Climate Change Response Program *News*
July / August / September 2013

National Park Service
U.S. Department of the Interior

Climate Change Response Program

SCIENCE • ADAPTATION • MITIGATION • COMMUNICATION

NPS Scenario Planning Handbook Released

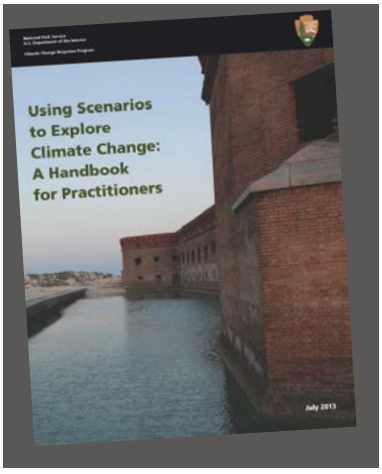
The Climate Change Response Program (CCRP) has been exploring and applying climate change scenario planning for the past six years. Scenario planning is a structured framework to help managers identify actions that will be most effective across a range of potential climate change futures. This includes four training workshops across the U.S. in 2010-11 to raise awareness of and build capacity in climate change scenario planning within and outside the NPS.

An outcome from this effort is the recently completed a climate change scenario planning handbook, *Using Scenarios to Explore Climate Change: A Handbook for Practitioners*. The handbook describes a five-step climate change scenario building process with detailed instructions on how to accomplish each step. The primary purpose of the handbook is to serve as reference for those who possess some familiarity with scenario planning.

The technique presented in the handbook is one of several approaches the NPS now has in its toolkit for adaptation planning and exploring uncertainties around climate change. Knowledge of this technique is a building block for anyone interested in creating and using climate change scenarios for decision making.

It is the intention of the CCRP to continue to evolve the NPS capacity for climate change scenario planning, both in terms of training others and in applying the tools we have to park planning and decision making.

Download a copy of the NPS Climate Change Scenario Planning Handbook at: **http://www1.nrintra.nps.gov/climatechange/assets/docs/CCScenariosHandbookJuly2013.pdf**
For more information about climate change scenario planning contact: **Don_Weeks@nps.gov**



Above: Loggerhead Sea Turtle hatchling making a break for Fort Jefferson at Dry Tortugas NP.

In this Issue

Monthly Climate Change Webinar Series

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

Next Webinar: Oct. 10th, 2013

October's presentation is titled, *Climate Change Research from the Next Generation: George Melendez Wright Climate Change Fellowship Science in Parks*. This will be a panel presentation featuring a number of fellows who participated in the climate change youth initiative and conducted work in parks.

Follow this link to register for the October webinar:
https://www1.gotomeeting.com/register/753644393

Upcoming Webinars

November 14th, 2013
December 12th, 2013

The November and December webinars will be a two part series featuring management strategies and guidance from the Climate Smart Adaptation working group.

Follow this link to register for the November webinar:
https://www1.gotomeeting.com/register/426380656

Follow this link to register for the December webinar:
https://www1.gotomeeting.com/register/397500817

Welcome to the Team: CCRP Featured Staff

Kiersten Jarvis
Kiersten joined the CCRP in June as a Pathways Student Intern to provide logistical and communication support for the program. She recently graduated from Colorado State University (CSU) with her bachelors degree in Natural Resources Management and a minor in Global Environmental Sustainability. She is currently working on graduate classes to earn a master's degree in environmental policy and affairs. Kiersten has worked past summers with CSU and the National Park Service on park soundscapes in both Sequoia and Denali NPs. She has also worked for the NPS Inventory and Monitoring Program in Fort Collins as a data manager with the IRMA (Integration of Resource Management Applications) database. Kiersten is excited to join the CCRP and put her passion for the outdoors and conservation to work.

Gregor Schuurman
Gregor joined the CCRP in August as an Ecologist to work with national parks and stakeholders to develop climate change adaptation strategies and conduct protection, mitigation, and restoration projects aimed at fostering resilient ecosystems. For the past six years he has worked with the Wisconsin Department of Natural Resources on climate change vulnerability assessments, adaptation, and research, white nose syndrome response, Karner blue butterfly population monitoring, and management and avoidance guidance for rare species. Before that he worked as a postdoctoral researcher with USGS studying the climate-change sensitivity of rare damselflies in Hawaii Volcanoes and Haleakalā NPs, where he remains active in a climatology project. Gregor's deeper history is in Africa, where he grew up for the first decade of his life and returned for his dissertation fieldwork. His dissertation research in the Okavango Delta region of Botswana focused on how fungus-growing termites – including those that construct the savanna's iconic termite mounds – influence savanna ecosystem function through their strong effects on decomposition. Gregor and his wife Shelley (who is also a climate change scientist) have a six-week-old baby boy named Ike who keeps them busy.

Kim Townsend
The CCRP welcomes Kim as a Pathways Student Intern to provide administrative support for a range of exciting upcoming international partnerships. Kim is a recently returned Peace Corps Volunteer from Albania (2011-2013). While there she worked with university and high school English teachers providing trainings on new strategies and practices for implementing English language learning into their classrooms. Kim also collaborated with local community members to create youth groups focused on civil society engagement and volunteerism. In the fall, Kim will begin her last semester at CSU as a graduate student studying literature. Kim is excited about the opportunity to work at NPS and looks forward to meeting and working with the CCRP staff and partners.

Stellar Superintendents Shine in New Video Series

Over the past twelve months the CCRP collaborated with Ron Bend, a professional filmmaker from Colorado State University and four park superintendents who have been leaders in addressing climate change at their parks. The product of this collaboration is a new video series that highlights the challenges each Superintendent faced and the actions they have taken or embarked upon to create more resilient park resources and infrastructure.

Superintendent Jeff Mow of Kenai Fjords NP discusses the interesting challenge that park faces with the flooding of the Exit Glacier road, one of the major visitor attractions, as the glacier melts.

Superintendent Bob Krumenaker of Apostle Islands NL discusses his creative approach to responding to lake level changes at his park that are likely to be a trend of the future.

Superintendent Trish Kicklighter of Assateague Island NS discusses the challenges and opportunities presented when creating a General Management Plan considering climate change impacts.

Superintendent Dan Kimball of Everglades NP shares his experience with addressing the impacts his park is facing. See how the park has decided to rebuild following the devastation of the Flamingo lodge during the 2005 storm season.

Check out the videos on the multimedia section of our public website: **http://www.nps.gov/subjects/climatechange/photosmultimedia.htm**

Northeast Region has 10 new Climate Friendly Parks

The Northeast Region (NER) has been busy this year supporting and implementing the NPS Climate Friendly Parks (CFP) program. In an effort to advance the Director's Call to Action, the region made it a priority to solicit interest from the field in utilizing the CFP program as a tool to achieve Call to Action item #23 *Go Green*. The response was positive and four CFP workshops were scheduled for FY13. They focused on the core values of sustainability and resiliency and planning for a future that may look very different due to climate change.

To maximize planning efforts and resources, two of the four workshops were designed as "cluster" workshops where more than one park was able to participate and take advantage of the CFP program. Each workshop included technical support for the completion of a park CLIP tool (an excel-based emission inventory tool to determine and track park greenhouse gas (GHG) emissions), local or regional experts on climate change science, guidance on climate change response and adaptation, innovative ideas on conserving park energy and water use, and ideas for sharing success stories with the public. Discussions in each workshop were lively and the audiences were a diverse group of park staff, partners and volunteers.

The parks identified several actions that would decrease GHG emissions in core areas of park operations – energy use, water use, transportation, landscape management, and purchasing/waste management. With the use of the CLIP tool, the parks can now track their progress toward their overall GHG reduction goal (e.g., 10% reduction goal in GHG emissions). Several parks decided to enhance the CFP workshop by adding a third day to focus on integrating CFP actions into their park Environmental Management Systems (EMS) plans. This integration helps ensure accountability and creates a system by which park Green Teams can track their CFP success alongside tracking the results of park environmental audits and other environmental compliance goals.

Next year the NER will continue to support these parks as they complete the final CFP steps as well as bring new parks into the CFP program.
Contact: **Holly_Salazer@nps.gov**

Spatterdock and cattails in the marsh at George Washington Memorial Parkway, one of the parks included in the NCR study.

Changes to Coastal Marshes in the National Capital Region

The effect of sea-level rise on coastal natural resources is a key management and research question. Of particular interest are predictions of change in coastal habitat area over time. A project is underway in the National Capital Region (NCR) that includes multiple parks but focuses primarily on tidal areas of the George Washington Memorial Parkway and National Capital Parks – East to predict changes in biodiversity in these parks resulting from future sea-level rise.

The study area includes all lands less than 5m in elevation surrounding tidal sections of the Potomac and Anacostia rivers and the Marsh Inundation Model (MAIM), based on the Sea Level Affecting Marshes Model (SLAMM), is used to forecast the impact of a suite of sea-level rise scenarios on marsh and coastal forest habitat area.

Results to Date
Vegetation maps for all of the modeling regions have been completed and validated. Initial model results, incorporating a newly parameterized accretion model, included all final vegetation maps for 2010; summaries by area of all vegetation classes; and models of vegetation change to 2100 for select areas. Model outputs include maps of vegetation classes as well as the amount of conversion from one vegetation class to another.

Work continues on developing an erosion component for MAIM. To date, shorelines were digitized at 3 time steps (1994, 2002, and 2005) for the entire study region and for 2011 at Dyke Marsh from high-resolution aerial photographs. The project team then calculated a historical shoreline erosion rate pre-2005 using linear regression of historical data for each 1-m segment of shoreline. The model then extrapolates erosion to 2011 (for validation at Dyke Marsh) and into the future using these historical rates.

In addition, the project examines potential changes to marshes from invasive species using invasion vulnerability models for 15 scenarios of future climate (3 for 2030, 3 for 2040, and 9 for 2050) as well as a model for current climate conditions. The models identify regions of the Earth that could act as potential sources of invasive species to the Potomac and Anacostia rivers study region by quantifying climatic similarity between the study region and all regions of the Earth. The models highlight central Europe as the closest climate match to the study region, with the potential source region increasing in area in the future.

Work will continue in the coming year with the hopes of finalizing output maps for the entire region and completing plant diversity calculations, including predictions of the proportion of species lost due to sea level rise.
Contact: **Geoffrey_Sanders@nps.gov**

Climate Change Resources

LANDSCAPE CONSERVATION COOPERATIVES

Have you been wondering what your local Landscape Conservation Cooperative (LCC) is all about? Check out their website for information on each LCC, current projects, available resources like staff and communication tools. In the upper left corner of the website, you can register for their e-newsletter to get the latest updates.
http://lccnetwork.org/

A new interactive distance learning forum is available for educators that bring webcasts, webinars, and online climate education resources into the classroom for the 2013-2014 school year.
http://climatechangelive.org/

Save the Redwoods

Save the Redwoods League (SRL) hosted a Redwood Ecology and Climate Symposium in Berkeley, CA on August 14, 2013. Several staff from parks across the Pacific West Region were there to hear the latest from researchers working on the Redwoods and Climate Change Initiative. This four year comprehensive investigation of coast redwoods (*Sequoia sempervirens*) and giant sequoias (*Sequoiadendron gigenteum*) in California is providing in-depth insight into the physiology of redwoods and how the trees weather changes in climate conditions.

For more information, go to: **http://rcci.savetheredwoods.org/science/results.shtml**

Pacific West Region Webinar Series Available

The Pacific Northwest Climate Change Collaboration (C3) is a federal inter-agency group that focuses on information sharing and integration of efforts across agencies, Landscape Conservation Cooperatives and Climate Science Centers. This group facilitates a monthly webinar series looking at climate change throughout the Pacific Northwest. They recently established a YouTube channel where the recordings of past webinars can be viewed. To watch these webinars, go to:
http://www.youtube.com/user/C3PNW

Amanda Short standing next to one of the signs she developed during her internship at Everglades NP.

Climate Change Intern Leaving a Legacy

Climate change intern Amanda Short recently completed a six-month appointment at Everglades NP. During her tenure, Short worked closely with the park's science staff to draft, design, and publish a variety of climate change communication products. She has left a visible legacy for both physical and virtual park visitors, including a network of in-park signage highlighting mitigation projects throughout the park, an expanded Everglades and Climate Change website, and a new junior ranger activity about the impact of sea level rise. Short is currently continuing her work for the NPS at Golden Gate NRA.
Contact: **Larry_Perez@nps.gov**

Small Park, Big Resources: *Reflections from a Climate Change Intern*

Freeman Tilden described interpretation as the effort to vividly translate the language of the earth. For my generation, the language of our earth is changing. Interpreters in national parks all over the country are being challenged by the topic of climate change. As an intern for the Climate Change Youth Initiative (CCYI), I've discovered that all of America's natural and historic places are powerful platforms for teaching about climate change.

The Climate Change Response Program sponsors CCYI to place students like me in national parks to work on diverse issues related to climate change. My project was titled, *Small Park, Big Resources*. Little did I know, the title described precisely the dilemma that smaller parks are encountering: how can we interpret climate change, and do our visitors even care?

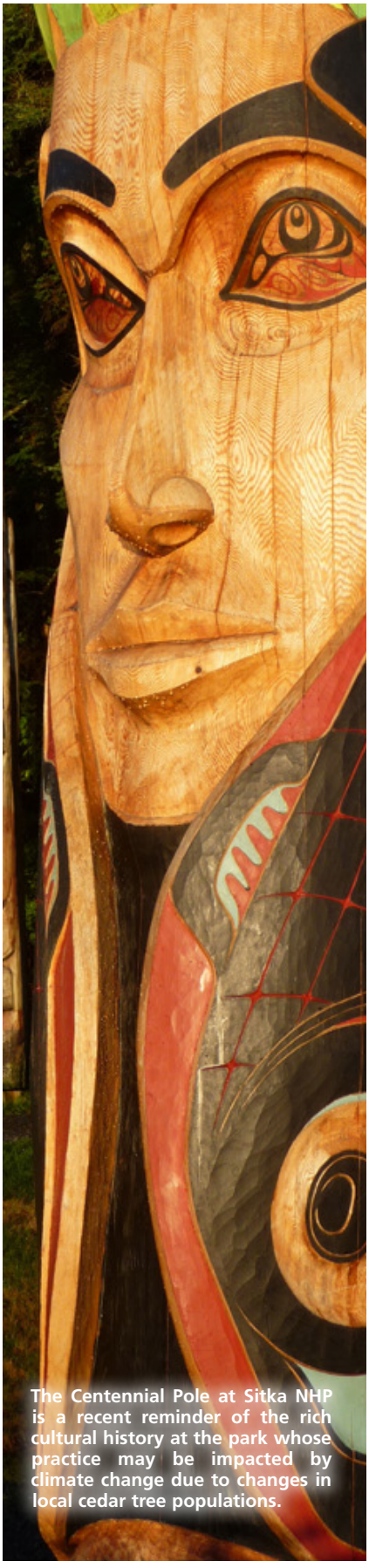
As an intern for Sitka National Historical Park, I was faced with the daunting task of science-based communication at a 113-acre park with primarily cultural resources. The park interprets Tlingit Native Alaskan culture and the lasting effects of Russian colonization. I discovered that the cultural resources in Sitka are inherently tied to the natural world. Artifacts, like totem poles, are made from local cedar trees. Salmon spawn in the park's Indian River and continue to represent prosperity for Alaskan people. It was my job to explore how these living representations of Sitka NHP are being threatened.

My role in Sitka had two components: resource monitoring and science outreach. I worked with the Southeast Alaska Network (SEAN) to carry out projects in the park, including water quality and streamflow monitoring. I monitored bat activity, counted sea stars in the park's intertidal zone, collected fish to test for contaminants, and dissected salmon for an otolith study. These projects enabled me to understand the resources and, more importantly, communicate them to the public. Science outreach meant developing climate change content for interpretive programs. Website updates, "table talks" about salmon, and evening programs all helped start the climate change conversation with visitors.

As my season in Sitka drew to a close, I'm confident that interpreters nationwide will answer the call for action I hear so loudly. Visitors care deeply about these special places, and they are curious, concerned and hopeful about climate change. No matter a park's size or resources, I feel strongly that this topic can – and must – be communicated everywhere. Climate change must be a phrase in every interpreter's vocabulary.

Emily Noyd will continue her passion for environmental studies and interpretation at the University of Washington and beyond. A short video of her experience at Sitka can be viewed at: **http://www.youtube.com/watch?v=B_q6NvQD3K4**

For more information, contact:
Becky_Latanich@nps.gov



The Centennial Pole at Sitka NHP is a recent reminder of the rich cultural history at the park whose practice may be impacted by climate change due to changes in local cedar tree populations.

Teachers Investigate Climate Change at Apostle Islands

A group of eighteen teachers from all over Wisconsin came together in Ashland, Wisconsin in July to learn how the state's climate is changing and how that will impact the way we live.

Apostle Islands National Lakeshore was one of three national parks selected to participate in the 2013 Parks Climate Challenge program of the National Park Foundation (NPF), the official charity of America's national parks. The grant allowed the National Park Service (NPS), the University of Wisconsin – Extension, the Friends of the Center Alliance, Ltd., and the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) to work together to develop a four-day "Changing Climate…Changing Cultures" teacher workshop that took place July 15-18. The workshop featured field trips to the Kakagon Slough in the Bad River Indian Reservation and to Stockton Island in Apostle Islands National Lakeshore. Presenters included GLIFWC's Jim St. Arnold and NPS's Damon Panek discussing the inter-relationship between native cultures and the environment, Dr. John Magnuson from the University of Wisconsin explaining his ground-breaking studies of lake ice, and Apostle Islands National Lakeshore's superintendent Bob Krumenaker describing the impacts of climate change on national parks and protected areas.

"We are already experiencing climate change in the Apostle Islands", stated Mr. Krumenaker. "Increasing air and water temperature, decreasing ice cover on the lake, and intensive storms are having an impact on how visitors experience the park."

Teachers participating in the workshop committed to developing climate change service projects for their students to help them use parks as classrooms. Transportation scholarships will help cover costs of bringing students to the national lakeshore.

Teachers were uniformly enthusiastic about their experiences at the workshop. Tera Fieri from Marathon Venture Academy said, "It was wonderful to have learned so much from the presenters and participants. Kids will be inheriting climate change and I am glad to be giving them some tools to help deal with it." Beth Hoagland from South Shore school is "excited to get my students in the park."

Lesson plans and instructional videos developed by teachers participating in the Parks Climate Challenge are available online to teachers everywhere. Educators can use the free online resources to train themselves and replicate the Parks Climate Challenge model in their own communities across the nation.

Learn more at: **www.parksclimatechallenge.org**
Or contact: **Neil_Howk@nps.gov**

More Information

This newsletter is a bimonthly forum to share the latest actions relating to NPS efforts to manage our parks in a changing climate.

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Climate Change Response
Leigh_Welling@nps.gov

Comments, Submissions:
Angie_Richman@nps.gov

The Climate Change Response Program websites:

External: **http://www.nps.gov/climatechange**

Internal: **http://www1.nrintra.nps.gov/climatechange**