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## Defended By Poets: Communicating Climate Change with Art

As long as humans have walked the earth we have used art to express our deepest feelings and to evoke meaning in the world around us. When we look at the history of the National Park Service, we find that art in many forms has strengthened our mission and promoted our message. Of significant note are the paintings of Thomas Moran, whose ability to portray western landscapes captivated Congress, who then appropriated funds for the creation of Yellowstone National Park which then led to the creation of the National Park Service.

As our agency now faces a new challenge with climate change, we are once again looking to the arts to convey our message. On June 16th, the Climate Change Response Program, in cooperation with several parks in the Pacific West Region, participated in the American Association for the Advancement of Science, Pacific Division meeting in Ashland, Oregon. They presented at a symposium titled *Defended by Poets: The Role of Art in Communicating Change in Our National Parks*.

The symposium organized by Leigh Welling and Will Elder covered a wide variety of art being used in parks to communicate climate change messages; from participatory poetry and song, to outdoor art exhibits and posters, to scientific visualizations as art. Attendees heard an overview, by Climate Change Coordinator Leigh Welling, of NPS efforts to communicate climate change

science, and to adapt to and mitigate changes. Will Elder from Golden Gate NRA presented on that park's efforts to communicate climate change science and promote sustainability through outdoor art exhibits and participatory song creation in educational programs. They also drew upon local university art students to create posters and other media. Linda Hilligoss from Crater Lake told of the park's Artist in Residence program and highlighted the work of one artist who worked with students to capture the park's soundscape and then created an audio piece that combined student poetry with those sounds. Michael Liang from North Cascades NP and Will George from Lewis and Clark NHT presented on using art to visualize and elicit emotions about scientific data that are frequently portrayed only as numbers and charts. They also provided an example of an artistically portrayed exhibit/story on salmon and climate change they created. Finally Jim Lutz from the University of Washington showed his scientific visualizations of changing forest structure in Yosemite, which, when printed as a poster, becomes art with fractal-like patterns, strings and arcs, clusters and voids. The symposium was presented and recorded as a webinar and several of the presenters joined the symposium via the webinar program.

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Above: The Grand Canyon of the Yellowstone, by Thomas Moran.



## Monthly Climate Change Webinar Series

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

**Next Webinar: August 12<sup>th</sup>, 2010**

August's presentation will feature Dr. Lynne Carter, Program Manager of the Southern Climate Impacts Planning Program (SCIPP) at Louisiana State University. Dr. Carter has been active in climate impacts and adaptation work for a long time. Among other things, she was a member of the author team for the 2009 Climate Impacts on the United States document from the Climate Change Impacts Program (CCSP).

Her presentation titled, "*Planning to Protect: How You Might Think About Climate Changes and Responding*" is aimed at helping communities consider climate changes and being more ready for them. There are three take home messages: 1. Climate change is here, 2. Climate change will have consequences for regions and the future will be different than the past, and 3. Decisions today can reduce vulnerability through anticipation and action.

Follow this link to register for this month's webinar:  
<https://www1.gotomeeting.com/register/113856321>

The Climate Change Response Program's public web site is: <http://www.nps.gov/climatechange>

We can also be found on InsideNPS at: <http://inside.nps.gov/waso/waso.cfm?prg=125&lv=2>

## Climate Change Response Program

### Alaska Scenario Training

The NPS Core Team for Scenario Planning started a series of webinars in July that will lead to the Scenario Planning Training Workshop in Anchorage, Alaska (August 17-19). This is the first of four training workshops scheduled over the next eight months. The Alaska workshop will prepare participants to implement a project funded by the Climate Change Response Program that applies Climate Change Scenario Planning to all four of the NPS Alaska networks over the next 3-4 years. Contact: [Don\\_Weeks@nps.gov](mailto:Don_Weeks@nps.gov)

## Park Facility Management Division

### Servicewide Sustainability Workshop

On July 19-20, the Sustainable Operations and Climate Change (SOCC) branch of the Park Facility Management Division hosted a cross-section of regional, Denver Service Center (DSC) and Commercial Services Division representatives at a sustainability workshop in Denver, Colorado. The meeting provided a platform to discuss the draft Green Parks Plan (GPP) and its integration with regional sustainability planning efforts. The GPP meets Department of the Interior Strategic Sustainability Performance Plan mandates for operations and is an integral element in efforts to mitigate climate change and environmental degradation in the National Park System.

To underscore the importance of sustainability in the National Park Service, the SOCC selected a sustainable venue, holding the meeting in downtown Denver in a renovated Leadership in Energy and Environmental Design "gold" certified building that was originally built as a warehouse a century ago. Those who traveled to the meeting respected its theme by taking public transportation or carpooling from the airport and stayed within walking distance of the workshop.

Twenty-four participants from all seven NPS regions and various other directorates attended the workshop via teleconference and in person. Setting the foundation for the workshop, regional representatives summarized their regional sustainability initiatives and shared best practices

### Park Thresholds Featured at ESA Symposium

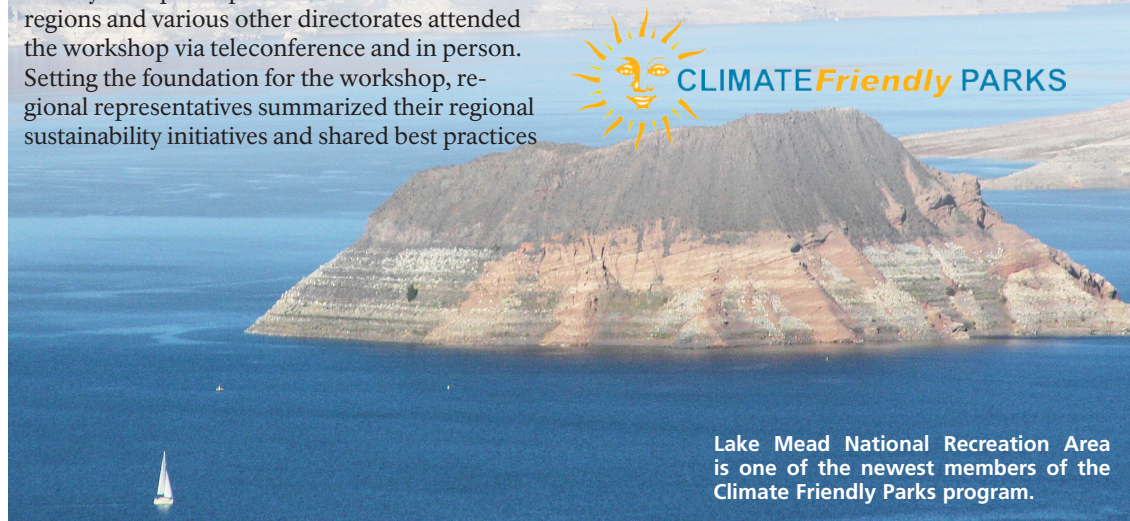
The 95<sup>th</sup> annual meeting of the Ecological Society of America was held August 1-6 in Pittsburgh, PA. Leigh Welling and Rebecca Beavers presented in a symposium, titled "Ecosystem Threshold Responses to Global Warming: Key Dynamics and Management and Policy Implications." Other speakers included Dennis Ojima, Mark Williams, Jesse Logan, Diana Lane, and Kit Batten. Contact: [Leigh\\_Welling@nps.gov](mailto:Leigh_Welling@nps.gov)

with other meeting attendees. A representative from the DSC provided an overview of sustainability checklists, tools and resources available to park and regional planners. SOCC staff discussed sustainability initiatives and priorities at the Washington level. Attendees then discussed aligning regional and national efforts, offered suggestions for moving the GPP forward and volunteered to sit on various workgroups related to its implementation.

Through collaboration across directorates and regions, the final version of the GPP will become the cornerstone for sustainable operational environmental stewardship in the NPS. Contact: [Julia\\_Corby@nps.gov](mailto:Julia_Corby@nps.gov)

## Climate Friendly Parks

The Climate Friendly Parks program welcomed two new member parks in July. Congratulations to Lake Mead National Recreation Area and to Santa Monica Mountains National Recreation Area for having successfully completed their greenhouse gas emissions inventories and climate action plans. Contact: [Julia\\_Corby@nps.gov](mailto:Julia_Corby@nps.gov)  
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Lake Mead National Recreation Area is one of the newest members of the Climate Friendly Parks program.



## First Flexible Biodiesel Blending System

When I used to think of the Point Reyes National Seashore (PORE) roads crew members, I would think one thing: dedication. These men and women keep our roads safe, our culverts clean, and help us navigate through our beautiful park. Without them, we'd literally be lost! Now my perspective has changed: they are dedicated environmental stewards.

In addition to numerous sustainable practices in the roads division, the newest addition is the FlexBlend Biodiesel Fueling System. Championed by roads supervisor Jeff Jewhurst, the system consists of two 1,000 gallon tanks and a modified E-85 Glibarco-Encore dispenser. While other biodiesel fueling systems are available at other parks, PORE has the first flexible blending system.

The benefit of a flexible system is the operator has control of the percentage of biodiesel in the mix. With a flex system, PORE is able to slowly increase the biodiesel percentage while observing the mechanical performance of each piece of equipment. While a forklift manufactured in 2009 may be able to utilize a B90 blend (90% biodiesel, 10% conventional diesel), a road grader from 2001 may only be able to utilize a B10 blend. The flexible system allows for a range of biodiesel blends to best suit equipment needs.

The biodiesel is soy-based and purchased from Redwood Coast Petroleum, a local vendor. It is trucked-in once a month and pumped into a 1,000 gallon biodiesel container. The second 1,000 gallon container houses conventional diesel. The two tanks are connected by a blending pipe. To illustrate, a B20 blend would pull 20% of the total volume from the biodiesel tank, 80% from the conventional tank, blend in the pipe, and then be dispensed. Currently, PORE is blending at B20 for off-road heavy equipment and is slowly increasing the biodiesel percentage.

PORE plans to expand the biodiesel blending system to its road mowers, trails and ground maintenance



Eric DePaul, member of PORE Roads crew, fuels a forklift.

equipment, and small utility vehicles. While the blending system is not currently approved for use with U.S. General Services Administration (GSA)-leased vehicles due to metering regulations, PORE is researching compliance options.

In accordance to Executive Order 13514, the FlexBlend Biodiesel Fueling System will enable PORE to reduce greenhouse gas emissions from transportation by 19%, as well as increase the park's alternatively-fueled vehicle fleet from five to seventeen vehicles.

Many thanks to Jeff Jewhurst and his crew for their stewardship excellence.

Written by Sara Hammond, Point Reyes National Seashore. For more information, contact: [Sara\\_Hammond@nps.gov](mailto:Sara_Hammond@nps.gov)  
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### Sustainable Practices in PORE's Roads Division

- Heavy equipment uses green hydraulic fluid
- Bio-based oil for chainsaws
- Bio-based cleaners and degreasers
- 30% of park signs recycled from previous signs

## Climate Change Ambassadors in Glacier National Park

Twenty-two high school students from San Diego now claim a vested interest in Glacier National Park, where they spent the first week in July assisting with the Crown of the Continent Research Learning Center's (CCRLC) citizen science program. For the past year, these students have spent elective time after school and on the weekends studying clean energy, climate change, environmental injustice, and comprehensive energy and climate legislation.

The complete article on InsideNPS at: <http://inside.nps.gov/index.cfm?handler=viewnpsnewsarticle&type=Announcements&id=9357>



Climate Change Ambassadors Survey for Goats

## Upcoming Workshops & Meetings

The Wildlife Society hosts its 17<sup>th</sup> annual conference in Snowbird, UT on October 2-6, 2010.

<http://www.wildlifesociety.org/>

The 10<sup>th</sup> Biennial Scientific Conference on the Greater Yellowstone Ecosystem titled, "Questioning Greater Yellowstone's Future: Climate, Land Use, and Invasive Species," will be held in Mammoth Hot Springs, Yellowstone NP on October 11-13, 2010.

<http://www.greateryellowstonescience.org/gyesci-conf2010>

The annual meeting of the National Association for Interpretation will host several sessions on Climate change in Las Vegas, NV on November 16-20, 2010.

<http://www.interpnet.com/workshop/>

The American Geophysical Union Fall meeting will be held in San Francisco, CA on December 13-17, 2010.

<http://www.agu.org/meetings/fm10/>

The biennial George Wright Society Conference on Parks, Protected Areas, and Cultural Sites titled, "Rethinking Protected Areas in a Changing World" will be held in New Orleans, LA on March 14-18, 2011.

<http://www.georgewright.org/gws2011>

The American Geophysical Union hosts the "Chapman Conference on Climates, Past Landscapes and Civilizations," in Santa Fe, NM on March 21-25, 2011.

<http://www.agu.org/meetings/chapman/2010/ecall/>

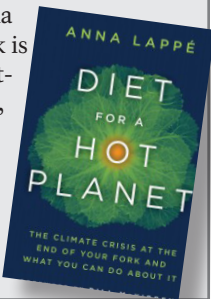
## Useful Resources Related to Climate Change

The Alaska Center for Climate Assessment and Policy has developed this climate information newsletter to provide seasonal weather and climate summaries as well as Alaska weather, wildfire, and sea ice outlooks in one easily accessible document. It can be found at: <http://ine.uaf.edu/accap/dispatch.htm>



An interesting study released last April titled, "Climate Change Threatening Glacier National Park Could Harm Montana's Future Tourism and Economy," can be found through this synopsis article at: <http://www.nrdc.org/media/2010/100407.asp>

"Diet for a Hot Planet: The Climate Crisis at the End of Your Fork and What You Can Do About It" by Anna Lappe. This book is part-exposé, part-myth-debunking, part-what-you-can-do about the global food system's impact on the climate.



## More Information

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

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## Alpine Mammal Survey in Yosemite National Park

While most climate research has focused on determining possible effects of a changing climate on ecosystems, a new Sierra Nevada animal study plans to examine how alpine mammals might reduce these effects based on their interactions with surrounding plant communities. Wildlife biologists seek to explore climate-related reactions in Yosemite and the broader Sierra Nevada. A cooperative study between five federal and state agencies and three California universities will model range shifts and potential alterations to habitat for five alpine mammals: the Sierra Nevada bighorn sheep; American pika; yellow-bellied marmot; Belding's ground squirrel; and golden-mantled ground squirrel.

To model potential impacts of climate shifts on alpine mammals, scientists will use remote sensing data, range-wide surveys of the mammals, and experiments on plant-animal interactions. By testing multiple models of projected vegetation transitions with and without variables representing shifts in mammal ranges, the study will allow scientists to evaluate the degree to which mammals can potentially "manage their own habitat" in the face of climatic shifts. Biologists hypothesize the climate-related changes in distribution of alpine mammals will be unique to each species, with some affected by physiological stress, others by changes in habitat, and others by altered forage

conditions. The study's hypothesis does not imply that climatic shifts will result in more restricted ranges but rather that some species could be unaffected or even benefit from climate shifts. It is just as likely, however, that some species will suffer adverse effects, as their distribution and behavior reflect adaptations to currently favorable habitat. Contact: [Scott\\_Gediman@nps.gov](mailto:Scott_Gediman@nps.gov), Or [Niki\\_Nicholas@nps.gov](mailto:Niki_Nicholas@nps.gov)



American Pika, NPS photo.

## CO<sub>2</sub> Studies in Everglades National Park

Park scientists have been studying the net ecosystem exchange of CO<sub>2</sub> above the mangrove forest along the coast of the Gulf of Mexico in Everglades National Park since 2003 using eddy covariance methods. In 2005, Hurricane Wilma destroyed the team's 30-m tower, instrumentation, and data acquisition system, but it also provided a natural before and after experiment allowing the team to document hurricane impacts on carbon cycling in mangroves. Victor Engel, Jose Fuentes, and Jordan Barr report their findings, "Investigating disturbance and recovery following a hurri-

cane along the Everglades mangrove coast", in the April 2010 edition of the FLUXNET newsletter (<http://www.fluxnet.ornl.gov/fluxnet/newsletters.cfm>). Their results indicate that hurricane impacts on carbon cycling should be factored into any long-term projections of mangrove ecosystem function. Contact: [Jordan\\_Barr@nps.gov](mailto:Jordan_Barr@nps.gov)

Caption: Treetop CO<sub>2</sub> collection tower used to understand the complex relationship between our changing climate and the park's mangrove swamps. Photo courtesy of Larry Perez.

