



Responding to the Challenge of Climate Change

Background

Climate change presents significant risks and challenges to park resources, infrastructure, and visitor experience. While some effects of climate change are known and are already visible on the landscape, many are just beginning to be understood. Most climate change impacts are complex and far-reaching. Some of the known and future effects include:

- Warming temperatures
- Accelerated melting of mountain glaciers, permafrost, and sea ice
- Sea level rise
- Changing weather patterns
- Expanded fire seasons
- Species range and migration shifts
- More frequent precursor conditions for pests, pathogens, disease, and exotic species invasion

The uncertainty of how and when specific impacts will become evident makes responding to climate change a challenge. However, the lack of certainty about specific impacts does not mean we should not act. In fact, inaction may be the riskiest decision of all because climate change is a long-term problem that carries a huge procrastination penalty. The NPS is now developing long-range plans and implement strategies for resource protection in the face of climate change. The effort is coordinated across all divisions and directorates and involves parks, regions, and national program offices as well as external partners including universities, non-profit organizations, and other federal agencies.

Approach

Meeting the challenge of global climate change requires a scientific approach, innovative thinking and an unprecedented level of cooperation and collaboration. In September 2010, the NPS released a Climate Change Response Strategy with goals and objectives organized around four integrated components: Science, Adaptation, Mitigation, and Communication. All four components consider the overarching legal and policy implications for climate change, as well as ways to incorporate this issue into long range planning.

Climate change response options will be developed and implemented in a manner consistent with NPS policy and Department of the Interior (DOI) guidelines set forth by Secretarial Order 3289 entitled *Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources*. Issued on September 14, 2009, the order calls upon all DOI bureaus to participate in a departmental climate change initiative.

The NPS response includes leveraging existing resources and expertise as well as developing new capacity where needed. Recognizing that



As climate warms, species will be under adaptive pressure to shift their current ranges toward more northerly and higher elevation environments. Some species, such as the Joshua Tree, may be reduced or even eliminated in parks established specifically for their protection. Photo Courtesy of Angie Richman.

climate change is complex, we will promote new thinking and continual learning about land management in cooperation with partners at landscape scales so we can continue to preserve park resources in ways that support the NPS mission and park values. Initial steps include:

- Leverage and enhance existing monitoring and data management capabilities to provide parks with on-the-ground information about park resources.
- Conduct inclusive strategic planning and training that involves parks, regions, and national offices and links with partner organizations.
- Support project funding for parks to build upon existing science partnerships and encourage the involvement of youth and diverse populations.
- Integrate climate change into NPS planning processes.

More Information

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Components for Responding to Climate Change

To address the challenges posed by climate change, the National Park Service has developed a strategy that focuses on four integrated components: science, adaptation, mitigation and communication. These components will be implemented through national and regional offices, parks and the robust partnerships of the Climate Science Centers and the Landscape Conservation Cooperatives that have been put forward by the Department of the Interior.

Science

- Use the best available scientific data and knowledge to inform decision making about climate change, and to evaluate and manage greenhouse gas storage and emissions in national parks.
- Collaborate with partners to develop, test, and appropriately apply climate change models to NPS activities.
- Inventory and monitor key attributes of the natural systems, cultural resources, and visitor experiences likely to be affected by climate change.

Adaptation

- Incorporate climate change considerations and responses in all levels of NPS planning.
- Implement adaptation strategies that promote ecosystem resilience and enhance restoration, conservation, and preservation of park resources.
- Develop, prioritize, and implement management strategies to preserve climate-sensitive cultural resources.
- Enhance the sustainable design, construction, and maintenance of park infrastructure.

Mitigation

- Substantially reduce the National Park System's carbon footprint from 2008 levels by 2016 through aggressive commitment to environmentally preferable operations.
- Integrate climate change mitigation into NPS business practices.
- Promote biological carbon sequestration as a function of healthy ecosystems.

Communication

- Coordinate and distribute climate change information throughout the NPS.
- Increase climate change knowledge and understanding within the NPS.
- Provide external communications about the implications of climate change and the NPS response.
- Model and communicate sustainable practices that lead by example.

Status and Next Steps

The Climate Change Response Program (CCRP) includes a small staff who serve the National Park Service in climate change science and modeling, interpretation and education, resource management, landscape connectivity, monitoring, planning, coastal hazards, cultural anthropology, and renewable and efficient energy use.

The CCRP supports servicewide initiatives to implement elements of the NPS Climate Change Response Strategy, working with partners to develop methods for assessing resource vulnerability, monitoring change, developing adaptation strategies for natural and cultural resources and facilities in climate-sensitive areas, and including climate change in NPS planning frameworks. Through the 2010 Servicewide Comprehensive Call, the CCRP funded over \$2.5 million in park projects, ranging from the dynamics of carbon cycling, to changes in flow regimes, to the impacts of climate change on pollinators and species.

Consistent with the NPS, *A Call to Action*, the CCRP embraces a renewed emphasis on reaching youth and providing career opportunities through the creation of the George Melendez Wright internship and fellowship programs. Over the past two years, these two programs placed more than 60 students in parks and offices across the country. The students' research and applied projects included surveys of marine animal populations to find species resistant to climate change; use of field data to model where and when park visitors are most at risk of diseases transmitted by ticks; and development of exhibits, lesson plans, podcasts and other new media to help visitors understand how climate change affects national parks.

Next Steps:

- Develop an Action Plan to execute the Climate Change Response Strategy with partners and across landscapes.
- Support servicewide climate change training initiatives.
- Increase efforts to *plan for* and *communicate about* climate change.
- Integrate climate change into the NPS planning framework and emphasize adaptation actions at all levels of the NPS.



Resources and structures in coastal parks are especially vulnerable to climate change as rising seas bring impacts such as increases in erosion, salt water intrusion, and storm surges. Photo Credit: Stephanie Toothman, Kaloko-Honokohau National Historic Park.