



National Park Service  
U.S. Department of the Interior



CLIMATE *Friendly* PARKS

Golden Gate National  
Recreation Area

Climate Change Action Plan

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## INTRODUCTION

The purpose of this plan is to provide a guide for the Golden Gate National Recreation Area (Park) to become a carbon neutral park and to adapt to changes the Park may experience due to a changing climate. This Action Plan is a planning-level document that lays out the principles and process by which the Park will adapt to climate change and reduce its net emissions of greenhouse gases (GHGs) (including those of its visitors) to the point that it is no longer a contributor to global warming. This plan will be implemented through annual plans that select actions and projects to pursue each year to achieve the overall goal of carbon neutrality by 2016.

### The Challenge of Climate Change

Many other sources describe the greenhouse effect, global warming, and climate change in more detail. In short, the greenhouse effect is a natural phenomenon that keeps the earth's temperature stable at an average of 60° F. Without this natural warming our planet would be uninhabitable at an average temperature of 14° F. However, human actions are disturbing this balance through over-production of large amounts of two main GHGs, carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>). The increase in GHGs is causing an overall warming of the planet, commonly referred to as *global warming*. The term *climate change* describes the variable consequences of global warming over time.

Average global temperatures on the Earth's surface have increased about 1.1° F since the late 19<sup>th</sup> century, and 11 of the past 12 years have been the warmest years recorded since reliable records began around 1850. The leading cause of this warming is the buildup of GHGs in the atmosphere.

The continued addition of CO<sub>2</sub> and other GHGs to the atmosphere will raise the Earth's average temperature even more rapidly in the next century; a global average warming of 4-7° F by the year 2100 is considered likely.<sup>1</sup> Rising global temperatures will further raise sea level and affect all aspects of the water cycle, including snow cover, mountain glaciers, timing of spring runoff, water temperature, ocean currents and upwelling, salinity levels of inland coastal waters, and aquatic life. Climate change is also expected to affect human health, alter crop production, animal habitats, and many other features of our natural and managed environments.

Climate change presents significant risks and challenges to the National Park Service (NPS). At Golden Gate National Recreation Area increased temperatures and sea level rise may alter the natural ecosystems present, and change both the habitats available for species and resources available for park visitor recreation.

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<sup>1</sup> 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> >

## GOLDEN GATE NATIONAL RECREATION AREA BECOMES A CLIMATE FRIENDLY PARK

As the steward of the Nation's most valued public lands, National Park Service has a special obligation to be a leader in protecting the environment. As a participant in the Climate Friendly Parks (CFP) program, Golden Gate National Recreation Area (GGNRA) belongs to a network of parks that are putting climate friendly behavior at the forefront of sustainability planning in national parks. By conducting an emission inventory, setting an emission reduction target, developing this Action Plan, and committing to educate park staff, visitors, and community members about climate change, Golden Gate National Recreation Area is serving as a model for climate friendly behavior within the park service.

Golden Gate National Recreation Area has committed to reducing GHG emissions from its operations by 100 percent below 2006 levels by 2016. This Action Plan lays out the measures the park will take to meet this carbon-neutral goal. In addition to implementing these measures, Golden Gate National Recreation Area will:

- Perform subsequent emission inventories to monitor progress
- Identify additional actions to reduce GHG emissions and inform the public on climate change
- Include additional actions, and strengthen existing actions, to reduce GHG emissions in future Action Plans

In addition, the Park commits to:

- Participation by all divisions and levels in the park
- Consider climate change impacts in planning, purchasing and operating decisions
- Generate clean energy for park use through compatible renewable energy projects
- Identify clear responsibility for environmental practices and include these responsibilities in employee performance standards, recognizing superior effort when it is demonstrated
- Consider the global environmental and societal impacts when making decisions to reduce our carbon footprint
- Purchase renewable energy credits to offset any carbon emissions remaining after the above steps

- Brian O'Neill  
Superintendent  
Golden Gate National Recreation Area

## GOALS AND OBJECTIVES

The objective of this Action Plan is to identify actions that Golden Gate National Recreation Area can undertake to reduce GHG emissions and thus address climate change. This plan presents the park's emission reduction targets and associated reduction strategies designed to achieve the park's emission reduction goals.

While the plan does not provide detailed instructions on how to carry out each of the proposed measures, it provides the essential framework needed to meet Golden Gate National Recreation Area's emission reduction targets. The plan presents an opportunity for the park to devote resources for climate action through a mandate from the park's superintendent. This mandate gives park staff the resources and authority to pursue the mitigation strategies contained in this plan.

Golden Gate National Recreation Area aims to:

*Operate the park in a carbon neutral manner by 2016 by implementing emission mitigation actions and carbon offset strategies.*

In order to meet this goal, the park will implement strategies proposed in this plan that build from the park's current and future emission inventories. Specifically, the plan recommends four main strategies:

**Strategy 1:** Reduce emissions from park facilities and operations by identifying and implementing emission mitigation actions

**Strategy 2:** Plan for and adapt to future impacts of climate change

**Strategy 3:** Increase climate change outreach and education efforts

**Strategy 4:** Evaluate progress and identify areas for improvement.



## BACKGROUND

There are several sources of guidance that direct the Park to reduce GHG emissions and undertake climate change action planning. An executive order from the Office of the President is presented in Section 1 along with national and regional guidance specifically from the National Park Service. Section 2 summarizes other state and local initiatives that the Park should consider. Section 3 highlights existing planning processes into which climate change planning must integrate.

### Section 1:

#### *Federal Policies: Executive Orders and NPS Directives*

Federal policy has emphasized sustainable practices for many years, and has more recently incorporated climate change into Executive Orders and park policies:

#### **Executive Order 13423, Issued by President George W. Bush, Jan. 24, 2007:**

##### **"Sec. 1. Policy.**

It is the policy of the United States that Federal agencies conduct their environmental, transportation, and energy-related activities under the law in support of their respective missions in an environmentally, economically and fiscally sound, integrated, continuously improving, efficient, and sustainable manner.

##### **Sec. 2. Goals for Agencies.**

In implementing the policy set forth in section 1 of this order, the head of each agency shall:

- (a) improve energy efficiency and reduce greenhouse gas emissions of the agency, through reduction of energy intensity by
  - (i) 3 percent annually through the end of fiscal year 2015, or
  - (ii) 30 percent by the end of fiscal year 2015, relative to the baseline of the agency's energy use in fiscal year 2003;
- (b) ensure that
  - (i) at least half of the statutorily required renewable energy consumed by the agency in a fiscal year comes from new renewable sources, and
  - (ii) to the extent feasible, the agency implements renewable energy generation projects on agency property for agency use;
- (c) beginning in FY 2008, reduce water consumption intensity, relative to the baseline of the agency's water consumption in fiscal year 2007, through life-cycle cost-effective measures by 2 percent annually through the end of fiscal year 2015 or 16 percent by the end of fiscal year 2015;
- (d) require in agency acquisitions of goods and services
  - (i) use of sustainable environmental practices, including acquisition of biobased, environmentally preferable, energy-efficient, water-efficient, and recycled-content products, and
  - (ii) use of paper of at least 30 percent post-consumer fiber content;
- (e) ensure that the agency
  - (i) reduces the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of by the agency,
  - (ii) increases diversion of solid waste as appropriate, and
  - (iii) maintains cost-effective waste prevention and recycling programs in its facilities;
- (f) ensure that
  - (i) new construction and major renovation of agency buildings comply with the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings set forth in the Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding (2006), and
  - (ii) 15 percent of the existing Federal capital asset building inventory of the agency as of the end of fiscal year 2015 incorporates the sustainable practices in the Guiding Principles;

- (g) ensure that, if the agency operates a fleet of at least 20 motor vehicles, the agency, relative to agency baselines for fiscal year 2005,
  - (i) reduces the fleet's total consumption of petroleum products by 2 percent annually through the end of fiscal year 2015,
  - (ii) increases the total fuel consumption that is non-petroleum-based by 10 percent annually, and
  - (iii) uses plug-in hybrid (PIH) vehicles when PIH vehicles are commercially available at a cost reasonably comparable, on the basis of life-cycle cost, to non-PIH vehicles; and
- (h) ensure that the agency
  - (i) when acquiring an electronic product to meet its requirements, meets at least 95 percent of those requirements with an Electronic Product Environmental Assessment Tool (EPEAT)-registered electronic product, unless there is no EPEAT standard for such product,
  - (ii) enables the Energy Star feature on agency computers and monitors,
  - (iii) establishes and implements policies to extend the useful life of agency electronic equipment, and
  - (iv) uses environmentally sound practices with respect to disposition of agency electronic equipment that has reached the end of its useful life."

### National Park Service Policies and Programs:

- (a) The NPS Management Policies, August 31, 2006, Section 4.7.2 states that "Parks containing significant natural resources will gather and maintain baseline climatological data for reference."
- (b) National Parks in the Climate Friendly Parks program are leading the way. A joint program of the U.S. Environmental Protection Agency and NPS, the Climate Friendly Parks program helps parks reduce greenhouse gas emissions by developing plans to reduce energy and water use, design and construct sustainable facilities, and develop alternative transportation systems. Across the country, park staff, partners and volunteers are developing a long-term commitment to sustainable practices for national parks and surrounding communities.

### NPS Pacific West Region Directive PW-047, October 31, 2006:

- A. On-Site generated renewable energy.
  1. Electricity, off-grid power: The conversion to renewable sources of electricity (photovoltaic, wind) is encouraged as methods to eliminate generators as primary sources of electricity.
  2. Electricity, on-grid: The addition of renewable sources of electricity (photovoltaic, wind) is encouraged as methods to reduce the grid load of park facilities. This supports the greater goal of reducing source pollution at electrical production facilities using fossil fuels. Net-metering shall be pursued as permitted by state regulations.
  3. Non-electrical energy: Renewable energy thermal projects (solar thermal and geo-thermal only when acceptable under the park's resource management mission and preferably outside park boundaries) are encouraged as alternatives to fuel oil fired or other air quality degrading sources of heat.
- B. Purchased renewable energy: Purchasing Green Power (i.e., wind, solar, geothermal, biomass) as allowed through the local electric company is encouraged when on-site renewable energy systems are not feasible. As an alternative method, purchasing Green Power Tags is permitted.

## Section 2:

### *State and Local policies*

The Park is located in a state that has taken an active role in addressing global warming, and neighboring local governments are leading the way in sustainability. The Park can maximize its effectiveness by incorporating the goals of these agencies into its planning.

### California Global Warming Solutions Act of 2006 (AB32):

California has committed to reducing its global warming emissions to 2000 levels by 2010 (11% below business as usual), to 1990 levels by 2020 (25% below business as usual), and 80% below 1990 levels by 2050.

### San Francisco's Climate Action Plan (2004)

San Francisco's Department of the Environment and Public Utilities Commission completed a Climate Action Plan in 2004. The reduction target established in this plan is 20% below 1990 levels by 2012.

## Section 3:

### *Golden Gate National Recreation Area Planning Documents*

#### **Environmental Management System**

An Environmental Management System (EMS) provides us with a tool to achieve environmental stewardship and leadership. An EMS is to include "measurable environmental goals, objectives, and targets that are the subject of review and that are updated annually." Its purpose is to help ensure compliance with regulatory requirements and a commitment to pollution prevention, waste reduction, sustainable planning, environmentally preferable purchasing, and the incorporation of environmental best management practices.

The Park completed its first EMS in December 2005 as required by Executive Order 13148, and has updated the targets annually since that time. An Environmental Management System Team (EMS Team) consists of representatives from most park divisions. This Climate Change Action Plan is intended to compliment the EMS, and future updates to the EMS will include objectives and measurable goals specified in the Climate Change Action Plan.

#### **General Management Plan**

The Golden Gate National Recreation Area is in the process of updating its General Management Plan (GMP), which will guide the Park's management for the next 20 years. It has been more than 25 years since the original GMP for the Park was put in place. Since then, the Park has more than doubled in size and visitation, and the ecological and historical significance of its resources are better understood. The new GMP will:

- Clearly define resource conditions and visitor experiences to be achieved at GOGA consistent with the recreation area's purpose and significance statements.
- Provide a framework for NPS managers to use when making decisions about how to best protect GOGA resources, how to provide a diverse range of visitor experience opportunities, how to manage visitor use, and what kinds of facilities, if any, to develop.
- Ensure that this foundation for decision making has been developed in consultation with interested stakeholders and adopted by the NPS leadership after an adequate analysis of the benefits, impacts, and economic costs of alternative courses of action.

The GMP will consider the goals and objectives laid out in this Climate Change Action Plan, and will summarize the guiding principles by which GOGA will attempt to reduce, educate, and adapt to climate change over the next 20 years.

## GREENHOUSE GAS EMISSION AND CRITERIA AIR POLLUTANT INVENTORY

Naturally occurring GHGs include CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, and water vapor. Human activities (e.g., fuel combustion, waste generation) lead to increased concentrations of these gases (except water vapor) in the atmosphere. Criteria air pollutants, which lead to numerous air quality and public health problems, include sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), volatile organic compounds (VOCs), particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), and carbon monoxide (CO).<sup>2</sup> While GHGs contribute to climate change on a global scale, the impacts of criteria air pollutants are often local and regional in nature.

Golden Gate National Recreation Area's emissions can be categorized into three tiers: 1) emissions from Park Operations; 2) emissions from concessioner and Park Partner operations (non-profits that utilize park buildings); and 3) Visitor emissions. Currently the Park Partner operations are very difficult to quantify (for example they receive separate utility bills) and are therefore excluded from the following evaluation. Instead, emissions are calculated separately for Alcatraz Island, as this is a self-contained unit where emissions reductions can be evaluated holistically.

The emissions are divided into three categories:

- **Energy** (generators, furnaces, dryers, hot water heaters, purchased electricity)
- **Transportation** (vehicle miles traveled by park fleet, visitor vehicles, and the Alcatraz Ferry)
- **Waste** (incorporates the emissions from wastewater treatment and municipal solid waste decomposition)

The GHG emissions inventory was completed using the Climate Leadership in Parks (CLIP) tool. The CLIP tool was developed under the Climate Friendly Parks initiative between NPS and the Environmental Protection Agency (EPA), with the purpose of enabling park personnel to complete GHG inventories and then use the tool to track future progress. It guides park personnel through the various steps involved in estimating emissions, automates calculations, and generates summary reports and reduction targets. By enabling parks to develop their own inventories and action plans, EPA and NPS hope to expand the Climate Friendly Parks program to many more parks than would otherwise be possible. The CLIP tool converts emissions of various GHGs into a common "metric tons of carbon equivalent" (MTCE) unit, which provides a basis for comparison between gases and simplifies reduction tracking. The conversion of a GHG to MTCE is based upon how strongly that particular gas contributes to the greenhouse effect, and how many tons of carbon emission would have the same effect.

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<sup>2</sup> Criteria air pollutants were calculated and are presented in the inventory section of this document due to their co-benefit relation with GHGs. However, it is important to realize that criteria air pollutants do not contribute directly to climate change.



## Greenhouse Gas Emissions

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

In 2006, Golden Gate National Recreation Area's GHG emissions totaled 10,319 metric tons of carbon equivalent (MTCE). As Figure 1 demonstrates, the majority of these emissions are due to Visitors. The Park receives approximately 13 million visitors per year, generating an estimated 73 million vehicle miles travelled. This accounts for a majority of the Park's emissions – totaling 88 percent of emissions. As Figure 2 and Table 1 demonstrate, the largest source of Golden Gate National Recreation Area's emissions is Transportation – totaling 9,613 MTCE. For the reasons previously discussed, the majority of emissions attributed to Transportation are due to visitor travel – totaling 9,096 MTCE.

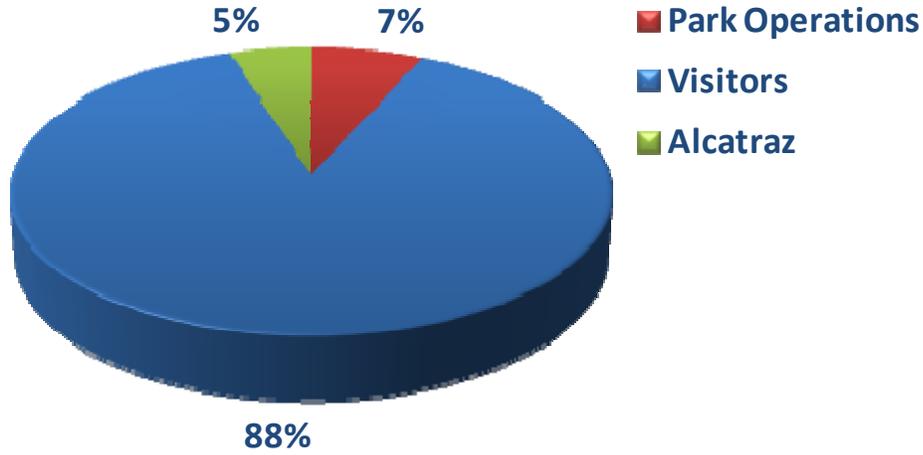
Figure 3 presents emissions from Park Operations and Alcatraz in comparison. As depicted, for some sectors, the emissions from Alcatraz make up a substantial portion of the park-wide total.

Access by the Park to the information required to inventory the Park Partners and most concessionaires is limited. Ideally, they will engage in their own climate change analysis and be able to provide the Park with their emissions tracking information in the coming years so that the Park can include that information in future updates to this plan.



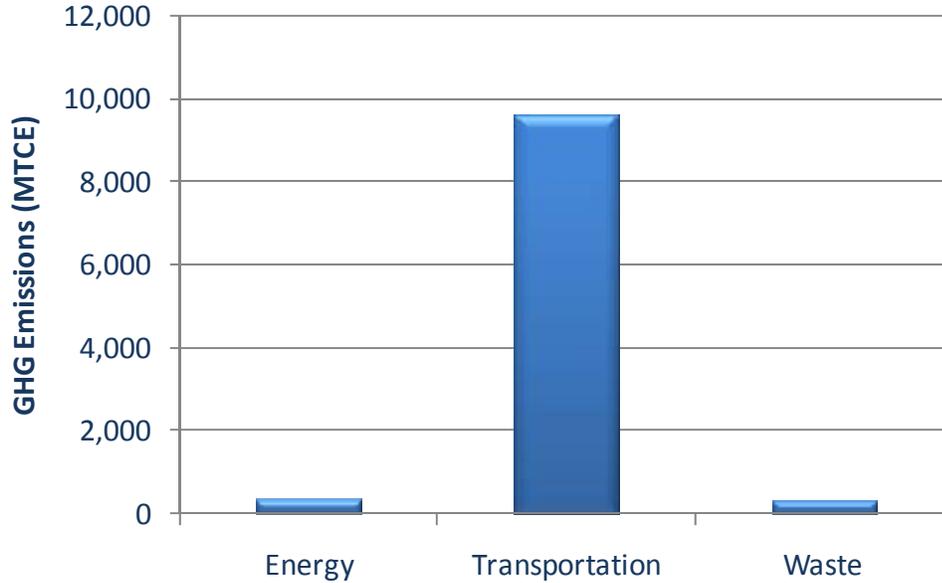
# FIGURE 1

*Golden Gate National Recreation Area's 2006 Greenhouse Gas Emissions by Park Unit*



# FIGURE 2

*Golden Gate National Recreation Area's 2006 Greenhouse Gas Emissions by Sector*



**TABLE 1**

*Golden Gate National Recreation Area's 2006 Greenhouse Gas Emissions by Sector, Source, and Park Unit\**

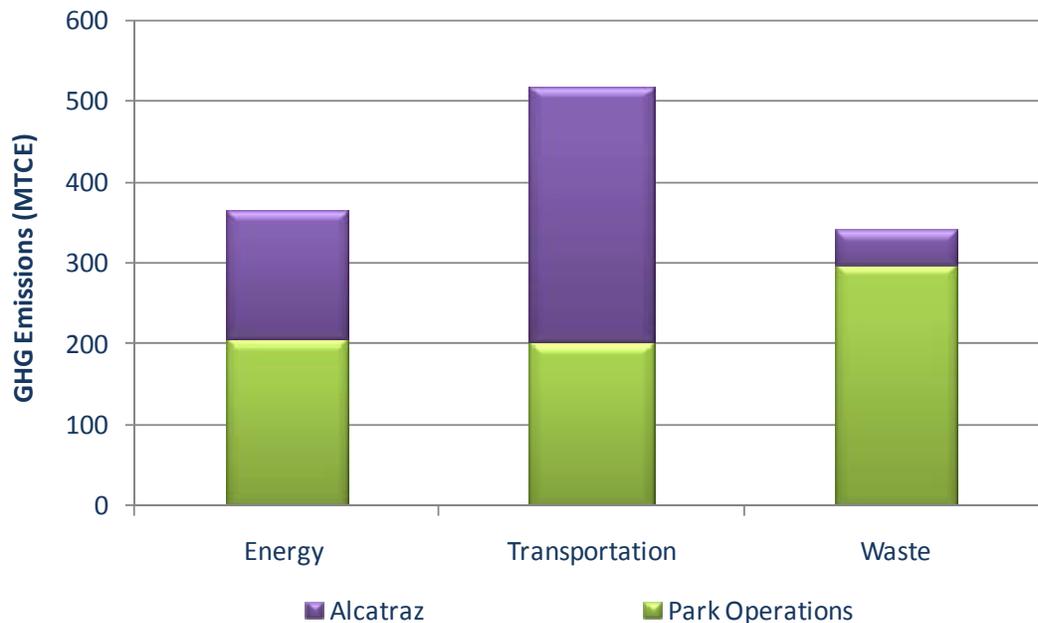
	Park Operations	Visitors	Alcatraz	Total
<b>Energy</b>	<b>207</b>	<b>NA</b>	<b>158</b>	<b>365</b>
Stationary Combustion	87	NA	158	245
Purchased Electricity	120	NA	NA	120
<b>Transportation</b>	<b>202</b>	<b>9,096</b>	<b>315</b>	<b>9,613</b>
Mobile Combustion	202	9,096	315	9,613
<b>Waste</b>	<b>299</b>	<b>NA</b>	<b>42</b>	<b>341</b>
Solid Waste Disposal	160	NA	36	196
Wastewater Treatment	139	NA	6	145
<b>Total Emissions</b>	<b>709</b>	<b>9,096</b>	<b>515</b>	<b>10,319</b>

\* Totals may not sum due to rounding

NA – Not Applicable. Visitor waste disposal and wastewater treatment are attributed to Park Operations and Alcatraz according to authority over disposal sites.

**FIGURE 3**

*Golden Gate National Recreation Area's 2006 Greenhouse Gas Emissions by Sector*



**CLIMATE Friendly PARKS**

A partnership between the Environmental Protection Agency and the National Park Service

[www.nps.gov/climatefriendlyparks](http://www.nps.gov/climatefriendlyparks)

## Criteria Air Pollutants (CAPs)

CAP sources include stationary sources (e.g., boilers), mobile sources, and area sources (e.g., campfires, solvent use). In 2006, Golden Gate National Recreation Area produced 19,892 lbs of CO, 4,131 lbs of NO<sub>x</sub>, 51,972 lbs of VOCs, and 72 lbs of PM (Figure 2). As Table 2 demonstrates, at 51,972 lbs, VOCs are the most emitted CAP, and these emissions are solely from transportation.

The same activities that generate GHGs often also generate CAPs. Therefore, addressing activities that generate GHGs also often has the added benefit, or co-benefit, of reducing CAPs.

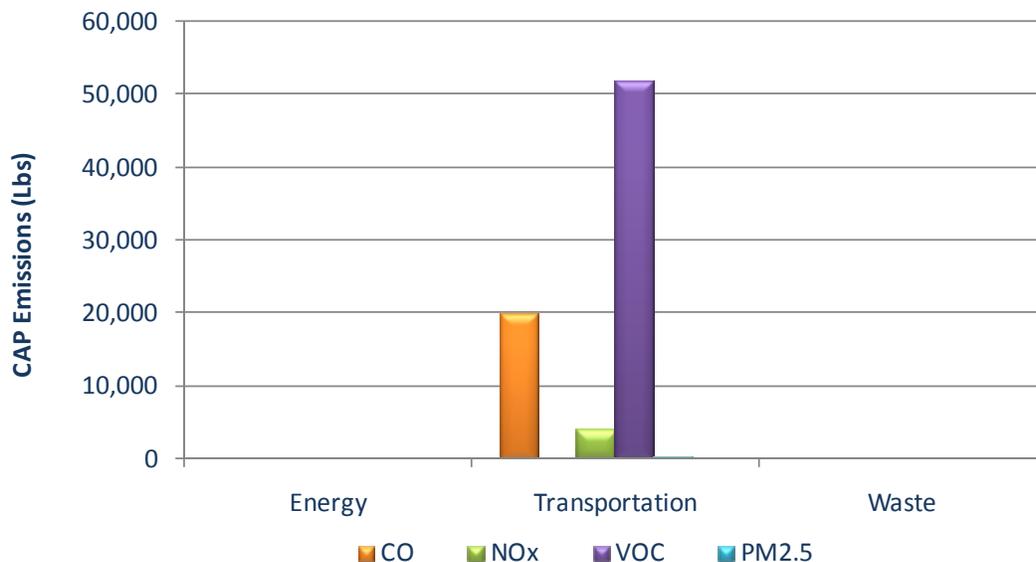
### TABLE 2

*Golden Gate National Recreation Area's 2006 CAPs by Sector and Source*

	CO (lbs)	SO <sub>2</sub> (lbs)	NO <sub>x</sub> (lbs)	VOC (lbs)	PM <sub>2.5</sub> (lbs)	PM <sub>10</sub> (lbs)
Energy	0	0	0	0	0	0
Transportation	19,892	0	4,131	51,972	72	0
Waste	0	0	0	0	0	0
<b>Total Emissions</b>	<b>19,892</b>	<b>0</b>	<b>4,131</b>	<b>51,972</b>	<b>72</b>	<b>0</b>

### FIGURE 4

*Golden Gate National Recreation Area's 2006 CAPs by Sector*



# How Golden Gate National Recreation Area is Responding to Climate Change

*The following actions were developed during the CFP workshop hosted by Golden Gate National Recreation Area on March 3<sup>rd</sup>, 2007 in order to meet the park's climate change mitigation goals.*

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

Golden Gate National Recreation Area has the goal of operating in a carbon neutral manner by 2016. This goal will be met first by reducing GHG emissions at the park in the Transportation, Energy, and Waste Management sectors. Specific goals for reducing emissions from these sectors relative to the baseline year of 2006 are presented in the respective sections below. To meet the overall park goal of operating in a carbon neutral manner by 2016, the park will supplement these mitigation actions with carbon offset strategies.

### Transportation Management

*Emission Reduction Goal: Reduce transportation emissions to 5 percent below 2006 levels by 2016.*

Reducing vehicle and watercraft miles and hours traveled, upgrading the fleet to the latest green technology that will result in improved efficiency, and using alternative fuels can significantly reduce Golden Gate National Recreation Area's emissions. As the inventory results indicate, 93 percent of the park's GHG emissions are a result of transportation. The following strategies were developed to meet the park's transportation emission reduction goal:

#### 1 Reduce petroleum consumption by NPS and concession vehicles and vessels

- Reduce the amount of miles driven by the park fleet.
- Increase employee options and incentives to use alternative transportation (walking, bicycles, and public transit) both to/from work and during working hours.
- Continually optimize fleet technology to utilize high-efficiency and low-emission vehicles including updating infrastructure.
- Reduce equipment use, vehicle use, and vehicle idling.
- Coordinate transportation planning with park partners and concessionaires.

#### 2 Reduce visitor vehicle miles traveled

- Expand and enhance shuttle services throughout the park.
- Work with public transportation agencies to maximize transportation options to the park.
- Encourage more efficient visitor vehicle use by such means as charging for parking or offering free or subsidized entry and parking for low-emission vehicles or carpools.

### Energy Use Management

*Emission Reduction Goal: Reduce energy use emissions to 100 percent below 2006 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. As the inventory results indicate, 3.5



percent of the park's GHG emissions result from energy consumption. The following strategies were developed to meet the park's energy use emission reduction goal:

### 1 Promote energy efficiency and energy conservation in NPS-owned facilities

- Prioritize and implement park projects that enhance energy-efficiency and other sustainability aspects.
- All new project that increase energy consumption will include mitigation of energy use elsewhere in the park.
- Install energy-efficient lighting and lighting-control devices.
- Replace diesel generators on Alcatraz with biodiesel or eliminate generators.
- Purchase only EnergyStar rated (or equivalent) appliances.
- Establish "energy-savings account" dedicated to energy conservation projects.

### 2 Utilize 100% clean energy through on-site generation or purchased from a renewable energy provider

- Generate 100% of energy demand at Alcatraz Island using solar photovoltaics.
- Actively seek compatible renewable energy projects within the park boundary.
- As an interim measure, offset all non-renewable energy use through purchase of Renewable Energy Credits (RECs).

## Waste Management

*Emission Reduction Goal: Reduce waste emissions to 50 percent below 2006 levels by 2016 through waste diversion.*

The connection between waste and GHG emissions may not be obvious. However, waste management—in the form of source reduction and solid waste reduction—can dramatically reduce GHG emissions. The less we consume in terms of products and packaging, the less energy is used and fewer GHGs are emitted. Additionally, reducing the amount of waste sent to landfills reduces CH<sub>4</sub> emissions caused by decomposition.

Diverting or reducing the park's waste stream through increased recycling efforts and waste management procedures will reduce the amount of waste sent to landfills, which are the largest human-generated source of CH<sub>4</sub> emissions in the United States. Golden Gate National Recreation Area activities emitted 341 MTCE from waste management in 2006. The following strategies were developed to meet the park's waste emission reduction goal:

### 1 Manage waste through source reduction, composting and recycling

- Increase diversion of mixed recyclables by an additional 20 tons.
- Reduce amount of waste generated park-wide by 50%.
- Compost 75% of food waste from GGNRA operations.
- Train all park staff on recycling and composting.



- Improve recycling in public areas.

## 2 Green Purchasing

- Train all NPS purchasing staff on the GGNRA Green Purchasing Policy.
- Establish guidance for contractor specifications for “green” construction practices.

## 3 Reduce the amount of wastewater sent to wastewater treatment plants and septic systems

- Decrease amount of wastewater treated by 5%.
- Decrease the amount of inflow/ infiltration into the sewer system through maintenance repair projects

# STRATEGY 2: PLAN FOR AND ADAPT TO FUTURE IMPACTS OF CLIMATE CHANGE

While it is crucial to reduce the park’s impact on climate change, it is also important to recognize the fact that certain effects of climate change may be inevitable, and the park should start planning and monitoring for them now.

## Natural and Cultural Park Resources

Understanding what natural and cultural resources the Park has and how they will be affected by climate change is crucial to developing a comprehensive and effective management plan to mitigate the impacts of climate change on these resources. The following strategies were developed to help the Park effectively mitigate the impacts on its resources:

### 1 Inventory and monitor park resources for climate change impacts

- Identify and prioritize park resources to be monitored (including natural and cultural resources).
- Form a science advisory group that can provide a plan to the Park on what ecological and habitat monitoring should be conducted.
- The Park should monitor the effectiveness of conservation efforts identified in this plan to ensure that conservation efforts are having the intended results.

### 2 Incorporate climate change risk into project planning

- Integrate a climate change risk index with the current building condition index and asset prioritization index to help manage project selection and prioritization.
- Discuss climate change threats and establish principles of response (e.g., use managed retreat as preferred option when resources are threatened by coastal erosion) in the Park’s General Management Plan.
- Planning should include a discussion of ways in which the Park might choose to adapt to shifting habitats and sensitive ecological populations.

### 3 Land use projects



- GGNRA will follow the discussion of land-use planning at the servicewide level and implement the policies that are developed.

## STRATEGY 3: INCREASE CLIMATE CHANGE EDUCATION AND OUTREACH

Climate change is a complex issue that the park can help communicate to the public. A better understanding of the problem and the benefits of reducing GHG emissions can motivate staff, visitors, and community members to incorporate climate friendly actions into their own lives. Golden Gate National Recreation Area 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 Golden Gate National Recreation Area takes to address climate change serve as opportunities for increasing the public's awareness of climate change.

### Park Staff

Developing a climate change education program for park staff is vital to increasing awareness about climate change among park visitors. By incorporating climate change education into staff-development programs and creating new opportunities for staff to learn about climate change, Golden Gate National Recreation Area will reduce park emissions and provide visitors with the tools and resources they need to reduce GHG emissions at home and in their own communities. We will raise expectations of ourselves and of each other. The park should become a leader by promoting and encouraging alternative transportation use.

#### **Incorporate climate change into park staff training and performance plans**

In an effort to provide Golden Gate National Recreation Area staff with the knowledge and tools to educate visitors, the park will:

- Establish an internal communications channel to keep our staff, partners and volunteers informed of the latest information. These periodic reports will be relayed through podcasts, newsletter articles and Internet/Intranet updates.
- Develop resource materials to help interpreters, field staff, and rangers develop educational programs about climate change awareness and things anyone can do to help.

### Visitors

Understanding climate change and its consequences is essential to initiating individual behavioral change. Golden Gate National Recreation Area 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, Golden Gate National Recreation Area can play an important role in educating the public about climate change.

#### **Incorporate climate change awareness into visitor education**

Park interpretive staff have the opportunity to introduce the issue of climate change to many visitors. Golden Gate National Recreation Area encourages staff to include messages about climate change in their visitor talks. The park will:

- Create programs and materials that address climate change in a manner that is appropriate to various groups from the adult public, to children, to school groups and teachers.
- Inform the public about climate change and park projects via podcasts, internet updates, signs and exhibits.

### Develop park-specific interpretive materials for visitors

Educating visitors about the tangible effects of climate change and what the actions the park is taking to address climate change is a powerful way to encourage visitors to reduce GHG emissions. The park will use existing and develop new climate change interpretive materials specific to impacts on and actions taken in Golden Gate National Recreation Area. The park will:

- Work with staff, partners, and volunteers to provide accurate information about climate change and how to relay a core message to the public via informal contacts, interpretive/educational programs, exhibits, events, lectures, and brochures.
- Develop literature for the park to distribute on climate change and its effects on the park, such as a climate change brochure, illustrations of possible impacts, and a children's activity book.
- Develop podcasts and Internet and Intranet sites to reach the public and the park staff on climate change issues and actions the park is taking.
- Track progress towards goals and share the progress with staff and the public.
- Create public service announcements and press releases to spread the word about climate change and how the park is addressing it.
- Include materials on climate change in media packets.

### Encourage visitors to reduce greenhouse gas emissions

Perhaps the greatest potential for Golden Gate National Recreation Area to help reduce GHGs is to increase visitors' awareness of how they can reduce their personal GHG emissions. The park will:

- Implement the Do Your Part! Program by advertising the program during public interpretive programs, on the park web site, and at special outreach events.
- Develop exhibits aimed towards both children and adults that educate about climate change, the latest science on climate change, and how to contribute to the solution.

The Do Your Part! program provides easy actions people can take every month to reduce emissions in their everyday lives.

## Local Community

The communities that surround Golden Gate National Recreation Area play a significant role in supporting the parks GHG reduction goals. As such, when appropriate, Golden Gate National Recreation Area staff will assist local communities with incorporating climate change messages into community events and find partners to promote climate change education at those events. Park staff will use their knowledge of climate change resources to help local communities engage in climate friendly actions.

### Encourage climate change awareness in the community and region

Golden Gate National Recreation Area realizes that climate change does not adhere to geographic or political boundaries. The park will:

- Develop a communications strategy on sustainability that includes identifying diverse local, state, and national audiences. The strategy will feature media communication through PSAs, news releases and media packets.
- Actively engage underrepresented communities in education and interpretive programs on climate change.
- Help local schools and teachers develop programs and materials they can use to teach about climate change.



- Encourage Park Partners, neighbors, and supporters to address climate change in their homes and organizations.

## STRATEGY 4: EVALUATE PROGRESS AND IDENTIFY AREAS FOR IMPROVEMENT

By taking the actions established in strategies 1 and 2 above, Golden Gate National Recreation Area plans to reduce its emissions to the specified goal. Achieving this goal will require an ongoing commitment by the park, which may include subsequent emission inventories, additional mitigation actions, and re-evaluation of goals.

- Perform subsequent emission inventories to evaluate progress toward goals stated in this action plan.
- Follow this action plan with a Strategic Workplan that details how these goals will be implemented.
- Develop additional emission mitigation actions beyond those listed in this plan.
- Review the progress of this plan periodically through the Environmental Management System.

## CONCLUSION

Golden Gate National Recreation Area has a unique opportunity to serve as a model for approximately 14,000,000 visitors annually.<sup>3</sup> This report summarizes the operational actions the park commits to undertake to affect 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, Golden Gate National Recreation Area will help mitigate climate change far beyond the park's boundaries.

This Action Plan also serves as an important enhancement mechanism for the park's established Environmental Management System (EMS). Realistic environmental commitments created by Golden Gate National Recreation Area staff and approved by the park's superintendent will significantly reduce the park's GHG emissions and CAPs in the coming years. The mitigation actions included in this plan have been developed in order to be directly transferable to the park's EMS. Golden Gate National Recreation Area's Action Plan thus provides an effective way to meet EMS goals.

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, Golden Gate National Recreation Area 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 Golden Gate National Recreation Area to the forefront of Climate Friendly Parks.

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<sup>3</sup> Golden Gate National Recreation Area: Park Statistics. Available online at: <http://www.nps.gov/goga/parkmgmt/statistics.htm>