



Visitor Center at Grand Canyon National Park

Climate Friendly Parks Assistance Internship:

A Sustainability and Climate Change Internship with the Grand Canyon Green Team

A Partnership Project of the Grand Canyon National Park and
Northern Arizona University's Landsward Institute

Final Report
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1. EXECUTIVE SUMMARY

This internship began as an assistance position to Kathryn Parker, Climate Change Coordinator for Grand Canyon National Park, and evolved into a position as intern for the Park's Green Team, led by Deirdre Hanners. The position duties naturally shifted during this transition, but the internship was largely focused on climate change communications with Park staff and visitors, and sustainability initiatives within park operations. The internship lasted from Fall 2009 until the end of 2010. The intern worked closely with Green Team leader and Environmental Protection Specialist Deirdre Hanners on the identification, execution and evaluation of all of the various tasks that took place as part of the internship.

Key accomplishments of the internship included:

- Coordination assistance for the Climate Friendly Parks Workshop in October 2009
- Participation in the Green Team for one calendar year
- Drafting a briefing statement about the park's climate program
- Drafting a Podcast about Climate Friendly Parks
- Drafting a newsletter article about Climate Friendly Parks
- Assistance with development of the Grand Canyon Guide summer text
- Assistance with developing content for the Park website
- Development of a newsletter template and 2010/2011 editions
- Assistance with multiple grant applications
- Assistance with distribution of water conservation tips and shower timers to Park staff
- Development of a list of additional internship opportunities

2. PROJECT DESCRIPTION

History of Climate Friendly Parks program at Grand Canyon

In summer 2009, Grand Canyon National Park (GRCA) was in the process of becoming a "Climate Friendly Park" as part of a larger, park-wide climate change initiative that was being developed. The Climate Friendly Parks (CFP) Program assists National Parks with management tools and resources to address climate change, both within park boundaries and the surrounding community. By completing the Climate Friendly Parks process, Grand Canyon would join more than two dozen National Parks already in the Climate Friendly Parks Program. As part of the program, park staff and managers and park concessioners worked together to complete a greenhouse gas emissions (GHG) inventory prior to hosting a CFP workshop. Using the GHG inventory and other Park operations information, staff developed an action plan as an outcome of the two-day CFP workshop. The goals of the action plan were to identify ways to reduce greenhouse gas emissions within the park and adopt strategies for adapting to climate change impacts.

Internship Description

This internship began as an internship with the Climate Change Initiative at Grand Canyon, focused on the implementation of the Climate Friendly Parks Program for Grand Canyon described above. The goal of the internship was to support staff efforts to establish a vital park-wide climate change initiative at

Grand Canyon National Park. The internship was set up under the supervision of Kathryn Parker, Climate Change Coordinator for Grand Canyon National Park. Project areas for the internship focused on: assisting with the coordination of a Climate Friendly Parks workshop for Grand Canyon; assisting with feedback on action items for the Park following the workshop; assisting with the development and dissemination of information about the Park's Climate program; and assisting with the implementation of the Climate Action Plan, once approved. A detailed list of activities is shown in the Methods section of this report.

Modification of the Internship

After Kathryn Parker's departure from the Climate Change program at Grand Canyon, internship supervision was transferred to Deirdre Hanners, Environmental Protection Specialist and Green Team leader for the park, and the scope of the project was modified to focus on the implementation of sustainability initiatives in Park operations. Jane Rodgers, deputy chief of socio-cultural and natural resources also advised on the modification of the internship.

The internship involved several working meetings between the intern and Deirdre Hanners, both in Flagstaff and at the Grand Canyon. The intern obtained a background check and security clearance in order to be able to work on National Park Service computers and assist with intranet, newsletter, and website activities. Additional duties were developed throughout the duration of the internship, ranging from assisting with in-person delivery of conservation materials to Park staff residences, to grant-writing for the purpose of funding additional Green Team initiatives in line with the Park's approved Climate Action Plan. A final presentation to Park deputies and other staff took place at Grand Canyon in October 2010, and the last activity of the intern was to assist Deirdre Hanners in securing a new intern through NAU's Climate Science & Solutions program.

3. METHODS

The internship's initial scope and timeline is shown in Table 1 below.

Table 1: Initial Intern Tasks & Timeline

Task	Deadline
Assist with the coordination of the Grand Canyon Climate Friendly Parks (CFP) workshop held on October 14 and 15, 2009	October 14, 2009
Assist park staff in identifying key components of the park-wide climate change initiative that complement those covered by the CFP program	After Oct. 15, 2009, in development of the Climate Action Plan
Prepare briefing statements on the CFP program for GRCA staff	Quarterly for internship
Assist with follow-up on action items identified during the CFP workshop or as elements of the Park's Climate Action Plan, including: <ul style="list-style-type: none"> interviews with personnel both at Grand Canyon National Park and primary stakeholders gathering pertinent information to identify needs and opportunities for climate change collaborations especially in the areas of education and outreach, science research and tribal collaborations 	After the issue of the Climate Action Plan, January –June 2010

The modification that took place at the beginning of 2010 is reflected in Table 2.

Table 2: Modified Intern Tasks & Timeline

Task	Deadline
1. Intern maintains regular communications with the Park and NAU through the course of the project. Participate in Green Team meetings in person or by phone	As needed after initial meeting Monthly
2. Assist with coordination of the Climate Friendly Parks (CFP) Workshop as needed, and participate in workshop if possible.	October 14-15, 2009
3. Assist with workshop follow-up activities including information transfer and documentation.	November 15, 2009
4. Develop a master briefing statement on climate change and the CFP program for the Park Superintendent	Nov 30, 2009
5. Develop articles for employee newsletter (Feb 12) and Park Guide sustainability insert (March)	Feb 12 and Mar 31, 2010
6. Write a Standard Operating Procedure for emissions inventories (annual inventory of Park operations only, 5-year inventory of all activities in park)	March 15, 2010
7. Develop a climate change bibliography representing key publications and web-based resources on climate change relevant to Grand Canyon including PDF files where possible and/or web links.	April 15, 2010
8. Create a template for a Park Sustainability newsletter to effectively update park staff (and possibly visitors) on sustainability issues relevant to the park.	May 15, 2010
9. Assist park staff to develop content for a climate change intranet webpage as a 'one-stop shop' for park staff to find relevant information on climate change	Ongoing through Nov 30, 2010
10. Final report and presentation to park Management Team	December 31, 2010

During the course of the internship, the following additional tasks were developed due to the programmatic changes that prevented the intern from completing tasks 6 and 7.

Table 3: Additional Intern Tasks and Timeline

Task	Deadline
11. Assist with grant writing for Grand Canyon's Small Grants program and the National Park Foundation grant program	October 2010
12. Assist with delivery of water conservation tips and devices to Park employees at their residences on the South Rim	November 2010
13. Develop additional internship descriptions including duties and deliverables	December 2010
14. Assist with the coordination of an internship with the Green Team for a student in NAU's Climate Science & Solutions program	December 2010

4. RESULTS

Each internship task is identified in this section in italics. The results of the task activities are detailed following each task.

1. *Intern maintains regular communication and attends Green Team meetings.*

The intern maintained close communications with Park liaison and Green Team throughout the course of the internship.

2. *Assist with coordination of the Climate Friendly Parks (CFP) Workshop on October 14-15, 2009.*

The intern assisted Kathryn Parker with the coordination of the invitation, agenda, attendee list, and presentation and meeting logistics for the October 14-15 2009 Climate Change Workshop at Grand Canyon National Park. The intern was not able to attend the workshop. However, Landsward Institute staff provided support at the workshop (Appendix A).

3. *Assist with workshop follow-up activities including information transfer and documentation.*

The intern helped Kathryn Parker coordinate several follow-up meetings after the October workshop in order to prioritize park activities for the development of the Climate Action Plan. The intern also assisted in these meetings with documentation of the meeting discussions and decisions. After each meeting the intern coordinated information transfer with ICF, the consultant developing the Climate Action Plan.

4. *Develop a master briefing statement on climate change and the CFP program for the Park Superintendent.*

The intern worked with Kathryn Parker to develop a briefing statement template and to write a briefing statement that Kathryn Parker could use in informing Park staff about the project (Appendix B). In addition, the intern developed text for a podcast/radio spot for Kathryn Parker with the Park interpretation staff (Appendix C).

5. *Develop articles for employee newsletter (February 12) and Park Guide sustainability insert (March).*

The intern wrote an article for the employee newsletter (Appendix D) and worked with Deirdre Hanners on developing text for the summer Park Guide insert (Appendix E). The Guide text covered a range of sustainability programs within Park operations and spearheaded by Park concessioners. Additional written materials were developed for Park publications (Appendices F and G).

6. *Write a Standard Operating Procedure for emissions inventories (annual inventory of Park operations only, 5-year inventory of all activities in park)*

The intern began the process of writing an SOP for the GHG emissions inventories, and worked through the inventory spreadsheet with Deirdre Hanners, inserting notes as to which parties were to be contacted for which pieces of information. It became apparent through this process that an SOP would not necessarily be feasible or appropriate beyond the instructions inserted into the spreadsheet tool,

particularly because the methodology for the GHG inventory could be subject to change in the future. As a result of this decision on the part of Deirdre Hanners, the internship priorities shifted to other areas.

- 7. Develop a climate change bibliography representing key publications and web-based resources on climate change relevant to Grand Canyon including PDF files where possible and/or web links.*

The intern worked with Deirdre Hanners and Jane Rodgers to develop a priority list of program areas for focusing a climate change bibliography. The intern researched regional climate change science resources and developed a list of key regional resources. Simultaneously, the National Park Service developed a Climate Change website, and the United States Global Change Research Program updated and improved its own scientific resources available online. Again, as a result of the availability of these online resources, the “climate bibliography” project was abandoned and the internship duties were re-prioritized.

- 8. Create a template for a Park sustainability newsletter to effectively update park staff (and possibly visitors) on sustainability issues relevant to the park.*

The intern developed a newsletter template in PowerPoint (Appendix H) that is easy to use and follows official Grand Canyon/NPS visual guidelines. The intern developed most of the content for editions of the newsletter for Winter 2010/2011 (Appendix I) and Spring 2011 (Appendix J).

- 9. Assist park staff to develop content for a climate change intranet webpage as a ‘one-stop shop’ for park staff to find relevant information on climate change*

The intern worked with Deirdre Hanners and web/information management staff at Grand Canyon to develop content for the ‘green’ pages of the Grand Canyon website (Appendix K). The Intranet site is still under development, and will include the newsletters that the Intern developed as one content item. Additional web links identified by the intern as relevant or critical sources of information for Park staff are included in the newsletter and will be highlighted on the intranet site. Again, the National Park Service Climate Change website serves as a clearinghouse for a great deal of climate change information.

- 10. Final report and presentation to park Management Team*

On October 19, 2010, the intern attended a meeting of Park Management and presented the activities and results of the internship.

- 11. Assist with grant writing for Grand Canyon’s Small Grants program and the National Park Foundation grant program.*

The intern assisted with brainstorming for, and writing, small grant applications to the Grand Canyon small grants program and the National Park Foundation grant program (Appendix L). These grant applications were for: an environmental lecture series; a bio-based products pilot program for Park operations; and a green office program for Park operations based on nationally recognized models. One part of the lecture series and one proposal for bio-based products were funded. Copies of the grant proposals are included in the Appendices to this report.

12. Assist with delivery of water conservation tips and devices to Park employees at their residences on the South Rim.

In November, the intern traveled to the South Rim for work meetings with Deirdre Hanners. During this visit, the intern helped Deirdre Hanners deliver water conservation tips and shower timers to all park staff living at the South Rim.

13. Develop additional internship descriptions including duties and deliverables

The intern developed a list of eight additional internships that could be partnerships between NAU and the Green Team at Grand Canyon (Appendix N).

14. Assist with the coordination of an internship with the Green Team for a student in NAU's Climate Science & Solutions program

In November 2010, the intern introduced Deirdre Hanners to the coordinator of the Climate Science & Solutions professional master's degree program at NAU. In mid-December, the intern attended a meeting with these individuals, at which it was decided to include the Green Team GHG inventory and associated activities as an internship for one student in the program.

5. Appendix A - Climate Friendly Parks Workshop Agenda



Climate Friendly Parks (CFP) Workshop Final Agenda
Grand Canyon National Park (GRCA)
October 14-15, 2009
Community Building and Horace M. Albright Training Center
Grand Canyon, AZ

Wednesday October 14th, 2009 – Community Building

- 8:00 – 8:30** **Registration and Coffee**
- 8:30 – 8:45** **Welcome and Introductions**
(Steve Martin, Superintendent, Grand Canyon National Park/GRCA, and Kathryn Parker, Climate Change Coordinator, GRCA) Note: NPS MC for both days will be Julie McNamee, Air Resources & Climate Change Liaison
- 8:45 – 9:10** **Overview of the Climate Friendly Parks Program and Policy Perspective**
Update on national DOI/NPS policies/legislation and CFP Program overview/goals for the workshop.
(Chris Shaver, Chief, Air Resource Division, NPS)
- 9:10 – 9:55** **Climate Change and the Greater Grand Canyon Region: An Overview of Climate Change and Impacts** *(George Koch and Bruce Hungate, Professors of Biological Sciences, Northern Arizona University/NAU, Tom Whitham, Regents' Professor, Biological Sciences, NAU)*
- 9:55 – 10:15** **Break**
- 10:15 – 10:40** **Climate Change and the Greater Grand Canyon Region: An Overview of Climate Change and Impacts** *(cont'd)*
- 10:40 – 12:00** **Regional Impacts-Effects of Climate Change on Tribal Communities in the Southwest** *(Margaret Cook, Environmental Director, Gila River Community)*
- Systems Thinking-Adaptation/Scenario Planning: Planning for Future Changes**
Overview of “systems thinking” and the scenario planning process. *(Margaret McRoberts, Community Planner, NPS and Holly Hartman, Director of Arid Lands Information Center, University of Arizona)*
- Alternative Energy and Energy Conservation** - Using current energy sources more efficiently and tapping into renewable energy sources such as biodiesel and solar.
(William Auberle, Professor of Civil Engineering, Construction Management and Environmental Engineering, NAU and Stephen Mead, Interim Chair, Department of Civil Engineering, Construction Management and Environmental Engineering, NAU)

12:00 – 1:00	Lunch (Box lunches available for \$5.50)
1:00 – 2:00	Climate Friendly Actions in and around Grand Canyon National Park <ul style="list-style-type: none"> • Coconino County Sustainability Initiative (SEDI)-(Carl Taylor, Coconino County Supervisor) • Sustainability Audit – Brief summary of findings from 2008 audit of South Rim operations. (Wilbert Odem, Professor of Civil Engineering, Construction Management and Environmental Engineering, NAU) • CFP in Context – Update on the Park's current climate friendly initiatives and Environmental Management System (EMS). (Deirdre Hanners, Environmental Protection Specialist, GRCA and park concessioners) • Solid Waste Reduction and Recycling – Decreasing solid waste; improving recycling (Tim Jarrell, Chief of Facilities Maintenance)
2:00 - 2:20	Break
2:20 – 3:10	Climate Friendly Actions in and around Grand Canyon National Park (cont'd) <ul style="list-style-type: none"> • Transportation Management - Increasing vehicle efficiency, reducing vehicle use and reducing number of vehicle miles traveled. Discussion of GRCA Transportation Management Plan, and bike master plan. (Vicky Stinson, Project Manager and Linda Jalbert, Wilderness Planner, GRCA) • Education and Interpretation - Developing effective outreach efforts for Park staff, visitors and the local community that communicate the importance of climate change mitigation and adaptation. (Lori Rome, Supervisory Park Ranger, Interpretation and Resource Education, Anita Davis, Education and Outreach Lead, NASA Landsat Program, and Asher Burns-Burg, ICF)
3:10 – 3:30	Grand Canyon National Park's Greenhouse Gas (GHG) Emission Inventory How the inventory was conducted, inventory results, impacts, and comparisons to other parks (Carl Bowman, Exhibit Planner, Division of Interpretation and Resource Education, GRCA, and Chris Steuer, GHG Emission Expert, ICF)
3:30– 4:45	Breakout: Visioning Exercise Developing a vision of a climate friendly GRCA. What mitigation and adaptation strategies are needed in order to make this vision a reality?
4:45 – 5:00	Wrap up and Adjourn
5:00 – 7:30	Dinner Break (on own)
7:30 – 8:30	Evening Program - People, Culture and Environment – Shrine of the Ages Auditorium (Margaret Cook, Environmental Director, Gila River Community)
7:00 – 9:00	Astronomical Viewing (Albright Training Center parking lot)

Thursday October 15th, 2009- Horace M. Albright Training Center

- 8:00 – 8:30** **Registration and Coffee**
- 8:30 – 8:45** **Goals for Today**
Summary of previous day's highlights including the visioning session, and an overview of the action-planning process. *(NPSMC Julie McNamee, Air Resources & Climate Change Liaison)*
- 8:45 – 9:05** **Introduction to CLIP (Climate Leadership in Parks) Module 2: The Action Planning Module/Establishing a Framework for Setting Emission Reduction Goals** *(Chris Steuer, GHG Emission Expert, ICF)*
- 9:05 – 9:20** **Break**
- 9:20 – 12:00** **Breakout: Developing the Grand Canyon's Climate Change Action Plan**
Using Module 2 of the CLIP Tool and a facilitated process, Park staff and other workshop participants will select mitigation actions and adaptation strategies appropriate for Grand Canyon.

Energy Management

- Replace an existing device (e.g. boiler, heater, generator) with a renewable energy system.
- Replace an existing device (e.g. boiler, heater, generator) with a biotic fueled device.
- Install energy efficient light fixtures.
- Purchase electricity from a renewable energy provider.
- Increase the efficiency of an existing device (e.g. boiler, heater, generator).
- Others

Transportation Management

- Reduce visitor and employee Vehicle Miles Traveled (VMT).
- Reduce fuel consumption of Park and concessionaire vehicles.
- Reduce fuel consumption of non-road equipment.
- Replace existing Park, concessionaire, and other vehicles with alternative fuel vehicles and hybrids.
- Reduce idling of trucks and buses.
- Others

Waste Management and Other Emission Sources

- Manage waste through source reduction, composting, recycling, and combustion.
- Increase the recycled content of purchased materials.
- Reduce the amount of wastewater sent to wastewater treatment plants.
- Reduce fertilizer applied to Park lands.
- Reduce campfire, fireplace, and wood stove burning.
- Others

Education and Outreach

- Train interpreters to speak about climate change and air pollution.
- Develop materials to educate staff and visitors about climate change.
- Develop coordinated emission reduction efforts with concessionaires.
- Develop coordinated emission reduction efforts with other parks enrolled in the CFP program.
- Implement the Do Your Part! Program.
- Others

Impacts and Adaptation – Developing management strategies to address adaptation needs for Grand Canyon National Park. (Note: group will include a representative from each park division. Impacts and climate drivers tables will be drafted prior to workshop.)

- What are the risks posed to Park resources by climate change? To what extent is climate change exacerbating existing risks/stressors versus posing new risks (e.g. changes in air temperature may create a need for vertical migration from lower elevations to higher elevations)?
- Which of these risks would benefit from immediate response, near-term mitigation actions (3-5 year time horizon), or longer-term adaptation measures (5-20 years)? What is the time frame needed to effect adaptive response?
- What are the resource management programs/processes currently used to address existing stressors?
- How can existing programs be modified to address climate change? Do any new programs need to be added?

12:00 – 1:00	Lunch (Box lunches available for \$5.50)
1:00 – 2:00	Breakout Groups Reconvene Finalize recommendations for presenting to the larger plenary session.
2:00 – 3:15	Plenary Session and Discussion Each breakout group will report back to the entire workshop on the actions they have selected.
3:15 – 3:30	Closing Remarks (<i>Steve Martin, Superintendent, GRCA</i>)
3:30 – 4:45	Determining Next Steps (<i>Park's Green Team and other key players</i>) Define action items, responsibilities, and timelines for the next 12 months (which will be part of EMS goals and tracking procedures).

Break Out Session	Facilitators
Energy	Steve Homan, Jeri Hall, Chris Steuer
Waste	Deirdre Hanners, Elliot Dale, Kerry Cebul
Transportation	Carl Bowman, Asher Burns-Burg
Education and Outreach	Lori Rome, Julie Thomas-McNamee, Anita Davis
Impacts and Adaptation	Kathryn Parker, Michael Wood, Holly Hartman

Appendix B - Climate Change Briefing Statement Draft

1.1 Briefing Statement

Bureau: National Park Service (NPS)

Issue: Overview of Current Climate Change Issues

Park Site: Grand Canyon National Park (GRCA)

Date: November 2, 2009

Climate Change Science

- The global average temperature since 1900 has risen by about 1.5 ° F. This observed increase is due primarily to human-induced emissions of heat-trapping, or greenhouse gases (GHG). These emissions come primarily from the burning of fossil fuels (coal, oil and gas) with important contributions from the clearing of forests, agricultural practices, and other activities. By 2100, the global average temperature is projected to rise another 2 to 11.5 ° F.
- Reducing emissions of GHG would lessen warming over this century and beyond. Early cuts in emissions will have a greater effect in reducing climate change than comparable reductions made later. As a result of human activities, the present carbon dioxide concentration (one of the most important GHG) is about 385 ppm (parts per million), which is about 30% above its highest level over at least the last 800,000 years.
- Recent warming in the Southwest is among the most rapid in the nation, significantly more than the global average in some areas. Expected impacts in this region, which will affect GRCA ecosystems and operations, include more extreme temperatures, less winter precipitation and snow, increased aridity and drought stress, and reduced runoff in the Colorado River Basin. Record wildfires are already being experienced in the Southwest and at GRCA are expected to increase in frequency and intensity, and runoff patterns are expected to change.
- Biological impacts include a mismatch of species and biotic communities with the climate that surrounds them, as the climate changes more rapidly than species can adapt to it or migrate. Extinction of many foundation and dependent species is likely. Invasive species will flourish as 'ecological space' becomes available. The composition of future plant and animal communities is highly uncertain. Because of the management implications for GRCA, additional research is necessary to identify key vulnerabilities and viable strategies for mitigation of biological impacts.
- Native American communities in the area who live on rural tribal lands have limited capacities to respond to climate change. Many reservations already face severe problems with water quality and availability. These problems are likely to be exacerbated by climate change.

Climate Friendly Parks

- The Climate Friendly Parks (CFP) program provides national parks with management tools and resources to address climate change (including impacts identification, GHG mitigation, and adaptation). Member parks complete a GHG inventory, a climate change workshop, a climate action plan, and a plan for public engagement in climate-change-related activities. Over twenty-four parks are already full members of this program, and GRCA will soon be added to the list.
- GRCA held its CFP workshop on October 14 and 15, 2009. Over 100 participants attended the workshop, which included not only Grand Canyon staff, but staff from nearby parks; park concessioners; tribes; other federal, state and local governments; local universities; public utilities; NGOs (non-governmental organizations); and local community representatives.
- By partnering with park concessioners, park managers were able to complete a greenhouse gas inventory prior to the workshop. This inventory provided estimates of the emissions resulting from activities occurring within the park. The GHG inventory was used by workshop participants to identify potential action items for the park's climate action plan.
- Grand Canyon's action plan is currently being drafted from the ideas generated by five different working groups that explored the climate related issues of education and outreach, transportation, waste, energy, and impacts and adaptation. The final action plan will outline "climate friendly" actions the park will be taking, in collaboration with park partners, workshop participants and nearby communities to further reduce its carbon footprint, educate park visitors and employees, and adapt to the projected impacts of climate change. Grand Canyon's final climate action plan should be completed by the end of January, 2010.

Climate Change Policy

Executive Order

- President Obama issued Executive Order (EO) 13514 on October 5, 2009, which built on EO13423, setting sustainability goals and making reduction in GHG emissions a priority for federal agencies. The order provides guidance and leadership on specific actions that can be taken to mitigate climate change from an operations perspective within federal agency offices.
- Each agency head is required by this order to: set GHG emissions reductions goals; improve water use efficiency; promote pollution and waste prevention; implement high-performance sustainable building practices; advance sustainable acquisitions and electronics stewardship; and advance regional and local integrated planning. The order further establishes an interagency steering committee on federal sustainability. Each agency is required to designate a Senior Sustainability Officer, to develop a Strategic

Sustainability Performance Plan, and to actively participate in the existing interagency Climate Change Adaptation Task Force.

DOI Secretarial Order

- Secretary of the Interior Ken Salazar issued Secretarial Order 3289 on September 14, 2009, establishing a department-wide strategy for applying scientific tools to increase understanding of climate change and to coordinate an effective response to its impacts on tribes and on the land, water, ocean, fish and wildlife, and cultural resources that the Department manages.
- The order established a Climate Change Response Council to execute a coordinated department-wide strategy to increase scientific understanding of the impacts of climate change and to develop effective adaptive management tools to address them. This Council will coordinate its activities with all relevant Federal departments and agencies.
- The order further establishes the following mechanisms for implementation of these activities: the use of climate change response planning requirements in making bureau or departmental decisions about planning, management, resource use, and research prioritization; the renaming of USGS regional science centers as DOI Regional Climate Change Response Centers, which will perform integrated research and develop tools for departmental managers and partners; and the development of a network of collaborative “Landscape Conservation Cooperatives” to build interagency landscape-level strategies for understanding and responding to climate change impacts. The Order also establishes a DOI Carbon Storage Project and Carbon Footprint Project.

NPS Climate Change Policy

- National Park Service Director Jon Jarvis has pledged to be a leader in educating the public on climate change and developing adaptation and mitigation strategies.
- In January 2009, representatives from across the NPS were selected to serve on the NPS Climate Change Response Steering Committee for a three-year term. The primary purpose of the Steering Committee is to serve as an advisory body to the NPS Climate Change Response Program Office and the National Leadership Council on matters pertaining to climate change and its impacts to National Park Service resources and values. There are six working groups: communication, policy, planning, science, adaptation, and mitigation.
- An NPS Climate Change Response Strategy is currently in draft and expected to be finalized in January.

Inter Mountain Region

- The IMR Resource Stewardship Advisory Team RSAT committee recently established a climate change subcommittee. The subcommittee meets monthly and has drafted a work plan which is currently under review.

Grand Canyon

National Park Service
U.S. Department of the Interior

Grand Canyon National Park
Arizona



Insider's Look at Grand Canyon

Webisode #17 – Interview with Climate Change Coordinator Kathryn Parker Transcript

Ranger Patrick: Welcome to another webisode of Insider's Look at Grand Canyon. I'm Ranger Patrick and today my guest is the Climate Change Coordinator for Grand Canyon National Park, Kathryn Parker. Kathryn, welcome to the show.

Kathryn Parker: Thank you Patrick, it is great to be here.

Patrick: So, back on October 14th and 15th you led the Climate Friendly Park Workshop. Could you let the folks know what the purpose of that workshop was?

Kathryn: Sure, we wanted to address this really important issue of climate change. And you know on October the 5th, President Obama came out with an executive order directing all federal government agencies, including of course the Park Service, to start tackling this issue. So we wanted to get a head start on that and really build partnerships both inside and outside the park to work together to address this really important issue. In addition we wanted to be able to show leadership and provide an example to others as to how people can take action on this issue.

Patrick: Well specifically, how could folks...or Grand Canyon for that matter, show this leadership?

Kathryn: So, as you know Patrick, we're an iconic park. We are currently being affected by climate change, we are seeing some of those affects now. Like the Javelinas coming up from lower elevations. So want to be able to look at this issue, to address it now and in the future. And because we have over four and a half million visitors every year we have a real opportunity to both, show leadership in the types of things we are doing and what people can do in their own lives /own homes. Also an opportunity to educate local community and these four and half million visitors that come every year, 40% of which are come from the international community. So we have that wide community to affect as well.

Patrick: What does it take to become a Climate Friendly Park?

Kathryn: Well, the first thing one needs to do, a park needs to do, is to put in an application to become one. The second thing is to complete, what we call, a greenhouse inventory. And that looks at the emissions generated within the park. The third thing is to hold the workshop, which is what we just did. And out of that develop an "Action Plan" for the park. The types of actions and steps we are going to take to become more climate friendly.

Patrick: So, I know the outcome of the workshop was to come up with this action plan. Could you share with the folks out there an example of something that is in that action plan that we are examining?

Kathryn: Through our greenhouse gas inventory we realized that a very large portion of our energy usage goes to pumping water that comes all the way from the north rim, down through the canyon, and back up to into Indian Gardens. And then from there pumped up to the south rim for the visitors and people who live here. And that is our water source. So, we use an enormous amount of energy pumping that water up to us. So, one of the things we are looking at is the use of, possibly, micro-hydro power down at Phantom Ranch, which is at the bottom of the canyon, to help supplement bringing that water up. That will save us a tremendous amount of energy and therefore reducing our carbon footprint.

Patrick: So, Kathryn what are the next steps?

Kathryn: Well currently we are working with Superintendent Steve Martin and other senior park managers to take this draft action plan, prioritize them, and then finalize the action plan in January of 2010. Then of course we have to implement it and that's the real important challenge.

Patrick: Well, you know Kathryn it sounds like you have your work cut out for you. But, I am really happy to know that you folks are working hard to address climate change here at Grand Canyon National Park. I know as time goes on you are going to be implementing these things. Would you be willing to come back and share with our listeners some of the updates on that?

Kathryn: Sure would Patrick, be happy to.

Patrick: Well, thanks for being on the show. We will catch you folks next time on, Insider's Look at Grand Canyon.

Appendix D - Inside NPS Newsletter Article Draft

Grand Canyon National Park held a Climate Friendly Parks (CFP) workshop on Oct 14-15. The CFP program assists national parks with management tools and resources to address climate change, both within park boundaries and the surrounding community. Over 100 participants attended the workshop which included not only Grand Canyon staff, but staff from nearby parks; park concessioners; tribes; other federal, state and local governments; local universities; public utilities; NGOs (non-governmental organizations); and local community representatives.

By partnering with park concessioners, a greenhouse gas inventory was completed prior to the workshop. This inventory provided estimates of the emissions resulting from activities occurring within the park. The greenhouse gas inventory was used by workshop participants to identify potential action items for the park's climate action plan. A climate action plan is one of the primary outcomes of a Climate Friendly Parks workshop.

Grand Canyon's action plan is currently being drafted from the ideas generated by five different working groups that explored the climate related issues of education and outreach, transportation, waste, energy, and impacts and adaptation. The final action plan will outline "climate friendly" actions the park will be taking, in collaboration with park partners, workshop participants and nearby communities to further reduce its carbon footprint, educate park visitors and employees, and adapt to the projected impacts of climate change. Grand Canyon's final climate action plan should be completed by the end of January, 2010.

Grand Canyon National Park is proud to already be engaged in many climate friendly activities such as utilizing photovoltaic panels at its primary visitor center, supporting an extensive recycling program, implementing a concessioner's in-park volunteer environmental service program, and providing an extensive mass transit shuttle system within the park that utilizes clean alternative fuel. Unfortunately, the American Southwest is already experiencing climate-related increases in the number and severity of wildfiresⁱ, longer droughtsⁱⁱ, and loss of some species while others migrate to different elevationsⁱⁱⁱ, all of which indicate that more can and must be done. Grand Canyon's Climate Friendly Parks workshop was the next step in a continued commitment to providing leadership in addressing this globally important issue.

ⁱ "Record wildfires (in the Southwest) are also being driven by rising temperatures and related reductions in spring snowpack and soil moisture"¹ U.S. Global Change Research Program, T. R. Karl, J. M. Melillo, and T. C. Peterson, editors, *Global Climate Impacts in the United States*, Cambridge University Press, New York, N.Y., 2009. p. 131, <http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts>. AND Westerling, A.L., H.G. Hidalgo, D.R. Cayan, and T.W. Swetnam, 2006: Warming and earlier spring increase western U.S. forest wildfire activity. *Science*, **313** (5789), 940-943.

ⁱⁱ "... temperature increases (*observed in recent years*) have made the current drought in the (*southwest*) region more severe than the natural droughts of the last several centuries. U.S. Global Change Research Program, T. R. Karl, J. M. Melillo, and T. C. Peterson, editors, *Global Climate Impacts in the United States*, Cambridge University Press, New York, N.Y., 2009. p. 131

ⁱⁱⁱ "Large-scale shifts have occurred in the ranges of species and the timing of the seasons and animal migration, and are very likely to continue" U.S. Global Change Research Program, T. R. Karl, J. M. Melillo, and T. C. Peterson, editors, *Global Climate Impacts in the United States*, Cambridge University Press, New York, N.Y., 2009. p. 80

Julie Thomas McNamee, NPS Resources & Climate Change Liaison, and Kathryn Parker, Grand Canyon National Park Climate Change Coordinator, facilitate a "visioning exercise" during the park's CFP workshop. The session explored mitigation and adaptation strategies needed to make the park's 2019 climate friendly vision a reality.

Appendix E - Grand Canyon Guide Draft

Sustainable Grand Canyon

Grand Canyon National Park is committed to reducing its impact on the environment by implementing sustainable practices and projects that help decrease greenhouse gas emissions, conserve water, increase recycling, and use alternative energy and fuels.

Grand Canyon National Park is committed to sustainability through understanding how our day-to-day operations effect the environment. Our actions help address environmental concerns which influence both the natural and cultural resources in the park, as well as the visitor's experience. Sustainable solutions not only improve the quality of life at the Grand Canyon but also extend beyond the boundary of the park into the lives of our visitors.

Features Visitors can participate in to improve Grand Canyon's sustainability

Shuttle Buses

- Since 1974, Grand Canyon National Park has offered shuttle bus service at the South Rim. In 2008, the park upgraded to a fleet of accessible shuttle buses which run on Compressed Natural Gas, a clean-burning fuel. The shuttle system has provided millions of rides since inception which helps reduce greenhouse gas emissions. In 2009, over 1 million people rode the shuttle, eliminating 344,828 vehicles on park roads! The new Tusayan route had 50,000 riders in its inaugural season, which kept 17,241 vehicles out of the park, providing less congestion on roads and parking lots which improves the National Park experience for visitors.

Bike Rentals and Employee Bike Share

- A new bike rental operation will kick off this summer at the Grand Canyon Visitor Center! Bikes can be rented from Bright Angel Bicycles for riding on the Greenway system around Grand Canyon Village, to Hermit's Rest, and in the future, on the expanded Greenway trail system to South Kaibab trailhead.
- NPS employees at Grand Canyon will have the option to use bikes rather than vehicles to commute between work areas at the South Rim thanks to a grant for bike purchases for each division. Watch for smiling, green-clad employees on bikes during your visit!

Recycling Program

- Grand Canyon has a robust recycling program for glass, tin, aluminum, paper, cardboard, magazines, and all plastics. Recycling bins are located throughout the park. Additionally, the park recycles laser and ink jet cartridges, cell phones, scrap metal,

propane canisters, electronics, fluorescent bulbs, batteries, and composts all mule manure!

Water Bottle Filling Stations

- Coming soon! Grand Canyon is working to encourage the use of reusable water bottles by providing water bottle filling stations in convenient locations throughout the park. On the South Rim, Grand Canyon souvenir water bottles are available from park gift shops and the Grand Canyon Market, and at the shops at the North Rim. Take part in reducing waste while enjoying fresh Grand Canyon spring water in your reusable bottle!

Climate Friendly Parks Program

- Grand Canyon is a participant in the NPS-wide Climate Friendly Parks (CFP) program. The program helps parks mitigate climate change impacts, reduce GHG emissions, and adapt to changing environmental conditions.
- As part of the Climate Friendly Parks program, Grand Canyon developed an Action Plan to address operational impacts contributing to Park greenhouse gas emissions. Grand Canyon aims to reduce emissions to 30% below 2008 levels by 2020. The emissions reductions will be achieved through a combination of operational changes and behavioral changes on the part park employees, residents and visitors.
- Every five years, Grand Canyon will conduct a complete emissions inventory including park operations, concessions, and residents, the Grand Canyon school, and visitors. This inventory will be used to guide operating decisions and take actions toward achieving the goals of the Climate Friendly Parks Action Plan.

What You Can Do

- Do Your Part: Lead the way toward a sustainable future by pledging to reduce your carbon footprint at www.doyourpartparks.org. You can pick a park, sign up, calculate your carbon footprint, and pledge to do your part.

Traveling Green

- "Traveling Green" is a great way to help Grand Canyon and other areas you visit reduce carbon emissions, divert and reduce what goes into the waste stream, and to generally help the environment. Go to the [Traveling Green page](#) for helpful tips on planning your next green adventure.

Learn More:

- Visit the National Park Service Climate Change website to learn more about climate change causes, impacts, and the effects on your national parks.
- <http://www.nature.nps.gov/climatechange/index.cfm>.

Other features of Grand Canyon's sustainable operations

Fuel Efficiency and Alternative Fuels

- Grand Canyon chooses alternative fuel vehicles when replacing the fleet, including flex fuel, bio-diesel, and hybrid cars and trucks. Grand Canyon considers fuel efficiency and right-sizing the fleet to reduce fuel consumption by 30% by 2016.

Green Auto Shop

- The South Rim Auto Shop, which maintains Park Service vehicles, has 'greened' its operation by using re-refined oil for maintenance and recycling all used oil, oil filters, tires, batteries and antifreeze. The Auto Shop has replaced environmentally harmful chemical products with more environmentally friendly products and practices.

Green Purchasing

- The park has a Green Purchasing policy for environmentally-friendly office supplies, janitorial products, and other materials that Park staff use in their day-to-day operation.

Renewable Energy

- *Photovoltaic.* At the Grand Canyon Visitor Center (GCVC), visitors can see the Arizona sunshine in action! In May 2009 APS (Arizona Public Service), the largest utility company in Arizona, worked with the park to install photovoltaic panels at Grand Canyon Visitor Center. The 18 kilowatt system supplies 30% of the power used in the building. The energy saved is more than a normal household would consume and reduces greenhouse gas emissions by at least 20 metric tons a year. A theater will be added to the Grand Canyon Visitor Center next year with additional photovoltaic cells included in the design.
- *Passive Solar.* When the Visitor Center was built in 2000 its design incorporated passive solar energy for lighting and heating of the building. Passive solar techniques will be used in new buildings.
- *Hydroelectric.* Grand Canyon proposes to install hydro-electric generation equipment to provide all power at Phantom Ranch, Cottonwood Campground and Ranger Station, and Roaring Springs Bunkhouse in the inner canyon. The projects will eliminate purchased electricity, and save 136 metric tons CO₂ equivalent at Phantom Ranch, which is enough electricity to power 17.6 houses per year.

Smart Energy Management

- Grand Canyon is replacing all incandescent bulbs with highly efficient T-8 fluorescents in park buildings. This year, the Park Headquarters building will be switched to all T-8 lighting systems.
- Grand Canyon purchases Energy Star® products when replacing expended equipment.

Reclaimed Water

- The park uses reclaimed water from treatment operations for landscaping and in toilets the Facility Operations building. Concessions operations also use reclaimed water for landscaping near the hotels on the South Rim.

LEED Buildings

- The Facility Operations building is LEED (Leadership in Energy & Environmental Design) certified. Reclaimed water, carpet made of recycled materials, insulated cement block construction, motion sensor and fluorescent lighting systems all contribute to its sustainable character.
- All new construction in the park will be LEED certified. Two planned projects, the Science and Resource Management building and new shared employee apartments are intended to achieve LEED Platinum certification.

The Green Team

- The Green Team is a group of Grand Canyon employees who support environmental programs and initiatives in park operations, visitor activities, and outreach and education programs. The Green Team works to update and implement the practices of the park's Environmental Management System.

Concessioner Contributions

Xanterra

- Xanterra recycles grease from restaurants into biodiesel that the Grand Canyon Railway uses in the Steam Engine.
- Shampoo, conditioner and lotion amenities bottles used in South Rim hotels and lodges are made from Plastarch material which is corn-based and biodegradable.
- In-room video for guests that discusses environmental programs and informs guests how to participate in everything from the linen reuse program to in-room recycling program.
- Xanterra's guest room keys are made from corn-plastics and are biodegradable.
- Sustainable cuisine program with over 15% of food and beverage items classified as sustainable (local, organic, all-natural or fair-trade)
- Xanterra staff volunteered 398 hours of personal time to environmental programs in 2009 such as litter pick-ups, Earth Day celebration, and educational learning series talks.

Delaware North

- Delaware North Parks and Resorts (DNC0) operate two retail stores within the park. using an Environmental Management System, GreenPath®, which is recognized according to the international ISO 14001 standard.

- The market offers a variety of organic groceries, Earth Friendly cleaning supplies, and gifts made of organic material and recycled content. The Deli disposables, including cups, utensils, and to-go containers, are 85% compostable.

Forever Resorts

- Forever Resorts on the North Rim operates a fully-staffed recycling center which has increased their solid waste diversion to 53% meaning that over half of their waste output is recycled instead of ending in a landfill!
- Forever Resorts uses a food composting machine which digests food waste into a liquid form that goes through the waste water system. In 2008 and 2009, 200,000 pounds of food waste has been diverted from landfills!
- All showerheads have been upgraded from low-flow to ultra-low flow (1.5 gpm). Aerators have also been provided for sinks used by Forever Resorts.

Grand Canyon National Park Environmental Commitment Statement

Grand Canyon National Park is committed to environmental stewardship and sustainable management. This policy supports our commitment to the mission of the National Park Service which “preserves unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations.” Park staff demonstrates this commitment by:

- seeking continuous improvement to meet environmental management objectives and enhance our environmental performance;
- conducting operations and activities in an environmentally sound manner, effectively and efficiently complying with the letter, spirit, and intent of all applicable environmental laws and policies;
- preventing pollution by implementing hazardous materials and Green Purchasing programs;
- communicating and educating staff, partners, and visitors about our environmental policies and practices; and
- addressing climate change by reducing our greenhouse gas emissions.

Appendix F - Green Team Update for Park Newsletter

The Green Team at Grand Canyon National Park (GCNP) is dedicated to implementing the park's commitment to environmental stewardship and sustainable management. Team members represent all divisions of Grand Canyon National Park, and the Green Team's success is dependent on its collaboration with several partners, including concessioners, nonprofits, and regional conservation organizations.

The Green Team uses Executive Order 13514 on Federal Sustainability to define the immediate and long-term goals of its activities, and to develop targets for success. The Federal government recently announced its intent to reduce greenhouse gas pollution 28 percent below 2008 levels by 2020, and GCNP will use the Green Team initiatives to achieve, or surpass, this goal.

Green Team subcommittees are working on projects related to improving energy efficiency, renewable energy, green fleet management, reduced water consumption, solid waste diversion, pollution prevention, sustainable building, green purchasing, electronics management, and contracting. Each person on team has an assignment related to these requirements – this month's assignment was to propose projects that would help meet these goals.

Each of these projects will target a specific activity and behavioral change. All park employees will be instrumental in the success of these behavioral change programs, and many of these projects will result in positive changes and opportunities for park visitors as well. These activities and programs will be advertised to visitors through interpretive displays and the Guide and other materials that visitors receive at the park.

The Green Team plans to have each of these projects implemented in part by the end of the fiscal year. Thereafter, the Team will to improve on each of these areas based on the goals expressed in the Executive Order.

All of these project areas reflect mandates in the Executive Order, and they are also well aligned with the recently drafted Climate Action Plan, which was developed by park staff and regional partners and climate experts at a series of workshops and meetings in 2009. The Climate Action Plan will be implemented in coordination with all of the activities of the Green Team, which, through its work with everyday park operations, will be the driving force for the climate change mitigation aspect of the Climate Program for GCNP.

Appendix G - Article for the Advocate

Sustainable environmental management is commonplace at Grand Canyon National Park. Park staff tackle sustainability challenges to preserve and protect park resources, but also as global citizens who are responsible for our impacts on the environment. Using an environmental management system (EMS) and a park-wide Green Team, staff identify projects and initiatives that help to eliminate pollution, lower greenhouse gas (GHG) emissions, and make more efficient use of resources in day-to-day park operations.

A project is in progress to install hydroelectric power at Phantom Ranch and other inner-canyon locations in partnership with private and non-governmental organizations (NGOs). Hydroelectric generation equipment connected to the Trans-Canyon water line will produce all of the electricity required to power NPS and concessioner operations at Phantom Ranch. This project meets executive objectives for production of renewable energy, reduces GHG emissions, and eliminates costs associated with providing electricity in remote locations.

Another energy project at the South Rim uses solar power. In 2009, Arizona Public Service (APS) donated 84 solar panels to the park, providing 30% of the power for the Grand Canyon Visitor Center and reducing consumption of coal-generated electricity.

Visitors have the option to park their cars and use the shuttle bus system at the South Rim. Fueled by compressed natural gas (CNG), the shuttle buses reduce GHG emissions by decreasing the number of vehicles on roads while providing a service for visitors. Visitors can also use the Greenway walking paths to experience extraordinary Canyon views. Plans for a bike rental operation are also in progress.

The park's fleet is also greening. Toyota donated five hybrid vehicles to enhance fleet efficiency. The park also converted to B-20 biodiesel, uses re-refined oil and recycled antifreeze, and has an Anti-idling policy in progress.

New construction in the park observes sustainable building practices. The Facility Operations building is LEED certified, using reclaim water, carpet made of recycled materials, insulated cement block construction, and fluorescent lighting. The proposed Science and Resource Management building and employee apartment complex will be LEED certified at the highest levels achievable.

Grand Canyon has a robust recycling program for co-mingled glass, cardboard, aluminum, plastic, and paper materials that diverts 1000 tons of recyclables from the solid waste stream annually. A proposed composting program will further increase the solid waste diversion.

Grand Canyon is a participant in the NPS-wide Climate Friendly Parks (CFP) program. The program helps parks mitigate climate change impacts, reduce GHG emissions, and plan for adaptation to changing environmental conditions. A draft plan identifying actions the park will implement to address climate change is in progress. Additionally, the action plan proposes increased collaboration with universities and climate change experts to identify research needs. Efforts to strengthen these relationships will enhance knowledge about the impacts of climate change and focus our management efforts in natural resources.

Mohandas Gandhi said, "Be the change you want to see in the world." Through these actions, planning efforts, and unceasing conviction, Grand Canyon will be the nation's "greenest" National Park and a global model for sustainability.

Appendix H - Green Team Newsletter Template

Grand Canyon Green Team Newsletter

Green Team News Headline

In every issue, the green team news should be highlighted in this spot. This news can be a feature story about one project or a list of recent projects and activities with highlights. It should be written by gathering information from the EMS manager (Deirdre), and

obtaining quotes from individuals who participated in the activities or events. Include photos if possible.
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10 Ways to Green Your Life

Every quarter the newsletter should have ten tips for greening different aspects of your life. These could be topical, including:

- Greening your home at GRCA,
- Greening the workplace,
- Greening your vacation,
- Or could be seasonal, and could include the following icons to indicate seasons, home/work, water savings: (all of the icons shown below are saved in this document's formatting as bullet options.)



Green Entertainment and Events

Book/movie titles or review, plus updates on speaker events or other things going on in the region (Spring edition: Earth day, Summer edition:?? Fall edition: National Parks day, Winter edition:??)

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Climate Friendly Parks / Climate Action Plan News



The first edition of the newsletter will explain the Climate Friendly Parks program and the status of Grand Canyon National Park within the program.	Text
Subsequent editions of the newsletter should provide Climate Action Plan updates, which are available directly from the EMS manager (Deirdre)	Text
Text	Text
Text	Text
Text	Text
Text	Text
Text	Text

Department of Interior

DOI Section : e.g. Landscape Conservation Cooperatives News

Updates on the LCCs and what's going on with this type of initiative at DOI level and below

<http://www.doi.gov/whatwedo/climate/strategy/Southern-Rockies.cfm>

This should always include a basic explanation of the LCCs and then could also include:

Feature story on one project of LCC

Reports from LCC events, conferences

Alternately, this section can be used to highlight any news from DOI or the executive branch regarding Executive Orders or policies that will impact Grand Canyon park employees and the Green Team



Climate News from National Park Service

There is already an NPS website – this newsletter can simply pull one item off of that website and then provide a link to the main site. <http://www.nature.nps.gov/climatechange/index.cfm>

Additional Climate Links:

<http://www.ipcc.ch/>

<http://www.globalchange.gov/>

<http://www.climas.arizona.edu/>

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

Grand Canyon Green Team Newsletter

Green Team News: Light Bulbs & Water Bottles

The Green Team is a volunteer group of park employees from departments all over the park, ranging from interpretation to law enforcement to facilities management. The team is charged with designing and implementing projects and programs to help the park's

operations be more environmentally friendly. Examples include changes in vehicle type and use, the use of bio-based products in park equipment, and conservation-oriented home and office practices like recycling and reducing water use.

In October 2010, Grand Canyon National Park collaborated with the Greening Youth Foundation to perform an audit of potential impacts of light bulb replacement in a "re-lamping" campaign. The audit found that nearly 2300 light bulbs on the South Rim and nearly 400 bulbs on the North Rim should be replaced. The impact of

replacing all of these bulbs would be an annual electricity bill savings of more than \$21,500 (more than 260,000 kWh). The bulb replacement project will begin in XXXXXX. The Greening Youth Foundation is a non-profit organization aimed at providing diverse youth with environmental opportunities.

Grand Canyon is working to encourage the use of reusable water bottles and promote Grand Canyon spring water, by providing water bottle filling stations in convenient locations throughout the park's South

Rim. On the South Rim, Grand Canyon souvenir water bottles are available from park gift shops and the Grand Canyon Market, and at the shops at the North Rim. The filling stations will be in place in XXXXXX.



Green Entertainment and Events

Interesting books and movies about parks, conservation and the environment:

- PBS series The National Parks by Ken Burns: <http://www.pbs.org/nationalparks/>
- 180° South (documentary of boat trip to Patagonia): <http://180south.com/>
- *Running Dry: A Journey down the Colorado River from Source to Sea* (Waterman)
- *How the West was Warmed: Responding to Climate Change in the Rockies* (Conover)
- *John Muir: Father of our National Parks* (Alef, available on Kindle)



Winterizing Tips

Here are a couple ways to get your home and office ready for winter while saving energy :

- Close shades at night for warmth, and open them during the day to allow the sun's heat in
- Seal air leaks around doors and windows with plastic sheeting or a homemade cloth draft-stopper
- Turn down your thermostat when you're not at home
- Wear sweaters to keep warm – keep a sweater at the office too

Water Bottle Facts

Some facts about water bottles:

- Americans buy nearly 30 billion plastic water bottles every year
- 80% of these water bottles end up in a landfill or incinerated
- The energy used to produce one water bottle could power a 60-watt light bulb for 9 hours
- Bottling and shipping water is the least energy efficient method used to supply water on the planet



Climate Friendly Parks / Climate Action Plan News



The Climate Friendly Parks program provides parks with the tools and resources to address climate change. The program aims to provide national parks with comprehensive support to address climate change both within park boundaries and the surrounding community.

The CFP program has developed a framework for providing climate change support. This structure is based on providing the technical assistance, tools and resources for national parks to protect their natural and cultural resources and serve as models of climate friendly behavior.

As part of the CFP program, Grand Canyon developed a Climate Action Plan to address

operational impacts contributing to Park greenhouse gas emissions. Grand Canyon aims to reduce emissions to 30% below 2008 levels by 2020. The emissions reductions will be achieved through a combination of operational changes and behavioral changes on the part of visitors as well as park employees and residents. The Climate Action Plan was approved in Fall 2010.

Every five years, Grand Canyon will conduct a complete emissions inventory of all park operations, including concessions, the school, and visitor use. This inventory will be used to guide operating decisions and take actions toward achieving the goals of the Climate Action Plan.

Department of Interior

Landscape Conservation Cooperatives: What is an LCC?

The National Park Service, the Bureau of Reclamation, and the Bureau of Land Management are all participating in a regional collaborative management initiative called a Landscape Conservation Cooperative. These cooperatives will engage Interior and other and federal agencies, local and state partners, and the public to craft practical, landscape-level strategies for managing climate-change impacts within the eight regions. They will focus on impacts such as the effects of climate change on wildlife migration patterns, wildfire risk, drought, or invasive species that typically extend beyond the borders of any single National Wildlife Refuge, Bureau of Land Management unit, or national park.

For more information:

<http://www.doi.gov/whatwedo/climate/strategy/Southern-Rockies.cfm>



Climate News from the National Park Service

The combination of high elevation and a semi-arid climate makes the Colorado Plateau particularly vulnerable to climate change. Climate models predict that over the next 100 years, the Southwest will become warmer and even more arid, with more extreme droughts than the region has experienced in the recent past. Because mountain plant species have narrow habitat tolerances and only marginal habitats are available for some species, climate change is likely to result in higher rates of species loss at higher elevations than at lower elevations. Climate-related disturbances in Grand Canyon will likely include severe droughts, increased fire frequency, flash flooding, and increased incidence of pests. **For more information:**

<http://www.nature.nps.gov/climatechange/index.cfm>

http://www.nature.nps.gov/climatechange/docs/SCPN_CC.pdf

<http://www.climas.arizona.edu/>

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

<http://www.globalchange.gov/>

<http://www.ipcc.ch/>

Grand Canyon Green Team Newsletter

Green Team News: Small Grants and Earth Day

The Green Team is pleased to announce the receipt of a number of small grants for the implementation of Green Team initiatives and Climate action Plan projects.

A number of small grants will fund an environmental lecture series featuring Terry Tempest-Williams, Craig Childs, and ?? ?. The lectures are scheduled for DATE DATE DATE. Another project involves piloting several bio-based products in place of synthetic lubricants, cleaners, and other

chemical substances used in the park's daily operations. Bio-based products range from chainsaw lubricant to degreasing cleansers to gun oil. Two separate Green Team initiatives will supply the Grand Canyon's offices with "green office" training and supplies and reusable products for special events that take place as part of park operations.

Funding for these projects comes from the Grand Canyon Small Grants program and the National Parks Foundation.



Ten Tips for Spring

- ✦ Walk, bike, or use public transportation to get to and from work- it saves energy and gets you back in spring shape
- ✦ Use bio-based cleaning products for your spring cleaning activities
- ✦ Turn down your thermostat – it's getting warmer out every day
- ✦ Use natural light in your home or office instead of lamps
- ✦ Have your car serviced
- ✦ Plant some herbs or vegetables in pots protected from deer and other browsers
- ✦ Get your bike tuned up
- ✦ Clean out your closets and give unwanted items to thrift stores
- ✦ Make an environmental commitment for the spring season
- ✦ Participate in Earth Day!

EARTH DAY NEWS

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Green Entertainment and Events

Interesting books, movies and events about parks, conservation and the environment:

- Lecture series:
- DATES AND LOCATIONS
- DATES AND LOCATIONS
- DATES AND LOCATIONS
- Earth Day Activities: ditto



Climate Friendly Parks / Climate Action Plan News



Whatever the heck is going on with the Climate
Action Plan
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Department of Interior

Landscape Conservation Cooperative News

Regional climate change challenges that face the LCCs include:

- Climate Impacts on Agriculture and Grazing
- Fish and Wildlife Response to Climate Change
- Forest Resilience
- Invasive Species and Wildland Fire
- Protection of Native American Cultural Resources
- Protection of Trust Species
- Renewable Energy
- Water Availability and Water Quality for Humans and Ecosystems
- Wildlife Recovery and Restoration

For more information:

<http://www.doi.gov/whatwedo/climate/strategy/Southern-Rockies.cfm>



Climate News from the National Park Service

National Park managers across the country are confronted with increasingly complex and challenging issues that require a broad-based understanding of the status and trends of each park's natural resources as a basis for making decisions, working with other agencies, and communicating with the public to protect park natural systems and native species. As part of the National Park Service's effort to "improve park management through greater reliance on scientific knowledge," a primary role of the [Inventory and Monitoring \(I&M\) Program](#) is to collect, organize, and make available natural resource data and to contribute to the Service's institutional knowledge by facilitating the transformation of data into information through analysis, synthesis, and modeling.

For more information: <http://www.nature.nps.gov/climatechange/index.cfm>

Natural Resources Information Portal: <http://science.nature.nps.gov/im/datamgmt/IRMA.cfm>

NPScape: <http://science.nature.nps.gov/im/monitor/npscape/index.cfm>

Appendix K - Website – The Greening of the Grand Canyon


National Park Service
U.S. Department of the Interior



Grand Canyon National Park **The Greening of Grand Canyon**

"Green is Grand!"

Grand Canyon National Park is committed to reducing its impact on the environment by implementing sustainable practices and projects that help decrease greenhouse gas emissions, conserve water, increase recycling, and use alternative energy and fuels.

Grand Canyon already has many sustainable practices in place, including an aggressive recycling program in both public and residential areas within the park, a water reclamation facility that converts wastewater into a useable form of water for irrigation and toilets, a composting program for mule waste from park and concessionaire operations, and a shuttle bus fleet that runs on clean-burning natural gas. In addition, all recently constructed buildings in the park meet **LEED (Leadership in Energy and Environmental Design)** standards, including a large Maintenance complex. Anticipated new LEED buildings will include the Science Center and residential housing units, with the goal of designing these buildings to achieve the highest possible LEED rating.

In May 2009 APS (Arizona Public Services), the largest utility company in Arizona, worked with the park to install 84 photovoltaic cells at Grand Canyon Visitor Center. The 18 kilowatt system supplies 30% of the power used in the building. The energy saved is more than a normal household would consume in a day and reduces greenhouse gas emissions by at least 20 tons per year. A theatre will be added to the Grand Canyon Visitor Center next year, and additional photovoltaic cells have been included in the design.



Solar Panels

Insider's Look Webisode 000: May, 2009

Dedication of Visitor Center Photovoltaic System, May 18, 2009

Arizona Public Service (APS), which provides 900,000 customers with electricity, has donated and built solar panels for the Grand Canyon Visitor Center. On May 18, 2009 the park and members of APS held a dedication ceremony. Here are some of the highlights, starting with Park Superintendent Steve Martin. [More e...](#)

Grand Canyon National Park utilizes an **Environmental Management System** to manage its environmental impacts. An Environmental Management System is a set of procedures and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency. It is a continual cycle of planning, implementing, reviewing and improving processes and actions to meet business and environmental goals.

This system is implemented by the Green Team, a group of employees who are passionate about the environment.

Grand Canyon National Park Environmental Commitment Statement

Grand Canyon National Park is committed to environmental stewardship and sustainable management. This policy supports our commitment to the mission of the National Park Service which "preserves unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations." Park staff demonstrates this commitment by:

- seeking continuous improvement to meet environmental management objectives and enhance our environmental performance;
 - conducting operations and activities in an environmentally sound manner, effectively and efficiently complying with the letter, spirit, and intent of all applicable environmental laws and policies;
 - preventing pollution by implementing hazardous materials and Green Purchasing programs;
 - communicating and educating staff, partners, and visitors about our environmental policies and practices; and
 - addressing climate change by reducing our greenhouse gas emissions.
-

Grand Canyon is becoming a Climate Friendly Park

Grand Canyon National Park recognizes climate change as a critical issue that will affect the park's natural and cultural resources now and into the future. In order to address issues associated with climate change, the park sponsored a two-day workshop on October 14 and 15, 2009. Sessions included discussion of the effects of climate change in the Southwest, presentation of the results of a 2008 Greenhouse Gas Emissions Inventory, highlighting of sustainable projects already underway in the park including those being carried out by park concessionaires, and development of recommendations for a climate change action plan.

With the October workshop, Grand Canyon National Park has taken its first step to becoming a designated "**Climate Friendly Park**". Finalizing and then implementing the park's Climate Change Action Plan is the next step. Through the **Climate Friendly Parks** program, Grand Canyon National Park, and other national parks around the country, are leading the way in an effort to protect our parks' natural and cultural resources and ensure their preservation for future generations.

If you would like to help your national parks while protecting the environment check out **Do Your Part For Climate Friendly Parks**. Do Your Part unites the efforts of individuals around the country to address global warming by tracking progress towards individual and community goals and showing results.

"Traveling Green" is a great way to help Grand Canyon and other areas you visit reduce carbon emissions, divert and reduce what goes into the waste stream, and to generally help the environment. Go to the **Traveling Green** page for helpful tips on planning your next green adventure.

Thanks for doing what you can to help protect our environment!



Did You Know?

Grand Canyon's Yavapai Observation Station (1928) located one mile (1.6 km) east of Market Plaza, features exceptional canyon views. Geology exhibits allow park visitors to see and understand the complicated geologic story in ways that all can understand. Exhibits and bookstore open daily.

[more...](#)

Appendix L - Grant Applications

Grand Canyon National Park

Grant Proposal Form FY11

Proposals Due by COB September 17, 2010

Date: 8-23-10

Project Manager: Deirdre Hanners

Status of Employment (i.e. perm/term/seas/intermittent/volunteer): Permanent

Type of Project: Environmental Program Implementation

Division: Facilities Management

Phone Number: 928-638-7627

Project Goal(s): Implementation of a bio-based products program for Grand Canyon National Park

Project Description: (Please include work to be accomplished, how work will be accomplished and where the project fits within the park's goals)

The Department of the Interior supports the EO 13423 and 13514 requirements to use biobased products as part of the development of Green Purchasing within the federal government. As one of the largest national parks with high visitation, a large number of employees, and many offices spread over a wide geographic area, Grand Canyon faces unique challenges and opportunities in program implementation to meet executive, NPS, and park goals.

This project proposes to provide a variety of biobased products to substitute for petroleum-based materials that are currently used in different divisions. Although the nature of the job will determine the biobased product, highlighted products include hydraulic fluids, greases, 2-Cycle engine oils, general-purpose cleaners and trash bag/can liners. The intent is to provide divisions with a "starter pack" of biobased products applicable to their work. The Green Team will solicit feedback on the efficacy of the products through a comment form. Comments will be synthesized into a report and recommendations will be incorporated into a formal biobased product program. The goals of this project are:

1. to make park staff aware of environmentally friendly choices that they can make in the products they use,
2. to determine which of these products work best for future use, and
3. to create employee buy-in in the future use of these products in compliance with EOs 13423 and 13514.

This initiative will move the park toward achieving some of its own environmental objectives in addition to those of the Executive Orders. This program would also help Grand Canyon meet several of its stated Seven Park Goals: maintaining NPS facilities to enhance visitor experience and protect resources by providing environmentally friendly alternatives to chemicals used for Park operations and maintenance; maintaining and improving the condition of natural resources by encouraging conservation and environmentally friendly choices in supplies; and maintaining a workforce to lead Grand Canyon into the 21st Century by encouraging environmental leadership in Park staff.

Following are divisions selected for starter packs, and the types of products that will be included in their packs:

Division and sub-divisions	Products included in pack
North Rim (Maintenance, Visitor & Resource Protection, Fire); Desert View (Maintenance, Visitor and Resource Protection)	Grease; Soy hydraulic, transmission, crank case, bar and chain, gun, and 2-cycle oil; cleaners & bags
Visitor & Resource Protection (River rangers, Law Enforcement, Fire & Aviation)	Grease; Soy hydraulic, transmission, crank case, bar and chain, gun, and 2-cycle oil; cleaners & bags
Facility Management (Housing, Buildings, Custodial, Roads/signs, Trails, Auto Shop)	Grease; Soy hydraulic, transmission, crank case, bar and chain, gun, and 2-cycle oil; cleaners & bags

The divisions that do not receive starter packs for items not pertinent to their job duties will nevertheless be made aware of the project, given a pack of bio-based cleaning solution and trash bags, and will be asked to participate in the survey regarding any feedback they would like to contribute about the program. These include the Superintendent's office, Administration, Interpretation, Science & Resource Management, and the Project Management Team.

Anticipated Start Date: January or February 2011

Anticipated Completion Date: September 2011

Budget Breakdown by Category: (All projects must stay within budgeted amounts. Please do your research to be as accurate as possible.)

<u>Item</u>	<u>Approximate Costs & Possible Manufacturers</u>	<u>Quantity</u>	<u>Subtotal</u>
#2 Grease; 16 oz	\$5; Plews-Edelmann	8	\$40
Soy hydraulic fluid; gallon	\$50; Renewable Lubricants	8	\$400
Soy transmission fluid; gallon	\$45	8	\$360
Soy 2-cycle oil; quart	\$20	8	\$160
Soy crank case oil ; 8 oz	\$30	4	\$120
Soy bar and chain oil; 5 gal	\$70; Terresolve	4	\$280
Soy gun oil; 4 oz	\$7 iosso.com/biopreferred.gov	4	\$28
Bio cleaning solution; gallon	\$50; NIB	8	\$400
Bio trash bags/can liners; 40	\$15; Stout	8 boxes	\$120
Printing pack info sheets	\$30	Total for all printing	\$30
Printing of surveys	\$30	Total for all printing	\$30
Printing laminate posterboards	\$100	10 (each division using 8)	\$1000
		Total	\$2968

Prices shown here are from the gsaadvantage.gov pricing sheets.

Division Chief Approval:

(Please submit signed proposal to Leah McGinnis for final approval) Electronic Submission acceptable!

Grand Canyon National Park
Grant Proposal Form FY11

Proposals Due by COB September 17, 2010

Date: 9-10-10

Project Manager: Deirdre Hanners

Status of Employment (i.e. perm/term/seasonal/intermittent/volunteer): Permanent

Type of Project: Green Operations – Green Office Program supplies

Division: Facilities Management

Phone Number: 928-638-7627

Project Goal(s): To reduce energy consumption, increase green purchasing, decrease waste and develop a sustainable work ethic in the office.

Project Description: (Please include work to be accomplished, how work will be accomplished and where the project fits within the park's goals)

The Department of the Interior supports the EO 13423 and 13514 requirements to reduce waste and energy use in office practices in the federal government. As one of the largest national parks, with high visitation, a large number of employees, and many offices spread over a wide geographic area, Grand Canyon faces unique challenges and opportunities in program implementation to meet Executive, NPS, and Park goals. By developing and implementing a "Green Office" program, Grand Canyon will help its employees comply with several components of EOs 13423 and 13514 and will help to encourage a culture of conservation and environmental leadership in everyday practices in the Park.

Funds will be used for the following Green Office practices:

- Printing Green Office promotional posters and stickers
- Publishing a Green Office "training manual" on the GRCA employee Sharepoint/intranet that includes reference materials
- Purchase reusable or bio-based flatware and plates for office break rooms and special events

The information distributed through these media will guide park staff in making environmentally friendly choices in their work practices, from the use of office supplies to their activities in employee kitchens and break rooms. The program will include a review of environmental office practices and will provide tips and answer common questions. The Green Office program will be modeled in part on EO goals and in part on successful programs

at other large institutions such as Harvard University (see <http://green.harvard.edu/>). The program information will be presented by a Green Team representative to their division in staff meetings. The Green Office program will be posted on the GRCA intranet with all of this information. Green Team representatives will monitor divisional adherence to Green Office practices on a regular basis.

A portion of these funds will be used purchase reusable or bio-based flatware and plates for office break rooms and for use in Park employee special events. These supplies will replace traditional throw-away event supplies, such as paper plates and plastic utensils, and will be either biodegradable items or items with lower environmental impacts than conventional alternatives. The supplies will be stored in a central location and used for the special events that routinely take place for park employees. Park staff will be informed of this program so that event planners can make use of these reusable or bio-degradable products instead of purchasing throw-away items for special events. A small stand-up poster will be created that explains the use of these environmentally friendly products so that Park staff are aware of the choice that is being made, and this poster can be set up with the products at Park events. These supplies will be available to staff at the North and South Rims.

By providing these supplies and the Green Office education tools, this program will help to fulfill Grand Canyon National Park's goals 6 and 7: to ensure administration of park business systems in a credible and professional fashion, and to maintain a workforce to lead Grand Canyon into the 21st century, by making compliance with Executive Orders and environmental leadership easy for employees. This program allows the park staff to reduce waste and to show leadership in their everyday office activities and special events. By promoting the Green Office culture, by providing an easy-to-use information resource and promoting awareness of the Park's and DOI's environmental goals, and by making environmentally sustainable choices in supplies for park events, Park management is showing leadership in its own actions, encouraging employees to think about their everyday choices in terms of environmental impacts and sustainability, and actively displaying stated Park Service values of minimizing waste and carbon emissions in purchasing and using equipment and supplies.

Small actions on the part of Park managers, such as taking environmental initiative in a day-to-day choice, and then evaluating its effectiveness with Park employees, can go a long way toward generating this type of positive choice and decision-making in the employee population at large.

Anticipated Start Date: Fall 2010

Anticipated Completion Date: September 30, 2011

Time Frame:

November 2010: Design posters and Sharepoint/intranet site

December/January 2010: Print posters and upload intranet site

February 2011: Distribute posters; announce intranet and present program at divisional meetings

January-August 2011: Monitor results (copy paper reductions, increased recycling, zero net waste events)

Budget Breakdown by Category: (All projects must stay within budgeted amounts. Please do your research to be as accurate as possible.)

Item	Cost (Vendor)	Quantity	Subtotal
Posters for division offices*	\$100	13	\$1300
8.5x11" poster and stand	\$25	2	\$25
Bio-based plates, 500 ct.	\$85 (AJM Packaging)	3	\$255
Bio-based hot cups, 1000 ct.	\$130 (Eco-products, inc.)	2	\$260
Bio-based cold cups, 1000 ct.	\$145 (Eco-products, inc.)	5	\$725
Bio-based flatware set, 400 ct.	\$71 (NIB)	3	\$213
Green Office Stickers, 500	\$200	1	\$200
TOTAL:			\$2978

* Superintendent, Interpretation, Concessions, Administration, AZ MABO, AZ servicing HR, Visitor & Resource Protection, Science and Resource Management, Project Management Team, Facility Management. North Rim will receive 3 posters: Concessions/interp/admin, VRP, Facility management.

Division Chief Approval:

(Please submit signed proposal to Leah McGinnis for final approval) Electronic Submission acceptable!

Appendix M - List of Additional Internship Opportunities

1. Create an annotated bibliography of climate change impacts research on the Colorado Plateau - This would simply be something that could be updated annually. Use CLIMAS, Southwest Climate Change Network, Global Change Biology and similar journals, and the NPS and USGCP websites to find scientific research on climate impacts in the park, and then synthesize these readings into an annotated list focusing on their relevance to park managers.

2. Develop and implement a series of workshops/trainings for the operations staff on sustainability innovations in the national parks - topics to include: composting/waste minimization; biofuels in vehicles and operations; energy efficiency & use of smart meters, timers, etc; renewable energy innovations in parks - the intern would need to interview operations staff at other parks and create presentations based on the specific technology options, the experiences of the other park employees, and lessons learned/estimated budget/suggestions for implementation at Grand Canyon.

3. Investigate and report on GHG inventorying strategies for other parks and similar operations - call other parks and entities that are performing audits and report on successful strategies or models that work.

4. Develop a Grand Canyon Environmental Speakers' series - meet with Interp and other GRCA staff to discuss how it would be structured and what the costs and program needs would be for a seasonal or year-round series; meet with NAU departments that organize lecture series and discuss opportunities for partnerships; contact potential speakers to determine what type and level of compensation or accommodation they would require; identify potential funding sources inside/outside NPS for funding such a series. Could there be a Four Corners national parks lecture circuit tour? etc.

5. Investigate and report on potential for greater public transportation options between Grand Canyon, Flagstaff and Williams. What are the costs, what are the barriers, who would be most likely to use it, how could the use be encouraged? What are the challenges for park employees vs. visitors?

6. Develop a marketing campaign for specific Grand Canyon sustainability initiatives, to advertise the achievements of the Green Team and the advancements that have been made in visitor conservation etc. and to motivate visitors to engage in and support these initiatives. Work with GRCA marketing/interp/operations staff.

7. Create contests or other free/cheap incentive programs for employees to participate in sustainability initiatives.

8. Create contests or other free/cheap incentive programs for visitors to participate in sustainability initiatives