

Climate Change Action Plan

August 2007



National Park Service

Golden Gate National Recreation Area

Climate Change Action Plan

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**Golden Gate National Recreation Area – National Park Service
Environment and Safety Programs Office**

This report was prepared by:

Laura Castellini, Golden Gate National Recreation Area
Jeff Phillips, U.S. Fish and Wildlife Service
Adam Kim, Northwestern University

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The Golden Gate National Recreation Area Climate Change Task Force,
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1. 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 Climate Change 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 (including those of its visitors) to the point that it is no longer a contributor to global warming. This plan is intended to mirror the time frame of the Park's General Management Plan, which is approximately 20 years, and it will be implemented through annual plans that select actions and projects to pursue each year to achieve the overall goal of carbon neutrality. A living, updatable list of recommended actions and projects will accompany this plan from year to year for Park planners to use in selecting objectives.

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 effect 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 greenhouse gases, carbon dioxide (CO₂) and methane (CH₄). The increase in greenhouse gases 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 19th 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 greenhouse gases in the atmosphere – primarily carbon dioxide, methane, and nitrous oxide (N₂O) – which trap heat that otherwise would be released into space.

The continued addition of CO₂ and other greenhouse gases 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. 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, 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. For example, Glacier National Park faces losing all of its famed glaciers within the next several decades. Climate change threatens the identity and unique resources of the Golden Gate National Recreation Area as well, such as the redwood trees of Muir Woods, near-shore cultural resources such as Fort Point and the Point Bonita Lighthouse, and threatened and endangered species that may not be able to adapt to changing conditions.

COMMITMENT STATEMENT

Golden Gate National Recreation Area, California

As the steward of the Nation's most valued public lands, the National Park Service has a special obligation to be a leader in protecting the environment. The Golden Gate National Recreation Area is committed to implementing a climate change action plan that demonstrates environmental leadership by reducing our contribution of greenhouse gas emissions, educating the public about climate change and solutions, and adapting to the impacts of climate change on Park resources. The Golden Gate National Recreation Area will provide leadership by becoming the nation's first carbon neutral Park. The Golden Gate National Recreation area will pursue this ambitious goal through a combination of energy conservation, renewable energy usage, habitat restoration, and purchase of carbon emissions credits.

The Park commits to:

- Consider climate change impacts in planning, purchasing and operating decisions.
- Continuously improve building efficiency and reduce the greenhouse gas contributions of our vehicle fleet.
- Install renewable energy projects within the Park, such as solar, wind, and tidal energy.
- Restore forested areas where native trees have been eliminated or reduced, and seek opportunities to restore developed areas to a native plant community, thereby creating new areas for carbon sequestration.
- Work closely with Park Partners and interested organizations in reducing greenhouse gas emissions, developing public education programs and materials, and planning for climate change.
- Promote climate change awareness and communicate solutions to our employees as well as our visitors, neighboring communities and the stakeholders we serve.
- Identify clear responsibility for environmental practices and include these responsibilities in employee performance standards, recognizing superior effort when it is demonstrated.
- Monitor our climate change mitigation, education, and adaptation performance regularly and seek opportunities for improvement in how we do business.
- Enroll in the Federal Energy Management Program (FEMP) and purchase renewable energy credits to offset any carbon emissions remaining after the above steps.

Signed,

Brian O'Neill
Superintendent
Golden Gate National Recreation Area

Date

2. BACKGROUND

There are several sources of guidance that direct the Park to reduce greenhouse gas emissions and undertake climate change action planning. An executive order from the Office of the President is presented in Section 2.1 below, along with national and regional guidance specifically from the National Park Service (NPS). The Park has existing planning processes into which climate change planning must integrate, two of which are described Sections 2.2 and 2.3: the Environmental Management System (EMS), and the General Management Plan (GMP).

2.1. 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:

2.1.1 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.”

2.1.2 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 the National Park Service, 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.

2.1.3 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 geothermal 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.

2.2. 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.

2.2.1 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.

2.2.2 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.

2.3. GGNRA Planning Documents

2.3.1 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.

GOGA completed its first EMS in December 2005 as required by Executive Order 13148, and has updated the targets annually since that time. 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.

2.3.2 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.

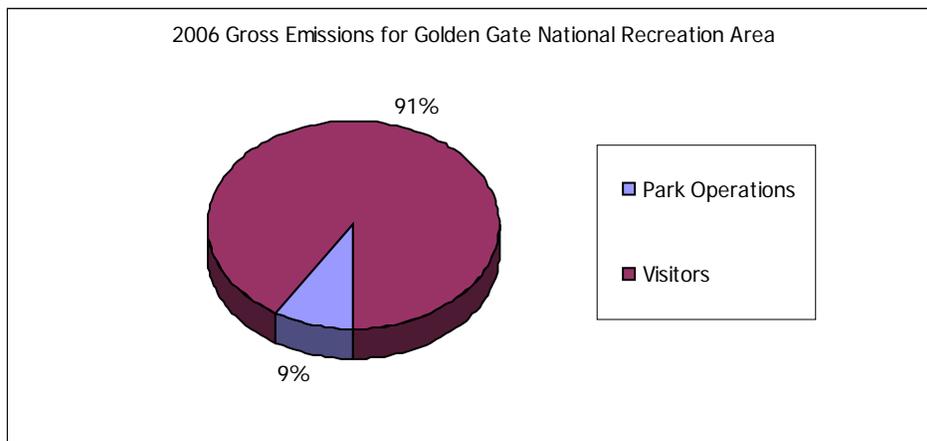
The GMP will consider the goals and objectives laid out in this Climate Change Action Plan, and will summarize the guiding principles by which GOGA will attempt to reduce, educate, and adapt to climate change over the next 20 years.

3. EMISSIONS INVENTORY

The greenhouse gas 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 greenhouse gas 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 greenhouse gases into a common “metric tons of carbon equivalent” unit, which provides a basis for comparison between gases and simplifies reduction tracking. The conversion of a greenhouse gas to metric tons of carbon equivalent 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.

Golden Gate NRA’s emissions will be categorized into three tiers, the first being the NPS’s contributions, the second tier will add the Park Partners (nonprofit organizations and concessionaires operating within the Park, including the Presidio Trust), and the last tier will include visitor contributions. *At the time of writing this plan, the Park partner emissions inventories have not been completed (or are inseparable from Park Operations; they should be added into an updated draft of this plan as soon as they are available and quantified.*

Visitor emission totals consist of an approximation of how much gasoline is consumed while driving to various park locations. Using annual visitor vehicle counts to many of the different locations in the park, the total number of miles driven by visitors was approximated (based on the assumption that they were driving from somewhere in the bay area). The resulting total vehicle miles driven by visitors was put into the CLIP tool. The CLIP tool then used assumptions about the different types of cars and the miles per gallon each had to determine an approximate fuel consumption.

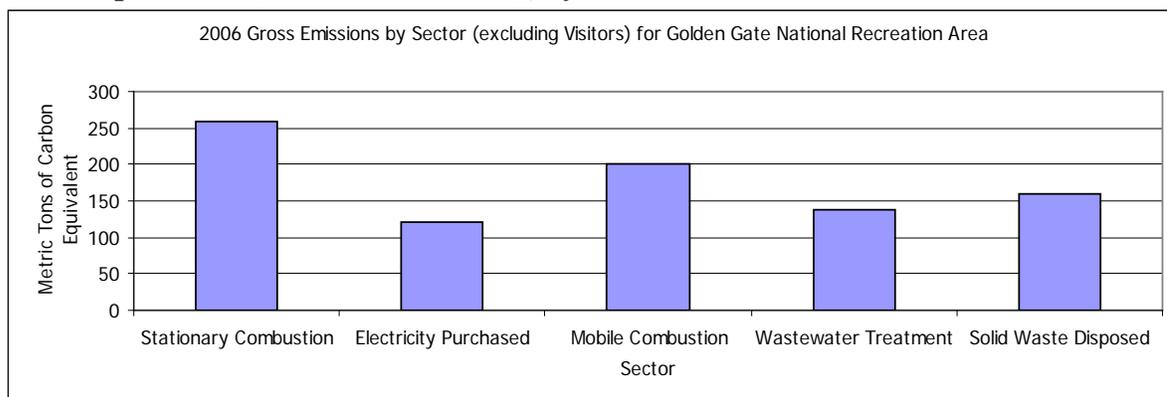


The emissions inventory then looks at the relative input of various sectors: stationary combustion (building furnaces, dryers, electrical generators, hot water heaters), purchased electricity, mobile combustion (vehicles, buses, heavy equipment), wastewater treatment, and solid waste disposal (garbage transportation and decomposition).

3.1 Golden Gate National Recreation Area – NPS Emissions Only

As the above gross emissions figure illustrates, the vast majority of Park emissions are attributable to visitor mobile combustion (vehicles). The following figure shows how the Park’s own emissions are distributed among sectors when visitor emissions are excluded.

Park operations (i.e. without visitors), by sector:



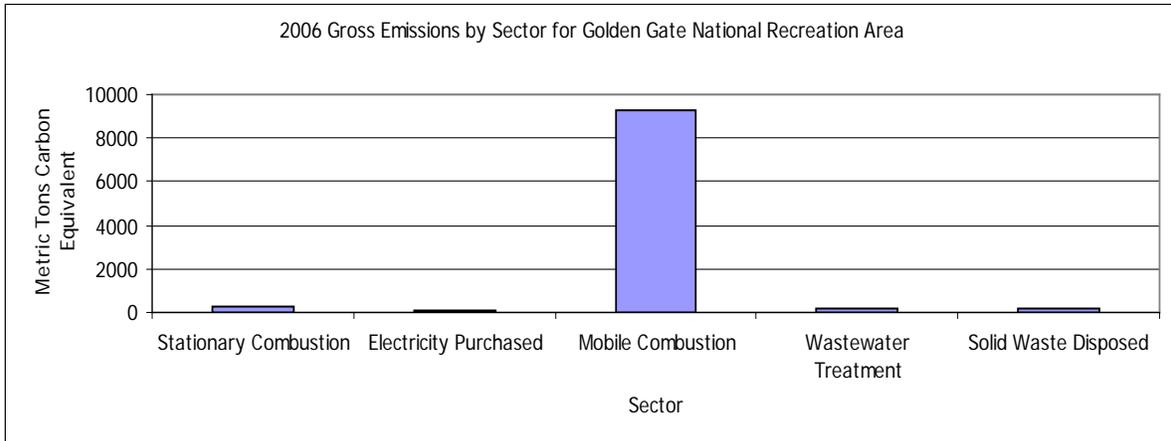
3.2 Golden Gate National Recreation Area – NPS, Presidio Trust, and Park Partner Emissions

The Park does not have access to the information required to break out the emissions inventory for the Presidio trust, Park Partners, and concessionaires. 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.

3.3 Golden Gate National Recreation Area – All Emissions, including park visitors

The following figure shows that when visitor emissions are included, the vast majority of Park greenhouse gas emissions come from mobile combustion.

Park emissions by sector, including visitors:



4. ACTIONS TO ADDRESS CLIMATE CHANGE

4.1 REDUCE – ACTIONS TO REDUCE GREENHOUSE GAS EMISSIONS

The Park intends to reduce its greenhouse gas emissions through the following means: building efficiency projects, renewable energy installation projects, vehicle fleet and transportation projects, land use projects, and projects involving Park Partners, including the Presidio Trust. Each of these categories will address the sectors described in the emissions inventory in various ways.

4.1.1 Building/Facility Projects (reduce stationary combustion, purchased electricity, wastewater, and solid waste)

Current actions: The Park has already undertaken a number of efforts to improve building efficiency, including lighting retrofits (replacing old ballasts with high efficiency ballasts), replacing incandescent light bulbs with compact fluorescents, adding insulation to walls when other maintenance needs to be performed, and weather stripping doors and windows in some locations.

Proposed actions: The Park will continue to improve building heating and lighting efficiency and improve insulation during building repairs and retrofits. The Park will develop innovative ways of improving buildings while conforming with historic and cultural preservation requirements.

4.1.2 Renewable Energy Projects (reduce purchased electricity)

Current actions: The Park is actively looking for renewable energy project opportunities. At Fort Baker, solar panels have been installed on the new buildings that are part of the retreat and conference center. At Alcatraz Island, several renewable energy projects are being evaluated as part of a feasibility analysis to make the island self-sustaining.

Proposed actions: The Park will continue to seek compatible renewable energy projects within the park boundary. The Climate Change Task Force will work with Natural and Cultural Resources to establish guidelines that will allow renewable energy development and siting while preserving resource values.

4.1.3 Transportation Projects (reduce mobile combustion)

Current actions, staff operations: The Park has a number of rechargeable electric carts (i.e. golf carts) that it uses for local transportation. Several vehicle charging stations have been installed in parking lots and these can be used/ expanded if further electric vehicles are incorporated in the fleet.

Many staff trips are made between Park offices in the Presidio and Fort Mason. These locations are only 2-3 miles apart and given the traffic in this part of the city, bikes can often make the trip faster than cars. A pilot project is currently underway to supply a number of bikes for employees to use when making the trip between offices.

Most of the vehicles in the Park fleet have the capability to run on E85 fuel, a less carbon intensive fuel that uses a blend of gasoline and ethanol. As of the time of writing this report, however, E85 fuel is not readily available for Park vehicles.

Current actions, visitors/public: The Park is currently offering free weekend bus shuttle service to Muir Woods from Tamalpais Valley. This has been a popular program and may be expanded.

Proposed actions, staff operations: The Park will strive to convert the entire vehicle fleet to low-carbon fuel. This could be a combination of biofuels, electric vehicles, bicycles, and emerging technologies such as hydrogen. Carpooling both to the workplace and during working hours will be promoted. The Park will strengthen and promote the FlexiPlace program, allowing eligible employees to work from home or at a satellite facility.

Proposed actions, visitors/ public: The Park will expand free shuttle services in the park, such as a Fort Baker and Marin Headlands shuttle. The Park will support the restoration of the Fort Mason streetcar tunnel from Aquatic Park to Lower Fort Mason, extending the historic Embarcadero streetcar route to Lower Fort Mason.

The Park will also look at ways to encourage more efficient visitor vehicle use, such as charging for parking or offering free or subsidized entry and parking for low-emission vehicles or carpools.

4.1.4 Land Use Projects (increase carbon storage in environment)

Current actions: The Park has significant green areas which represent a compartment of carbon storage. In an established, mature landscape carbon is taken up from the atmosphere and incorporated in new plant growth, and at the same time decaying plant matter returns carbon to the atmosphere. The net flux is close to zero. However, if a landscape is changed, for example from a parking lot to grassland or from grassland to a forest, the carbon stored in that area is increased. Thus, land use can be a means of removing excess carbon from the atmosphere.

The Park currently pursues native habitat restoration and uses native trees in landscaping. For example, the Crissy Field restoration removed a significant amount of paved area and replaced it with carbon-storing natural areas, including wetlands.

Proposed actions: The Park will pursue land use plans within the Park that have a potential to increase carbon storage. For example, the Lower Redwood Creek Restoration at Muir Beach will re-orient and reduce the footprint of the current parking lot and restore riparian vegetation. Likewise, the Marin Headlands/Fort Baker Transportation Plan anticipates consolidating parking areas, which may free areas to restore with vegetation.

4.1.5 Coordination with Partners and Concessionaires

Current actions: Many of the Park's partners and concessionaires are undertaking actions that will reduce the carbon footprint of the park. For example, the Presidio Trust remediation

projects have re-vegetated remediated areas with native vegetation, helping to store carbon. The Presidio Trust also provides a free city shuttle for Presidio tenants which greatly reduces the miles driven by personal vehicles.

Proposed actions: The Park will work with park partners and concessionaires to promote sustainable practices in all operations. Many partners already have ambitious plans underway. For instance, the Headlands Institute is planning a campus upgrade that will be LEED certified. The Presidio Trust plans to daylight the creek in Tennessee Hollow and restore native vegetation, as well as removing asphalt on the main parade ground to create green space. The proposed Doyle Drive project would build tunnels in place of the current streets, and revegetate the landscape over the tunnels.

4.2 EDUCATE – ACTIONS TO EDUCATE ABOUT CLIMATE CHANGE AND INTERPRET CLIMATE CHANGE SCIENCE

The Park has a unique position in the Bay Area to reach millions of visitors and educate the public about climate change and the affects on the park. Part of the education component will be to provide Park employees with the tools and information needed to give accurate information.

4.2.1 Within-park communications

The Climate Change Task Force will work with Park staff, Partners, and volunteers to provide relevant and accurate information about climate change and how to relay the information to the public. This information can be relayed by a variety of means including internet, newsletters, and workshops.

4.2.2 Visitor communications

Visitors to the park range from the adult public to children to school groups and teachers. The Park will develop programs and materials that address climate change in a manner appropriate to these various groups.

4.2.3 Public Affairs communications

The Park will develop content and materials that can be used for tours and press kits.

4.3 ADAPT – ACTIONS TO ADAPT TO CLIMATE CHANGE

While much of this plan focuses on how the Park will become a leader by reducing its 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. The following three sections outline important actions the Park can take to adapt to climate change.

4.3.1 Inventory Park Resources

The Park will conduct an inventory of existing park resources (both natural and cultural) and rate them for climate change risk (e.g., risk from coastal erosion, flood, or fire). For buildings and facilities, the inventory should assign a climate risk index that can interface with the existing asset prioritization index (API) and facility condition index (FCI) to evaluate and prioritize maintenance projects.

4.3.2 Incorporate Climate Change Risk into Project Planning

Prior to new construction, maintenance, or repair projects, Park planners should assess climate change risk and mitigate the risk if possible, or reconsider the project.

The Park's General Management Plan will discuss climate change threats and establish principles of response (e.g., use managed retreat as preferred option when resources are threatened by coastal erosion).

4.3.3 Monitor Park Resources for Climate Change Impacts

The Park should create a science advisory group made up of internal staff and external experts to develop a monitoring plan for natural resources and shoreline erosion, interpret the data collected, and recommend actions.

5. IMPLEMENTATION STRATEGY

This climate change action plan will be implemented in large part through the annual EMS planning and goal setting process. A list of recommended actions to reduce greenhouse gas emissions and adapt to climate change impacts is included in Appendix A, with an example of how to incorporate climate change action goals into the current EMS format. The list of recommended actions is intended to be added to by Park staff and stakeholders and updated from year to year. The document should be used to help the EMS planning team set each year's goals.

5.1 Schedule

This Climate Change Action Plan will serve as a companion document to the Golden Gate National Recreation Area General Management Plan (GMP). The GMP broadly outlines how the Park will be managed for the next 20 years. The list of recommended projects and actions included in Appendix A is intended to be a living part of the Climate Change Action Plan and be updated from year to year throughout the life of the plan.

5.2 Carbon Neutral

To become carbon neutral, the Park will continuously pursue energy and fuel efficiency improvements throughout its facilities and operations. Next, the Park will look for opportunities to implement renewable energy projects within the Park. For remaining electricity needs, it is recommended that the Park purchase 100% renewable energy through Pacific Gas & Electric's Climate Smart Program. At the time of this report, doing so would add approximately 3.5% to the cost of purchased electricity. Assuming that energy conservation is able to cut back more than 3.5% of the Park's energy use, the Park would be able to use the savings to pay the premium for 100% renewable energy and still have money left over to apply to renewable energy installation projects or other conservation measures. Likewise, once renewable energy projects had generated enough energy to pay for their installation and maintenance costs, the annual electricity savings could be spent on further conservation measures. The implementation guide for Executive Order 13423 has a "Retention of Funds" measure that states:

"unused appropriated funds directly related to energy and water cost savings by all agencies can be used for reinvestment in energy or water conservation and sustainable building requirements."

After fleet efficiency improvements have reduced greenhouse gas emissions from the Park's vehicle fleet, stationary combustion sources, and waste operations as much as practicable, the remaining emissions should be offset by purchase of carbon credits through one of several certified vendors available. By current pricing, these credits cost about \$2.50 for each metric ton of carbon dioxide equivalent. Using the Park's current vehicle fleet and mileage totals, it would cost approximately \$1,700 per year to buy the carbon credits to offset all of the Park operations vehicle emissions, and future emissions should decrease with improvements in efficiency and reductions in consumption. The Park will ensure that the carbon credits are purchased from a certified vendor and that the funds go towards the development of new

renewable energy resources.

Likewise, the Park should implement policies to reduce the amount of greenhouse gas emissions created by the people visiting the Park facilities as much as possible. The remaining greenhouse gas emissions from visitors should again be offset by purchasing carbon credits. By current pricing, it would cost about \$7,000 per year to buy the carbon credits to offset all of the Park visitor vehicle emissions.

This roadmap to carbon neutrality is intended to offset the carbon footprint of the Golden Gate National Recreation Area, including that of its Park Partners, the Presidio Trust, and visitors. It is an intent of the plan that the Park will work with the Park partners, Park concessionaires, and the Presidio Trust to encourage climate change planning in their respective operations and take responsibility for offsetting any of their greenhouse gas emissions that they cannot eliminate through conservation and efficiency improvements. The Park should make every effort to reach out to these groups and encourage them to become partners in the Park's climate change efforts.

APPENDIX A

SPECIFIC RECOMMENDATIONS – ACTIONS/ PROJECTS TO REDUCE GREENHOUSE GAS EMISSIONS

This section provides a list of recommended actions to reduce the Golden Gate National Recreation Area’s contribution to greenhouse gas emissions. The list includes both short-term recommendations for immediately feasible actions, as well as longer term projects that may require more complex planning and budget support. The list is intended to provide the annual EMS planners with recommended project ideas from which they can select that year’s greenhouse gas reduction goals.

TABLE 7.1 - Recommended actions to Reduce GHG emissions

Category / Action
Facilities
1. Install energy-efficient lighting, make use of natural lighting where possible
2. Purchase only EnergyStar rated (or equivalent) appliances
3. Improve building insulation (repair or replace windows, doors); retrofit older buildings
4. Complete a building heating and insulation pilot project
5. Install motion sensors for lighting
6. Establish “energy-savings account” dedicated to energy conservation projects
7. Explore use of hydrogen fuel cells for electricity generation for grouped buildings/ facilities (e.g. Fort Baker demonstration?)
8. Alcatraz as model carbon neutral / sustainable facility
9. Establish guidance for contractor specifications for “green” construction practices
10. Offset all non-renewable energy use through renewable energy credits
Renewable Energy
11. Explore alternative energy projects: solar, wind, tide. Focus on residential scale projects.
Transportation / Vehicles
12. Increase employee options and incentives to use alternative transportation (walking, bicycles, and public transit) both to/from work and during working hours
13. Ensure a ride home for domestic emergencies
14. Replace the Park vehicle fleet with modern hybrid, electric, or otherwise high-efficiency

<p>and low-emission vehicles. Especially look for options to replace pickup trucks</p> <p>15. Reduce equipment use, vehicle use, and vehicle idling</p> <p>16. Improve access to alternative fuels, infrastructure (e.g. biodiesel facilities, electric vehicle charging locations, ethanol facilities)</p> <p>17. Establish employee buying incentives for high-mileage or alternative fuel vehicles</p> <p>18. Strengthen and promote the FlexiPlace program to reduce employee mileage; survey employees for their commuting patterns and distance</p>
Land Use
<p>19. Look for opportunities to restore developed/ paved areas to native plant communities</p> <p>20. Look for opportunities to increase/ restore native forested areas</p> <p>21. Consider managed retreat preferred option where shoreline erosion threatens resources</p>

TABLE 7.2 - Recommended actions to Educate park staff and the public

Category / Action
Community Engagement
<p>22. Keep park employees, volunteers, and the public informed about climate change and park projects via podcasts, newsletter articles, and internet/intranet updates</p> <p>23. Track progress towards goals and share the progress with staff and the public</p> <p>24. 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</p> <p>25. Actively engage underrepresented communities in education and interpretive programs on climate change</p> <p>26. Help local schools and teachers develop programs and materials they can use to teach about climate change</p>
Public Affairs
<p>27. Create public service announcements and press releases to spread the word about climate change and how the park is addressing it</p> <p>28. Include materials on climate change in media packets</p> <p>29. Encourage Park Partners, neighbors, and supporters to address climate change in their homes and organizations</p>
Products to Develop
<p>30. Literature for the park to distribute on climate change and its effects on the park, such as a</p>

- climate change brochure, illustrations of possible impacts, and a children’s activity book
- 31. Resource materials to help interpreters, field staff, and rangers develop educational programs about climate change awareness and things anyone can do to help
- 32. Podcasts and Internet and Intranet sites to reach the public and the park staff on climate change issues and actions the park is taking

TABLE 7.3 - Recommended actions to Adapt to possible impacts

Category / Action
Inventory Park Resources
33. Form a science advisory group that can provide a plan to the Park on what ecological and habitat monitoring should be conducted.
34.
Incorporate Climate Change Risk into Project Planning
35. Integrate a climate change risk index with the current building condition index and asset prioritization index to help manage project selection and prioritization
36. Planning should include a discussion of ways in which the Park might choose to adapt to shifting habitats and sensitive ecological populations.
37.
Monitor Park Resources for Climate Change Impacts
38. Conduct monitoring based on recommendations of science advisory group.
39.

EXAMPLE – BASED ON EMS PLAN FY-2007

FY05-07 Target:	Projects Planned for FY07:
Goal 1: Improve Environmental Audit Results	
<ul style="list-style-type: none"> • Complete correction of 90% of 2002 Audit findings by Aug. '05 • Document corrective action for all priority one findings from Aug. '05 Audit within 90 days (<i>PWR Directive</i>) * • Document corrective actions for all priority two finds from Aug. '05 Audit within 180 days (<i>PWR Directive</i>) • Document corrective actions for all priority three findings from Aug. '05 Audit with 365 days (<i>PWR Directive</i>) 	<ol style="list-style-type: none"> 1. Provide updates/ education on good audit practices (maintenance, natural resources, etc.) 2. Submit PMIS Statements for remaining findings
GOAL 2: IMPROVE WATER QUALITY	
<ul style="list-style-type: none"> • Develop a routine surface water monitoring program in coordination with the SWRCB by June 2005 • Develop Stormwater Management Plan by April 2006 • Begin Implementation of Sanitary System Management Plan by 2008 (<i>RWQCB Order R2-2003-0095</i>) 	<ol style="list-style-type: none"> 3. Review and assess SWRCB surface water monitoring data when it becomes available 4. Initiate Wastewater Pollution Prevention Plan 5. Develop parkwide BMPs for Stormwater
GOAL 3: IMPROVE SOLID WASTE MANAGEMENT	
<ul style="list-style-type: none"> • Divert solid waste from disposal in landfills by recycling at the rate of 45% by the year 2005 (<i>DOI Strategic Plan 2000</i>) • Adopt Integrated Solid Waste Alternatives Program (ISWAP) Plan in FY05 	<ol style="list-style-type: none"> 6. Contact Presidio Trust and City of San Francisco re. EMS 7. Develop written agreements with SFCC and waste haulers 8. Discuss strengthened MCC relationship 9. Include waste reduction requirements in Park Partner and Concessioner contracts (ongoing) 10. Implement Building 201 Pilot Project for waste diversion

FY05-07 Target:	Projects Planned for FY07:
GOAL 4: IMPLEMENT CLIMATE CHANGE ACTION PLAN	
IMPROVE ENERGY CONSERVATION	
<ul style="list-style-type: none"> • Reduce facility energy use per square foot by 2 percent in FY06 and 4 percent in 2007 relative to 2003 baseline (<i>EPACT 2005</i>) • Purchase 3% Renewable Energy by (<i>EPACT 2005</i>) • Develop Energy Conservation Plan by FY07 • Complete energy-efficiency projects in 3 priority buildings by FY07 • Cease purchase of incandescent bulbs by FY07 wherever possible. Replace with appropriate compact fluorescent bulbs. 	<ol style="list-style-type: none"> 11. Select a public educational campaign addressing global warming 12. Identify priority energy-efficient building projects 13. Complete system for tracking energy use 14. Explore renewable energy use: Purchase of Green Energy, participation in energy block, in-park generation 15. Implement park-wide incandescent bulb replacement
DECREASE FOSSIL FUEL CONSUMPTION	
<ul style="list-style-type: none"> • Reduce vehicle fleet's annual petroleum consumption by at least 20 percent by the end of FY 2005, compared with FY 1999 petroleum consumption levels (<i>E.O. 13149</i>) • Vehicle fleet uses 10% alternative fuel by FY07 • Decrease number of single-driver commuter trips by 5% in FY06 • Decrease fossil fuel use in equipment by 10% by FY07 	<ol style="list-style-type: none"> 21. Research and implement alternate forms of meeting 22. Conduct vehicle fleet study and identify options for adding alternative fuel or fuel efficient vehicles 23. Promote carpooling, public transit, and telecommuting 24. Improve carpooling functions during work hours 25. Select Biodiesel generator pilot project
RENEWABLE ENERGY PROJECT(S)	
<ul style="list-style-type: none"> • Research, identify and plan at least one renewable energy generation project to be sited within the Park. • 	<ol style="list-style-type: none"> 26.
GOAL 5: IMPROVE WATER CONSERVATION	
<ul style="list-style-type: none"> • Develop Water Conservation Plan by FY07 • Assess water use and recommend conservation practices by FY06 • Begin using recycled water at Crissy Field in FY07 • By FY06, sign a three-party agreement to protect Redwood Creek instream resources 	<ol style="list-style-type: none"> 16. Educate employees on water conservation 17. Research improved landscaping practices 18. Inventory park-wide fixtures (toilets, sinks, etc.) 19. Evaluate data and extent of recycled water use at Crissy 20. Initiate Fort Baker recycled water pilot project

FY05-07 Target:	Projects Planned for FY07:
GOAL 6: IMPROVE HAZARDOUS WASTE OPERATIONS/ REMEDIATION	
<ul style="list-style-type: none"> • Complete HazWaste Minimization Plan in FY06, including analysis of waste stream • Decrease amount of waste disposed by 10% in FY05 through decrease in new waste generation and increase in waste recycling • Dispose of all waste backlog by FY05 • Complete inventory of remediation sites by FY07 	<ol style="list-style-type: none"> 27. Complete draft GOGA HazWaste Minimization Plan 28. Conduct HazWaste training for applicable staff 29. Establish BPA for HazWaste collection 30. Create site-specific business plans for each hazwaste site
GOAL 7: IMPROVE COMMUNICATION OF ENVIRONMENTAL MEASURES	
<ul style="list-style-type: none"> • Develop comprehensive environmental and safety training program • Develop a comprehensive climate change communication program (internal, visitor, and media communication plans) • Send out 4 e-mail bulletins in 2006 • Develop a web page on the GOGA <i>intranet</i> site in 1st half FY06 • Develop a web page on the GOGA <i>internet</i> site in 2nd half FY06 • Award 1 “Green Leader” in FY06 	<ol style="list-style-type: none"> 31. Create Global Warming Action Plan 32. Hold All-Employee Meetings to discuss best practices on sustainability and address global warming 33. Select a large-scale iconic project to address global warming 34. Gather sources of information for fact sheets 35. Work with ITMS to set up web pages 36. Work with Interpretation and Public Affairs to educate public on EMS activities/ sustainability/ global warming 37. Develop Green Awards program 38. Create EMS checklist for Project Review 39. Create UXO brochure in coordination with Army