Indoor Environmental Quality (IEQ) LEED credit 3.2 where the intent is “to reduce indoor air quality problems resulting from construction or renovation to promote the comfort and well-being of construction workers and building occupants” in projects where LEED certification is targeted
- 5) Assess air handling & filtration technology
- 6) Ensure HVAC systems are properly maintained (regular filter change, coils cleaning and repair of damaged parts)
- 7) Maintain and evaluate a green or blue cleaning program
- 8) Ensure interior spaces are properly sealed off during building construction/renovation projects

GW’s third "Healthy Air & Climate" target under Scope 1 is to Reduce GW's total carbon footprint by 80 percent by 2040. In the near term, GW will work to reduce its carbon footprint by 54,000 metric tons of carbon dioxide equivalent (MtCO₂e) by 2025 through building energy efficiency measures. The indicator for this target is the MtCO₂e emitted due to on-site building energy consumption. Some potential tactics to achieve these targets include:

- 1) Implement multi-phase, campus-wide energy efficiency upgrade and retrofit program for existing buildings through a broad mix of projects such as: lighting upgrades/occupancy sensors, boiler control optimization, computer systems that monitor and control building equipment, plug-load management, air handler replacement, and various other means.
- 2) Develop best practice guidelines to improve energy efficiency of new construction to reduce increases in emissions resulting from campus growth
- 3) Conduct more robust and targeted building audits to gain holistic view of the energy savings opportunities across campus
- 4) Develop comprehensive campus utilities master plan to help maximize the benefit from ensuing projects
- 5) Install building dashboards and kiosks to encourage behavior change and engage the campus community in energy reduction efforts

Figure 7: Targets for Goal 2

Scope 1	Scope 2	Scope 3
Goal 2 Promote healthy air and climate		
<p>Target 2.1: Enhance tree canopy and green cover to help increase sequestration potential and outdoor air filtration capacity</p> <p>Short Term Target 2.1A: Offset sq. ft. loss of existing tree canopy and green cover from natural causes or development with new planting</p> <p>Indicator: No net loss of existing tree canopy and green cover</p>	<p>Target 2.4: Increase proportion of commuters using lower carbon commuting options vs. SOVs</p> <p>Short Term Target 2.4A: Establish staff telecommuting policies for offices on each GW campus</p> <p>Indicator: MtCO₂e emitted due to student, faculty, and staff commuting</p>	<p>Target 2.7: Increase sourcing of lower climate footprint products</p> <p>Short Term Target 2.7A: Draft a sustainable procurement strategy for three major purchase categories by 2015</p> <p>Indicator: % of new contract actions sourcing low-carbon alternatives</p>
<p>Target 2.2: Enhance livability of indoor space and increase indoor air filtration capacity</p> <p>Indicator: Plantings in indoor spaces</p>	<p>Target 2.5: Generate 10% of energy demand through on-site low-carbon technologies by 2040</p> <p>Short Term Target 2.5A: Complete a number of new installations of small-scale, on-site low-carbon technologies by 2015</p> <p>Indicator: kWh output from on-campus renewable generation</p>	<p>Target 2.8: Mitigate air travel mileage of GW staff and faculty</p> <p>Short Term Target 2.8A: Implement carbon measuring and reporting mechanism for staff and faculty air travel</p> <p>Indicator: MtCO₂e emitted via air travel</p>
<p>Target 2.3: Reduce GW's total carbon footprint by 80% by 2040</p> <p>Short Term Target 2.3A: By 2025, reduce campus GHG emissions by 54,000 MtCO₂e through building energy efficiency and conservation measures.</p> <p>Indicator: MtCO₂e emitted due to on-site building energy consumption</p>	<p>Target 2.6: Decrease the carbon intensity of the region's electricity fuel mix and create a system for credible, local carbon offsets</p> <p>Indicator: MtCO₂e emitted through electricity and natural gas (heating) consumption</p>	

Under Scope 2, one of GW's targets is to increase the proportion of commuters using lower carbon commuting options versus single occupancy vehicles (SOVs). An indicator for this target is MtCO₂e emitted due to student, faculty, and staff commuting. In the near term, GW will work to establish staff telecommuting policies for offices on each GW campus. Some potential tactics to achieve these targets include:

- 1) Promote lower carbon commuting option such as Capital BikeShare, Washington Metropolitan Area Transit Authority (WMATA) rail and bus lines, carpooling, rideshare, etc.

- 2) Offer programs and incentives to support increased use of telecommuting and alternative work schedule options
- 3) Use video/teleconferencing options wherever available for regularly scheduled staff meetings
- 4) Incorporate contract language in new vehicle lease and shuttle contracts requiring use of low-carbon alternative vehicle technologies and fuels (e.g. vehicles approved as part of Federal Energy Management Program's federal fleet management guide)
- 5) Understand traffic patterns on campus to provide real-time support for commuters

GW is also committed to generating 10 percent of its energy demand through on-site low-carbon technologies by 2040. Progress towards this target will be measured by kilowatt hour (kWh) output from on-campus renewable generation. By 2015, GW will work to complete a number of new installations of small-scale, on-site low-carbon technologies. Some tactics to achieve these targets include:

- 1) Conduct feasibility analyses for on-site renewable generation capacity alternatives
- 2) Investigate federal and local incentives to subsidize investment in local renewable generation capacity
- 3) Facilitate collaborative academic and research opportunities to help launch on-site renewable energy technology and use campus as a test bed for demonstration projects

With target 2.6, GW aims to decrease the carbon intensity of the region's electricity fuel mix, as measured by the MtCO_{2e} emitted through electricity and natural gas (heating) consumption. GW also aims to help create a system for credible, local carbon offsets. Some tactics around this target include:

- 1) Explore 'near-the-fence'/regional renewable energy partnership opportunities
- 2) Partner with local and regional organizations to leverage collective bargaining power and influence regional investments in new generation capacity by utility providers

Under Scope 3, GW's activities relate to sustainable procurement. GW is committed to increase sourcing of lower climate footprint products, as measured by the percentage of new contract actions to source low-carbon alternatives. In the near term, GW aims to draft a sustainable procurement strategy for at least three major purchase categories (e.g., paper, electronics, water, furniture, food, vehicles, and textiles) by 2015. Some of the ways this can be achieved are:

- 1) Engage GW students and vendors in eco-labeling/carbon foot printing project of products sold on campus
- 2) Work with GW Procurement to help identify the origin of products in its internal purchasing catalog, iBuy (local & regional sources preferred)
- 3) Partner with NGOs to determine credible rating and certification agencies
- 4) Draft procurement strategies emphasizing sourcing energy efficient, lower carbon footprint, and/or non-ozone depleting products (e.g., via EPA Energy Star, FEMP, EPEAT, and SNAP-designated products)
- 5) Adopt paperless initiatives on campus for conferences, events, and meetings
- 6) Formalize campus-wide reuse program to reduce demand for new equipment and other purchases
- 7) Implement green purchasing training and awareness program

- 8) Collaborate with delivery companies like FedEx, UPS and the US postal service and product vendors to consolidate delivery schedules to reduce shipment frequency and to shift to less carbon intensive delivery vehicles

Finally, GW also aims to reduce its impact across its global footprint by trying to mitigate the air travel mileage of GW staff and faculty. As a result, GW will implement carbon measuring and reporting mechanism for staff and faculty air travel. A key indicator for this target is the MtCO₂e emitted via air travel. In order to achieve this target, some potential tactics include:

- 1) Continue to refine air travel emissions tracking and measuring capability
- 2) Negate the remaining emissions by purchasing credible local offsets
- 3) Promote staff air travel purchases via iBuy to enable better tracking of travel expenditures, mileage, and associated emissions
- 4) Enhance remote teleconferencing and computing capability to reduce air travel demand
- 5) Use non-stop flights when available
- 6) Encourage the use of rail for travel within 250-300 miles whenever available

FRESHWATER PROVISION

In 2010, GW released the *GWater Plan – A Roadmap to Water Sustainability at GW*. As detailed in this plan, the university is committed to reducing its potable water usage, increasing the retention of rainwater, enhancing water quality and reducing the use of bottled water. This section expands on the targets described in the *GWater Plan* and places them within the context of ecosystem services – ensuring a system-wide approach to managing this vital and valuable natural resource.

According to the Millennium Ecosystems Assessment, the provision of freshwater itself is an important ecosystem service, and as water is used by people for domestic use, irrigation, power generation, and transportation. Not only do ecosystems provide us with freshwater for our use, they also help regulate water flow by influencing the timing and magnitude of water runoff, flooding and groundwater aquifer recharge. Ecosystems also provide natural water purification and treatment services.³⁰

However, the functioning of these natural ecosystem services is hampered in urban environments by the predominance of built-up infrastructure, which is made of impermeable surfaces. Rainwater is not able to recharge groundwater aquifers, and instead becomes surface water runoff that is diverted back into the local water bodies by urban sewage infrastructure. A high volume of surface water runoff results in degraded water quality as it picks up urban street pollutants such as litter on its way down the drain. It also increases the risk for flooding.³¹

Furthermore, water is a resource with a “strong regional dimension,” and changes to these water flows can create serious problems. Estimates show that the flow of water represents a large percent of all material flow entering and leaving cities. Cities rely on adjacent ecosystem services in their surrounding region to break down biodegradable wastes and filter water. However, urban consumption and production often results in the accumulation of non-degradable and toxic substances in the water stream, thus impairing the capacities of ecosystems downstream.³²

Located within the Chesapeake Bay watershed, Washington, DC, receives water from three rivers – the Potomac River, the Anacostia River, and Rock Creek. Therefore, the quality of water in the District is affected by activities throughout the watershed, and activities within the District affect the quality of water downstream and the health of Chesapeake Bay.³³ The Anacostia River, which is plagued by a host of problems typical of urban rivers, is the Washington, DC, area’s greatest source of toxic pollution to the Chesapeake Bay.³⁴

The city’s combined sewer system further exacerbates water quality downstream. In dry weather, it carries both sanitary sewage and stormwater runoff to DC Water’s Blue Plains Advanced Wastewater Treatment Plant, the largest plant of its kind in the world. However, when rain or snowfall events over half an inch of precipitation occur, the system overflows and discharges untreated waste directly into the Anacostia and Potomac.³⁵

Blue Plains is the largest point discharger to the Chesapeake Bay, and accounts for roughly 2 percent of the bay’s nitrogen input. Nitrogen aids the growth of algae in the Bay, which in turn causes the depletion of oxygen needed by fish and other aquatic and disrupts the fragile ecosystem within the region.³⁶

Another prominent water issue for the region is the increased usage of disposable bottled water. Negative perceptions about the water quality of municipal tap water supplies encourage this unsustainable trend. Bottled water usage also has its own negative implications, including the vast quantities of solid waste it produces, the questionable quality of the bottled water, the financial cost to consumers, and the large carbon footprint associated with the manufacture, transport, and disposal of water bottles. Bottled water also has an impact on GW’s global footprint as it removes drinking water from local communities elsewhere in the world in unsustainable ways.

Despite these challenges, there are a number of opportunities to adopt new technologies for infrastructure development and behavior change programs that will serve to replenish freshwater supplies within the city and its surrounding region. Therefore, GW is committed to using practices and creating ecosystem services that promote clean and abundant freshwater.

Under scope 1, GW seeks to reduce its potable water consumption by 25 percent over 10 years from an FY08 baseline. This will be measured in total annual water consumption in kilo gallons (kgal), as summarized on GW’s water bills. The following tactics will be adopted to help achieve this target:

- 1) Create an Operations policy to prioritize the installation of low-flow fixtures in cases of plumbing repairs/replacement
- 2) Prioritize WaterSense appliances where applicable
- 3) Continue to host Eco-Challenge between residence halls to encourage water conservation
- 4) Continue the expansion of Eco-Challenge to faculty & staff buildings
- 5) Create communications guidelines when low-flow fixtures are installed to ensure that users understand the new products they are using (signage, informational sheets).
- 6) Adopt improved leak detection and repair policy that prioritizes more holistic leak investigation
- 7) Encourage drought-resistant, non-invasive plantings on campus grounds

The next two targets under Scope 1 relate to permeable space and stormwater retention. GW has committed to a 10 percent absolute increase in permeable space over 10 years from an FY11 baseline.

The primary indicator for this is total permeable campus area (sq. ft.). Some potential tactics to help achieve this target include:

- 1) Pilot the use of new permeable surface technologies on campus
- 2) Ensure that green space planning is integrated into renovation and construction projects (by using permeable pavers or other permeable surface technology in GW parking garages or uncovered parking facilities)
- 3) To the extent that it is feasible, convert GW’s undevelopable land area (amounts to 58,000 sq. ft. according to the Campus Plan) to permeable surface

Figure 8: Targets from Goal 3

Scope 1	Scope 2	Scope 3
Goal 3 Use practices and create ecosystem services that promote clean and abundant fresh water		
<p>Target 3.1: 25% absolute reduction in potable water consumption over 10 years from FY08 baseline Indicator: Total Annual Water Consumption (in kgal)</p>	<p>Target 3.4: Encourage watershed replenishment through projects on GW’s campus that qualify for water quality trading schemes Indicator: Number of projects and/or credits achieved</p>	<p>Target 3.5: 50% reduction in university expenditure on bottled water over 5 years from FY11 baseline Indicator: University expenditure (\$) from GW Procurement on bottled water</p>
<p>Target 3.2: 10% absolute increase in permeable space over 10 years from FY11 baseline Indicator: Total Permeable Campus Area (in sq. ft.)</p>		<p>Target 3.6: Increase sourcing of lower water footprint products Short-Term Target 3.6A: Draft a sustainable procurement strategy for three major purchase categories by 2015 Indicator: % of new contract actions sourcing low-water alternatives</p>
<p>Target 3.3: By 2021 reuse all retained stormwater for greywater systems, cooling towers, and irrigation Indicator: Total stormwater reclaimed (in kgal)</p>		

Target 3.3 commits GW to reuse all retained stormwater for greywater systems, cooling towers, and irrigation by 2021. This is a step ahead of regulation as proposed EPA standards will require GW to retain some stormwater. Progress against this target will be measured in kilo gallons (kgal) of total stormwater reclaimed. Potential tactics for achieving this target include:

- 1) Incorporate new water sourcing technologies such as greywater systems into design standards for new construction and major renovations

- 2) Pilot new technologies to harvest, and reuse rainwater such as permeable paver technology, rain barrels, cisterns, green roofs, bioswales, rain gardens and tree box technologies
- 3) Work with the District Department of Transportation to incorporate water saving technologies in public space as part of the landscaping for new projects on campus e.g., plans for larger tree boxes as part of Streetscape
- 4) Incorporate rain water capture systems in new parking/parking garage installations

In the Chesapeake Bay region, GW seeks to encourage watershed replenishment through projects on GW's campus that qualify for water quality trading schemes. Potential indicators for this target include the number of projects implemented, and/or the credits achieved. Some of the tactics that could be employed to help achieve this target include:

- 1) Partner with organizations like the Bay Bank to investigate projects on GW's campus that may qualify for water quality trading
- 2) Link to farmers in Virginia to cooperate on watershed restoration projects
- 3) Partner with organizations within the Chesapeake Bay area

From the perspective of GW's global water footprint, GW is committed to a 50 percent reduction in university expenditure on bottled water over five years from an FY 2011 baseline. This can be accomplished by the following means:

- 1) Integrate preferred purchasing strategy to decrease bottled water purchase and prioritize filtered water systems
- 2) Standardize and improve existing water fountains on campus
- 3) Integrate bottle filling stations into existing fountains
- 4) Increase signage, outreach and communications efforts to encourage GW community to drink tap water/filtered tap water
- 5) Partner with student groups to provide funding for reusable bottled water purchases.

The last target under scope 3 also relates to procurement. GW aims to increase the sourcing of lower water footprint products. By 2015, GW aims to have drafted a sustainable procurement strategy for three major purchase categories (e.g., paper, electronics, water, furniture, food, vehicles, and textiles). Progress towards this target can be measured by the percentage of new contract actions sourcing low-water alternatives. Potential tactics to achieve this include:

- 1) Engage GW students and vendors in eco-labeling project of products sold on campus
- 2) Work with procurement to help identify the origin of products in its internal purchasing catalog, iBuy (local and regional sources preferred)

FOOD PRODUCTION SYSTEMS

One of the most vital ecosystem services is the sustainable and healthy production of food, in the form of crops, livestock, capture fisheries, aquaculture, and wild foods.³⁷

Urban centers, with their growing populations and lack of arable land, are highly dependent on rural farm communities near and far for their supply of food. However, with the increasing lack of food

security in many countries and calls for the sustainable intensification of production, a new paradigm is emerging to promote regional and local food self-reliance.³⁸

Interactions between local and global food supply chains can be governed in ways to promote trade, but still improve the conditions for small farmers within the region. By encouraging local food production, wherever feasible within city boundaries and in their immediate surroundings, cities may be able to reduce the distance for transporting food, lower food prices, better manage their water resources, increase local green space, and ensure a better and more diverse diet for their citizens. It is estimated that the production of food such as green vegetables, eggs, milk, and meat from small animals, by urban households can supply between 20 to 60 percent of their total food consumption.³⁹

GW is committed to using practices and creating ecosystem services that support sustainable food production systems on its campuses, within the Chesapeake region, and across its global footprint.

Figure 9: Targets from Goal 4

Scope 1	Scope 2	Scope 3
Goal 4 Support sustainable food production systems		
<p>Target 4.1: Produce food on campus</p> <p>Short Term Target 4.1A: Sell food grown on campus in on-campus venues</p> <p>Indicator: Pounds of food produced on campus</p>	<p>Target 4.3: Source food from regional sources</p> <p>Short Term Target 4.3A: Highlight all food in GW run venues with its producer origin</p> <p>Indicator: % of university expenditure of local food</p>	<p>Target 4.5: Increase transparency of food served on campus</p> <p>Short Term Target 4.5A: Conduct "GW Food Footprint" for some products in 2013</p> <p>Indicators:</p> <ul style="list-style-type: none"> • Number of third party certifications used; • Results of food sourcing survey
<p>Target 4.2: Engage with on-campus food vendors to encourage sustainable practices</p> <p>Short Term Target 4.2A: Certify 3-5 vendors on campus in 2013</p> <p>Indicator: Number of certified restaurants</p>	<p>Target 4.4: Raise awareness about nutrition and environmentally-friendly farming and eating practices</p> <p>Indicator: Number of awareness campaigns</p>	<p>Target 4.6: Integrated food studies into curriculum and research initiatives at the universities</p> <p>Indicators:</p> <ul style="list-style-type: none"> • Number of courses offered; • Number of research dollars towards food studies

The first target under scope 1 highlights GW’s commitment to local food reliance by committing to producing food on campus. In the near-term, GW also aims to provide food produced on its campus at on-campus venues. The key indicator to measure progress against this target is the weight of food (in pounds) produced on campus. Some potential tactics to achieve this target include:

- 1) Increase spaces devoted to growing food on campus
- 2) Encourage greater community engagement in gardening programs

- 3) Increase the number of apiaries on campus
- 4) Develop a GW Food Cooperative, or a GW Bulk buying program for food
- 5) Work with on-campus vendors to 'sell' one product from GW's GroW Community Garden by fall 2013

GW will strive to engage with on-campus food vendors to encourage sustainable practices, and is considering certifying vendors with green practices. In 2013, GW hopes to have certified between three to five vendors on campus. Some potential ideas to help accomplish this target include:

- 1) Host a Sustainable Food Fair
- 2) Develop a green certification for GW food venues (including non-Sodexo vendors)
- 3) Launch green catering guide by 2012

GW is also committed to sourcing more food from regional sources. In the near term, GW will seek to highlight the produced origin of all food served in GW run venues to raise awareness of GW's impact on local and global food systems. Progress against this target will be measured by the percentage of university expenditure of local food. Some ideas to work towards this target include:

- 1) Integrate local food percentages into food service contracts
- 2) Help to broker contact between vendors and local farms
- 3) Partner with other DC metropolitan area organizations (such as NGOs, schools, etc.) to pool demand for locally-sourced food

Under scope 2, GW also commits to raising community awareness about nutrition and environmentally-friendly farming and eating practices. These awareness campaigns can be run jointly by the School of Public Health and Health Services and the School of Medicine and Health Sciences.

Across its global footprint, GW commits to increased transparency of its food procurement. In 2013, GW seeks to conduct the first ever GW Food Footprint for some of the food served on its campuses. Potential indicators to measure progress towards this target include the number of third party certifications used and/or the results of a campus-wide food sourcing survey. Some potential tactics to achieve increased transparency are:

- 1) Partner with GW food service providers to increase transparency of their sourcing practices via labeling, survey responses and engagement
- 2) Use the Real Food calculator and/or other Sodexo tools to help track food transparency

GW is also committed to integrating food studies into its curriculum and other research initiatives at the university. Some key indicators to measure progress against target 4.6 include the number of food-related courses offered and/or the amount of research funding directed towards food studies. One potential tactic is to increase service learning and capstone projects related to global food challenges available to GW students. Another tactic is to launch a GW food institute to encourage interdisciplinary research related to sustainable food production systems.

WASTE DECOMPOSITION & TREATMENT

Waste management is crucial issue for the healthy functioning of ecosystems services. All natural processes and individual living organisms generate waste. However, in nature, diverse ecosystems are sustained because of the biodiversity they possess, whereby the waste of one species becomes a resource for the other, thus maintaining a balance. However, when one species is dominant, there is an accumulation of waste causing an imbalance in the ecosystem. Untreated waste poses a threat to human health and well-being, as well as to the integrity of natural habitats.⁴⁰

This problem is particularly acute in urban centers, where natural waste treatment and decomposition services are not available or impaired. The sheer quantity and speed at which waste is being generated is alarming. Also, the composition of urban waste being generated is also shifting – “from dense and more organic to bulky and increasingly non-biodegradable.”⁴¹

To address the challenge of waste management in a holistic and sustainable way, GW is considering adopting a Zero Waste approach. The Zero Waste approach mimics the way waste is treated in nature - by thinking of used materials, garbage and discards as potential resources for others to use. It considers the entire life-cycle of all products, and designs our wastes for future application. This approach reduces consumption, maximizes recycling and composting, encourages reuse, minimizes the waste that goes to the landfill, ensures that products are made to be reused, repaired or recycled back into nature or the marketplace. The internationally accepted standard for Zero Waste for businesses and communities is to achieve over a 90% diversion of waste from landfills and incinerators.⁴²

GW is committed to using practices and creating ecosystem services that optimize waste decomposition and treatment. Under scopes 1 and 2, GW aims to achieve zero waste in the long-term. The indicator used to measure progress against this goal is the percentage of waste diverted from the landfill or incinerator.

The university has committed to a number of short-term targets to move towards Zero Waste on its campuses. GW hopes to introduce a pilot program for front-of-house composting on the Mount Vernon campus by fall 2012 and on the Foggy Bottom campus by the following year. Also, in 2013, GW will launch a website for its reuse program, and explore the feasibility of opening a showroom at the graduate resident hall, Hall on Virginia Avenue. By 2017, GW aims to increase its recycling rate to 50 percent. Some potential tactics to help achieve these targets include:

- 1) Create a Zero Waste Coordinator position at the university
- 2) Work with Campus Development and Procurement to ensure that guidelines for responsible disposal of construction debris are clearly highlighted in contracts with vendors
- 3) Increase the number and quality of trainings for housekeeping staff on recycling
- 4) Increase the number of engagement events with students to educate them about recycling practices
- 5) Update and standardize recycling waste infrastructure
- 6) Develop scalable, on-site composting infrastructure
- 7) Conduct responsible consumption awareness programming
- 8) Expand the on-campus reuse program
- 9) Conduct waste audits through student projects or external vendors
- 10) Create a composting plan for yard waste

Figure 10: Targets from Goal 5

Scope 1	Scope 2	Scope 3
Goal 5 Optimize waste decomposition and treatment		
<p>Target 5.1: Zero Waste</p> <p>Short Term Target 5.1A: Increase recycling rate to 50% by 2017</p> <p>Short Term Target 5.1B: Introduce front-of-house composting on MVC by Fall 2012 and FB by Fall 2013</p> <p>Short Term Target 5.1C: Launch Reuse program website in 2013</p> <p>Indicator: Waste Diversion Rate</p>	<p>Target 5.2: Zero Waste</p> <p>Short Term Target 5.2A: Create regional reuse partnerships</p> <p>Short Term Target 5.2B: Establish regional composting partnerships</p> <p>Short Term Target 5.2C: Reduce litter on campus that would end up polluting the Chesapeake watershed</p> <p>Indicator: Waste Diversion Rate</p>	<p>Target 5.4: Encourage sustainable practices in our sourced products that reduce waste</p> <p>Short Term Target 5.4A: Draft a sustainable procurement strategy for three major purchase by 2015</p> <p>Indicator: % of new contract actions sourcing low waste alternatives</p>
	<p>Target 5.3: Zero Pollution</p> <p>Short Term Target 5.3A: Pilot green chemistry in one lab by 2015</p> <p>Indicator: TBD</p>	

Under scope 2, the university also has a number of short-term targets to move towards zero waste. GW aims to create regional reuse and composting partnerships, and to reduce litter on campus that would end up polluting the Chesapeake watershed. In order to achieve these, GW will:

- 1) Investigate regional composting partnerships
- 2) Facilitate the expansion of the regional reuse program
- 3) Maintain an Integrated Pest Management plan
- 4) Launch an "Adopt-a-Street" campaign with Greek Life
- 5) Work on a disposable-reduction campaign
- 6) Enhance the number of trash cans and recycling bins in private and public space

Another target for the university to reduce its negative impact on the Chesapeake watershed is zero pollution. In the short term, GW will pilot green chemistry in one lab by 2015. Together with the Chemistry department in the Columbian College of Arts and Sciences and the GW Hospital, GW will work to develop guidelines for green labs.

Across GW’s global footprint, the university aims to encourage sustainable practices to reduce waste in the products it sources. By 2015, GW will aim to draft a sustainable procurement strategy for three major purchase categories (e.g., paper, electronics, water, furniture, food, vehicles, and textiles). Progress against this target will be measured by the percentage of new contract actions sourcing low waste alternatives. In order to achieve these targets, GW can adopt some of the following tactics:

- 1) Partner with relevant stakeholders to help adopt sustainable practices
- 2) Embed zero waste tactics into supplier contracts (i.e., packaging reduction, recyclable/compostable material composition)
- 3) Enhance the Reuse program for furniture, electronics, and other goods
- 4) Explore the possibility of creating an IT refurbishing initiative
- 5) Incorporate sustainable waste handling requirements into construction/renovation contracts
- 6) Implement compost handling infrastructure or contracts to process food and other compostable waste streams
- 7) Collaborate with GW Innovation Task Force's (ITF) Paperless Initiative and other information technology-related ITF initiatives examining the greater use of cloud computing, thin client hardware, and electronic faxes.

PHYSICAL, MENTAL & SOCIAL WELL-BEING

Urban centers can be very stressful environments for their citizens. This is one reason why natural spaces, which provide recreational and cultural ecosystem services, are so highly valued in cities.⁴³ Even small green areas are considered significant as they can increase the physical and psychological well-being of urban citizens.⁴⁴

Not only do these ecosystems provide a level of aesthetic beauty that is closely linked to the cultural and ethical values of that community, but also they are important for public health as they provide a space for physical activity and socializing. High quality urban natural spaces are easily accessible, have clean air, low levels of noise pollution, are connected to surrounding green areas and, as a result, exhibit biodiversity.⁴⁵

In addition to natural spaces, cities also host many other cultural perspectives and artifacts as they contain the built heritage of a given communities such as significant buildings and urban landscapes.⁴⁶

To make the most of this opportunity, GW is committed to using practices and creating ecosystem services that encourage a natural urban environment that helps enhance physical, mental, and social well-being.

Under scope 1, GW aims to increase access to and awareness of local natural spaces for the GW community. Some potential progress indicators include the numbers of: events held on campus, Green Grad Pledgers, survey respondents, Eco-Reps, and offices participating in the Green Office Program Network. To achieve this target, some of the activities GW will undertake include:

- 1) Use campus as a living laboratory and by fall 2012 conduct an audit of the ability of campus to support physical activity such as walk-ability, safety, or stair access
- 2) Integrate Green Campus Walking Tours in the relevant media outlets (e.g. GW mobile application, Twitter, Facebook, web page, etc.)
- 3) Encourage more volunteer hours in gardens
- 4) Launch monthly Sustainability Showcase Brown Bag Lunch events for students, staff and faculty to highlight on-campus initiatives
- 5) Work with GW Athletics to encourage use of outdoor space for recreational activities

- 6) Encourage botany/biology students and professors to conduct nature walks
- 7) Add signage to campus to highlight 'green' features, and include mile markers to promote well-being
- 8) Conduct training/ mentorship for the Eco-Reps
- 9) Create an urban/street side arboretum and use it as an educational tool.
- 10) Partner with local watershed organizations like the Potomac Riverkeeper to encourage people to visit the rivers
- 11) Create raised beds with wheelchair access for the hospital and therapeutic gardening
- 12) Partner with the Smithsonian Institute to connect students to green space on the National Mall
- 13) Launch "Urban living is sustainable" campaign for freshmen at Colonial Inauguration, and adopt consistent signage and messaging
- 14) Create dialogue around human interaction with local ecosystems with relevant organizations to find solutions to these problems/challenges/issues

Figure 11: Targets from Goal 6

Scope 1	Scope 2	Scope 3
Goal 6 Encourage a natural urban environment that helps enhance physical, mental, and social well-being		
<p>Target 6.1: Increased campus sustainability programming/awareness and increased access to local natural spaces for the GW community</p> <p>Indicator:</p> <ul style="list-style-type: none"> Number of events Green Grad Pledge Campus Survey Number of Eco-reps Number of offices participating in the Green Office Program 	<p>Target 6.2: Increase GW community's awareness of and engagement with regional natural areas</p> <p>Indicator:</p> <ul style="list-style-type: none"> No. of projects Total Volunteer Hours No. of partners 	<p>Target 6.3: Increase GW community's awareness of and engagement with global natural areas</p> <p>Indicator:</p> <ul style="list-style-type: none"> No. of projects Total Volunteer Hours No. of partners

GW also aims to increase the community’s awareness of and engagement with regional natural areas. Key progress indicators include the total number of projects, total volunteer hours and number of community partners. Some potential tactics to achieve this target include:

- 1) Leverage alternative breaks to promote sites within the Chesapeake watershed for service learning projects
- 2) Establish a list of Chesapeake area partner organizations and sign the Maryland-DC Campus Compact
- 3) Continue the integration of sustainability principles into Freshman Day of Service, Martin Luther King, Jr. Day of Service and Earth Day
- 4) Promote and foster internships in the Chesapeake region for students
- 5) Partner with relevant Chesapeake area organizations for events, capstone projects, class visits and sustainability treks to ecosystems in the region
- 6) Work with the Bridge Project to develop a comprehensive map of service learning projects within the region to understand GW’s local impact

- 7) Create a dialogue around human interaction with regional ecosystems with relevant organizations to find solutions to various challenges facing the Chesapeake region

Similarly under scope 3, the university aims to increase the GW community's awareness of and engagement with global natural areas. Some potential tactics to accomplish this target include:

- 1) Leverage alternative breaks to promote trips to fragile ecosystems across the world
- 2) Integrate national and international field study opportunities into academic offerings
- 3) Launch academic programming to foster understanding of GW's supply chain and implications on global ecosystems
- 4) Develop a comprehensive map of service learning projects around the globe to understand GW's impact
- 5) Create a dialogue around human interaction with global ecosystems with relevant organizations to find solutions to global challenges

PROCUREMENT

While it is important for organizations to understand how their operations impact and depend on biodiversity and ecosystem services, it is also crucial for them to look upstream in their supply chain and understand the indirect effects of their purchasing decisions. Irrespective of location, if their suppliers are using unsustainable production processes that have an adverse effect on ecosystem services, it could result in potential operational disruptions or the risk of reputational damage in the future. Additionally, close collaboration with suppliers can ensure innovative products, which have fewer negative impacts on biodiversity and ecosystem services and result in increased sales.⁴⁷

Sustainable Procurement Targets

Target 1.6: Increase sourcing of products that minimize impact on biodiversity and natural space

Target 2.6: Increase sourcing of lower climate footprint products

Target 3.5: 50% reduction in university expenditure on bottled water over five years from FY11 baseline

Target 3.6: Increase sourcing of lower water footprint products

Target 4.3: Source food from regional sources. *In the short term, GW aims to highlight the producer origin of all food in GW run venues.*

Target 4.5: Increase transparency of food served on campus. *In 2013, GW aims to conduct the GW Food Footprint for some of its products.*

Target 5.4: Encourage sustainable practices in our sourced products that reduce waste

This is why some of the key targets under scopes 2 and 3 are related to sustainable procurement. GW aims to develop sustainable procurement strategies for three major purchase categories (e.g., paper, electronics, water, furniture, food, vehicles, and textiles) by 2015. The following text box summarizes the different targets related to sustainable procurement across the six strategic focus areas.

INVESTMENT & FINANCE

In today's global economy, it is hard to understand the extent to which companies are dependent on, or impact ecosystem services. As with sustainable procurement, it is important for investors to understand if the groups they invest in are managing their risks and opportunities suitably. Investors can influence investment policies and practices to encourage companies to adopt more sustainable practices.⁴⁸

With more than \$400 billion in combined assets, US college and university endowments constitute a significant segment of institutional investors. In the past, college endowments were considered the pioneers of responsible investing. This may be partly because these funds accommodate a wide range of interest groups – students, faculty, alumni, trustees, civil society organizations – each with strong opinions on the environmental, social, and governance (ESG) implications of college investments.⁴⁹

However, over the past few decades, this group has shifted its attention. According to a 2012 report by the Tellus Institute and The Investor Responsibility Research Center Institute, a number of colleges have moved their investments from “directly held, publicly traded securities into indirect investments in comingled vehicles, and opaque illiquid investments in alternative asset classes.” Presently, the primary forms of ESG investing activity exhibited by this group seems to be limited to negative screening of public equity portfolios related to single issues such as tobacco, climate change and investments in conflict areas such as Sudan. Endowment funds do not participate in the leading ESG investor networks. ESG investing has been perceived as a tool for stakeholder crisis management, rather than as a way to mitigate risks or an opportunity to generate positive social or environmental impact.⁵⁰

Universities have an opportunity to integrate ESG factors into their investment decision-making activities as a way to fortify the investment portfolio against future risks in the market, and to be well-positioned to take advantage of future market opportunities. The incorporation of ESG criteria into endowment management can take a variety of forms including filtering portfolios for positive attributes, using ESG criteria to identify “best-in-class” investments in a particular sector, proxy voting, shareholder resolution filing and engaging in dialogue directly or indirectly with the company.⁵¹

GW is committed to developing a framework to consider sustainability trends and issues as part of the evaluation of strategic investment opportunities and risks. This target is under scope 3. As part of this commitment, GW aims to develop a process for reviewing proxy votes on sustainability-related issues by 2014. Some potential tactics that can be employed to achieve these targets include increasing investment officers' understanding of sustainability and identifying short-, medium- and long-term trends and issues related to sustainability.

Targets & Indicators

Target 7.0: Develop a framework for considering sustainability trends and issues as part of the evaluation of strategic investment opportunities and risks

Short Term Target 7.0A: Develop a process for reviewing proxy votes on sustainability-related issues by 2014

Indicator: Percentage of investments that is sustainable

MOVING FORWARD

The GW Ecosystems Enhancement Strategy is an ambitious document, with a broad mandate: to serve as a guide for GW as it moves towards sustainability by improving the state of ecosystem services on which it has an impact, or from which it draws benefits. GW is approaching the implementation of the strategy with an eye towards inquiry, learning, and innovation. As the university tests various approaches to implementing the plan, it will look to others in the higher education and corporate sector for input and feedback based on their experiences and observations in augmenting ecosystem services within their own realm of influence.

PLANNING FOR IMPLEMENTATION

This document provides six strategic focus areas and outlines long-term targets for GW's vision for urban sustainability. However, GW will likely adjust the targets with time to accommodate future market, scientific, and policy changes.

Additionally, GW will conduct additional research and gather further input from key stakeholders on each of the targets to ensure that GW is on a practical track and utilizing best practice to reach the desired state. The GW Ecosystems Enhancement Strategy provides an overarching framework for possible future action plans such as a zero waste plan, a sustainable food plan, or a plan for sustainability in academics and curriculum.

The process of creating this strategy has served as a powerful impetus for collaboration amongst internal stakeholders. The GW Office of Sustainability is forming working groups to develop action plans for the ecosystems services affected by the university, just as with the GW Climate Action Plan and GWater Plan. The GW Office of Sustainability will facilitate this process and look to internal and external stakeholders to provide insight to the action plans, which will assess the current state, set a baseline, and outline a roadmap to reach the targets, including a financial model and implementation timeline.

In addition to facilitating working groups, the GW Office of Sustainability will conduct regular outreach to staff in offices across administrative divisions and academic departments through the GW Green Office Program and GW Eco Beat.

STAKEHOLDER ENGAGEMENT AND REPORTING

In addition to staff in divisions across the university taking up the implementation of sustainability at GW, students and faculty will continue to play an important role. Students at GW provide ideas, passion, and influence across the campus on sustainability issues. Student leaders are involved with the Food Justice Alliance, Green GW, Net Impact, Eco-Reps, Campaign GW, Energy Group, Roots and Shoots, Neighbor's Project, Environmental Law Association, Planet Forward, Residence Hall Association, and the Student Association. The GW Office of Sustainability will look to student leaders as a source of inspiration and ideas, as well as support in engaging other students across the university in sustainability activities and programs.

The GW Office of Sustainability will continue to seek support from faculty across the disciplines based on their research and expertise. The GW Office of Sustainability will work closely with Deans, the Institute

for Sustainability, the Office of the Vice President of Research, and the Provost’s Office to integrate research and curricular aspirations into the sustainability strategy. Additionally, Planet Forward, a program of the School of Media and Public Affairs may act as an outreach arm for GW’s Ecosystem Enhancement Strategy. Planet Forward provides web resources, television programming, and in-person salons to generate dialogue and identify solutions to sustainability challenges.

As GW moves forward and begins to draft the individual roadmaps related to the specific focus areas, the GW Office of Sustainability will engage external stakeholders and develop partnerships with them (see figure 12). Such thought leaders and practitioners will continue to act as a resource for best practices and constructive feedback. As GW attempts to address systemic sustainability issues, it will need to collaborate with local, regional, and global players. GW will more likely be able to impact systemic changes such as more sustainable food production or more sustainable urban infrastructure only by pooling the resources and influence of partners across the region and even the globe. External stakeholders may serve as key partners in implementing projects that are only partly within GW’s sphere of influence.

The implementation of GW’s sustainability strategy as outlined in this Ecosystems Enhancement Strategy will be a journey of trial, error, and discovery. GW will strive to maintain an open dialogue with key stakeholder groups on the vision, goals, and implementation of the supporting plans related to carbon neutrality, freshwater impacts, zero waste, procurement, and others. As one component of stakeholder dialogue, the GW Office of Sustainability will monitor and report on progress and challenges in reaching the sustainability goals.

Figure 12: External Stakeholders and Potential Partners

Strategic Focus Areas	Organizations
Habitat & Natural Space	Casey Trees District Department of the Environment District Department of Transportation District Office of Planning International Dark Sky Association
Healthy Air and Climate	Capital Bikeshare Casey Trees District Department of the Environment District Department of Transportation Washington Metropolitan Area Transit Authority
Freshwater Provision	Bay Bank DC Water District Department of the Environment Potomac Riverkeeper
Food Production Systems	Farmers Market Founding Farmers Nature’s Path Sodexo Various on-campus food vendors
Waste Decomposition & Treatment	Whole Foods DC Consortium of Universities US Environmental Protection Agency Waste Management
Physical, Mental & Social Well-Being	Bridge Project Chesapeake-based NGOs Global NGOs MD-DC Compact
Procurement	US EPA US General Services Administration Staples World Resources Institute World Wildlife Fund Xerox
Investment & Finance	Education Advisory Board Peer institutions Shareholder advocacy organizations

Currently GW provides updates on its climate impact through its annual, publicly available American College and University Presidents Climate Commitment (ACUPCC) report available at www.presidentsclimatecommitment.org. Additionally, GW has published a summary of sustainability programs and projects. The report is available at <http://go.gwu.edu/gwsustainabilityreport>. Stakeholders have an opportunity to learn more, submit solutions, and provide timely feedback on the website at sustainability.gwu.edu and through GW's sustainability social media outlets including [Sustainability at GW \(Facebook\)](#), [@SustainableGW \(Twitter\)](#) and PlanetForward.org.

SYSTEMS APPROACH TO GW SUSTAINABILITY

By analyzing GW's impact and dependence on ecosystem services, and then outlining priority areas for action to enhance those services, GW is taking a comprehensive systems approach to sustainability. This approach is essential for effective decision making because industry, society, and ecology are inextricably interlinked.⁵² The purpose of this document is to provide the framework for GW to effectively manage its long-term risks and opportunities in light of natural resource changes locally and globally. This report intends to highlight the interconnections of various ecosystem dynamics including ways to create a more resilient GW in light of potential disruptions to systems that may result from increasing human demand for natural resources. The complex natural resource system within which GW operates is ever changing, and this report sheds light on how GW can adapt its actions and also help to fortify the system. GW will continue to evaluate its role in the ecosystem and make updates to its approach.

"As an institution GW is taking an honest look at its interaction with the system of plants, animals, soil and water that provide us with air to breathe, food to eat and places to enjoy. We are on an ambitious journey. GW will strive to uncover innovations to enhance ecosystem services in a way that mitigates risk and generates long-term value for the university and the planet. We don't yet have all the answers, but we are exploring options to be a healthy part of local and global ecosystems."

- Meghan Chapple-Brown
Director, GW Office of Sustainability
Earth Day 2012

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From Meghan Chapple-Brown, director of The George Washington University Office of Sustainability:

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GLOSSARY

ACUPCC

American College & University Presidents' Climate Commitment. GW was the first university in DC, to join the American College and University Presidents' Climate Commitment (ACUPCC) in 2008.

Biodiversity

The degree of variation of life forms with a certain species, ecosystem, biome, or the entire planet. It is a measure of the health of an ecosystem. The greater the biodiversity of an ecosystem, the greater the health of that ecosystem.

Carbon dioxide sequestration⁵³

The process of injecting carbon dioxide (CO₂), captured from an industrial (e.g., steel and cement production) or energy-related source (e.g., a power plant or natural gas processing facility), into deep subsurface rock formations for long-term storage.

Combined Sewer Overflow (CSO)⁵⁴

The capacity of a combined sewer may be exceeded during periods of significant rainfall. Regulators are designed to let the excess flow (more commonly known as Combined Sewer Overflow) be discharged directly into the Anacostia River, Rock Creek, the Potomac River, or tributary waters. CSO is a mixture of storm water and sanitary wastes; its release is necessary to prevent flooding in homes, basements, businesses, and streets.

Ecological footprint⁵⁵

A measure of humanity's demand on nature. This accounting system tracks, on the demand side (Footprint), how much land and water area a human population uses to provide all it takes from nature.

Ecosystem

An interdependent system of abiotic (non-living) and biotic (living) combinations of plants, animals and microbes that live together in a unified physical environment.

Ecosystem services

Goods and services provided by ecosystems that are beneficial to humans and other organisms.

GHG

Greenhouse gases absorb and emit radiation within the thermal infrared range, causing the greenhouse effect. The main greenhouse gases in the Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide and ozone (CO₂, CH₄, O₃, N₂O, H₂O).

Green chemistry⁵⁶

Green chemistry, also known as sustainable chemistry, is the design of chemical products and processes that reduce or eliminate the use or generation of hazardous substances.

Green infrastructure

The use of vegetation and soil to manage rainwater as opposed to traditional gray stormwater infrastructure, which uses pipes to dispose of rainwater.

Green roofs

A roof of a building that is partially or completely covered with vegetation.

Greywater systems

A system that collects water from the laundry, shower and bath and filters it so that it can be diverted to the landscape for irrigation purposes.

Habitat

The ecological area that is inhabited by a particular species of plants, animals, or other organisms.

Heat island effect⁵⁷

The term “heat island” describes built up areas that are hotter than nearby rural areas because the city development absorbs and traps heat. Heat islands can affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution and greenhouse gas emissions, heat-related illness and mortality, and water quality.

Impermeable Surface⁵⁸

An impervious surface is a constructed surface that cannot be easily penetrated by water, such as rooftops, driveways, patios, tennis courts, swimming pools, parking lots, and other paved areas.

Indoor Air Pollution⁵⁹

Sources of indoor air pollution include combustion sources such as oil, gas, kerosene, etc.; building materials and furnishings as diverse as deteriorated, asbestos-containing insulation, wet or damp carpet, and cabinetry or furniture made of certain pressed wood products; products for household cleaning and maintenance, personal care, or hobbies; central heating and cooling systems and humidification devices; and outdoor sources such as radon, pesticides, and outdoor air pollution.

Invasive species⁶⁰

A species that is non-native, or alien, to an ecosystem under and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

LEED

Leadership in Energy and Environmental Design (LEED) is a rating system for the design, construction, and operation of green buildings.

Light clutter

The excessive grouping of lights.

Light pollution

The presence of excessive or obtrusive light.

Light trespass

The presences of unwanted light that shines on someone’s property or through their windows.

Low Impact Development⁶¹

Low-Impact Development (LID) is a strategy for land development (or redevelopment) that works with nature to manage stormwater. It employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage. LID

treats stormwater as a resource, rather than a waste product, using practices such as bio-retention facilities, rain gardens, vegetated rooftops, rain barrels and permeable pavements.

Maryland-DC Campus Compact (MDCC)⁶²

The MDCC is a membership association of college and university presidents and their institutions committed to promoting engaged citizenship as an aim of higher education. The MDCC provides statewide leadership in advocating, supporting, and increasing student involvement in academic and co-curricular based public service. It aims to strengthen the capacity of member institutions to serve society; to enhance student learning; and to develop in individual students the knowledge, skills, attitudes, and habits of civic responsibility locally and globally.

Native species

An organism that is found in an area due to natural reasons and not as a result of human intervention.

Nightscape

A view or representation of a night scene.

Noise pollution

Excessive and displeasing noise that disrupts activity or balance of human or animal life.

Nutrient cycling

The movement of nutrients from the physical environment into living organisms and the subsequent recycling of these nutrients back to the physical environment.

Potable water

Potable water is all water that is fit for human consumption that comes through pipes to faucets, taps, toilets, etc.

Pre-emergent pesticides

A tool used to prevent weeds from germinating.

Proxy voting

A form of voting where some members of a decision-making body may delegate their voting power to other members of the same body to vote in their absence.

Shareholder resolution

Proposals submitted by shareholders for a vote at a company's annual meeting.

Sky glow

Illumination of the night sky.

Stormwater runoff⁶³

Generated when precipitation from rain and snowmelt events flows over land or impervious surfaces and does not percolate into the ground. As the runoff flows over the land or impervious surfaces (paved streets, parking lots, and building rooftops), it accumulates debris, chemicals, sediment or other pollutants that could adversely affect water quality if the runoff is discharged untreated.

Sustainable procurement⁶⁴

Procurement is called sustainable when it integrates requirements, specifications and criteria that are compatible and in favor of the protection of the environment, of social progress and in support of economic development, namely by seeking resource efficiency, improving the quality of products and services and ultimately optimizing costs.

Urban dust dome⁶⁵

A meteorological phenomenon in which soot, dust, and chemical emissions become trapped in the air above urban spaces.

Urban heat island effect⁶⁶

Heat islands occur both on the surface and in the atmosphere. Surface urban heat islands are strongest during the day, whereas atmospheric urban heat islands are more pronounced at night. During the day, the temperature difference between urban surfaces and the surrounding air can range from 50 – 90 degrees Fahrenheit. After sunset, due to the slow release of heat from urban infrastructure, the annual mean air temperature of a city with one million people or more can range from 1.8 to 22 degrees Fahrenheit warmer than its surroundings. One cause of atmospheric heat island effect is the urban dust dome, which traps fine particles and gases that retain heat within the surrounding atmosphere.

Urban pollinators

An insect that carries pollen from one flower to another, e.g. bees.

Wastewater

Wastewater is water that has been used and/or contains dissolved or suspended waste materials.

Watershed⁶⁷

The area of land where all of the water that is under it or drains off of it goes into the same place.

Zero Waste⁶⁸



Zero Waste is a goal that is ethical, economical, efficient and visionary, to guide people in changing their lifestyles and practices to emulate sustainable natural cycles, where all discarded materials are designed to become resources for others to use. Zero Waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them.
















APPENDIX A: OVERVIEW OF ECOSYSTEMS ENHANCEMENT GOALS, TARGETS, INDICATORS, AND TACTICS

For an overview of the goals, targets, indicators, and tactics detailed in this document, please also see the [GW Ecosystems Enhancement Strategy Presentation](#) available online.








GW is committed to adopting practices and nurturing ecosystem services that:








Goal 1: Strengthen habitat and optimize natural space



<p>Target 1.1</p> <p>Target 1.1A</p> <p>Indicator</p> <p>Tactics</p> <p>System-wide Impacts</p>	<p>Increase green space</p> <p>Design guidelines around outdoor space that are habitat friendly and promote non-invasive plants</p> <p>Total Permeable Campus Area (in SF)</p> <p>1) Implement green infrastructure such as living walls, green roofs</p> <p>2) Convert more impermeable space to green space</p> <p>3) Boost incentives and options for public or alternative forms of transit for faculty and staff to reduce parking demand via single occupancy vehicle use</p> <p>4) Convert former parking spaces to green spaces through the use of low impact development and permeable surface technology.</p> <p>  </p>
<p>Target 1.2</p> <p>Target 1.2A</p> <p>Indicator</p> <p>Tactics</p> <p>System-wide Impacts</p>	<p>Enhance the biological richness/diversity of the campus</p> <p>Design guidelines around outdoor space that are habitat friendly and promote non-invasive plants</p> <p>% of university spend on non-invasive and/or native plants</p> <p>1) Encourage native/adaptive/non-invasive/drought-resistant plantings and pro-habitat landscaping practices using the following criteria for plantings - appearance, adaptability, security and survivability</p> <p>2) Place more bird houses around campus</p> <p>3) Encourage the use of systemic and pre-emergent pesticides and encourage the use of natural predators to manage pests</p> <p>4) Maintain apiaries on campuses to encourage local urban pollinator species and encourage pollinator-friendly plantings on campus</p> <p>5) Connect GW campuses to green ways within the region</p> <p>6) Use the campus as a living laboratory for conducting a campus-wide habitat assessment</p> <p>7) Partner with local NGOs such as Casey Trees to raise awareness about local urban ecosystems, indigenous species and preservation tactics</p> <p>  </p>
<p>Target 1.3</p> <p>Target 1.3A</p> <p>Indicator</p>	<p>Reduce interior and exterior light pollution from university owned & operated facilities</p> <p>40% of new construction and major renovation projects meet LEED light pollution reduction requirements by 2017</p> <p>% or # of new construction or major renovation projects meeting LEED light pollution</p>

<p>Tactics</p> <p>System-wide Impacts</p>	<p>reduction requirements</p> <ol style="list-style-type: none"> 1) Install occupancy sensors to enable automatic shut-off of non-emergency interior lighting during non-operating hours (between 11PM and 5AM) 2) Install full cutoff luminaires on streetscapes and building exteriors 3) Use fully shielded outdoor fixtures that direct light downward when applicable 4) Ensure exterior lighting installations only as required for safety and comfort <p>1  2  6 </p>
<p>Target 1.4</p> <p>Indicator</p> <p>Tactics</p> <p>System-wide Impacts</p>	<p>Research biodiversity in Chesapeake watershed and work with local conservation/preservation organizations</p> <p>Amount of research funding (\$) for biodiversity-related projects</p> <ol style="list-style-type: none"> 1) Partner with local organizations <p>1  3  4  6 </p>
<p>Target 1.5</p> <p>Target 1.5A</p> <p>Indicator</p> <p>Tactics</p> <p>System-wide Impacts</p>	<p>Reduce light pollution in DC metropolitan area</p> <p>Conduct on-site light pollution study with partner organization by 2015</p> <p># of partners</p> <ol style="list-style-type: none"> 1) Partner with DC City Council, DDOT, DDOE, DC zoning board, or other regional organizations to study and benchmark DC metropolitan area light pollution 2) Partner with the International Dark-Sky Association (IDA) to help inform minimum and maximum illumination guidelines suitable for an urban environment 3) Leverage partnerships and studies to inform development of lighting criteria to reduce light pollution on university owned land while maintaining safe light levels and adhering to zoning and safety protocols <p>1  2  6 </p>
<p>Target 1.6</p> <p>Target 1.6A</p> <p>Indicator</p> <p>Tactics</p> <p>System-wide Impacts</p>	<p>Increase sourcing of products that minimize impact on biodiversity and natural space</p> <p>Draft a sustainable procurement strategy for three major purchase categories (e.g., paper, electronics, water, furniture, food, vehicles, textiles) by 2015</p> <p>% of new contract actions sourcing low-impact product alternatives</p> <ol style="list-style-type: none"> 1) Draft procurement strategies emphasizing sourcing materials with lower adverse impact on biodiversity and preservation of natural spaces (such as sustainably managed wood and paper products, encouraging the use of veneer over laminate for furniture, and sustainably managed feed stocks for textiles) 2) Standardize contract language stipulating sustainability requirements such as the use of green cleaning products for housekeeping and washing linens, organic materials in textiles, recyclable content in paper, electronics, carpets, and furniture <p>1  2  3  4  5 </p>

Goal 2: Promote healthy air and climate












<p>Target 2.1</p> <p>Target 2.1A</p> <p>Indicator</p> <p>Tactics</p> <p>System-wide Impacts</p>	<p>Enhance tree canopy and green cover to help increase sequestration potential and outdoor air filtration capacity</p> <p>Offset sq. ft. loss of existing tree canopy and green cover from natural causes or development with new plantings.</p> <p>No net loss of existing tree canopy and green cover</p> <p>1) Conduct annual campus surveys to establish baseline and measure progress</p> <p>2) Factor green cover and tree canopy preservation into campus construction and development projects via landscaping, green roofs, etc.</p> <p>3) Encourage the increased use of public transport by students, staff, and faculty to reduce demand for parking spaces</p> <p>4) Create an urban/street-side arboretum</p> <p>1  2  3  6 </p>
<p>Target 2.2</p> <p>Indicator</p> <p>Tactics</p> <p>System-wide Impacts</p>	<p>Enhance livability of indoor space and increase indoor air filtration capacity</p> <p>Plantings in indoor spaces</p> <p>1) Encourage the adoption of interior green spaces (such as living walls and biophyllic design) in new constructions and major renovation design</p> <p>2) Encourage the adoption of potted plants or other greenery as part of the Green Office Program</p> <p>3) Purchase materials and equipment comprised of non-toxic or less toxic components (e.g., low VOC carpets and paints, green cleaning products, Green Guard/Green Seal products, FloorScore hard surface flooring, Green Label carpeting)</p> <p>4) Achieve Indoor Environmental Quality (IEQ) LEED credit 3.2 where the intent is “to reduce indoor air quality problems resulting from construction or renovation to promote the comfort and well-being of construction workers and building occupants” in projects where LEED certification is targeted</p> <p>5) Assess air handling & filtration technology</p> <p>6) Ensure HVAC systems are properly maintained (regular filter change, coils cleaning and repair of damaged parts)</p> <p>7) Maintain and evaluate a green or blue cleaning program</p> <p>8) Ensure interior spaces are properly sealed off during building construction/renovation projects</p> <p>1  2  6 </p>
<p>Target 2.3</p> <p>Target 2.3A</p> <p>Indicator</p> <p>Tactics</p>	<p>Reduce GW's total carbon footprint by 80% by 2040</p> <p>By 2025, reduce campus GHG emissions by 54,000 MtCO₂e through building energy efficiency and conservation measures.</p> <p>MtCO₂e emitted due to on-site building energy consumption</p> <p>1) Implement multi-phase, campus-wide energy efficiency upgrade and retrofit program for existing buildings through a broad mix of projects such as lighting upgrades/occupancy sensors, boiler control optimization, SCADA control infrastructure improvements, plug-load management, air handler replacement, and various other means.</p> <p>2) Develop best practice guidelines to improve energy efficiency of new construction to reduce increases in emissions resulting from campus growth</p> <p>3) Conduct more robust and targeted building audits to gain holistic view of the energy</p>


<p>System-wide Impacts</p>	<p>savings opportunities across campus</p> <p>4) Develop comprehensive campus utilities master plan to help maximize the benefit from ensuing projects</p> <p>5) Install building dashboards and kiosks to encourage behavior change and engage the campus community in energy reduction efforts</p> <p>1  2  6 </p>
<p>Target 2.4 Target 2.4A Indicator Tactics</p> <p>System-wide Impacts</p>	<p>Increase proportion of commuters using lower carbon commuting options vs. SOVs</p> <p>Establish staff telecommuting policies for offices on each GW campus</p> <p>MtCO₂e emitted due to student, faculty, and staff commuting</p> <p>1) Promote lower carbon commuting options via incentives such as Capital BikeShare, Washington Metropolitan Area Transit Authority (WMATA) rail and bus lines, carpooling, rideshare etc.</p> <p>2) Offer programs and incentives to support increased use of telecommuting and alternative work schedule options</p> <p>3) Use video/teleconferencing options where available for regularly scheduled staff meetings</p> <p>4) Incorporate contract language in new vehicle lease and shuttle contracts requiring use of low-carbon alternative vehicle technologies and fuels (e.g. vehicles approved as part of Federal Energy Management Program's federal fleet management guide)</p> <p>5) Understand traffic patterns on campus to provide real-time support for commuters</p> <p>2  6 </p>
<p>Target 2.5 Target 2.5A Indicator Tactics</p> <p>System-wide Impacts</p>	<p>Generate 10% of energy demand through on-site low-carbon technologies by 2040</p> <p>Complete a number of new installations of small-scale, on-site low-carbon technologies by 2015</p> <p>kWh output from on-campus renewable generation</p> <p>1) Conduct feasibility analyses for on-site renewable generation capacity alternatives</p> <p>2) Investigate federal and local incentives to subsidize investment in local renewable generation capacity</p> <p>3) Facilitate collaborative academic and research opportunities to help launch on-site renewable energy technology test bed and demonstration projects</p> <p>2 </p>
<p>Target 2.6 Indicator Tactics</p> <p>System-wide Impacts</p>	<p>Decrease the carbon intensity of the region's electricity fuel mix and create a system for credible, local carbon offsets</p> <p>MtCO₂e emitted through electricity and natural gas (heating) consumption</p> <p>1) Exploring 'near-the-fence'/regional renewable energy partnership opportunities</p> <p>2) Partner with local and regional organizations to leverage collective bargaining power and influence regional investments in new generation capacity by utility providers.</p> <p>2 </p>
<p>Target 2.7 Target 2.7A</p>	<p>Increase sourcing of lower climate footprint products</p> <p>Draft a sustainable procurement strategy for three major purchase categories (e.g., paper, electronics, water, furniture, food, vehicles, textiles) by 2015</p>

<p>Indicator</p> <p>Tactics</p> <p>System-wide Impacts</p>	<p>% of new contract actions sourcing low-carbon alternatives</p> <ol style="list-style-type: none"> 1) Engage GW students and vendors in eco-labeling/carbon foot printing project of products sold on campus 2) Work with GW procurement to help identify the origin of products in its internal purchasing catalog, iBuy (local, closer preferred) 3) Partner with NGOs to determine credible rating and certification agencies 4) Draft procurement policies emphasizing sourcing energy efficient, lower carbon footprint, and/or non-ozone depleting products (e.g., via EPA Energy Star, FEMP, EPEAT, and SNAP-designated products) 5) Adopt paperless initiatives on campus for conferences, events, and meetings 6) Formalize campus-wide reuse program to reduce demand for new equipment and other purchases 7) Implement green purchasing training and awareness program 8) Collaborate with delivery companies like FedEx, USPS, and UPS and product vendors to consolidate delivery schedules to reduce shipment frequency and to shift to less carbon intensive delivery vehicles <p>  </p>
<p>Target 2.8</p> <p>Target 2.8A</p> <p>Indicator</p> <p>Tactics</p> <p>System-wide Impacts</p>	<p>Mitigate air travel mileage of GW staff and faculty</p> <p>Implement carbon measuring and reporting mechanism for staff and faculty air travel.</p> <p>MtCO₂e emitted via air travel</p> <ol style="list-style-type: none"> 1) Continue to refine air travel emissions tracking and measuring capability 2) Negate remaining emissions by purchasing credible local offset 3) Promote staff air travel purchases via iBuy to enable better tracking of travel expenditures, mileage, and associated emissions 4) Enhance remote teleconferencing and computing capability to reduce air travel demand 5) Use non-stop flights when available 6) Encourage the use of rail for travel within 250-300 miles whenever available <p>  </p>




Goal 3: Foster clean and abundant fresh water










<p>Target 3.1</p> <p>Indicator</p> <p>Tactics</p>	<p>25% absolute reduction in potable water consumption over 10 years from FY08 baseline</p> <p>Total Annual Water Consumption (in kgal)</p> <ol style="list-style-type: none"> 1) Create operations policy to prioritize the installation of low-flow fixtures in cases of plumbing repairs/replacement 2) Prioritize WaterSense appliances where applicable 3) Continue to host Eco-Challenge between residence halls to encourage water conservation 4) Continue the expansion of Eco-Challenge to faculty & staff buildings 5) Create communications guidelines when low-flow fixtures are installed to ensure that users understand the new products they are using (i.e. signage, informational sheets). 6) Adopt improved leak detection and repair policy that prioritizes more holistic leak investigation 7) Encourage drought-resistant, non-invasive plantings on campus grounds
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<p>System-wide Impacts</p>	<p>1  3 </p>
<p>Target 3.2 Indicator Tactics</p>	<p>10% absolute increase in permeable space over 10 years from FY11 baseline Total Permeable Campus Area (in sq. ft.) 1) Pilot use of new permeable surface technologies on campus. Ensure that green space planning is integrated into renovation and construction projects (by using permeable paver or other permeable surface technology in GW parking garages or uncovered parking facilities) 2) To the extent that it is feasible, convert GW’s undevelopable land area (amounts to 58,000 sq. ft. according to the Campus Plan) to permeable surface.</p>
<p>System-wide Impacts</p>	<p>1  3  6 </p> <p>Target 3.3 Indicator Tactics</p> <p>By 2021 reuse all retained stormwater for greywater systems, cooling towers, and irrigation. Total stormwater reclaimed (in kgal) 1) Incorporate new water sourcing technologies such as greywater systems into design standards for new construction and major renovations. 2) Pilot new technologies to harvest, and reuse rainwater such as permeable paver technology, rain barrels, cisterns, green roofs, bioswales, rain gardens and tree box technologies 3) Work with District Department of Transportation to incorporate water saving technologies in public space as part of the landscaping for new projects on campus e.g., plans for larger tree boxes as part of Streetscape. 4) Incorporate rain water capture systems in new parking/parking garage installations.</p>
<p>System-wide Impacts</p>	<p>1  3 </p> <p>Target 3.4 Indicator Tactics</p> <p>Encourage watershed replenishment through projects on GW’s campus that qualify for water quality trading schemes Number of projects and/or credits achieved 1) Partner with organizations like the Bay Bank to investigate projects on GW's campus that may qualify for water quality trading 2) Link to farmers in Virginia to cooperate on watershed restoration projects 3) Partner with organizations within the Chesapeake Bay area</p>
<p>System-wide Impacts</p>	<p>1  3  4  6 </p> <p>Target 3.5 Indicator Tactics</p> <p>50% reduction in university expenditure on bottled water over 5 years from FY11 baseline University expenditure (\$) from GW Procurement on bottled water 1) Integrate preferred purchasing strategy to decrease bottled water purchase and prioritize filtered water systems. 2) Standardize and improve existing water fountains on campus. 3) Integrate bottle filling stations into existing fountains. 4) Increase signage, outreach and communications efforts to encourage GW community to drink tap water/filtered tap water. 5) Partner with student groups to provide funding for reusable bottled water purchases.</p>

System-wide Impacts	
Target 3.6	Increase sourcing of lower water footprint products
Target 3.6A	Draft a sustainable procurement strategy for three major purchase categories (e.g., paper, electronics, water, furniture, food) by 2015
Indicator	% of new contract actions sourcing low-water alternatives
Tactics	<ol style="list-style-type: none"> 1) Engage GW students and vendors in eco-labeling project of products sold on campus 2) Work with procurement to help identify the origin of products in its internal purchasing catalog, iBuy (local, closer preferred)
System-wide Impacts	





Goal 4: Support sustainable food production systems

Target 4.1	Produce food on campus
Target 4.1A	Sell food grown on campus at on-campus venues
Indicator	Pounds of food produced on campus
Tactics	<ol style="list-style-type: none"> 1) Increase spaces devoted to growing food on campus 2) Encourage community engagement in gardening programs 3) Increase the number of apiaries on campus 4) Develop a GW Food Co-Op, or a GW Bulk buying program 5) Work with on-campus vendors to 'sell' one product from GroW Garden by fall 2013
System-wide Impacts	
Target 4.2	Engage with on-campus food vendors to encourage sustainable practices
Target 4.2A	Certify 3-5 vendors on campus in 2013
Indicator	Number of certified restaurants
Tactics	<ol style="list-style-type: none"> 1) Host a Sustainable Food Fair 2) Develop green certification for GW food venues (including non-Sodexo vendors) 3) Launch green catering guide by 2012
System-wide Impacts	
Target 4.3	Source food from regional sources
Target 4.3A	Highlight all food in GW run venues with its producer origin
Indicator	% of university expenditure of local food
Tactics	<ol style="list-style-type: none"> 1) Integrate local food percentages into food service contracts 2) Help broker contact between vendors and local farms 3) Partner with other DC metropolitan area organizations (such as NGOs, schools, etc.) to pool demand for locally-sourced food
System-wide Impacts	













<p>Target 4.4</p> <p>Indicator</p> <p>Tactics</p> <p>System-wide Impacts</p>	<p>Raise awareness about nutrition and environmentally-friendly farming and eating practices</p> <p>Number of awareness campaigns</p> <p>1) Awareness campaigns can be run jointly by the School of Public Health and Health Services and the School of Medicine.</p> <p> </p>
<p>Target 4.5</p> <p>Target 4.5A</p> <p>Indicator</p> <p>Tactics</p> <p>System-wide Impacts</p>	<p>Increase transparency of food served on campus</p> <p>Conduct “GW Food Footprint” for some products in 2013</p> <p>Number of third party certifications used; Results of food sourcing survey</p> <p>1) Partner with GW food service providers to increase transparency of their sourcing practices via labeling, survey responses and engagement</p> <p>2) Use Real Food calculator and/or other Sodexo tools to help track food transparency.</p> <p>    </p>
<p>Target 4.6</p> <p>Tactics</p> <p>System-wide Impacts</p>	<p>Integrate food studies into curriculum and research initiatives at the universities</p> <p>Indicators</p> <p>1) Increase service learning and capstone projects related to global food challenges available to GW students</p> <p>2) Launch a GW food institute to encourage interdisciplinary research related to sustainable food production systems</p> <p> </p>

Goal 5: Optimize waste decomposition and treatment

<p>Target 5.1</p> <p>Target 5.1A</p> <p>Target 5.1B</p> <p>Target 5.1C</p> <p>Indicator</p> <p>Tactics</p>	<p>Zero Waste</p> <p>Increase recycling rate to 50% by 2017</p> <p>Introduce front-of-house composting on MVC by Fall 2012 and FB by Fall 2013</p> <p>Launch Reuse program website in 2013</p> <p>Waste Diversion Rate</p> <p>1) Create a Zero Waste Coordinator position at the university</p> <p>2) Work with Campus Development and Procurement to ensure that guidelines for responsible disposal of construction debris are clearly highlighted in contracts with vendors</p> <p>3) Increase the number and quality of trainings for housekeeping staff on recycling</p> <p>4) Increase the number of engagement events with students to educate them about recycling practices</p> <p>5) Update and standardize recycling waste infrastructure</p> <p>6) Develop scalable, on-site composting infrastructure</p> <p>7) Conduct responsible consumption awareness programming</p> <p>8) Expand the on-campus reuse program</p> <p>9) Conduct waste audits through student projects or external vendors</p> <p>10) Create a composting plan for yard waste</p>
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<p>System-wide Impacts</p>	
<p>Target 5.2 Zero Waste Target 5.2A Create regional reuse partnerships Target 5.2B Establish regional composting partnerships Target 5.2C Reduce litter on campus that would end up polluting the Chesapeake watershed Indicator Waste Diversion Rate Tactics</p>	<p>1) Investigate regional composting partnerships 2) Facilitate the expansion of the regional reuse program 3) Maintain integrated Pest Management plan 4) Launch an "Adopt-a-Street" campaign with Greek Life 5) Work on a disposable-reduction campaign 6) Enhance the number of trash cans and recycling bins in private and in public space</p>
<p>System-wide Impacts</p>	
<p>Target 5.3 Zero Pollution Target 5.3A Pilot green chemistry in one lab by 2015 Tactics</p>	<p>1) Together with the Chemistry department in the Columbian College of Arts and Sciences and the GW Hospital, GW will work to develop guidelines for green labs.</p>
<p>System-wide Impacts</p>	
<p>Target 5.4 Encourage sustainable practices in our sourced products that reduce waste Target 5.4A Draft a sustainable procurement strategy for three major purchase categories (e.g., paper, electronics, water, furniture, food) by 2015 Indicator % of new contract actions sourcing low waste alternatives Tactics</p>	<p>1) Partner with relevant stakeholders to help adopt sustainable practices 2) Embed zero waste tactics into supplier contracts (i.e. packaging reduction, recyclable/compostable material composition) 3) Enhance the Reuse program/policy for furniture, electronics, and other goods 4) Explore the possibility of creating an IT refurbishing initiative 5) Incorporate sustainable waste handling requirements into construction/renovation contracts 6) Implement compost handling infrastructure or contracts to process food and other compostable waste streams 7) Collaborate with Innovation Task Force's (ITF) Paperless Initiative and other information technology-related ITF initiatives examining the greater use of cloud computing, thin client hardware, electronic faxes, and so on.</p>
<p>System-wide Impacts</p>	

Goal 6: Encourage a natural urban environment that helps enhance physical, mental, and social well-being

<p>Target 6.1</p> <p>Indicator</p> <p>Tactics</p> <p>System-wide Impacts</p>	<p>Increased campus sustainability programming/awareness and increased access to local natural spaces for the GW community</p> <p>Number of events, Green Grad Pledgees, Campus Survey, Number of Eco-reps, Number of offices participating in the Green Office Program</p> <ol style="list-style-type: none"> 1) Use campus as a living laboratory and by fall 2012 conduct an audit of the ability of campus to support physical activity such as walk-ability, safety, or stair access 2) Integrate Green Campus Walking Tours in the relevant media outlets (E.g. GW mobile application, Twitter, Facebook, web page, etc.). 3) Encourage more volunteer hours in gardens. 4) Launch monthly Sustainability Showcase Brown Bag Lunch events for students, staff and faculty to highlight on-campus initiatives 5) Work with GW Athletics to encourage use of outdoor space for recreational activities 6) Encourage botany/biology students and professors to conduct nature walk 7) Add signage to campus to highlight 'green' features, and include mile markers to promote well-being 8) Conduct training/ mentorship for the Eco-Reps 9) Create an urban/street side arboretum, and use it as an educational tool. 10) Partner with local watershed organizations like the Potomac Riverkeeper to encourage people to go to the rivers 11) Create raised beds with wheelchair access for the hospital and therapeutic gardening 12) Partner with the Smithsonian Institute to connect students to green space on the National Mall 13) Launch "Urban living is sustainable" Campaign for freshmen at Colonial Inauguration, and adopt consistent signage and messaging 14) Create dialogue around human interaction with local ecosystems with relevant organizations to find solutions to these problems/challenges/issues <p>1  2  3  4  5  6 </p>
<p>Target 6.2</p> <p>Indicator</p> <p>Tactics</p> <p>System-wide Impacts</p>	<p>Increase GW community's awareness of and engagement with regional natural areas</p> <p>No. of projects/Total Volunteer Hours/No. of partners</p> <ol style="list-style-type: none"> 1) Leverage alternative breaks to promote sites within the Chesapeake watershed for service learning projects 2) Continue the integration of sustainability principles into Freshman Day of Service, Martin Luther King, Jr. Day of Service and Earth Day 3) Promote and foster internships in the Chesapeake region for students 4) Partner with relevant Chesapeake area organizations for events, capstone projects, class visits and sustainability treks to ecosystems in the region 5) Work with the Bridge Project to develop a comprehensive map of service learning projects within the region to understand GW's local impact 6) Create a dialogue around human interaction with regional ecosystems with relevant organizations to find solutions to various challenges facing the Chesapeake region <p>1  2  3  4  5  6 </p>

<p>Target 6.3</p> <p>Indicator</p> <p>Tactics</p> <p>System-wide Impacts</p>	<p>Increase GW community's awareness of and engagement with global natural areas</p> <p>No. of projects, Total Volunteer Hours, No. of partners</p> <ol style="list-style-type: none"> 1) Leverage alternative breaks to promote trips to fragile ecosystems across the world 2) Integrate national and international field study opportunities into academic offerings 3) Launch academic programming to foster understanding of GW's supply chain and implications on global ecosystems 4) Develop a comprehensive map of service learning projects around the globe to understand GW's impact 5) Create a dialogue around human interaction with global ecosystems with relevant organizations to find solutions to global challenges <p>       </p>
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Target 7.0: Develop a framework for considering sustainability trends and issues as part of the evaluation of strategic investment opportunities and risks

<p>Target 7.0A</p> <p>Indicator</p> <p>Tactics</p> <p>System-wide Impacts</p>	<p>Develop a process for reviewing proxy votes on sustainability-related issues by 2014</p> <p>% of investments that are sustainable</p> <ol style="list-style-type: none"> 1) Increase investment officers' understanding of sustainability 2) Identify short-, medium- and long-term trends and issues related to sustainability <p>       </p>
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