

NOCA'S RESPONSE TO CLIMATE CHANGE

Embraced the Climate Friendly Parks Program and Climate Leadership in Parks (CLIP) Tool to inventory greenhouse gas emissions and strategically implement emission reduction measures.

- ENERGY USE
 - Partnered with Seattle City Light and Puget Sound Energy to perform energy audits and implement recommendations at facilities in the Skagit District.
 - Replaced existing bulbs with CFLs and initiated an energy-efficient redesign of exhibit lighting at the North Cascades Visitor Center. Researched and requested funding to replace obsolete HVAC system with high efficiency heat pumps.
 - Replaced old washing machines, freezers, and refrigerators with high-efficiency ENERGY STAR appliances, cutting electricity consumption by 60%.
 - Remodeled the Marblemount Wilderness Information Center to improve energy efficiency by replacing single-pane windows, insulating exterior walls and ceiling, replacing electric resistance heaters with heat pumps and propane backup heating, installing efficient light fixtures, and installing low-flow fixtures in the employee restroom and break room.
 - Began negotiations to establish an Interconnection Agreement with Puget Sound Energy to allow net metering for grid-connected renewable energy projects in Marblemount and requested funding to install photovoltaic panels on two south-facing buildings.
 - Partnered with Mount Baker-Snoqualmie National Forest to encourage and support installation of a 32.2 kW grid-connected photovoltaic systems to provide 14% of electricity needs for the joint agency headquarters and visitor information center in Sedro Woolley.
 - Replaced off-grid trailer housing with a state-of-the-art sustainably designed housing unit including a 7.2 kW photovoltaic system (propane backup generator), recycled construction materials, and an Earth Tub to promote sustainable seasonal employee housing in the remote location of Hozomeen.
 - Purchased a 495 W trailer-mounted photovoltaic power system to support visitor education and interpretation programs at the remote Hozomeen Amphitheater.
 - Secured funds and hired local contractors to perform energy efficiency improvements to concession facilities in Stehekin, including upgrades to windows, doors, water heaters, heating systems, and insulation in exterior walls and ceilings.
 - Worked with Denver Service Center to schedule energy audits for NPS and unaudited concession facilities in Stehekin.
 - Worked with Denver Service Center to initiate planning and design to relocate Stehekin maintenance, fire, and housing facilities out of the flood plain. Facilities are expected to achieve Leadership in Energy and Environmental Design (LEED) Silver certification.
- WASTE REDUCTION
 - Improved itemization of tracking for individual recycling categories and solid waste sources in Stehekin to provide quality data for an Integrated Solid Waste Alternatives Plan (ISWAP)

and to identify and target expanded outreach and education opportunities for the Stehekin community and visitors.

- Replaced water-using urinals with waterless models in the Golden West Visitor Center and public restrooms at the Stehekin Landing Resort and incorporated educational wall plaques on the water conservation benefits.
 - Purchased and installed additional recycling containers (e.g. glass, aluminum, and plastic) at primary visitor use areas in Stehekin including the Stehekin Landing & Marina, the Stehekin Landing Resort, and public picnic areas and campgrounds.
 - Updated and revised the Marblemount Compound Recycle Center information and instruction booklet to educate park staff on expanded recycling opportunities within the Skagit District.
 - Expanded static pile windrow composting in Marblemount to incorporate cardboard in addition to stock manure and green vegetation in an effort to reduce emissions associated with transportation of recyclable materials from Marblemount to Burlington (~45 miles).
 - Modified an existing solid waste handling contract to require proper disposal of non-NPS electronics, which are acquired through the transfer station in Stehekin, through the e-cycle Washington program.
 - Incorporated language into key contracts requiring the use of materials with recycled content, United States Department of Agriculture BioPreferred or biobased products, and/or products or materials identified by the Environmental Protection Agency's Comprehensive Procurement Guideline program.
 - Purchased 30% post-consumer content office paper, replaced single-sided printers with models capable of automatic duplex printing, and provided staff training on setting default printer preferences to double-sided.
 - Purchased 30% post-consumer content toilet paper and 40% post-consumer content paper towels for park-wide use in restroom facilities.
- TRANSPORTATION
 - Partnered with Defense Solutions LLC to produce a Fleet Management Study and then implemented recommendations to ensure the fleet was of proper character and composition to meet park needs while incorporating as many alternative fuel vehicles as possible.
 - Purchased new bike racks and relocated existing racks to serve public facilities, including the U.S. Post Office, Golden West Visitor Center, and Stehekin Landing Resort, and encourage alternative transportation in Stehekin.
 - Established an agreement with Seattle City Light (SCL) whereby NPS employees can refuel at SCL pumps in Newhalem and Diablo, reducing the need to drive unnecessary distances for refueling vehicles and equipment when working in the area.
 - Implemented a park-wide "No Idling" policy and provided "No Idling" resources that have been embraced by parks throughout the Pacific West Region.
 - Designed, purchased, and distributed a "No Idling" static cling window decal for installation in the rear window of all appropriate Government vehicles and equipment.

- Developed and received Superintendent approval of a “No Idling” Standard Operating Procedure for all vehicles and equipment operated by internal combustion engines.
- Emphasized the “No Idling” message through NOCA’s Defensive Driving course.
- Reduced mowing up to 30% by replacing lawn with native vegetation and allowing grasses to grow uncut where appropriate.
- Designed a carbon offset sticker purchasable by visitors to mitigate carbon emissions generated by travel to the park through investment in clean, renewable energy (wind and solar power) administered by the Bonneville Environmental Foundation.
- EDUCATION & OUTREACH
 - Developed new web pages for NOCA’s NPS website specifically focused on climate change communication including science and research at NOCA to understand and address the impacts of climate change; specific actions NOCA is taking to become carbon neutral in park operations; and a broad range of climate change resources available to the public.
 - Established a NOCA.Green.Team@nps.gov email address to provide staff and visitors with a means for making recommendations to NOCA’s Green Team on how improve sustainability and energy efficiency in park operations.
 - Participated in the Cool Climate Café on the International Day of Climate Change (October 24th, 2009) to help educate Skagit County community members and promote the reduction of carbon emissions.
 - Highlighted the importance of addressing climate change at annual employee orientation by focusing presentations on the theme of environmental impact reduction in park operations and employee housing.
 - Incorporated climate change messages into the Junior Ranger Program, evening interpretative programs, and NPS publications distributed online and through visitor information facilities.
 - Solicited public engagement in adaptation planning and implementation of strategies through public review of the Draft Ross Lake General Management Plan.

Demonstrated local, regional, and national leadership by partnering with entities to provide public outreach and education on the science of climate change, specific threats to park resources, and adaptive management techniques used to mitigate the impacts of climate change.

- Partnered with Skagit County to host the Master Composter-Recycler program, which provides community education on backyard waste reduction and resource conservation, in Marblemount using NPS facilities for hands-on demonstration.
- Conducted a multi-month recycling and vermicomposting education program in the Stehekin School District by engaging students in weighing food scraps, calculating the conversion to worm castings, and experimenting with variable combinations of soil and castings to determine optimal mixtures for vegetable growth.

- Partnered with Chuckanut Brewery & Kitchen to create a “science café” called *Tapping Into Science*, which is a monthly forum used to facilitate conversation about park research with both scientists and non-scientists.
- Partnered with North Cascades Institute and the National Park Foundation to initiate and then expand the Cascades Climate Challenge (originally Parks Climate Challenge) program, which brings high school youth leaders from across the northwest to NOCA for a month of study and experiential learning about climate change. Youth return to their communities to develop service-learning projects and to continue communicating their experiences to the public with the ongoing support of NCI.
- Partnered with the Skagit Fisheries Enhancement Group and the Junior Stream Stewards Program to provide classroom instruction to 7th and 8th grade students on salmon biology and habitat, collect scientific data during field trips to NOCA, and grow native plants for riparian restoration of neighborhood salmon streams.
- Partnered with Washington State University Extension 4-H Youth Development Program and the Concrete School District through the National Park Foundation’s First Bloom program to connect 4th through 6th graders with NOCA by meeting with park staff monthly over one year and engaging in outdoor, hands-on activities growing native plants and gardening, including planting a native landscape at the highly visited Diablo Overlook.
- Partnered with the Upper Skagit Indian Tribe to engage tribal youth in native plant nursery activities (e.g. plant identification, seed collection and propagation, ethnobotanical gardening, composting and soil development, native landscaping) to promote understanding of the connections between healthy lifestyles, communities, and ecosystems.
- Partnered with Outward Bound, Boy Scouts of America, the Urban Wilderness Project, North Cascades Institute, the Student Conservation Association, and others to engage youth in stewardship activities on Ross Lake funded by the Skagit Environmental Endowment Commission.
- Partnered with the National Park Foundation to host an Electronic Field Trip focusing on climate change at NOCA to provide an interactive, live, educational experience for 4th through 8th graders in classrooms across the country.

Collaborated with adjacent land management agencies and research institutions to increase the resistance and resilience of the North Cascades ecosystem with respect to climate change through rigorous science, clear communication, and implementation of adaptive management techniques.

- Participated in C3 (Pacific Northwest Climate Change Coalition of federal agencies) to maintain a dialogue with federal agencies on research, education, and adaptive management activities with respect to climate change.
- Contributed to the Climate Sensitivity Database (developed by Dr. Joshua Lawler from the University of Washington), which will be used to assess inherent sensitivity of species and systems to climate change, project potential impacts, and facilitate development of adaptation strategies.

- Worked with the Mount Baker –Snoqualmie National Forest and Okanagan-Wenatchee National Forest under the guidance of Dr. David L. Peterson (USFS) to develop adaptive management strategies; project is expected to increase in scope to include Mount Rainier National Park and Olympic National Park.
- Conducted climate change research through the North Coast and Cascades Inventory and Monitoring Program’s Vital Signs Monitoring, which is used to evaluate the health of national park ecosystems and report to Congress; specifically:
 - Installed two telemetered high elevation climate stations near Noisy Glacier (6590 ft) and the Easy Pass snow-course site (5270 ft) to provide near real-time data on air temperature, precipitation, snow depth, snow water equivalent, net solar radiation, wind speed and direction, and relative humidity.
 - Continued snow pack and glacial monitoring on five key “index” glaciers for yearly mass balance and summer meltwater discharge as well as 10-year glacier area/volume changes.
 - Worked with The Institute for Bird Populations and the U.S. Geological Survey to establish a Landbird Monitoring Protocol as indicators of ecosystem health for national parks in the North Coast and Cascades Network.
 - Determined the status of targeted high mountain lakes to identify long-term trends in water quality, biological indicators, and physical characteristics of each lake.
 - Implemented a forest monitoring program using 1-hectare plots to identify forest types along different elevation, temperature, and precipitation gradients to assess tree mortality, recruitment, and growth over time.
 - Established whitebark pine monitoring plots to document trends in rates of infection and mortality as well as patterns of genetic diversity, genetic resistance to blister rust and mountain pine beetles, and site-specific methods to restore whitebark pine populations.
 - Continued pika research to develop baseline knowledge on the status of this low-mobility species and to inform park management and the public on potential changes in alpine treeline ecotones.
- Developed early detection and rapid response protocols for invasive non-native species to promote ecosystem health and increase resilience to climate change.
- Initiated redbreast shiner studies on Ross Lake to gather baseline data and monitor population changes as well as impacts on native fish populations.
- Prepared an Invasive Plant Management Plan to address problematic plant species such as knotweed and cheat grass at NOCA.
- Began restoration on mountain lakes with high-density reproducing stocked fish populations to recover native biological communities and natural food webs while minimizing the impact on non-target organisms and protecting native threatened bull trout populations.
- Investigated the establishment of Grinnell Transects within NOCA and the NCCN to provide a baseline on current conditions of natural and cultural resources. Baseline conditions will provide an important record of these conditions for future park users and will also provide data to test the accuracy of predictions of current models.

- Supported research that predicts the future of wildlife population in response to climate change as a tool in the development of adaptation strategies.
- Partnered with Western Washington University researchers to initiate a subalpine butterfly monitoring program in North Cascades and Mount Rainier National Parks monitoring the response of pollinators to climate change and to engage the public in protection of park resources.