National Park Service
U.S. Department of the Interior

CLIMATE*Friendly* PARKS

Wolf Trap National Park for the Performing Arts Climate Action Plan

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Introduction

As the steward of the nation's most valued public lands, the NPS has an obligation and an opportunity to be a leader in protecting the environment. As a participant in the Climate Friendly Parks (CFP) program, Wolf Trap National Park for the Performing Arts (Wolf Trap) belongs to a network of parks that are at the forefront of sustainability planning. Located in the suburbs of Washington, D.C., Wolf Trap has a global reach; more than half of a million visitors come to enjoy its performances and educational programs every year. Wolf Trap is the only park in the National Park Service (NPS) dedicated to the performing arts, with the mission of providing a venue "for the performing arts and related educational programs, and for resource use in connection therewith." Well known for its magnificent Filene Center and world-renowned performances, Wolf Trap also provides a natural enclave in the midst of the increasingly urbanized northern Virginia area. Less than one-half of the park's land is developed, leaving approximately 65 acres of woodlands, streams, and wetlands with a wide variety of plants, animals, birds, and wildflowers. The park's natural areas add critical green space in the densely populated suburb in which it is located and provide refuge for many species, serving as a migration rest stop for wildlife and a living biology classroom for the local community.

By developing a greenhouse gas (GHG) emissions inventory, setting an emissions reduction target, developing this Climate Action Plan, and committing to educate park staff, visitors, and community members about climate change and what the Wolf Trap is doing to mitigate its impacts, the park is leading by example. The park commits to the following actions with the overall goal of reducing GHG emissions from park operations by 12% below 2009 levels by 2016:

1. Increase the energy efficiency of existing assets and operations and investigate opportunities for renewable energy use at the park.
2. Improve data accuracy and energy management through the use of monitoring systems.
3. Collaborate with local transportation planning groups and the Wolf Trap Foundation to reduce emissions from visitor transportation.
4. Reduce solid waste through responsible purchasing, increased recycling, and composting.
5. Increase climate change outreach and education for staff and visitors.

Wolf Trap's Climate Action Plan supports and enhances existing initiatives such as the park's environmental management system (EMS) and the NPS National Capital Region's EMS. An EMS is a management tool and organizational means to apply continuous improvement principles and strategic planning methods that reduce environmental impacts and achieve sustainability goals. The park's EMS addresses all environmental programs at the park, and provides the context for actions related to reducing park emissions, including this Climate Action Plan. The Region's EMS includes energy and GHG reduction goals as outlined in Executive Orders 13423 and 13514 that extend to the park level.

The Challenge of Climate Change

The atmosphere has a natural supply of gases that trap heat and keep the temperature of the Earth warm enough for life to survive. Such gases are known as greenhouse gases, or GHGs. However, the release of certain GHGs - including carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) - through industrial processes has disturbed this balance. These gases, which can stay in the atmosphere for at least fifty years and up to centuries, are accumulating in the atmosphere faster than natural processes are able to remove them, in effect creating an extra-thick heat blanket around the Earth. The increase in GHGs is causing an overall warming of the planet, commonly referred to as global warming. Rather than referring to the change in the day-to-day or year-to-year weather patterns, the term climate change describes the variable consequences of global warming over time.

According to the Intergovernmental Panel on Climate Change, the leading international organization for the assessment of climate change, "continued GHG emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21st century that would very likely be larger than those observed during the 20th century."[1] Rising global temperatures will further raise sea levels and affect all aspects of the water cycle, water temperature, ocean currents and upwelling, and salinity levels of inland coastal waters. Increased volatility of weather is expected. Climate change is also expected to affect human health, alter crop production, shift wildlife migratory patterns, and impact many other features of our natural and managed environments. At Wolf Trap, increased temperatures will alter the park's natural landscape and potentially affect the timing of the performance season at the Filene Center.

Inventory Process

Wolf Trap, in association with the Wolf Trap Foundation for the Performing Arts (the Foundation), completed the park's baseline inventory in 2006. This Action Plan presents the results of the park's second GHG inventory and addresses the park's updated GHG reduction goals and actions. The park's GHG emissions inventory was completed using the Climate Leadership in Parks (CLIP) tool. The CLIP tool was developed by the CFP program in association with the U.S. Environmental Protection Agency to account for GHG emissions specific to national parks. The tool is designed to:

- Translate energy and resource use data into metric tons of CO_2 equivalent.
- Educate park employees about the emissions inventory process through data gathering.
- Assist with identifying strategies for each park to reduce emissions through a workshop.
- Enable park personnel to track current and future progress toward emissions reduction goals.

Park staff gathered annual activity data (e.g. gallons of fuel used in a year) related to park operations and visitor travel within park boundaries for the inventory year, fiscal year (FY) 2009. Park staff selected FY 2009 as the inventory year as this was the most recent data available. Since EO 13423 stipulates 2008 as the agency baseline year, it should be noted that

[1] Intergovernmental Panel on Climate Change, Climate Change: 2007: Synthesis Report, page 45, www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf.

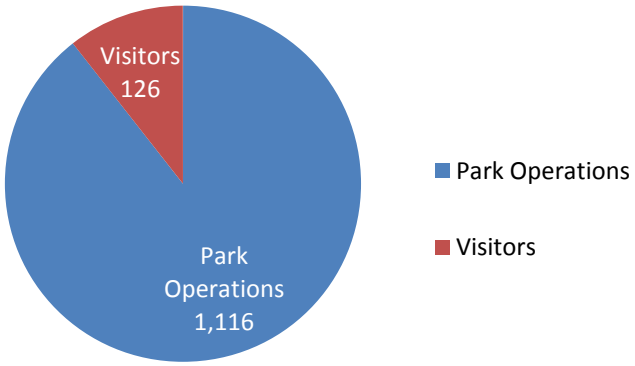
WOTR's emissions in FY 2009 are representative of emission from 2008. The Wolf Trap Foundation develops a separate GHG emissions inventory for Foundation assets and so emissions attributed to the Foundation's operations were not included in this assessment.

Data categories included stationary combustion, mobile combustion, purchased electricity, waste, fertilizer, refrigeration, and wastewater. The CLIP tool automatically converts the park's data into "metric tons of carbon dioxide equivalent" ($MTCO_2e$), a single unit that normalizes CO_2, N_2O and CH_4[2]. The output of the CLIP tool is the park's emissions profile, which was used to prioritize GHG emission reduction strategies.

Wolf Trap Emissions Profile

Wolf Trap's GHG inventory includes emissions from park operations and visitors. Total GHG emissions from park operations and visitors for FY2009 were estimated to be 1,242 $MTCO_2e$, 1,116 $MTCO_2e$ of which is attributed to park operations. This amount represents approximately 90 % of Wolf Trap's total emissions. Emissions from visitor transportation within park boundaries represent the remaining 126 $MTCO_2e$, or 10% of the total emissions. See Figure 1 below.

FIGURE 1. WOLF TRAP'S FY2009 TOTAL GREENHOUSE GAS EMISSIONS - 1,242 $MTCO_2E$

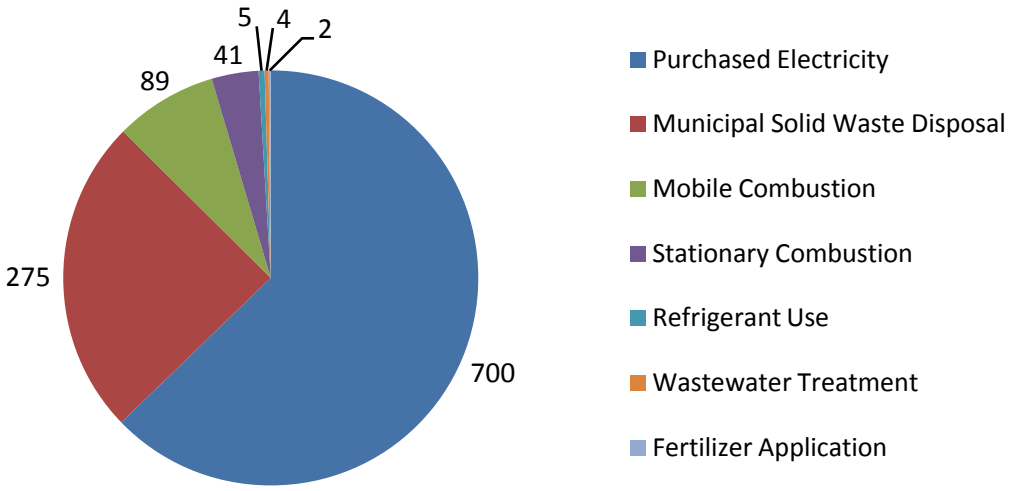


In 2006, park emissions were estimated to be 1,863 $MTCO_2e$, and visitor emissions were estimated to be 326 $MTCO_2e$, together totaling 2,189 $MTCO_2e$. A direct comparison between 2006 and 2009 emissions should not be made since data sources and assumptions are likely different. Nonetheless, a reduction from 2,189 $MTCO_2e$ to 1,242 $MTCO_2e$ is significant and suggests the park has made great strides toward reducing GHG emissions in the 3 year interim.

In order to target emissions reductions efforts, the park assessed emissions from park operations by source. At 700 $MTCO_2e$, or 63 % of emissions from park operations, emissions from purchased electricity are by far the largest source of the park's GHG emissions. This is understandable since the park manages energy intensive facilities. At 275 $MTCO_2e$ (25% of emissions from park operations) and 89 $MTCO_2e$ (8% of emissions from park operations), municipal solid waste disposal and mobile combustion are the next largest sources, respectively. See Figure 2 for a breakdown of emissions by source.

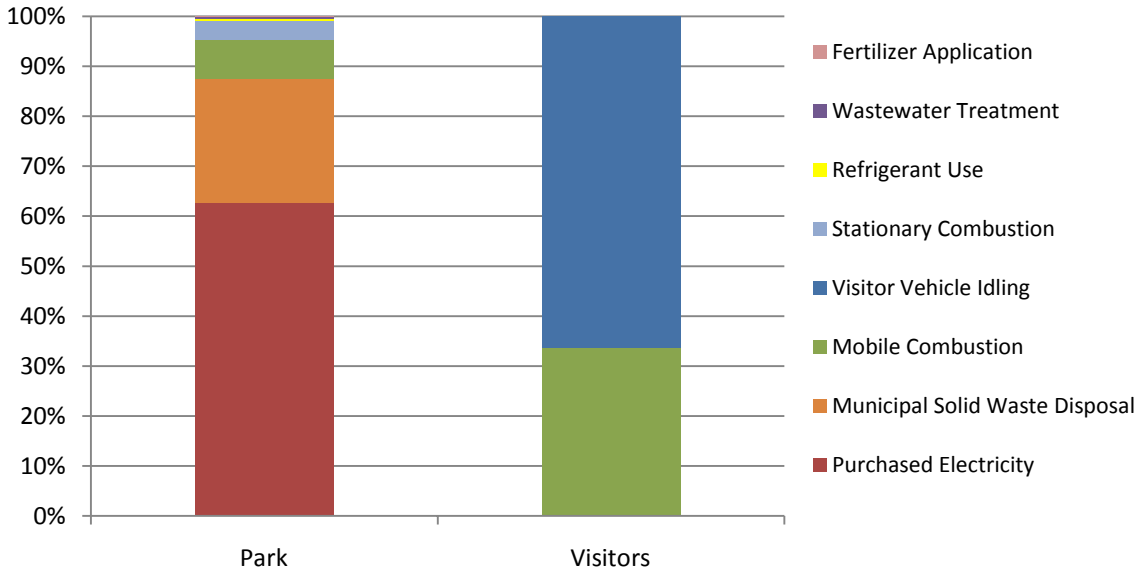
[2] The conversion of a GHG to $MTCO_2e$ is based on the potential of that GHG to contribute to the greenhouse effect, or its global warming potential (GWP), relative to the potential of CO_2 which is given the GWP of 1. CH_4's GWP is 21 and N_2O's GWP is 310, meaning that an equivalent amount of CH_4 has 21 times the potential of CO_2 and N_2O has 310 times the potential of CO_2 to contribute to global warming.

FIGURE 2. WOLF TRAP'S FY2009 GHG EMISSIONS FROM PARK OPERATIONS BY SOURCE (TOTAL: 1,116 $MTCO_2E$) (EXCLUDES EMISSIONS FROM VISITOR TRANSPORTATION)



Wolf Trap differs from other parks in that there is often a high volume of visitors and performance-goers who idle their vehicles for long periods while waiting for traffic to clear when exiting the park. For this reason, emissions from visitor transportation were divided into two categories: idling and mobile combustion. Since the CLIP tool does not assess emissions from idling, these calculations were conducted independently. See Figure 3 for percentage distribution of emissions by source for park operations and visitor transportation.

FIGURE 3. WOLF TRAP'S FY2009 GHG EMISSIONS FROM PARK OPERATIONS AND VISITORS BY SOURCE (PERCENT CONTRIBUTION)



Strategies for Reducing Emissions

Wolf Trap developed GHG reduction strategies and actions during the park's CFP action planning workshop, held January 25, 2011. The park's emissions reduction strategies focus on energy consumption, transportation, waste generation, and climate change education. Implementing a comprehensive action plan will help to reduce emissions, encourage better data management and therefore better informed decision making, and establish a program to educate staff and visitors.

STRATEGY 1: REDUCE GHG EMISSIONS FROM ENERGY USE BY 20% BELOW 2009 LEVELS BY 2016

As has already been noted, by far the most significant amount of GHGs produced at Wolf Trap are from energy use in facilities. Therefore, Wolf Trap will focus reduction actions on energy use and more specifically, on electricity use. In addition to reducing GHG emissions, reducing energy use will benefit the park financially by saving on energy costs.

PROGRESS TO DATE:

- Major update of lighting fixtures in the Filene Center.
- EMon energy monitoring system installed in Filene Center.
- Programmable and locked thermostats installed in many locations.

WOLF TRAP COMMITS TO THE FOLLOWING ACTIONS IN ORDER TO REDUCE PARK ENERGY USE:

1 Increase energy efficiency for existing assets and operations.

- Install weather stripping and/or window and door sealing or replacement in key

locations.

- Replace and upgrade Filene Center HVAC upgrade.
- Replace and upgrade HVAC systems for Administrative Office and Ranger Station (geothermal).
- Consolidate staff into fewer office spaces to reduce energy demand in other buildings. Use lower energy efficiency spaces for storage instead of staff offices.
- Install on-demand or tankless water heaters.
- Replace parking lot lights with solar lighting.
- Research feasibility of solar array installation on the maintenance shed (south roof) and Filene Center roof.

STRATEGY 2: IMPROVE DATA ACCURACY

In order to reach GHG reduction goals, the park recognizes the importance of reliable and accurate data and will work to improve data gathering and management.

PROGRESS TO DATE:

- Performed baseline GHG inventory in 2007 using 2006 data.
- Installed EMon energy monitoring system at Filene Center in 2011 that can be expanded park wide.

WOLF TRAP COMMITS TO THE FOLLOWING ACTIONS TO IMPROVE DATA COLLECTION PROCESSES AND ACCURACY.

1. Require non-NPS and non-Foundation power users in the park to be removed from NPS meters in order to reduce costs to the NPS, improve data accuracy, and show the true NPS footprint.
2. Develop a system to utilize and understand data from EMon, the new energy monitoring system in the Filene Center Review and prioritize energy projects identified through, EMon, the energy monitoring system.

STRATEGY 3: REDUCE GHG EMISSIONS FROM TRANSPORTATION BY 5% BELOW 2009 LEVELS BY 2016

Transportation is Wolf Trap's second largest source of GHGs. Therefore, reducing vehicle miles traveled, improving vehicle efficiency, and using alternative fuels can significantly reduce the park's emissions. However, the park is also limited by the extent to which visitor emissions from vehicle idling can be reduced.

PROGRESS TO DATE:

- Shuttle bus provided from the local West Falls church station to the park during events.
- Instituted annual parking review workshop to review and address issues related to parking, transportation and vehicle idling.
- Internal fleet used for intra-park travel by staff undergoing conversion to electric

vehicles.

WOLF TRAP COMMITS TO THE FOLLOWING ACTIONS TO REDUCE PARK EMISSIONS FROM TRANSPORTATION:

1. Work with local and regional transportation planning groups on developing alternative means of transportation for visitors and staff.
2. Continue to review, analyze, and implement changes to overall visitor transportation and parking strategies both in-house, and with partners. Overall goals of these efforts are to reduce visitors using cars and increase alternative means of transportation, and more efficient movement of cars into and out of the park to reduce idling time.

STRATEGY 4: IMPROVE THE WASTE REDUCTION AND RECYCLING PROGRAM

Waste decomposing in landfills is the largest human-generated source of CH_4 emissions in the United States. Waste management in the form of source and solid waste reduction can dramatically reduce GHG emissions. Reducing the amount of waste sent to landfills reduces CH_4 emissions caused by decomposition as well as other GHG emissions from the transportation of waste. Purchasing and wise use of products is closely tied to waste generation. The less the park and its visitors consume in terms of products and packaging, the less energy is used and the fewer GHGs are emitted.

PROGRESS TO DATE:

- Recycling program established and implemented.
- Procurement decision-making includes green purchasing considerations.

WOLF TRAP COMMITS TO THE FOLLOWING ACTIONS TO REDUCE PARK EMISSIONS FROM WASTE GENERATION:

1. Improve internal park practices.
2. Reduce paper use.
3. Increase recycling in administrative offices.
4. Conduct a composting feasibility study.
5. Collaborate with the Foundation to increase recycling.
6. Include solid waste and recycling requirements in concession contracts.
7. Include solid waste and recycling requirements in group permits.
8. Improve recycling signage and “marketing” in Centerlines and other venues.

STRATEGY 5: EDUCATION AND OUTREACH

About 500,000 people visit Wolf Trap annually, giving the park an enormous opportunity to educate the public about climate change and GHG emissions reductions. There are also opportunities to educate park staff and members of the surrounding community.

PROGRESS TO DATE:

- Implemented Green Spot, a display operated by volunteers and park staff that is aimed at sharing environmental information, such as the park's sustainability activities.

WOLF TRAP COMMITS TO THE FOLLOWING ACTIONS TO INCREASE CLIMATE CHANGE EDUCATION FOR PARK STAFF, VISITORS, AND THE LOCAL COMMUNITY:

1. Increase climate education for staff.
2. Incorporate sustainability initiatives and practices into staff trainings, including trainings for seasonal staff and volunteers.
3. Provide training to maintenance staff related to their expertise and areas of work in order to encourage energy and water use reduction.
4. Incorporate sustainability updates in the volunteer newsletter.
5. Increase climate education for visitors.
6. Interpret sustainability actions already taken and planned at the park, including collaboration with the Foundation in their educational outlets.
7. Share information about the park's Climate Action Plan with the Foundation.
8. Reestablish the park's "Green Team" and collaborate with the Foundation's "Green Team" through joint meetings.
9. Encourage and sponsor local university students and interns to conduct sustainability initiatives.

STRATEGY 6: ENCOURAGE CARBON SEQUESTRATION THROUGH LANDSCAPE INITIATIVES.

Wolf Trap's GHG inventory does not account for the amount of CO_2 sequestered by the park's forested areas, but the park recognizes that trees play an important role in sequestering CO_2 and mitigating the effects of climate change. The park also recognizes the environmental benefits that can be gained from reduction of mowed areas.

PROGRESS TO DATE:

- Reduced mowed areas by approximately 2 acres, reducing overall emissions from mowing.
- Planted approximately 300 trees and shrubs park-wide.

WOLF TRAP COMMITS TO THE FOLLOWING ACTIONS TO ENCOURAGE CARBON SEQUESTRATION THROUGH LANDSCAPE INITIATIVES:

1. Reduce mowed areas by additional 4 acres, replacing these areas with non-mowed meadows or trees.
2. Plant an additional 200 trees in strategic locations.

Conclusion

Wolf Trap National Park for the Performing Arts has an excellent opportunity to educate and set an example for the approximately half of a million of people who visit the park every year. This report summarizes the actions to which the park commits in order to reduce its GHG emissions. The park will prioritize emissions reductions actions and tackle reduction efforts in realistic and effective way. Additionally, by sharing these goals and strategies with park visitors and partners, Wolf Trap will promote an awareness of climate change and encourage GHG emissions reductions on a broader scale.