



SCIENCE • ADAPTATION • MITIGATION • COMMUNICATION

Looking Ahead: FY 2012 and Beyond

Since the release of the NPS *Climate Change Response Strategy* in September 2010, the service has made significant progress in assessing resource vulnerability, incorporating climate change scenarios into park planning, communicating about impacts to parks, and exploring and implementing on-the-ground adaptation and mitigation strategies and actions to protect park resources. It has been truly heartening to see the ideas, focus, and dedication NPS employees have shown to address the challenges presented by climate change.

Public interest remains high around climate change and we continue to have the support and encouragement of NPS leadership to consider climate change in our planning and decision making processes and to share an honest and scientifically accurate perspective with the visiting public. Director Jarvis recently released a memo to the field providing guidance on applying NPS Management Policies in the context of climate change (<http://www.nps.gov/policy/MPandCC.pdf>), reaffirming his commitment for implementing actions which utilize the best available science. At the same time, FY12 budget realities demand we work smarter and more efficiently to prioritize short term needs while keeping the overall NPS mission and long-term requirements for effectively coping with climate change firmly in view.

The NPS's long-term goal is to consider climate change as a part of routine operations, just as we incorporate variations in weather in our every-

day work now. The systems and resources we manage are changing and we will cope with this either proactively or reactively. Limited funding and resources do not change that long-term goal, but simply require us to be even more strategic in selecting near-term priority actions that create momentum for the long road ahead. Two important priority areas for FY12 are emphasized in this newsletter, science-based planning and communication, especially in regards to training. Both areas of emphasis are being addressed through collaborative work across the traditional organizational structures and disciplines, bringing together resource professionals, planners, interpreters, park managers, and others within the NPS family and with our partners to understand and apply our knowledge and experience in new ways.

Science-based Planning – The NPS is committed to incorporating climate change into long-range planning, as required under Secretarial Order 3289. There are several mechanisms underway in FY12 that will strengthen our collective ability to achieve this through the new planning framework, including consideration in Park Foundation Documents, Resource Stewardship Strategies and State-of-the-Parks reporting. These efforts are laying the groundwork for a greater flexibility in planning and implementation so that new information can more readily inform management decisions as it becomes available.

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Above: Overlooking the Arctic National Wildlife Refuge; photo courtesy of FWS.

Monthly Climate Change Webinar Series

2nd Thursday of every month
2:00 pm - 3:30 pm EST

Next Webinar: April 12th, 2012

April's presentation will feature Dr. Rob Young, who is a professor of coastal geology at Western Carolina University and Director of the Program for the Study of Developed Shorelines.

In September 2011, Rob began work with the Climate Change Response Program to provide practical and actionable options for adaptation to long-term sea level rise and storm impacts in coastal parks. His presentation will address his past work as well as what he will be working on in his role with the NPS.

April's presentation will also feature Will Elder, who is a frontline interpreter at Golden Gate NRA. He will describe the park's sea level rise exhibits and visitor reactions to them.

Follow this link to register for April's webinar:
<https://www1.gotomeeting.com/register/513614969>

Upcoming Webinar

May 10th, 2012

Dr. Cheryl Anderson of the University of Hawaii will discuss her work conducting park-based research on community perspectives about the impacts of climate on cultural resources in Hawaii Volcanoes and Kaloko Honokohau NPs.

Follow this link to register for May's webinar:
<https://www1.gotomeeting.com/register/398456025>

Looking Ahead *Cont'd*

Communication and Training – There are few organizations in the world that have as powerful an opportunity as the NPS to demonstrate both the effects of climate change and responsible action for resource protection and conservation. Utilizing the excellence of our interpretation and communication expertise, and local park champions who are already making a difference, we can leverage existing training opportunities to convey a consistent and empowering message to all levels of the organization. Efforts for 2012 include a series of 4 training modules for the New Superintendents Academy in June and July and development of a series of climate literacy videos to complement the climate change competency for NPS interpreters. Investing in workforce training has a multiplier effect that builds momentum and plants the seeds for future innovation.

Also, in spring 2012 we are scheduled to release the draft Climate Change Action Plan for internal review, building on the goals and objectives outlined in the strategy. To support these efforts, the

Climate Change Response Program will launch a new intranet site in the coming months to more effectively share information and tools. Some aspects of the site are already available at: <http://www1.nrintra.nps.gov/climatechange/>

While we continue to move forward in the coming year, it is important to remind ourselves how far we have already come and to recognize the individual and collective dedication, passion and adaptability being exhibited by the NPS in addressing this critical issue. We are witnessing and contributing to a 'community of practice' that can only be described as adaptation in 'real time'. This is the kind of spirit that makes the NPS so special and continues to inspire us all to keep the long view in mind.

Sincerely,



Leigh Welling, Chief
Climate Change Response Program

CCRP Featured Staff



Doug Parsons

Stationed in Washington, D.C., Doug functions as a climate change liaison for the Climate Change Response Program. Prior to this, he worked for the Florida Fish & Wildlife Con-

servation Commission in Tallahassee where he has been the Partnerships & Climate Change Coordinator since 2007. In his Florida role, Doug developed the agency's Climate Change Initiative, which included an agency wide climate literacy course, focusing on the fundamentals of climate science and adaptation planning. Since receiving his master's in conservation ecology and sustainable development from the University of Georgia in 2000, Doug has worked extensively in the fields of climate change, sustainable agriculture, and natural resource management, both in the United States and Australia. His background and multi-faceted experience in climate change policy, planning, science literacy, and communication make him a valuable addition to the CCRP.

Don Weeks

Don started work as a Climate Change Resource Planner for the National Park Service's Water Resources Division (WRD) in 2011, after a one-year work detail



with the CCRP exploring and applying climate change scenario planning. Don will be instrumental in bridging climate science with NPS planning efforts in the coming years. Don has more than 25 years professional experience in water resources and has worked for the NPS WRD Planning Program since 1997. Prior to that, he was the hydrologist at Big Cypress National Preserve in Florida and Buffalo National River in Arkansas, where he established water-quality monitoring programs. Don worked five years as a hydrogeologist for Woodward-Clyde Consultants in Louisiana and Arkansas and was also employed by the Edwards Aquifer Research and Data Center in Texas. He is a registered professional geologist.

Seeking Applicants for the George Melendez Wright Climate Change Internships

A short description of each project and a link to our partner's (the National Council for Science and the Environment) website where you can download an application is available at:
<http://www.nature.nps.gov/climatechange/internshipsresearch.cfm>

Incorporating Climate Change into Park Planning

The incorporation of climate change into park planning processes is a highly collaborative, increasingly common effort across the NPS. Discussions about climate change and analysis of potential impacts add value to planning processes by encouraging open dialogue about the scope of future planning needs, influencing the assignment of management priorities, informing the direction of management decisions, and providing a basis for adaptation through good choices in the selection of on-the-ground park activities.

Using departmental and NPS guidance, climate change has now been incorporated into more than a dozen ongoing General Management Plans. More than one hundred and fifty personnel from parks, regional, and central NPS offices as well as other agencies have attended Climate Change Scenario Planning training, and elements of the methodology are being applied in a variety

of planning processes. The Climate Change Response Program and other national offices are providing science to integrate with planning processes through their research and synthesis of major climatic trends that are expected to affect parks. DSC-Planning, parks, and regional offices are using this information in the development of Foundation Documents and Resource Stewardship Strategies. Other efforts, such as Long-Range Transportation Plans, Green Parks and Climate Friendly Parks initiatives, provide frameworks for thoughtful decisions about climate related park operations. By including this critical topic in many kinds of park planning, we can best meet the challenges presented by climate change at all scales across the service, and we can respond to the four tenets of the NPS Climate Change Response Strategy - science, adaptation, mitigation, and communication. Contact: Larissa_Read@nps.gov

A Revised NPS Planning Framework

The NPS now requires climate change considerations in all levels of planning. In response, the NPS Planning Leadership Group recently added a representative from the Climate Change Response Program (CCRP) to this core team of national and regional planners. In FY12, the Planning Leadership Group is working on a new, and more flexible, NPS Planning Framework that incorporates adaptive management into the design. This framework will better serve the “living process” inherent in planning for climate change.

A primary planning focus starting in FY12 is Foundation Documents. Under the new planning framework design, the NPS Park Planning and Special Studies (PPSS) is funding an effort to complete Foundation Documents for all NPS units by 2016. The CCRP is working with park planners to organize for this and meet the associ-

ated demands. Along with participating in some of the first Foundation projects, a Climate Change Planning intranet site <http://www1.nrintra.nps.gov/climatechange/planning.cfm> has been developed to help facilitate some of the information needs for considering projected climate futures in park Foundations.

The CCRP is also working on two Resource Stewardship Strategy (RSS) projects, that includes climate change planning, funded by the NPS Water Resources Division (WRD) in FY12, Pinnacles National Monument and Catoclin Mountain Park. The CCRP has formed two core teams to conduct climate change scenario planning at each park, from which the outcomes will be used to test and develop strategies that consider a range of plausible climate futures in each RSS. Contact: Don_Weeks@nps.gov

Inventory & Monitoring Climate Change Update

As one component of addressing the effects of rapid climate change on national park resources, the NPS Inventory and Monitoring Program has leveraged its existing infrastructure and expertise by (1) building on and enhancing monitoring of climate-sensitive indicators, (2) developing a state-of-the-art integrated data system that can be linked with other agency data systems to improve data integration and sharing, and (3) contributing to vulnerability assessments and other high-priority climate adaptation needs. These activities support key components of climate adaptation: the ability to detect changes, effectively find and share data and information, and use the information to support park management and planning.

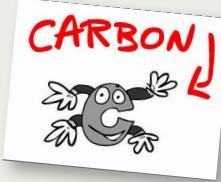
The majority of the “vital sign” indicators selected by parks during a multi-year, structured process to design and implement the long-term ecological monitoring efforts were later identified by other groups as being priority indicators for monitoring the effects of climate change. Climate change was recognized as an “agent of change” at the beginning of this process, and is built into the conceptual models, scoping work, and monitoring plans for the 300+ I&M parks. In 2010-2011, funding from the Climate Change Response Program was used to increase and supplement climate-sensitive indicators in 94 parks in 13 of the I&M networks. For more information regarding the I&M Network and its role in addressing climate change, contact: Douglas_Parsons@nps.gov

Assateague Island NS is one of more than a dozen parks to include climate change considerations into their General Management Plan.



Climate Change Resources

NPR's *It's All About Carbon* video series addresses the basic reason for global warming through a five-part animated series that starts by looking at the behavior and characteristics of the carbon atom. The videos are both humorous and informative. Episode 1 can be found at: <http://www.npr.org/2007/05/01/9943298/episode-1-its-all-about-carbon> Be sure to scroll to the bottom of the page to find the link for Episodes 2-5. Each episode is only about 4 minutes in length.



The October 2011 issue of *Physics Today* included an article titled, "Communicating the Science of Climate Change." This article is written for scientists and communicators alike. It explores tips for more effectively share messages on climate change, lists some of the common pitfalls of climate change communication, and even suggests some common terminology for sharing this topic with the public. <http://grist.files.wordpress.com/2011/11/somerville-hassol-physics-today-2011.pdf>

The *Living on Earth* radio program produced by Public Radio International, covers a wide range of ecological topics and issues. They frequently cover relevant and contemporary climate change topics. Recent episodes covered the climate talks in Durban, South Africa, extreme weather events, the environment in the State of the Union address and communicating complex scientific topics through rap music. This podcast is a great way to learn how other countries are dealing with the effects of a changing climate. <http://www.loe.org/>



Communicating Climate Change

Recently the Climate Change Response Program (CCRP) staff worked through an exercise aimed at identifying priority areas for addressing climate change. Interpretation and Education was overwhelmingly listed as one of the top priority areas where the NPS can take a national leadership role on this topic, a commitment which was reaffirmed by the Climate Change Coordinating Group at their November 2011 workshop. This may come as no surprise. After all, what other federal agency has such a talented, highly trained and professional frontline interpretive staff than the NPS?

In FY2012, the CCRP will continue to put an emphasis on the development and dissemination of training, tools and resources to help staff effectively communicate and engage with audiences on climate change. We are also developing avenues to help those of you in the field share lessons learned, ideas and tips about effective climate change communication. For example, the article below shares one interpreter's experience addressing this topic at her park last summer. Contact: Angie_Richman@nps.gov

Climate Change Interpretation — Report from the Field

As the new climate change interpreter at Pictured Rocks NL, I was nervous about the response I would get from visitors as I spoke about what can be a rather gloomy and controversial topic. How would the message be received? Would I be confronted by angry skeptics? And if I did, could I keep my cool in that situation and prevent any negativity from adversely affecting others? I armed myself with a notebook stuffed with plenty of documentation in order to refute any naysayers, read helpful psychology articles and made a deliberate attempt to keep my presentation style upbeat and bubbly.

Well, after three months in the field and speaking with approximately 500 visitors, both in the park and the local community, I'm pleased to report that my fears never came to pass, and the response has been overwhelmingly positive. Those folks who still have some doubts about the reality of climate change have been most respectful in their conversations. Only one family seemed startled to hear me and they hustled

their children by me (and the kids had their fingers in their ears!) before they could be subjected to my "heresy." But by far, most people have said they enjoyed my presentations and what's been even more surprising and gratifying is that they have even thanked me for bringing this information to their attention. My sense is that people are glad to get some basic scientific information that's not filtered by the media, talk-show hosts, politicians or anyone else. I also think that wearing the NPS uniform gives me credibility I might not have otherwise. It appears that climate change programming at Pictured Rocks this summer, made possible by funding from the Great Lakes Restoration Initiative, has proved to be a success!



Contact: Andrea_Chynoweth@nps.gov

Interpretive ranger, Anne Spillane, uses an annual snowfall graph to illustrate changes in climate for visitors during a snowshoe walk at Crater Lake NP.



Talking to Visitors

Many interpreters share similar reservations about interpreting climate change. They may be afraid visitors will argue with them about the science or even become hostile. However, a recent NSF Climate Change Education project conducted surveys of both park service staff and visitors. Preliminary results indicate the majority of NPS employees believe visitors do not want to hear about climate change while on vacation. But when park visitors were asked if they wanted to hear about climate change in national parks, they overwhelmingly said yes. This data was presented during our December 2011 webinar, a recording of which is available on our [SharePoint site](#). To get the latest information on American's attitudes and perspectives on climate change, Yale University hosts a forum called, *Climate Note* that you can subscribe to for e-mail updates at: <http://environment.yale.edu/climate/the-climate-note/>

Pacific West - California Phenology Project

During the past year seven NPS units participated in the successful launch of the California Phenology Project (CPP). Climate Change Response Program funding allowed NPS resource management and interpretation staff at Joshua Tree NP, Santa Monica Mountains NRA, Golden Gate NRA, Redwood National and State Parks, Lassen Volcanic NP, Sequoia and Kings Canyon NPs, John Muir NHS, the Californian Cooperative Ecosystem Studies Unit and the Pacific Coast Science Learning Center to join in a collaboration with investigators at the University of California, Santa Barbara Phenology Stewardship Program (UCSB) and the National Phenology Network's (USA-NPN) National Coordinating Office in Tucson, AZ. Together this illustrious group is working to develop and test protocols for a California-wide phenology monitoring that engages citizens of all ages in observing and understanding the response of plants to changing climatic conditions. Monitoring protocols utilize the USA-NPN's *Nature's Notebook* (<http://www.usanpn.org/participate/observe>), a user-friendly on-line interface that standardizes and centralizes phenology data nationally.

Initially funded as a 3-year pilot project, the CPP is developing tools and infrastructure for an on-going phenology monitoring and education program that will include 19 NPS units in California and University of California Natural Reserves. Botanical experts across the state assisted the project team with development of a scientific framework to guide selection of target species and monitoring locations, and in conducting a biogeographically based process to identify an initial set of target plant species for protocol development and monitoring. During the 2011 field season a series of phenology trails and sites were established at the seven pilot parks to test monitoring protocols for 27 target plant species. A variety of groups and individuals engaged in the pilot data collection from park staff in all units to volunteers with the Presidio Trust at Golden Gate NRA, and to students associated with NatureBridge's education program at Santa Monica Mountains. To find out more about the CPP, the species being monitored, and links to educational resources for reaching a wide range of audiences, visit the new CPP website at: <http://www.usanpn.org/cpp/> Or contact: Angela_Evenden@nps.gov

Alaska Region Glacier Study

Glaciers are an iconic symbol of Alaska. Over four million acres of these geologic wonders are found in nine of the 15 major National Park Service units in Alaska, yet baseline knowledge in many parks is lacking. A multi-year project is currently underway to increase knowledge of glaciers in Alaska national parks. Initial results from Glacier Bay and Denali show the vast majority of glaciers in both parks have shrunk considerably, mainly by terminus retreat, between 1952 and 2010. In addition, volume analysis shows that 13 of 16 glaciers studied in Glacier Bay exhibit thinning over the study period (1994 – 2011).

Each of the three components of this study provide insight into what glaciers in Alaska's national parks have been doing over the last several decades and what they're likely to do in the com-

ing years. Boundaries for each individual glacier will be mapped for two time periods (1950s and 2010) and analyzed to identify change in surface area over time. The boundaries and associated information about the physical characteristics for each glacier will be the first complete dataset of its kind. A second component of this study uses laser altimetry to determine glacier ice elevation and change in elevation. This information will then be used to determine glacier volume change over time for a select suite of glaciers. Used in conjunction with the boundary mapping dataset, glacier volume change can then be projected to larger regions. Lastly, a "Guide to the Glaciers of Alaska's National Parks," an interpretive publication, will highlight in detail the characteristics and recorded changes of 20 focus glaciers, which are representative of the types of glaciers found in Alaska and have been selected from each glaciated park in Alaska.

Glaciers influence, and in many cases define, many components of the ecosystems in which they are found, and they are a central piece of the visitor experience. This study will not only provide valuable information on the status and recent trends of these glaciers to scientists, but will also inform decisions made by park managers about mitigation and adaptation efforts associated with climate change. In addition, it will assist interpreters in telling the complex stories of glaciers: their trends and their relationship to people and the environment. Contact: Bruce_Giffen@nps.gov

Conducting phenological monitoring at Sequoia and Kings Canyon National Parks.



SPROUTS: A Student Phenological Monitoring Curriculum

“Oaks! We love them!” These are the words that educators and students at Cottonwood Creek Elementary School in Visalia, California, are chanting as they head out into their schoolyard to take a closer look at the valley oak trees lining their playground. These 6th grade students, participants in the SPROUTS (Student Phenologists Researching Oaks to Understand Trees and Science) program, have just discovered that by monitoring phenophase development in valley oaks (*Quercus lobata*), they can begin to understand how climate affects the timing of life cycle events in these trees.

During the 2010–2011 school year, Stephanie Sutton with the Rangers in the Classroom education outreach program at Sequoia and Kings Canyon National Parks began piloting SPROUTS, a new phenological monitoring curriculum for 6th grade students. Through a continuum of experiences, students meet their national parks, learn how their watershed connects them to Sequoia and Kings Canyon, identify life zones, discover what climate change is, determine potential threats that a changing climate might pose to plant and animal species, and become student phenologists monitoring oak trees. During classroom visits, park educators engage students in activities that teach them about photosynthesis, plant reproduction, and the life cycle of an oak. Flagging tape labeled with each student’s name is used to mark individual oak tree stems, and each week teachers and students record observations about their stems (e.g., breaking leaf buds, leaves, colored leaves, falling leaves, fruit, ripe fruit, and recent fruit drop).

In 2011, working in concert with the California Phenology Project, Sequoia and Kings Canyon established blue oak (*Quercus douglasii*) monitoring sites inside the park. Blue oaks are higher elevation deciduous species found in the parks’

foothills life zone. With the use of digital web cameras, or phenocams, SPROUTS students were able to make comparisons along an elevational gradient between their field observations of the valley oak and phenocam observations of blue oak. The students then recorded their observations in Nature’s Notebook, the National Phenology Network’s monitoring database.

Through the SPROUTS curriculum, the Rangers in the Classroom administrators hope to raise science literacy, develop connections to the natural world through observation, and inspire environmental stewardship.

Visit: <http://www.nps.gov/seki/forteachers>

Contact: Denise_Robertson@nps.gov



SPROUTS student measuring valley oak stems. Photo courtesy of Cathy Smith, Science Teacher, Cottonwood Creek Elementary School, Visalia, CA.

Energy Star Award for Point Reyes NS



The Administration Headquarters building at Point Reyes National Seashore was recently awarded the U.S. Environmental Protection Agency’s prestigious ENERGY STAR for 2011. The award is given to buildings that meet superior energy performance standards that are verified by licensed professionals. Point Reyes is a Climate Friendly Park and has set aggressive energy reduction goals through

their Climate Friendly Parks Action Plan. The Park is aiming to reduce their energy consumption by 45% by 2016 (based on a 2008 energy consumption baseline). The Park will achieve this goal by measures such as purchasing ENERGY STAR products, turning equipment off at night, encouraging energy conservation behavior in staff, and alternative energy projects. Point Reyes is very excited about reaching and exceeding that goal by 2016! Contact: Sara_Hammond@nps.gov

More Information

This newsletter serves as a bimonthly forum to share the latest news related to NPS efforts to manage our parks in a changing climate.

Dr. Leigh Welling, Chief Climate Change Response
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Comments, Submissions:
Angie_Richman@nps.gov

The Climate Change Response Program can be found on the web at: <http://www.nps.gov/climatechange>

CCRP Intranet Launched

We have launched a new intranet site in order to provide relevant climate change information and a forum for parks to share information. Some sections are already available and additional sections will “go live” over the next month. Check back often to see what’s new.

<http://www1.nrintra.nps.gov/climatechange/>

Now Available on the web

An archive of past *Climate Change Response Newsletters* is now available on our public website at: <http://www.nps.gov/climatechange/resources.cfm#newsletters>