



Green Voice

Pacific West Region Demonstrates Leadership

As embodied in this edition of *Green Voice*, the National Park Service continues to be an environmental leader. This is not a new role for us; it is a core value that we all hold. I feel very strongly that the Park Service has an obligation to demonstrate environmental leadership, as well as incorporate sustainable practices in everything we do. Environmental leadership is an integrated approach for improving environmental compliance, preventing pollution, and educating others on sustainable practices.

My definition of sustainability is the capability of natural and cultural systems to continue over time. The NPS has a "sustainable" mission statement: "to preserve and protect the natural and cultural resources for future generations." It is up to us to live up to this.

In the Pacific West Region (PWR), we have brought together an ad hoc group of personally committed staff to help steer our sustainability and environmental leadership efforts. These efforts are meant to be complementary to the environmental leadership efforts taking place in national parks, where much innovation is taking place.

We've completed over 20 environmental audits. This Department of Interior mandated program seeks to identify environmental compliance problems and correct them. Our goal is not just to meet environmental compliance requirements but to exceed them. Through these audits we are struggling with how to go beyond compliance and integrate sustainable concepts into daily operations. Hopefully we can make the leap in thinking not just of how to store hazardous materials, but to look beyond and see if these are even needed or if there are other non-toxic substitutes.



PWR efforts to demonstrate environmental leadership bear fruit at Whiskeytown NRA. (See article pg. 3)

We continue to emphasize sustainability as a major focus of regionwide workshops including West by Northwest and the joint Admin/Rangers/Interpreters Workshop to be held in 2002.

We have inventoried two-stroke engines, which are highly polluting, and with the Maintenance Advisory Committee (MAC), accelerated replacement of these with less polluting alternatives. Also with the MAC, we developed a list of the most polluting diesel generators and are looking for ways to use Equipment Replacement and Green Energy Parks program funding to accelerate replacement with less polluting alternatives such as photovoltaic systems. By next year, we will have replaced six of the largest constantly running diesel generators.

We are working on a variety of green procurement issues. A key focus will be on getting PWR contracting officers better trained on green procurement and how to find economically competitive green products.

A major effort has been looking for ways to build sustainability into facility design at a variety of points. These include using sustainability as a criterion in awarding A&E contracts and applying the Leadership in Energy and Environmental Design building



criteria to our design projects. This standard represents a checklist of design features that can be incorporated into plans, to make a building more environmentally friendly.

We are actively looking for ways to opportunistically conserve energy. The western energy crisis has affected us all and we need to set an example with our conservation efforts. We are doing this through:

- implementing the President's directive to conserve energy at federal facilities,
- aggressively taking advantage of funding opportunities through the Green Energy Parks program that provides money to install less polluting and consumptive energy systems in parks, and
- grappling with the issue of vehicle fleet sizing and how smaller or alternative-fuel vehicles might be incorporated into our fleets.

The possibilities for being an environmental leader are endless. Hopefully, as you read this edition of *Green Voice*, you will be stimulated to think of ways to be more sustainable in your own way.

*Superintendent George Turnbull,
Pacific Great Basin Support Office*

Pumping Green Fuel

Mardie Lane of Hawaii Volcanoes shares a new use for vegetable oil.

November 2000 marked the start of a three-year demonstration program at Hawaii Volcanoes NP to use biodiesel fuel in park vehicles. Biodiesel is a fuel produced from recycled vegetable oil and is a cleaner-burning alternative to diesel fuel. It is non-toxic, biodegradable, and can be used in diesel engines without costly modifications or retrofits.

Hawaii Volcanoes Superintendent Jim Martin said, "Living on an island increases our awareness of the global need to find and utilize clean, alternative energy. Switching to biodiesel will contribute to park efforts to join with our island community and local businesses to expand the use of recycled energy and materials." The park is the first in the system to use biodiesel fuel for a fleet operation, demonstrating a real commitment to the "greening" of park operations.

"Living on an island increases our awareness of the global need to find and utilize clean, alternative energy."

Hawaii Volcanoes was one of 32 park areas selected to receive special funding through the Department of Energy to promote the development and use of alternative fuels. As part of the program, the park purchased over 18,000 gallons of biodiesel fuel from Pacific Biodiesel, Inc., of Kahului, Maui, and has received the initial shipment of 800 gallons for use in sixteen park vehicles.

Pacific Biodiesel, Inc., is a locally owned company that built and now operates the first biodiesel plant in the Pacific Rim. It is dedicated to the production of biodiesel fuel from used cooking oil. "Our process accomplishes two important tasks of top priority, especially for an island community," explained Pacific Biodiesel president Bob King. "We are recycling waste at a tremendous rate, and we are creating a clean, renewable fuel."

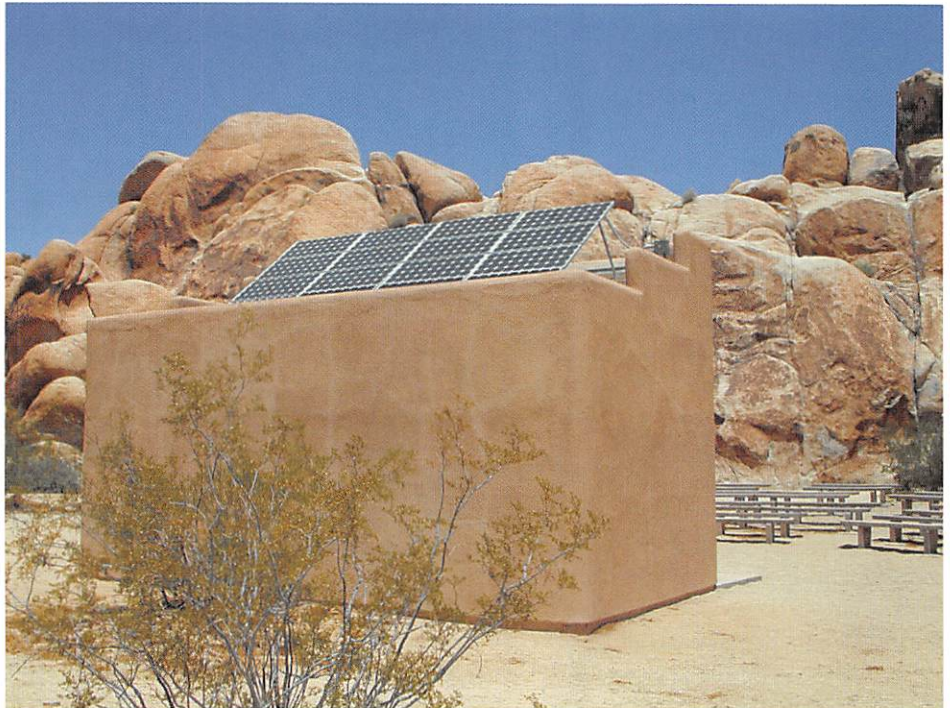
PV Panels Are Easy to Steal

Dennis Burnett of NP-WASO-OPR and Steve Butterworth of Pacific Northwest Regional Office send a wake-up call.

While energy consumers in California are paying a steep price for electricity from the power grid, Joshua Tree National Park has been a national model for offsetting the demand for and the cost of energy by the use of off-grid solar-powered photovoltaic systems. The success of this Federal Energy Saver Showcase facility was recently marred by the theft of 14 photovoltaic panels from the Indian Cove Campground amphitheater. The three by four foot panels, valued at about \$6000, supply energy to the projection equipment that park rangers use to present slide-illustrated evening programs and to the lights that illuminate the pathway to the amphitheater. In addition to the solar panels, all of the conduit lines and the combination box were also stolen.

The Department of the Interior has almost 1,000 such systems providing critical energy for facility power, lighting, and water pumping, primarily at remote locations in California and other western states. The value of these systems ranges from a few thousand to over a million dollars, and with rising energy costs nationwide, they too could become targets.

As Steve Butterworth says, "In a sad way it is verification that we are doing the right thing. But we can use this incident to bring progress to our sustainability efforts." To this end, Steve has offered a couple of suggestions. One idea would be to look into providing better identification on the present PV installations. A property manager might classify them as fixed and therefore not in need of a property number or ID. Perhaps we need to issue special guidelines for NPS property identification of these installations. The second idea is to try to get engineers and architects to see the value of Building Integrated Photovoltaic Systems (BIPV) when they are planning a building. It is much easier to rip PV panels off their framework than to break apart a building and pry them out. If they balk at the additional initial cost, we can now remind them of the risk of theft of free-standing panels and the high potential costs of replacement.



Campground amphitheater in Joshua Tree where solar panels were stolen.

Whiskeytown Hosts Photovoltaic Workshop

Jerry Wheeler sends us news of a very successful project



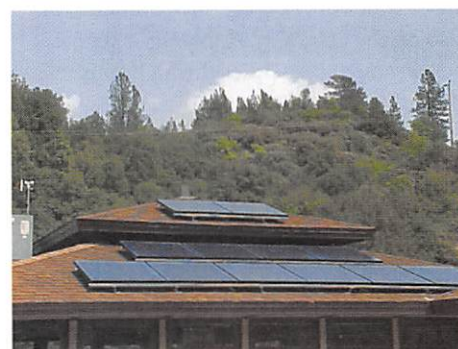
Whiskeytown National Recreation Area hosted a photovoltaic workshop April 11 and 12, 2001 that was coordinated by the Bonneville Power Administration (BPA). The purpose of the workshop was to instruct attendees in photovoltaics and to have them assist in installing a new PV system at the visitor center.

The project, which was funded as a Green Energy project by 20 percent fee demo funds, was to install a photovoltaic system to operate the visitor center and to educate the public on photovoltaics. An exhibit was installed inside the visitor center that demonstrates how photovoltaics work and how much energy and money is being saved.

The photovoltaic system produces 3.8 kW of power, and there are 24 Solarex MSX 120 arrays mounted on the roof of the visitor center with eight additional arrays located on a tracking system that rotates while the sun moves across the sky. Two Trace Surtite ST 2500 single-phase inverters were installed in the building and connected directly to the grid. Power produced during the daytime is used to provide most power needs for the visitor center until

nighttime when it automatically converts back to the grid. An hour meter located in the visitor center tracks how much power is sold back to the electricity provider, and a credit is received from the provider for power produced by the system. Total cost of the project was \$28,000, but due to a \$9,000 rebate from the California Energy Commission (CEC), the cost was only \$19,000. It is estimated that the new PV system will save Whiskeytown approximately \$950 a year on their utility bill and will pay for itself in approximately 19 years.

The National Park Service worked with the Bonneville Power Administration to design the system for the visitor center at Whiskeytown. Mr. Michael Huber of BPA was the lead engineer on the project and coordinated with Mr. Larry Beasley, construction representative at Whiskeytown, to put together the two-day workshop. Five national parks participated in the workshop and a total of 20 people attended. The five parks that participated in the workshop were Whiskeytown NRA, Lassen NP, Crater Lake NP, Redwood NP and John Day Fossil Beds NM. The workshop included a two-hour orientation to photo-



voltaics and how they work; participants spent the remainder of the time assembling the arrays and installing them on the roof and tracker unit.

Due to the efforts of National Park Service Pacific West Region Energy Coordinator Steve Butterworth and the Bonneville Power Administration, Whiskeytown NRA now has an energy efficient visitor center that will also help educate visitors about alternative energy. The workshop was also a good example of what can be done when parks come together on a project. Whiskeytown would like to thank everyone for their efforts in making this project a success.

Pursuing and Teaching Sustainability

■ The National Park Service should adopt policies, create partnerships, and train its workforce to make sustainability integral to all its operations.

Across America today, smart, progressive businesses, industries, and communities know that environmental management is central to the conduct of everyday operations. They understand that environmental issues can be key components, rather than consequences, of business processes.

Sustainability is about planning and carrying out our day-to-day work with full consideration of how environmental factors affect long-term goals. It means eliminating waste and developing energy sources that comport with natural processes. How and what we design and build, the way in which we operate and maintain our facilities, and how we use and conserve energy all have impacts not only on the environment but also on the economy. Applying sustainable development principles throughout society

■ The Service should establish Centers for Environmental Innovation that showcase sustainable technologies and practices and educate the public about their benefits.

lowers long-term maintenance and operating costs and improves the quality of life.

Programs in energy efficiency and recycling have gained in popularity in recent years, and dedicated innovators in government and the private sector must help develop more of them. The Park Service can become a leader in modeling sustainability. While parks have implemented some measures aimed at curbing pollution, saving fuels, and reducing waste, these efforts remain scattered and unsystemic. A sweeping, Service-wide commitment is needed. With nearly 300 million visitors each year, national parks are ideally suited to showcase exemplary environmental practices that demonstrate the value and fundamental wisdom of maintaining healthy, functioning natural systems.

■ The Service should monitor and interpret the ecological "footprint" of park development and use and chronicle attempts to reduce it.

National parks should serve as centers for environmental innovation, places that display energy-efficient mass transit, use of recycled materials and "green" products, passive heating and cooling systems, model composting and alternative energy solutions, and better use of natural light. Educational and interactive displays could augment model installations, allowing the public to understand the benefits of new technologies. Computers could track and generate information on park staff and visitor energy usage and ways to reduce it. Partners-in-waiting for these demonstrations include business and industry, academia, and the Federal government's Environmental Protection Agency, NASA, the national laboratories, and Departments of Energy and Defense.

Joshua Tree Staff Supports Community Recycling

The Hi-Desert Master Composters and Recyclers is a community group based near Joshua Tree National Park. Among the members are park employees who are dedicating energy and enthusiasm to a variety of projects.

Committed to backyard composting and recycling at home, Jean Graham enjoys meeting with local folks who share her dedication to reducing organic materials from nearby landfills. Jean works in the park's Arid Plants Nursery where she routinely composts and has experimented with vermiculture. Her professional interests spilled over to her personal time when she became a Master Composter. Now she helps



Composting at the park's Arid Plants Nursery.

organize workshops about this important subject for desert residents.

Cynthia Williams, Joshua Tree's purchasing agent, helps organize clean-ups for the club's Adopt-A-Highway program, which occur four times a year. Cynthia's goal is to lead the way for Joshua Tree National Park to someday adopt a highway and get more co-workers involved.

Interpretive Supervisor Cindy Von Halle coordinates a neighborhood recycling bin. Aluminum, glass, and plastics are being converted into cash for education projects. Lending a hand to these worthwhile projects

is rewarding for Joshua Tree staff as they provide leadership and support to the local community.

by Cindy Von Halle

Park Service Partners with the University of Washington to Promote Sustainability

*Philip Malte, Professor Mechanical Engineering, University of Washington
Joe Dunstan, Design and Engineering, Columbia Cascades Support Office*

Four years ago, the Pacific West Region entered into a cooperative agreement with the Department of Mechanical Engineering at the University of Washington to promote sustainable energy practices in parks. Using NPS funds as well as grants from the University National Park Energy Partnership Program, four project studies have been undertaken. These projects are:

Alternative Propulsion for the Tour Boats on Crater Lake

For many summers, gasoline powered tour boats have provided visitors to Crater Lake National Park (CRLA) with an outstanding experience of the geology and ecosystem of Crater Lake. Although the gasoline engines have served the four, sixty-passenger tour boats well, the engines are noisy, and they admit objectionable smoke and hydrocarbon odor. Furthermore, petroleum hydrocarbons have been measured in the lake. In the last three years the University of Washington has evaluated a number of alternative propulsion systems, including:

All electric, or batteries with electric motors: Since electricity is unavailable at the Crater Lake boat dock, a solar PV or alternative electrical generating system would need to be constructed for charging the batteries, or the dock would need to be relocated to the south end of Crater Lake,

where grid electricity could be accessed. Relocation would also reduce the energy demand of the tour, since the boat cruising distance could be significantly reduced. Details are contained in the Masters of Science in Mechanical Engineering Thesis of John Weale.

Clean burning boat engines: The University of Washington looked into automotive-type catalytic converters and clean-burning engine technologies, and explored the use of alternative fuels. Natural gas, methanol, ethanol, and biodiesel were explored for technical and economic feasibility at Crater Lake. The impacts of the emissions on air and water quality from the burning of these fuels and the consequences of a fuel spill in the Crater Lake ecosystem were evaluated. Biodiesel from rape-seed oil or spent fryer oil has been recommended. The impact on the Crater Lake ecosystem would probably be minor should a spill occur; it performs well in diesel engines and generally requires little modification of the engine. Details are contained in the Masters of Science in Mechanical Engineering Thesis of Michael O'Keefe.

New Solar PV for the Watchman Lookout at Crater Lake

The Watchman Lookout has historic and scenic values, and its rehabilitation has been conducted using the design and types of materials of the original structure built in the 1930s. The Lookout has served well as the site of a radio repeater, providing communication year-round for the park—a crucial function during emergencies.

Electrical power for the more powerful radio repeater was designed and installed on the roof of the lookout in 2000. This was done by Craig Connors, a graduate student in the UW's energy program, and Phil Malte, a professor in the Mechanical Engineering Department. The system was designed to meet several historic and scenic values of the Lookout. The solar panels lay directly on the roof in the summer, out of sight. However, in order to function in the winter, the panels are tilted up at an angle of about 60 degrees. This steep angle permits snow to slide off the panels. Furthermore, the installation has to withstand gale-force winter winds. The new solar system was turned on in September 2000 and has been continuously functioning since that time. Craig Connors' Masters of Science in Mechanical Engineering Thesis deals with solar PV for the Pacific Northwest.

Sustainable Energy at North Cascades National Park

This project, conducted by the University of Washington during 2000 and 2001, involved engineering analyses and computer simulations of representative buildings at the Marblemount Ranger Station and application of the computer model to determine the most cost-effective changes that could be made in the buildings to reduce energy consumption. Grid-electricity is the main energy used; though propane is used to heat some of the station's buildings. The heat demand arising from the contributions of personnel, office equipment, appliances, lighting, and solar energy to the buildings' heating accounted for almost 50 percent of the mid-winter heat used by some of the buildings. The installation of heat pumps, adding ceiling insulation, and replacing single-glazed windows with high-performance, double-glazed, argon-filled, low-e-coated windows would cut the energy bills for heating by about one-half. Overall, the building upgrades should have simple pay-

Alternate fuel powered boat tours at Crater Lake



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Making Good Dirt at the Presidio

Marney Blair shares the Presidio's recipe for controlling waste.

The Presidio of San Francisco is part of the Golden Gate National Recreation Area and the National Park System. Like other parks, we face many challenges as we enter this next century. One of the challenges for all of us will be to develop more sustainable ways of handling our debris. As landfills across the country face closure in the near future, it is crucial that answers to waste issues be pursued. Another issue that confronts most parks is abating the impact humans have had on these delicate ecosystems.

Composting: the ancient art of purposeful decomposition.

The Presidio is a young member of the park system. For most of its modern history this point has been a military post. Now as park the Presidio is undertaking a large transformation. This transformation includes urban habitat restoration. Nestled amongst the historic buildings here are remnant native ecosystems. The challenges include creating living forests from non-native historic plantation forest, reestablishing the once thriving native plants and animal population, and revitalizing the once majestic historic lawns and victory gardens.

Another compelling issue is the acknowledgement of our wasteful society and the impact it is having on the planet. Awareness of our waste realizes the need to sustainably manage waste and/or re-think the concept of what constitutes waste. The Presidio is not exempt from these waste issues. The park generates thousands of cubic yards of

green debris annually. This is a resource that we can no longer afford to view as waste.

Composting, the ancient art of purposeful decomposition, can help us with these daunting issues. By re-classifying organic debris from waste to a resource and composting the debris, we are severely reducing our contribution to the waste stream. The finished product serves as a way to heal and restore the soil and the plants and organisms that depend on it.

Therefore the composting program located in the Presidio seeks two goals. One is to eventually capture and compost all organic debris, thereby reducing the waste stream, saving money, and creating a valuable product. The second is to produce the highest quality compost possible in order to contribute to the restoration of this park. In doing so we hope to serve as a model of sustainability for other national parks and municipalities.

The program can be divided into three divisions: production, research, and education. Each of these aspects of the program is essential for its survival and success. By focusing on all three of these aspects we become a strongly anchored program.

The compost is produced in a closed loop system. This means that all the starting materials for the compost are derived from the Presidio and all of the finished compost is used here as well. This affords us many advantages. We do not have to worry about hauling costs, contamination issues, or limited supplies. It also enables us to focus on the quality of the compost. If there is an issue about the debris that comes in we can easily track down where the problem is coming from. When the compost is finished we conduct a series of tests (maturity test, phytotoxicity, and germination) to make sure we produce a quality product. We want to make sure we are contributing to the health of this park.

The research component drives the com-

posting program in many ways. Because of the diversity of the park's land uses, every application of the compost has different needs. For example, there is extensive native plant habitat expansion underway. We are researching the effects of compost on these native plants, both while growing in the nursery and when transplanted out



School children helping to turn the dirt.

in the field. It is an interesting project, as most of the plants native to this area are sand dune species and thus do not require a large amount of organic matter for growth. Another very exciting research project we are involved in is using compost tea on our golf course. Compost tea is an aqueous solution full of the beneficial micro-organisms found in good compost. This solution acts as a natural alternative to herbicides and pesticides. It does this by increasing the health of the soil foodweb and increasing competition for deleterious organisms. During our study this year the golf course was able to drastically reduce the use of fungicides.

Every week school children from around the Bay Area participate in sifting, turning, and making compost piles. We have been lucky to participate in a program organized by the National Park Service and the Golden Gate National Park Association called "Here's the Dirt." These school children come out for the day to participate in many of the daily chores around the nursery. These chores include washing pots, transplanting plants, sowing seeds, and building compost piles. It is an excellent way for teachers to extend their science lessons and for the children to see how com-



Preparing to compost green debris.

posting their food scraps can be involved in a larger issue.

Every park in the National Park System could implement a composting program.

For the residents of the park we have begun a composting program that encourages residents to compost their kitchen scraps. By using reclaimed lumber from construction projects, the residents can construct worm boxes from free materials. A small pilot project is underway to look at the feasibility of having residents manage a wooden three-bin system. We have built the bins from recycled lumber and will distribute them to four apartment clusters. The residents of the chosen apartment complex will be given a class on composting and a point person will be selected. We will then monitor the progress over the next five months. If the program is a success, each apartment complex will have a bin in which to compost their kitchen waste.



Growing native plants in native compost.

Every park in the National Park System could implement a composting program. Some have started programs already. It is easy to learn the process. Farmers have practiced the art of composting for centuries. These farmers long ago recognized that as we use the land to grow plants, or in a park's case, use the land for recreation, the soil becomes depleted of humic acids, fungi, bacteria, earthworms, and amoebas. Compost contains all of these things and delivers them back to the soil.

Compost can be used as a growing medium for native plant nurseries. The Muir Woods Native Plant Nursery has just started such a program. By using starting materials from around the park, they are assured of the most local microorganisms in their compost. These specific tiny creatures will natu-

rally associate with the native plants.

Compost tea can be used to restore depleted soils. In the Golden Gate National Recreation Area, park rangers are using a type of compost tea to rehabilitate native soils that are next to horse stables. This tea brings back to the soil the microorganisms that keep soils alive. An interesting application for compost tea would be to use it in areas that have been hit by acid rain, disease outbreaks, erosion, and general over use.



Starting very small at the Presidio.

The best way to start a composting program is to start very small. Without a comprehensive program in place the situation can get out of hand. Quickly you will have piles and piles of debris needing to be composted immediately. When you start out small, one pile or two, you will be able to closely observe the amazing process. By observing you can determine the correct "recipe" for your next piles. The recipe, a proportional mix of all your materials, enables you to have quality compost that does not smell. The proper recipe also makes sure your pile breaks down efficiently and retains nitrogen. Also, by observing your pile you will get a feel for what a larger program would look like. If you are composting food scraps, for instance, you will be able to observe how much dry material you will need to gather to soak up the moisture. Another advantage to starting small is that you can determine what the consumers of your compost will be before you have too much compost. By starting small you can slowly entice people into using it. This will give you time to really educate the users on how to use the compost and witness the wonderful results from it. By the time you have increased your operation, if you have quality compost, everyone will be begging for more.

Green Tools

Considering the environment in all aspects of park operations can be overwhelming. New products, technologies, and practices are cropping up or evolving all the time. To help parks get or stay updated, here are a few tools in the works:

- A review, and "green" revision, of CSI master specs. First to be accomplished, construction waste specs/waste management plans/deconstruction and demolition salvage, and carpet selection, installation and recycling. An ongoing project.
- A recommended matrix of "green" cleaning products and janitorial practices. Final out in August.
- A matrix of 100 top Best Management Practices (or, what a "green" park looks like). Draft out in August, final publication in September.
- A "How-To Purchase Environmentally Preferable Products and Services in the NPS" Guide (for users and procurers). Draft out in October. Final, December.
- An "Environmental Contracting" 2.5 day training for facility managers, project managers, contracting and procurement personnel (Seattle, Nov. 27-29).
- Director's Order no. 48: Sustainable Design and Construction Practices, April 2, 2001. <http://165.83.71.10/maintenance/directives.htm>

Questions? Want to know the progress? Be on a review team? Have a new idea you'd like us to explore? Let us know! Contact Sonya Capek at the Columbia Cascades Support Office for further information: 206-220-4271 or by e:mail.



National Park Service
U.S. Department of the Interior
Pacific West Region

Green Voice is a publication of the Pacific West Region of the National Park Service. Its purpose is to share information about sustainability issues practices, and resources among the National Park Service Units located in the Pacific West Region.

Comments? Story Ideas? Write to:

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**National Park Service
U.S. Department of the Interior
Pacific West Region**

Cabrillo National Monument
Cape Krusenstern National Monument
Channel Islands National Park
City of Rocks National Reserve
Crater Lake National Park
Craters of the Moon National Monument
Death Valley National Park
Devils Postpile National Monument
Ebey's Landing National Historical Reserve
Eugene O'Neil National Historic Site
Fort Clatsop National Memorial
Fort Point National Historic Site
Fort Vancouver National Historic Site
Golden Gate National Recreation Area
Great Basin National Park
Halekale National Park
Hawaii Volcanoes National Park
Hagerman Fossil Beds National Monument
John Day Fossil Beds National Monument
John Muir National Historic Site
Joshua Tree National Park
Juan Bautista de Anza National Historic Trail
Kalaupapa National Historical Park
Kaloko-Honokohau National Historical Park
Kings Canyon National Park
Klondike Gold Rush National Historical Park
Lake Chelan National Recreation Area
Lake Mead National Recreation Area
Lake Roosevelt National Recreation Area
Lassen Volcanic National Park
Lava Beds National Monument
Manzanar National Historic Site
Mojave National Preserve
Mount Rainier National Park
Muir Woods National Monument

National Park of American Samoa
Nez Perce National Historical Park
North Cascades National Park
Olympic National Park
Oregon Caves National Monument
Pinnacles National Monument
Point Reyes National Seashore
Pu'uhonua o Honaunau National Historical Park
Puukohola Heiau National Historic Site
Redwoods National Park
Rosie the Riveter National Historic Site
Ross Lake National Recreation Area
San Francisco Maritime National Historical Park
San Juan Island National Historical Park
Santa Monica Mountains National Recreation Area
Sequoia National Park
USS Arizona Memorial
War in the Pacific National Historical Park
Whiskeytown-Shasta-Trinity National Recreation Area
Whitman Mission National Historic Site
Yosemite National Park

back periods of about 10 to 50 years. Details on the study are found in the Masters of Science in Mechanical Engineering Thesis of Bo Vestergaard-Hansen. Keith Elder of Coffman Engineers in Seattle is thanked for his advice and assistance on the study.

Solar Energy Opportunities at North Cascades National Park

Solar energy equipment is being evaluated for the Ross Lake Resort and Stehekin Visitor Center in North Cascades National Park. Solar-thermal hot water is the choice for the Ross Lake Resort because of the large amounts of hot water used at the resort, and solar photovoltaic (PV) is the logical choice for Stehekin because of the high cost of electricity in the Stehekin Valley and the limitations of the Stehekin hydro-electricity facility used for meeting the need of the valley. During the summer of 2001, the University of Washington will design and install the solar system. Hourly monitoring of each system will be conducted over one year. By the end of the project in late 2002, these data will be analyzed, and the daily performance of the systems will be determined. This study should obtain experience and performance comparisons not available elsewhere and of significant relevance for future solar installations in the North Cascades. Progress reports on the study are released monthly. Final results will be available in late 2002.

Green Products

Countertops

There are not a lot of choices in sustainable or recycled-content materials that will withstand moisture around sinks in kitchens and bathrooms. Seattle Environmental Home Center highly recommends Richlite. Made in Tacoma, Washington, a four by eight foot sheet costs \$138. It comes in a limited choice of colors and works like wood. Learn more at http://www.built-e.com/shop.mv?CatCode=10290_COUNTTOP

The Presidio has used a product called SlateScape. It is a classy, pricey, fiber-cement material with recycled content that looks and feels like soapstone. It requires more specialized installation skills. For more information go to <http://www.built-e.com/shop.mv?CatCode=PRODUCT&ProdCode=SLATESCAPE>

Biodiesel Fuel

<http://www.biodiesel.org/fleets/default.asp> is an excellent source for learning more about biodiesel. It talks about what it is, how it is used, storage, emissions, cold weather concerns, potential of combustible rags, product storage life, vendors registered with National Biodiesel Board, and lots more.

You can also click on a report on Yellowstone's biodiesel truck, or Channel Islands biodiesel boat. Go to the "factsheet" where the information is easy to access and understand. And don't miss "Pumping Green Fuel" on page two of this issue of *Green Voice*.

WHAT DOES \$1,500,000, SEVEN PARKS, AND AN ENERGY CRISIS EQUAL?

This is how much the Bonneville Power Administration has invested in energy conservation measures, at no cost to the NPS, to help reduce the energy consumption at GRTE, YELL, GLAC, LARO, MORA, SAJH, JODA, and a couple more parks.