



CLIMATE *Friendly* PARKS

# Cabrillo National Monument Action Plan

TABLE OF CONTENTS

Cabrillo National Monument Becomes a Climate Friendly Park ..... 3  
The Challenge of Climate Change..... 4  
Greenhouse Gas Emission Inventory at Cabrillo National Monument ..... 5  
STRATEGY 1: Reduce GHG Emissions Resulting from Activities within and by the Park ..... 8  
    Energy Use Management ..... 8  
    Transportation Management ..... 9  
    Waste Management ..... 10  
STRATEGY 2: Increase Climate Change Education and Outreach ..... 12  
    Park Staff ..... 12  
    Visitor Outreach ..... 13  
    Local Community Outreach..... 13  
STRATEGY 3: Evaluate Progress and Identify Areas for Improvement ..... 14  
Conclusion..... 14  
APPENDIX A: List of Work Group Participants..... 15

# CABRILLO NATIONAL MONUMENT BECOMES A CLIMATE FRIENDLY PARK

As a participant in the Climate Friendly Parks program, Cabrillo National Monument 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, Cabrillo National Monument provides a model for climate friendly behavior within the National Park Service.

Cabrillo National Monument, as a member of the Pacific West Region, is involved in the first regional effort in the National Park Service to become carbon neutral. The Region has developed a vision of having its park operations be carbon neutral and of having all of its parks be a member of the Climate Friendly Parks Program by 2010.

This Action Plan identifies steps that Cabrillo National Monument can undertake to reduce GHG emissions and 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 Mojave Desert and Mediterranean Coast Climate Friendly Parks Workshop.<sup>1</sup> While the plan provides a framework needed to meet the Park's emission reduction goal, 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. The Park will work with the Superintendent to devise a "green plan" for Cabrillo National Monument that will fit in to the Park's annual budget. Cabrillo National Monument will educate supervisors, employees, volunteers and visitors to be proactive partners in our Climate Friendly Park.

Cabrillo National Monument aims to:

- Educate Park employees and visitors about the importance of reducing greenhouse gas emissions and mitigating climate change.
- Replace old equipment with new energy efficient equipment.
- Replace light bulbs with energy efficient florescent bulbs.
- Increase the number of solar panels on the visitor center and maintenance building
- Install energy efficient double pane windows with reflective film to reduce solar heating.
- Place more recycling receptacles throughout the Park.
- Install Photovoltaic lighting along the sidewalks throughout the Park.
- Continue to purchase and encourage the use of electric vehicles.
- Replace large utility vehicles with smaller more efficient vehicles.
- Install waterless urinals throughout the Park.

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<sup>1</sup> Original notes from these workshops, including detailed action items not presented in the final plan have been archived by Cabrillo National Monument and are available upon request.

To meet these goals, 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 Cabrillo National Monument. 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 19<sup>th</sup> century, and the 10 warmest years of the 20<sup>th</sup> 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<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O)—which trap heat that otherwise would be released into space.

The continued addition of CO<sub>2</sub> 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.<sup>2</sup> Rising global 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.

Cabrillo National Monument has hundreds, even thousands of species that utilize the coastal sage scrub and tidepool communities. Birds, plants, mammals, fungi, snails, crabs, algae, fish, sea stars . . . all of them are adapted to a certain range of climatic conditions. As the climate changes, it is extremely difficult to predict exactly what will happen, which makes the changes to come all the more disturbing. One thing is for certain, *the changes are coming*.

What sorts of changes due to climate changes might we observe? For one thing, dry regions are expected to get drier, and hotter. The plants of the coastal sage scrub are adapted to arid conditions, but they have their limits. Coastal fog, which contributes water to the landscape, is expected to decrease, or disappear. The plants of the coastal sage scrub are adapted to arid conditions, but they have their limits. Drier plant communities mean a greater chance of catastrophic fires, a force of nature San Diego is all too familiar with. Unfortunately, a changing climate opens the door for invasive species from other habitats that may not currently be able to survive here.

Sea level rise is not expected to have an adverse effect on tidepool critters. But increased erosion along the soft sandstone cliffs of Point Loma will certainly be a problem, and any terrestrial organisms living near the edge of the sea will have less space to live. A warmer ocean will most likely facilitate invasions and range expansions for marine species not currently found here. A change of just one or two degrees in the average annual temperature is all that is needed for these things to happen. This means in the coming decades, Cabrillo National Monument may become a very different place.

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<sup>2</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>>

# GREENHOUSE GAS EMISSION INVENTORY AT CABRILLO NATIONAL MONUMENT

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 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). Presently at Cabrillo National Monument we have a fleet of eight electric vehicles and plans to purchase at least two more. Our recycling efforts for the past five years have been very effective. We have numerous recycling receptacles throughout the Park and in all the offices. We will continue these practices and develop more ways to be a Climate Friendly Park.

In 2008, GHG emissions within Cabrillo National Monument totaled 263 metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>E). For perspective, a typical single family home in the U.S. produces approximately 12 MTCO<sub>2</sub> per year.<sup>3</sup> Thus, the emissions from Park operations are roughly equivalent to the emissions from the energy use of 22 households each year.

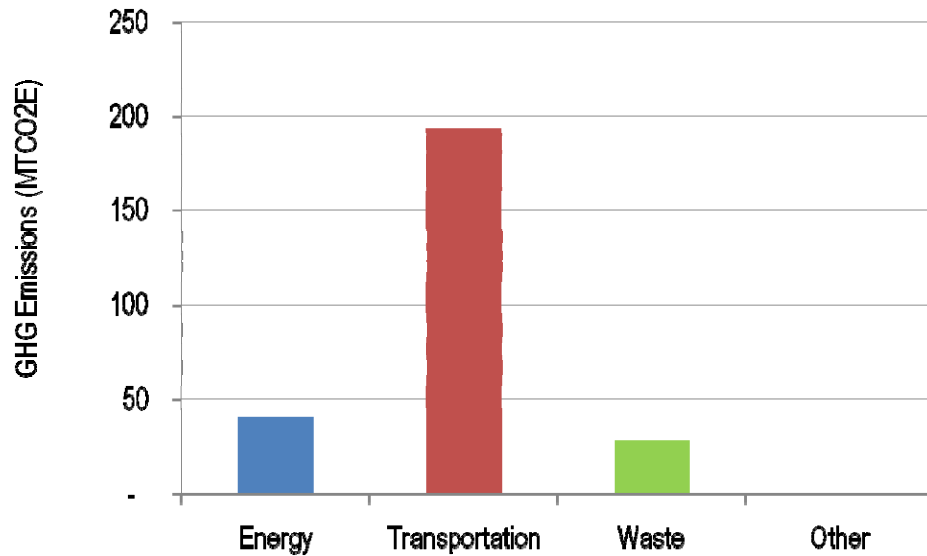
The largest emission sector for Cabrillo National Monument is transportation, totaling 194 MTCO<sub>2</sub>E (Fig 1 and Table 1). Cabrillo National Monument currently has nine electric vehicles in use within the Monument and plans to purchase at least two more. Presently, our Interpretive Park Ranger staff is developing ranger led talks promoting ways to reduce Greenhouse Gases. Through education we will not only help the Park but also increase awareness through the eyes of our visitors.

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

## FIGURE 1

*Cabrillo National Monument 2008 Park Operations Emissions by Sector*



## TABLE 1

*Cabrillo National Monument 2008 Park Operations Emissions by Sector*

	MTCO2E
<b>Energy</b>	<b>40</b>
Stationary Combustion	-
Purchased Electricity	40
<b>Transportation</b>	<b>194</b>
Mobile Combustion	194
<b>Waste</b>	<b>28</b>
Landfilled Waste	22
Wastewater	6
<b>Other</b>	<b>1</b>
Refrigeration and Air Conditioning	1
<b>Total</b>	<b>263</b>

Note - Totals may not sum due to rounding

Not applicable data sources represented by "-"

# Cabrillo National Monument Responds to Climate Change

*The following actions were developed during the Mojave Desert and Mediterranean Coast Climate Friendly Parks Workshop on December 1-2, 2009, in order to meet the Park's climate change mitigation goals.*

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

Cabrillo National Monument 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 Cabrillo National Monument 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 100 percent below 2008 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 15 percent of the Park's GHG emissions from Park operations are from energy consumption. Consequently, Cabrillo National Monument 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

- Set all computers to enter hibernate mode after fifteen minutes without use.
- Installed solar collectors on the visitor center and lower maintenance buildings.
- Divisions (with the exception of maintenance) use the 36 - 44 flex schedules (the flex schedule is more energy efficient in that employees work nine hour days instead of eight, on a 36-44 rotation. This is a reduction of GHG by reducing one commuting day during a two week pay period).
- Rotating janitorial schedules on a weekly basis to reduce energy use.
- Installed energy efficient windows in the Administration building.

### Energy Use Management – Planned Actions

#### 1 Promote energy efficiency and energy conservation in the Park through behavioral change

- Develop a mandatory energy-saving training program.
  - Develop a schedule and assign individuals on a weekly basis to check computers, lights, and any other office electronics to ensure they are turned off each evening.
  - Incorporate conservation into training and employee meetings.
  - Send weekly emails to staff about green policies.



## 2 Upgrade lighting options

- Implement lighting sensors in all offices in the administration building and public restrooms. Upgrade all light fixtures and bulbs in Park to energy efficient bulbs.

## 3 Switch to more efficient electronics and devices

- Implement a procurement policy through the "Green Team" with the cooperation of the superintendent to only purchase energy efficient electronics and requires a minimum energy performance standard for all electronic equipment.
  - Ensure that all new electronic/office equipment is ENERGY STAR qualified and rather than purchasing individual copy, fax, print, and scanning equipment, consider a multi-function device.
- Replace water heaters with energy efficient water heaters as needed.

## 4 Improve building structures and envelopes

- Install energy efficient windows in buildings throughout Park.
  - Look for spectrally selective glass, double-glazed, low-e systems, gas filled windows, and electrochromic windows that provide better insulation and solar selectivity.
- Implement window films where applicable.

## 5 Utilize alternative energy sources

- Install photovoltaic bollard lighting for all public walkways and parking lots in the Park.
- Identify number of additional photovoltaic panels needed to produce enough electricity in order to be off the grid for both lower maintenance and the administration buildings.

## Transportation Management

*Emission Reduction Goal: Reduce Park operations transportation emissions to 50 percent below 2008 levels by 2016*

Reducing vehicle miles traveled, improving vehicle efficiency, and using alternative fuels can significantly reduce Cabrillo National Monument's emissions. As the inventory results indicate, GHG emissions from transportation comprise 74 percent of the Park's 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

- All visitors that use public transportation to reach the Park receive free admission.
- Park fleet currently has nine electric vehicles in use.

## Transportation Management – Planned Actions

### 1 Transportation-related behavioral changes

- Prohibit visitor vehicle idling.
  - Request bus drivers to turn off their engines while waiting for passengers to return.
  - Post signs and information with Park idling rules for visitors.
- Install charging station in the North Bay parking lot for visitor and Park vehicles.

### 2 Reduce visitor vehicle fuel consumption

- Investigate the possibility of implementing a shuttle to the tide pool area to reduce fuel use and impact on the resource.
- Continue offering free admission to visitors that use public transportation, but also encourage carpooling.

### 3 Replace NPS vehicles and equipment

- Purchase two global electric motorcar (GEM) vehicles to replace aging Think electric vehicles.
- Replace the twelve passenger van with a fuel efficient smaller van.
- Investigate possible compressed natural gas or hybrid patrol vehicles.

## Waste Management

*Emission Reduction Goal: Reduce Park operations waste emissions to 40 percent below 2008 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<sub>4</sub> emissions in the United States. Reducing the amount of waste sent to landfills reduces CH<sub>4</sub> 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.

Cabrillo National Monument's Park operation activities emitted 22 MTCO<sub>2</sub>E from waste management in 2008. Diverting or reducing the Park's waste stream through increased recycling efforts and waste management will reduce the amount of waste sent to landfills, resulting in lower 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

- Working in collaboration with cooperative foundation on recycling procedures.
- Have installed low flow and automatic shut-off faucets in public restrooms and will look into installing the low flow faucets in administration restrooms.
- Donating used or outdated computer equipment that can no longer be used by the Park to local schools.
- Have a policy in place for purchasing energy saving electronics. Currently in the process of replacing all cathode ray tubes with light-emitting diode both in officer computer use and interpretive display use.
- Park recycling and trash containers are located in strategic "high traffic" areas throughout the Park.

## Waste Management – Planned Actions

### 1 Decrease waste through behavior change

- Discuss the importance of our waste policies during all employee meetings, which include foundation employees.
  - Ensure that staff and contractors are aware of their roles and responsibilities to reduce waste. Conduct periodic trainings to inform maintenance crews about recycling and composting policies at the Park.
  - Require an annual training on waste reduction and green procurement.

### 2 Establish new plans and policies that promote waste reduction.

- Encourage employees to bring their own reusable cups, plates and utensils to functions and employee meetings. Provide recycle containers at all employee functions
  - Establish guidelines for waste minimization: use durable, reusable utensils and mugs, buy in bulk, use items with reduced packaging, and provide recycling receptacles.

### 3 Reduce waste through green procurement

- Train employees about making green purchases.
- Develop a "Green Policy" for all Park employees based upon the Climate Friendly Park comprehensive plan that was developed as a result of the Climate Friendly Parks seminar.
  - Apply this plan for visitors by developing posters and a "Green Park" brochure.
- Designate the Park as "smoke free," eliminating cigarette butts, and pollution from second hand smoke.
- Have a student conservation association intern, seasonal or volunteer to investigate products presently used by the Park use that can be purchased as green products.
- Install "Eco-boxes" for all future interpretive audio displays.

#### 4 Reduce and reuse wastewater

- Install waterless urinals in all Park restrooms, saving approximately 45,000 gallons of water a year per urinal.
- Investigate installing the low flow faucets in administration restrooms.

## STRATEGY 2: INCREASE CLIMATE CHANGE EDUCATION AND OUTREACH

Climate change is a complex and easily misunderstood issue. Cabrillo National Monument 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. Cabrillo National Monument 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 Cabrillo National Monument takes to address climate change serve as opportunities for increasing the public's awareness of climate change. Presented below are 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

- Established partnerships with organizations in the surrounding community and communicate the Park's Climate Change Plan with them.
- Developed partnerships with local non-profits, community groups, and universities to enhance the effectiveness of climate change initiatives.

#### 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, Cabrillo National Monument 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:

- Develop a policy memo that is sent out to the Park employees based on the results of the Climate Friendly Park conference in Boulder City, Nevada.
- Create an employee incentive, such as time off, to reduce personal greenhouse gases with tangible examples they may use.
- Develop "green" climate change posters that can be put in employee common areas.
- Implement bi-monthly "Green Team" committee meetings to discuss new ideas, tools and publications that may be available.
- Discuss during bi-monthly climate change committee meetings topics we can include in all employee meetings.

- Incorporate climate change in the new Park mission statement. Include the Park "mission statement" in the employee handbook.
- Incorporate the science and impacts of climate change in our Climate Friendly Park brochure.
- All new employee training will have climate change included as an important policy.

## Visitor Outreach

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

Cabrillo National Monument 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 actions to reach these various audiences effectively. These actions include:

- Develop interpretive programs on climate change.
  - Have Ranger led education talks about how the Coastal Sage Chaparral and Rocky Intertidal at Cabrillo National Monument are at risk due to Climate Change.
  - Discuss how to be proactive and how to reduce GHG emissions.
  - Stress recycling programs.
- Create a display on climate change that will be complimented by the Park climate change brochure.
- Create curriculum based environmental education programs to be presented to local schools emphasizing climate change policies.
- Create a "Do Your Part!" display on climate change that can be displayed in the visitor center and the tide pool kiosk.
- Develop dedicated climate change booth to be included at "Earth Day" and "Public Lands Day" events.

## Local Community Outreach

The gateway communities, agencies, vendors, and volunteers surrounding Cabrillo National Monument 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. Potential actions include:

- Investigate the integration of the Green Tag Sticker Program with the Park's cooperative foundation inventory.
- Share with our partners and local community about Cabrillo's climate change policy and "lead by example."



- Include a display on our Climate Change Policy during meetings and Park events, and involve our partners and community members, especially adjacent city parks.
- Incorporate a "Do You Part" section that will be included in all outreach events.

## STRATEGY 3: EVALUATE PROGRESS AND IDENTIFY AREAS FOR IMPROVEMENT

By taking the actions established in strategies 1 and 2 above, Cabrillo National Monument 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 reevaluation of goals. As part of this strategy, Cabrillo National Monument 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.
- The Park will track climate friendly actions through the environmental management system.

## CONCLUSION

Cabrillo National Monument has a unique opportunity to serve as a model for over 705,000 recreational visitors annually.<sup>4</sup> 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, Cabrillo National Monument 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, Cabrillo National Monument 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 Cabrillo National Monument to the forefront of Climate Friendly Parks.

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<sup>4</sup> Cabrillo National Monument: Park Statistics. Available online at: <http://www.nature.nps.gov/stats/viewReport.cfm>

# APPENDIX A: LIST OF WORK GROUP PARTICIPANTS

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