



Global warming—the rapid increase in atmospheric and ocean temperatures around the world—will have a profound effect on the national parks of the Golden Gate. Extreme heat waves, increased wildland fires, coastal flooding, and habitat destruction are among possible scenarios in the coming decades. Golden Gate and other national parks are working to reduce global warming, and also taking action to respond to this threat.

Facing the Reality of Sea Level Rise

Sea level rise is already happening. At Crissy Field, tidal records show a sea level rise of about 0.2 meters (8 inches) in the last 100 years. This rate of rise is two to ten times faster than in the previous 5000 years, and the rate is increasing. Even a small rise in sea level can flood and erode broad coastal areas, such as Crissy Field (above).

The Causes of Global Warming

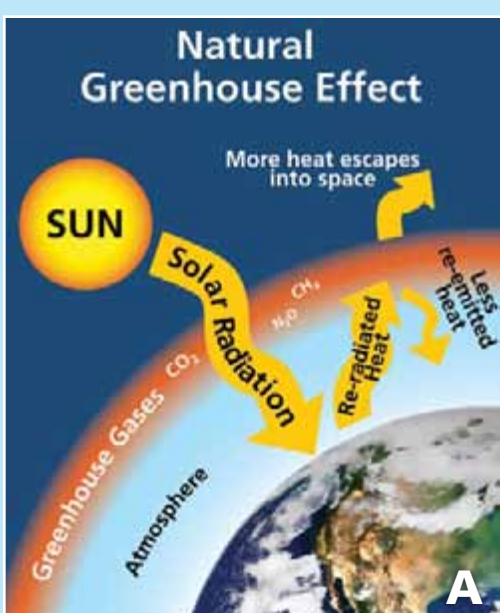


Figure A. Naturally occurring greenhouse gases—carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O)—normally trap some of the sun's heat, keeping the planet from freezing.

Figure B. Human activities, such as the burning of fossil fuels, are increasing greenhouse gas levels, leading to an enhanced greenhouse effect. The result is global warming and unprecedented rates of climate change.

Illustrations by Will Elder, NPS

A Troubled Future for Golden Gate?

If global warming progresses at predicted rates, sea level could rise three feet or more by the end of this century. The park could lose its beaches and suffer severe coastal erosion. Historic buildings, archaeological sites, and roads will be threatened.

As the Bay Area's microclimates and sensitive habitats experience new weather patterns, their plant and animal communities may be disrupted. Invasive species and diseases may proliferate. Some native plants and animals—including rare species found no place else—may be unable to adapt and will disappear.

Global Warming and National Parks

Some national parks are already experiencing significant impacts from global warming. Glaciers are melting, alpine habitats are being replaced by warmer climate zones, wildfires are larger and more frequent, and floods and diseases are more commonplace in many parks.



1941



2004

A large portion of Muir Glacier in Glacier Bay National Park has already melted. Glaciers at all of the nation's glacial parks are melting at an alarming rate.



Some scientists believe that climate change is causing Joshua trees to disappear from Joshua Tree National Park. Their loss will affect the entire ecosystem, including ground squirrels, jack rabbits, coyotes, and hawks.

Fire in Glacier National Park



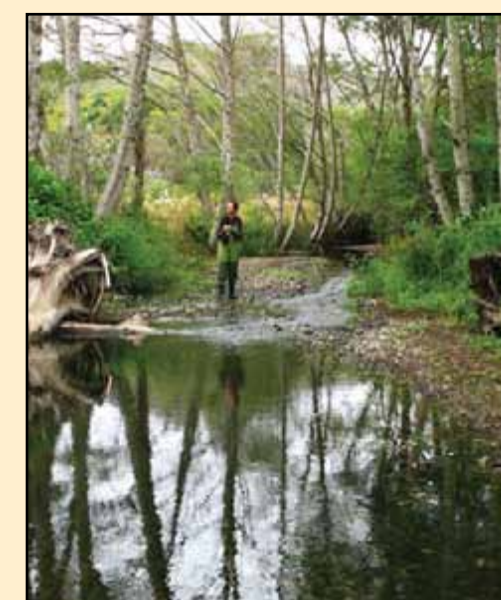
Historic Fort Point and its access road may be damaged as the sea rises and storms become more intense. Photo by Drew Shinnick of the winter storms, 2008.



Climate change could greatly increase the risk of wildfires in California. Longer, hotter, summers have already lengthened the fire season at Golden Gate. Photo of the Mt. Tamalpais fire, 2004.



Decreases in summer fog could devastate the majestic, centuries-old redwood trees at Muir Woods.



With rising sea level, lower portions of some freshwater streams will be replaced by brackish estuaries.



Global warming, and the habitat changes that result, will stress already threatened species like the spotted owl.



Golden Gate Is Taking Action

At Golden Gate, we are trying to be part of the solution to global warming and are helping visitors to do the same. We have implemented a Climate Change Action Plan that integrates the following actions into operations, planning, and management:

Reducing the park's greenhouse gas emissions through decreasing the CO₂ generated by our vehicles and buildings. We are switching to fuel-efficient cars and trucks and providing shuttle buses and other transportation options for park visitors. We are installing energy efficient lighting and insulating our historic buildings. We are protecting our employees' health and the environment by purchasing non-toxic and recycled products.

Educating staff, park partners, and the public through a variety of interpretation and education programs, including exhibits, conferences, and speaker's series.

Adapting to climate change by monitoring and managing its effects on the park's natural and cultural resources. We are gathering information to document local ecological changes and to refine regional climate models. This will inform how we manage endangered species and our response to sea level rise, fire, habitat disruption, and invasive species.



We are installing solar panels on the roofs of Fort Baker buildings to generate renewable energy.



We are partnering with transit agencies to provide alternatives so park visitors can leave their cars behind. Photo of Muir Woods Shuttle by Paul Bignardi.



We are converting our fleet to electric, low emission, and high mileage vehicles.



Park scientists are monitoring plant and animal species to understand the effects of climate change and to develop management plans.



We are replacing incandescent bulbs with compact fluorescent lights in most fixtures.



Park rangers are educating the next generation of environmental stewards about climate change so they will help protect our natural and cultural heritage.

Please Do Your Part

The park is working hard to reduce its carbon footprint and to protect its resources. We hope our efforts will inspire you to reduce your contribution to global warming.

There are no borders in global warming—we all need to work together. You can easily take action to reduce your carbon emissions and save money too. Check out the list below and get started!

Action	Energy and Cost Savings
Replace incandescent light bulbs with compact fluorescent or LED bulbs.	Reduce yearly CO ₂ emissions by 100 lbs and save \$20 , on average, for every bulb replaced.
Improve your car's mileage by properly maintaining it: keep your tires properly inflated and change your air and oil filters regularly.	Reduce yearly CO ₂ emissions by 1,700 lbs , and save \$250 . Get up to 14% better fuel economy.
Unplug unused electronics and battery chargers: they use electricity even when off or in sleep mode.	Reduce yearly CO ₂ emissions by 1,000 lbs and save \$250 . Household electronics can use as much power as a refrigerator.
Insulate and turn down your water heater to 120°F: your water heater accounts for about 13% of home heating costs.	Reduce yearly CO ₂ emissions by 1,500 lbs and save \$70 .
Adjust your heater/AC thermostat down (in winter) and up (in summer) by 2°F and weatherize your home.	Reduce yearly CO ₂ emissions by 3,500 lbs and save \$150 . Poorly weatherized doors and windows are huge energy wasters.
Reduce, reuse, recycle and buy products with recycled content and less packaging: you can easily cut your household waste in half.	Reduce CO ₂ emissions by more than 2,500 lbs a year.
Conserve Water by installing low-flow showerheads and toilets and limiting yard watering: wasting water is wasting energy.	Reduce water consumption by 50% or more and also save energy and money.
Walk, bike, or take public transit: over half the vehicle trips we make are two miles or less.	Reduce CO ₂ emissions while saving money. Leave your car at home and get some exercise.
Choose local products and produce in season: many of the foods and products we use are shipped long distances.	Buy local products to support local producers and reduce CO ₂ emissions. Read labels and ask questions.
Choose energy efficient vehicles, appliances, and electronics next time they need replacing.	Reduce CO ₂ emissions and save lots of money. Every gallon of gasoline burned emits 20 lbs of CO ₂ . Buy Energy Star products.

More Things You Can Do

Together we *can* make a difference.

Calculate your carbon footprint and pledge to make reductions. Visit the Climate Friendly Parks website at:

www.doyourpartparks.org

Talk about global warming with family, friends, and neighbors.

Learn more about what Golden Gate is doing to combat global warming at:

www.nps.gov/goga/naturescience/climatechange.htm



Help Stop Global Warming



National Parks Conservation Association®
Protecting Our National Parks for Future Generations®

This brochure is made possible in part by support from the National Parks Conservation Association (www.npca.org) and a grant from Ambassador and Mrs. Laurence William "Bill" Lane Jr.

NEW LEAF PAPER® ENVIRONMENTAL BENEFITS STATEMENT <i>of using post-consumer waste fiber vs. virgin fiber</i>				
Golden Gate National Recreation Area saved the following resources by using New Leaf Primavera Gloss (FSC), made with 80% recycled fiber and 60% post-consumer waste, 80% processed chlorine free, and manufactured with electricity that is offset with Green-e® certified renewable energy certificates.				
trees	water	energy	solid waste	greenhouse gases
8 fully grown	5,031 gallons	6 million Btu	404 pounds	1,051 pounds
Calculations based on research by Environmental Defense and other members of the Paper Task Force.				
©2008 New Leaf Paper www.newleafpaper.com				