National Park Service
U.S. Department of the Interior

CLIMATE *Friendly* PARKS

Lewis and Clark National Historical Park Action Plan

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LEWIS AND CLARK NATIONAL HISTORICAL PARK BECOMES A CLIMATE FRIENDLY PARK

As a participant in the Climate Friendly Parks program, Lewis and Clark National Historical Park belongs to a network of parks nationwide that are putting climate-friendly behavior at the forefront of sustainability planning. By conducting an emission inventory, setting an emission reduction goal, developing this Action Plan, and committing to educate park staff, visitors, and community members about climate change, Lewis and Clark National Historical Park provides a model for climate-friendly actions within the Park Service.

This Action Plan identifies steps that Lewis and Clark National Historical Park can undertake to reduce GHG emissions mitigate its impact on climate change. The plan presents the park's emission reduction goals, and associated reduction actions to achieve the park's goals. Strategies and action plan items were developed by working groups at the North Coast & Cascade and Upper Columbia Basin Climate Friendly Parks Workshop.[1] While the plan provides a framework needed to meet the park's emission reduction, it is not intended to provide detailed instructions on how to implement each of the proposed measures. The park's Environmental Management System will describe priorities and details to implement these actions.

Lewis and Clark National Historical Park intends to:

- Reduce GHG emissions from the park to 35% below 2007 levels by the year 2016 by implementing emission mitigation actions identified by the park.

To meet this goal, the park will implement strategies proposed in this plan that relate to the park's current and future emission inventories. Specifically, the plan recommends three strategies:

Strategy 1: Identify and implement mitigation actions that the park can independently take to reduce GHG emissions resulting from activities within and by the park.

Strategy 2: Increase climate change education and outreach efforts.

Strategy 3: Monitor progress with respect to reducing emissions and identify areas for improvement.

THE CHALLENGE OF CLIMATE CHANGE

Climate change presents significant risks and challenges to the National Park Service and specifically to Lewis and Clark National Historical Park. Scientists cannot predict with certainty the general severity of climate change nor its impacts. Average global temperatures on the Earth's surface have increased about 1.1°F since the late 19th century, and the 10 warmest years of the 20th century all occurred in the last 15 years. The single leading cause of this warming is the buildup of GHGs in the atmosphere—primarily carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) —which trap heat that otherwise would be released into space.

The continued addition of CO_2 and other GHGs to the atmosphere will raise the Earth's average temperature more rapidly in the next century; a global average warming of 4-7°F by the year 2100 is considered likely.[2] Rising global

[1] Original notes from these workshops, including detailed action items not presented in the final plan have been archived by Lewis and Clark National Historical Park and are available upon request.
[2] IPCC 2007. Climate Change 2007: The Physical Science Basis. Intergovernmental Panel on Climate Change, Geneva Switzerland. Available online at < http://ipcc-wg1.ucar.edu/wg1/wg1-report.html>

temperatures will further raise sea levels and affect all aspects of the water cycle, including snow cover, mountain glaciers, spring runoff, water temperature, and aquatic life. Climate change is also expected to affect human health, crop production, animal and plant habitats, and many other features of our natural and managed environments.

At Lewis and Clark National Historical Park, increasing temperatures, and changing precipitation patterns may alter park ecosystems, changing vegetation communities, habitats available for species, and the experience of park visitors. To address the increase in non-native species, which may be due in part to climate change, the park removes exotic plants as time allows, involving the public to participate and voice their concerns.

GREENHOUSE GAS EMISSION INVENTORY AT LEWIS AND CLARK NATIONAL HISTORICAL PARK

Naturally occurring GHGs include CO_2, CH_4, N_2O, and water vapor. Human activities (e.g., fuel combustion and waste generation) lead to increased concentrations of these gases (except water vapor) in the atmosphere.

Greenhouse Gas Emissions

GHG emissions result from the combustion of fossil fuels for transportation and energy (e.g., boilers, electricity generation), the decomposition of waste and other organic matter, and the volatilization or release of gases from various other sources (e.g., fertilizers and refrigerants).

In 2007, GHG emissions within Lewis and Clark National Historical Park totaled 188 metric tons of carbon dioxide equivalent ($MTCO_2E$). This includes emissions from park and concessioner operations and visitor activities, including vehicle use within the park. For perspective, a typical single family home in the U.S. produces approximately 12 $MTCO_2$ per year.[3] Thus, the combined emissions from park and concessioner operations, and visitor activities within the park are roughly equivalent to the emissions from the electricity use of 16 households each year.

The largest emission sector for Lewis and Clark National Historical Park is energy, totaling 159 $MTCO_2E$ (see Figure 1 and Table 1), which is directly related to electrical and natural gas consumption for all building operations.

[3] U.S. EPA, Greenhouse Gases Equivalencies Calculators – Calculations and References, Retrieved , Website: http://www.epa.gov/RDEE/energy-resources/calculator.html

FIGURE 1

Lewis and Clark National Historical Park 2007 Total Greenhouse Gas Emissions by Sector

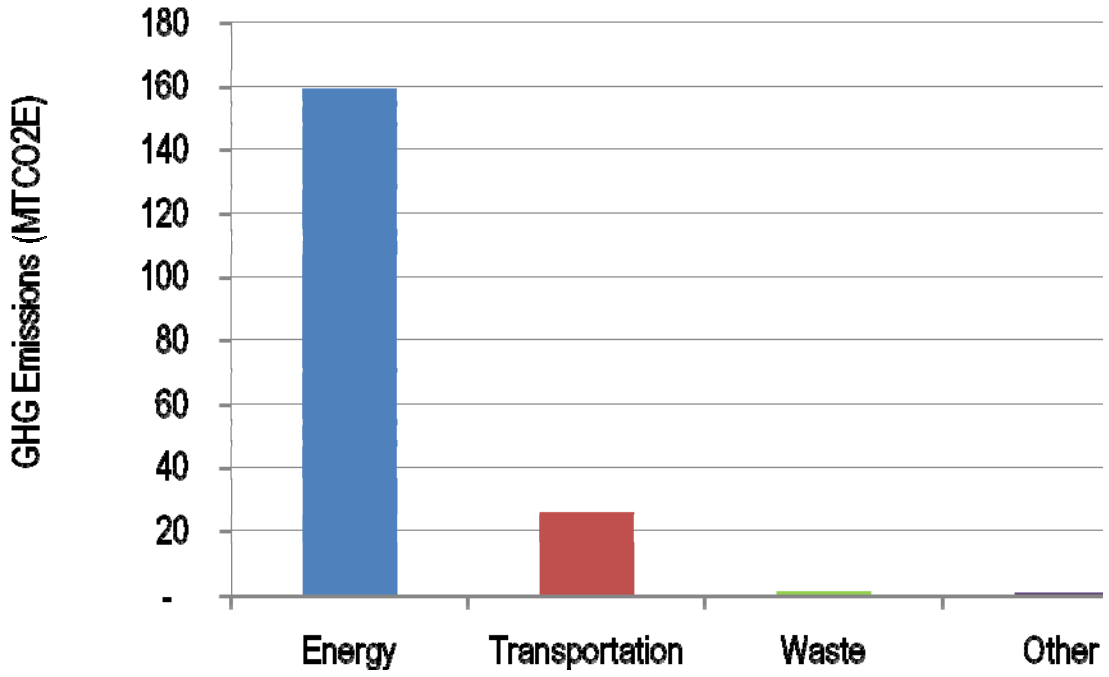

TABLE 1

Lewis and Clark National Historical Park 2007 Total Greenhouse Gas Emissions by Sector and Source

	MTCO2E
Energy	159
Stationary Combustion	47
Purchased Electricity	112
Transportation	27
Mobile Combustion	27
Waste	1
Landfilled Waste	1
Other	1
Refrigeration and Air Conditioning	1
Total	188

Note - Totals may not sum due to rounding

Not applicable data sources represented by "-"

FIGURE 2

Lewis and Clark National Historical Park 2007 Park Operations Emissions by Sector

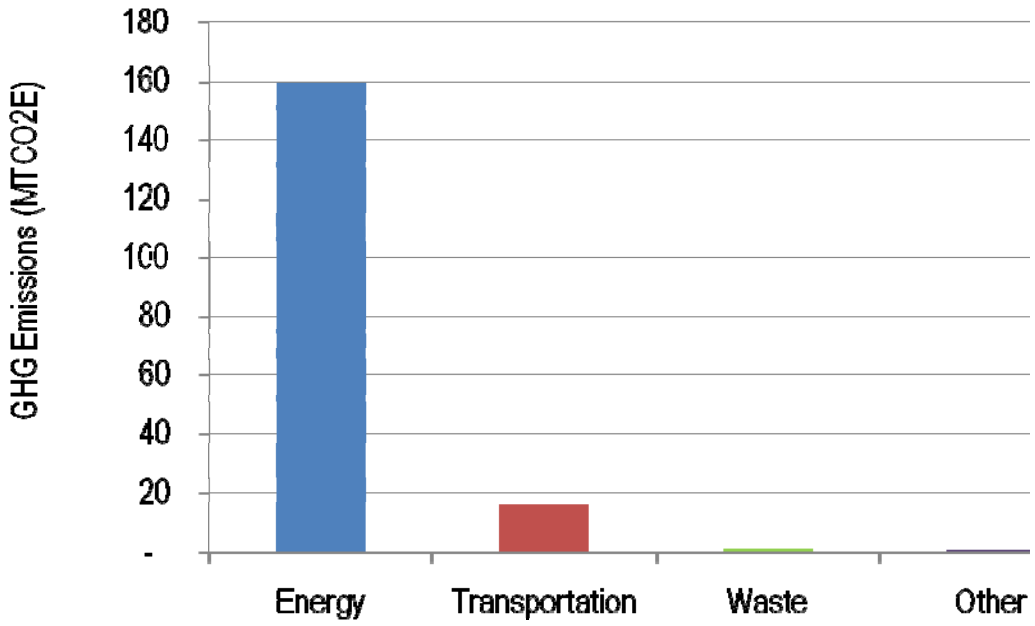

TABLE 2

Lewis and Clark National Historical Park 2007 Park Operations Emissions by Sector

	MTCO2E
Energy	159
Stationary Combustion	47
Purchased Electricity	112
Transportation	16
Mobile Combustion	16
Waste	1
Landfilled Waste	1
Other	1
Refrigeration and Air Conditioning	1
Total	177

Note - Totals may not sum due to rounding
Not applicable data sources represented by "-"

Lewis and Clark National Historical Park Responds to Climate Change

The following actions were developed during the North Coast & Cascade and Upper Columbia Basin Climate Friendly Parks Workshop on February 9th and 10th, 2010 in order to meet the park's climate change mitigation goals.

STRATEGY 1: REDUCE GHG EMISSIONS RESULTING FROM ACTIVITIES WITHIN AND BY THE PARK

Lewis and Clark National Historical Park has developed a set of actions that the park is committed to taking in order to reduce emissions from activities within and by the park. These strategies have been prioritized based on a qualitative assessment of a set of criteria including: emission reduction potential, cost-effectiveness, feasibility, co-benefits, regional impact, and ability to rapidly implement. Actions that Lewis and Clark National Historical Park will take have been presented below in order from highest to lowest priority within each sub-category.

Energy Use Management

Emission Reduction Goal: Reduce park operations' energy use emissions to 35 percent below 2007 levels by 2016.

Improving energy efficiency and implementing alternative energy sources reduces park-based fuel use, lowers GHG emissions, decreases electricity consumption, and offers monetary benefits for the park. Emissions inventory results indicate that 90 percent of the park's GHG emissions from Park Operations are from energy consumption. Consequently, Lewis and Clark National Historical Park identified actions it will take to reduce energy-related emissions. Presented below are the actions that are currently under way and which comprise the park's progress to date, as well as those actions the park will pursue.

Progress to Date

Lighting options

- Made lighting changes to visitor center areas and planning additional upgrades.

Alternative Energy

- Purchased BLUE SKY wind power from Pacific Power and Light Company resulting in avoidance of 12.5 tons of CO_2 emissions.

Other Energy Management Actions

- Completed an energy audit of the park's Visitor Center.
- Being actively conservative in the park's power use.

Energy Use Management – Planned Actions

1 Promote energy efficiency and energy conservation in the park through behavioral change

- Encourage energy conservation in all park activities.
  - Develop an energy policy that reinforces the National Park Service's commitment to conserve. The staff will review and sign the park's conservation policy each year.

- Develop a mandatory energy-saving training program.
  - Environmental Management Systems (EMS) Committee and Stewardship (FM) Team will work together to develop a training program and present the park energy policy during "Seasonal Training."

2 Upgrade lighting options

- Upgrade all light fixtures and bulbs in park to energy efficient bulbs.
  - Install 90 LED lamps in the MR16 existing fixtures.
  - Install 11 Compact Fluorescent bulbs in incandescent fixtures.
  - Replace 16 incandescent recessed bulbs with compact fluorescent in lobby, sales area, exhibit hall, and entry ways.
- Install lighting controls.
  - Install four occupancy sensors in exhibit hall and lobby of the Fort Clatsop Visitor Center.
- Install energy-efficient outdoor lighting.
  - Install and upgrade high pressure sodium outdoor lights in the Employee and Fort Clatsop Visitor Center parking lots.

3 Heating, ventilation, and air conditioning (HVAC)

- Develop and HVAC maintenance schedule.
  - Research and plan for purchasing an upgraded HVAC system. In the next two years the park will develop new HVAC controlling schedule after Visitor Center HVAC system is upgraded.

4 Switch to more efficient electronics and devices

- Establish and implement a green procurement policy that sets minimum energy performance standards for all electronic equipment.
  - Adopt and implement the National Park Service, General Services Administration (GSA), and Pacific West Region green purchasing policy. The park's administration officer will ask if the purchase is green and document response.
- Default all computers to print double-sided.
  - Default all computers to print double-sided but allow staff assess printing needs at time of printing and override if necessary.

5 Improve building structures and envelopes

- Weatherize park buildings by adding R-values to improve insulation effectiveness.
  - Upgrade ceiling insulation and furnace duct wrap (est. 700-1000 square feet) to improve building weatherization.

- Replace old windows with new windows.
  - Use repair/rehab resources and funding to upgrade nine windows and three main entry doors in the Visitor Center.

6 Utilize alternative energy sources

- Install photovoltaic panels on park buildings, parking lots, open areas, etc.
  - Explore and install solar generation capacity in locations deemed feasible.
- Purchase electricity from a renewable energy provider.
  - Continue to purchase green power through Pacific Power and Light Company.
- Explore wind generation power development.
  - The Yeon property is active, applying action to install wind power generation. The staff is in direct planning phase for this operating property to use the stored power for various uses of lighting and heat when needed on the power grid. Plan is to use site by 2011 for education and staff office area for at least four months of the year.

7 Measure energy use throughout the park

- Conduct an energy audit for all park buildings. Partner with local utilities to conduct the audit.
  - Conduct an energy audit of the maintenance buildings, resources building, headquarters building and Yeon structure.

Transportation Management

Emission Reduction Goal: Reduce park operations' transportation emissions to 30 percent below 2007 levels by 2016.

Reducing vehicle miles traveled, improving vehicle efficiency, and using alternative fuels can significantly reduce Lewis and Clark National Historical Park's emissions. As the inventory results indicate, GHG emissions from transportation comprise nine percent of park operations emissions and 14 percent of the park's overall emissions (including visitors, and concessioners). Accordingly, in addition to the park operations emissions reduction goal, Lewis and Clark National Historical Park set a goal to reduce overall transportation emissions by 35 percent below 2007 levels by 2016. Presented below are the actions that are currently under way and which comprise the park's progress to date, as well as those actions that the park will pursue.

Progress to Date

Behavioral Changes

- Developed idling guidelines for heavy equipment use and operations.

- Students and volunteers will use mass transportation on education trips.

Vehicle and Equipment Fuel Consumption

- Planted native plants from the park's nursery stock and xeriscaped five acres.

Vehicles and Equipment Replacement

- Developed a plan to phase out all traditional gas-powered vehicles from the GSA fleet and replace them with hybrids or alternative fuel vehicles.
- Replaced a conventional park vehicle with a comparable hybrid.
- Acquired one Ford Fusion Hybrid car (GSA).

Transportation Infrastructure

- Recycled (converted into a new asphalt surface) four thousand square feet of old asphalt from the Netul Landing Development site.

Transportation Management – Planned Actions

1 Transportation-related behavioral changes

- Reduce staff idling.
  - Use the annual staff training to inform staff about reducing idling practices for all park related vehicles.
- Reduce meeting travel.
  - Use Webinar system training purpose and utilize conference and Web technology to reduce meeting travel.
- Combine trips for purchasing and errand running.
  - Reduce the summer bus schedule from eight inter park runs per day to four and the bus will run on biodiesel.

2 Replace NPS vehicles and equipment

- Use alternative fuel vehicles or hybrids .
  - Replace two trucks with hybrids or alternative vehicles.

Waste Management

Emission Reduction Goal: Reduce park operations' waste emissions to 40 percent below 2007 levels by 2016 through waste diversion and reduction.

The connection between waste and GHG emissions may not be obvious. However, waste management—in the form of source and solid waste reduction—can dramatically reduce GHG emissions. Landfills are the largest human-generated source of CH_4 emissions in the United States. Reducing the amount of waste sent to landfills reduces CH_4 emissions caused by decomposition as well as the GHGs emitted from the transportation of waste. The less the park and its visitors consume in terms of products and packaging, the less energy is used and fewer GHGs are emitted.

Lewis and Clark National Historical Park's park operation activities emitted 1 $MTCO_2E$ from waste management in 2007. Diverting or reducing the park's waste stream through increased recycling efforts and waste management will reduce the amount of waste sent to landfills and resulting emissions. Presented below are the actions that are currently under way and which comprise the park's progress to date as well as those actions that the park will pursue.

Progress to Date

Behavioral Changes

- Trained 45 staff members (each year) on green procurement practices during the annual staff training. Two staff members are trained through DOI Learn and NPS workshops to track and monitor green procurement for the park.

Waste Prevention

- Developed a recycling program that has been in place for about 25 years.
- Outreach is on going through signage and recycling containers and school groups, tour groups and day to day visitors are invited to participate.
- A new program was introduced in 2010 called "Bash the Trash." Through this program, school groups are invited to compete to have the least amount of waste.
- Established an exchange program that ensures the park donates office machines, computers, typewriters, and printers to Goodwill Industries and local schools. The maintenance staff coordinates this program.
- In the past, we have recycled five tons of electronic E-waste and 50 tons of building materials such as concrete and waste wood. Four major pieces of equipment have been traded and upgraded for newer machinery.

Waste Diversion (Recycling and Composting)

- Complying with the park's Integrated Solid Waste Alternatives Plan (ISWAP) for 15 years and waste reduction is part of the standard operating procedure.

- Recycled and reclaimed five tons of materials form the Ness Farmhouse deconstruction project resulting in zero net generation of waste.
- Require all construction projects to have a waste management plan (including the materials that need to be recovered), which includes reduction and salvaging of deconstructed building materials.
- Began tracking waste management data in 1990 which has allowed the park to understand trends in waste generation and target areas for improvement.
- Installed new receptacles to visitor areas.
- Recycled building materials from one demolished structure..

Reduce Wastewater

- Planted native plants on the Fort to Sea Trail and at the Netul Landing Day Use Area. This has reduced water dependency and improved native habitat.

Other waste-related actions

- Applied 120 yards of recycled composted soils to parks' grounds.
- Restored 167 acres back to wetlands habitat.

Waste Management – Planned Actions

1 Reduce and reuse wastewater

- Conserve water used in grounds maintenance.
  - Plant more native ground cover throughout the park.
- Reduce storm and groundwater runoff.
  - Install a rain garden in front of the Visitor Center that is available for public viewing as a model demonstration garden.

STRATEGY 2: INCREASE CLIMATE CHANGE EDUCATION AND OUTREACH

Climate change is a complex and easily misunderstood issue. Lewis and Clark National Historical Park can play an integral role in communicating about climate change to a vast audience. A better understanding of the challenges and benefits of reducing GHG emissions can motivate staff, visitors, and community members to incorporate climate-friendly actions into their own lives. Lewis and Clark National Historical Park recognizes that the greatest potential

impact the park can have on mitigating climate change is through public education. Thus, the park sees public education as an end goal of any climate initiative. From increasing the efficiency of public transportation to developing a green purchasing program, the actions Lewis and Clark National Historical Park takes to address climate change serve as opportunities for increasing the public's awareness of climate change. Presented the actions that are currently under way and which comprise the park's progress to date, and those actions that the park will pursue.

Progress to Date

Climate Change Education

- Developed recycling programs including "Bash the Trash." We weigh students' trash after they have recycled and composted their lunch. "Bash the Trash" is an educational tool to look at waste reduction and visitor's carbon footprint.
- Continuing education for staff regarding conserving the park's resources.

Park Staff

Incorporate climate change into park staff training, events, and performance plans

Developing a climate change education program for park staff is vital to increasing awareness about climate change among park visitors and fostering a sense of collective responsibility among staff to help reduce park emissions. By incorporating climate change education into staff development programs, Lewis and Clark National Historical park will enable its staff to demonstrate their commitment through leading by example, and providing visitors with the tools and resources they need to reduce GHG emissions in the park and in their own communities. Potential actions include:

- Create a park Climate Change Policy Memo specific to Lewis and Clark National Historical Park.
  - Develop a policy memo for the annual staff training that specifies the park's commitment to addressing climate change that every employee and volunteer will sign.
- Keep staff members that are part of the Green Team/Environmental Management Team informed about climate-related issues.
  - Keep staff informed about efforts to address climate change including behavioral changes and new policies.
- Incorporate sessions on climate change into new staff training.
  - At the annual staff training the EMS committee will present the park's greenhouse gas emission inventory that was generated through the Climate Leadership in Parks Tool, ISWAP, green procurement policies and how to recycle and compost.
- Advise staff on monthly webinars hosted by the climate change steering committee.
  - Keep staff aware of climate change educational opportunities including the Climate Change Steering Committee's webinar opportunities.

Visitor Outreach

Understanding climate change and its consequences is essential to initiating individual behavioral change. Lewis and Clark National Historical Park realizes that it has a unique opportunity to educate the public in a setting free from many of the distractions of daily life. By using existing materials, developing park-specific materials, highlighting what the park is currently doing about climate change, and encouraging visitors to reduce emissions, Lewis and Clark National Historical Park can play an important role in educating the public about climate change.

Lewis and Clark National Historical Park staff recognize the many different audiences that visit the park, including recreational and non-recreational park visitors, "virtual visitors" who visit the park online, school-aged visitors, local and out of town visitors, local tribes, and external audiences. Reaching these various audiences with climate change information and engaging them in the park's efforts requires appropriately focused messaging. The park has developed a number of strategies to reach these various audiences effectively. These strategies include:

- Educate visitors about climate change.
    - Premiere the "Sammy the Salmon" exhibit which will tell the story of how climate change affects salmon at Earth Week 2010. The exhibit will also feature the current science of climate change in the Pacific Northwest and include a call to action for children to reduce their carbon footprint to help little Sammy the Salmon.
- Incorporate climate-friendly information into interpreter programs and talks.
    - Encourage and support interpreters in offering information about climate change and the park's climate change initiative.
- Communicate with local communities, park visitors, and local media about actions they can take to reduce GHG emissions.
    - Offer a green sticker – carbon offset program wherein visitors can offset the greenhouse gas emissions generated by their visit to the park. Stickers will be available through the book store in association with Bonneville Environmental Foundation.
- Consider hosting a climate change traveling exhibit.
    - Host the Arrange for Change Exhibit for Earth Week 2010.

Local Community Outreach

The gateway communities, agencies, vendors, and volunteers surrounding Lewis and Clark National Historical Park can play a significant role in supporting the park's climate change mitigation goals. As such, when appropriate, park staff will assist local communities with incorporating climate change messages into community events and find partners to promote climate change education at those events, and engage with surrounding agencies to coordinate effective outreach and education efforts.

- Construct trails, activity areas, and programs for interpretation in conjunction with and accessible to the community.

STRATEGY 3: EVALUATE PROGRESS AND IDENTIFY AREAS FOR IMPROVEMENT

By taking the actions established in strategies 1 and 2 above, Lewis and Clark National Historical Park plans to reduce its emissions to the specified goals. Achieving these goals will require an ongoing commitment by the park, which may include subsequent emission inventories, additional mitigation actions, and revaluation of goals. As part of this strategy, Lewis and Clark National Historical Park will:

- Monitor progress with respect to reducing emissions. This will include subsequent emission inventories to evaluate progress toward goals stated in this action plan.
- Develop additional emission mitigation actions beyond those listed in this plan.
- Periodically review and update this plan.
- Lewis and Clark National Historical Park will track climate-friendly actions through the environmental management system.

CONCLUSION

Lewis and Clark National Historical Park has a unique opportunity to serve as a model for the more than 168,000 recreational visitors to the park annually.[4] This report summarizes the operational actions the park commits to undertake to address climate change. Specifically, the park realizes its ability to educate the public and serve as a valuable model for citizens. By seriously addressing GHG emissions within the park and sharing its successes with visitors, Lewis and Clark National Historical Park will help mitigate climate change far beyond the park's boundaries.

The National Park Service faces an uncertain future due to the possible effects of climate change. However, by seriously addressing climate change impacts and reducing emissions, Lewis and Clark National Historical Park will reduce its contribution to the problem while setting an example for its visitors. The strategies presented in this Action Plan present an aggressive first step towards moving Lewis and Clark National Historical Park to the forefront of Climate Friendly Parks.

[4] Lewis and Clark National Historical Park: Park Statistics. Available online at: http://www.nature.nps.gov/stats/viewReport.cfm