

Newsletter for the Natural and Cultural Resource Challenge

When Congress established Yellowstone National Park on March 1, 1872, they set in motion a national park movement that has inspired more than 100 nations to establish over 1,200 national parks or equivalent preserves. In 1999, the National Park Service again took a leadership role when it established the Natural and Cultural Resource Challenge (NCRC).

Through the NCRC, parks are becoming libraries, laboratories, and classrooms, providing vital information about the variety of living and non-living parts of the environment, the plants, animals, forests, rivers and streams, mountains, and soil. NCRC also studies how these elements interact to form ecological systems (ecosystems) as well as how humans interact with the environment.

The Natural and Cultural Resource Challenge assesses ecosystem health through inventorying and monitoring park vital signs with the help of cutting-edge science. It is a matter of tracking, counting, and monitoring all the

plant and animal species in each park. Until now, endangered plants and animals have sometimes gone unnoticed simply because parks have not had the resources to conduct inventories. When an oil spill off the Washington coast occurred in 1991, it was difficult to assess the damage to Olympic National Park because there was a lack of baseline data on conditions prior to the spill. With improved inventories, park managers will be better able to recognize changes in the environment as they occur. They will also be better equipped to understand the effects of environmental disturbances.

As part of the Natural and Cultural Resource Challenge, 13 Learning Centers and Networks have been established around the country. The North Coast and Cascades Learning Network (NCCLN) includes eight national parks and historic sites: Mount Rainier, North Cascades, Olympic, San Juan Island, Ebey's Landing, Fort Vancouver, Fort Clatsop and Seattle's Klondike Gold Rush. This Network contains a wealth and variety of natural and cultural resources.

Through the North Coast and Cascades Learning Network, the National Park Service is working to encourage further research and educational uses of national park areas through partnerships and public programs. Through these partnerships, research projects have increased substantially through learning network efforts. Last year, the Learning Network also taught over 16,400 people about the natural and cultural resources protected by these national parks. Students dug in, literally, and provided thousands of volunteer hours to restore natural ecosystems. For more information on the Challenge, the Network, and upcoming projects, see the centerfold of this newsletter.

There are more opportunities for you to learn about the Natural and Cultural Resource Challenge, the North Coast and Cascades Learning Network, park science and cultural resources through park educational programs and park partner programs. Ask at your local park, or check out our website at www.nature.nps.gov or www.nature.nps.gov/challengedoc/nrc.htm

Welcome to the pilot issue of the North Coast and Cascades Learning Network Newsletter for the Natural and Cultural Resource Challenge!

This newsletter highlights and shares with you a sampling of the research studies, educational programs, service learning projects, and other Learning Network accomplishments taking place in your Pacific Northwest national parks. See the enclosed articles to learn what the Natural and Cultural Resource Challenge is, which National Park Service units are part of the North Coast and Cascades Learning Network, who the National Park Service's partners in science and education are in this Network, how school kids are helping to monitor and restore parklands, how national parks are outdoor laboratories, which animals make their homes in parks, and much more.

Happy reading!

Surveys for Forest Carnivores

In the large wilderness parks in the Network, some forest carnivore species have not been documented for over 40 years and several are suspected to be extirpated or locally extinct. These include the Fisher, a member of the weasel family, in Mount Rainier, North Cascades, and Olympic National Parks (NPs); Wolverine in Mount Rainier and North Cascades NPs; Gray Wolf in Mount Rainier and Olympic NPs; and Canada Lynx in Mount Rainier NP. Questions and concerns have been raised about forest carnivore populations, so the Wildlife Working Group of the North Coast and Cascades Network (NCCN) Inventory & Monitoring Technical Committee ranked gathering information on forest carnivore presence and relative abundance as the second highest priority for further work on vertebrate species.



The American Marten was the most frequently photographed forest carnivore at Mount Rainier and North Cascades National Parks.

THE STUDY

The Committee designed a rotating sampling schedule where each park would be inventoried for 2 years: Mount Rainier NP in the winters of 2001 and 2002; Olympic NP in 2002 and 2003; and North Cascades NP in 2003 and 2004. Numerous pre-existing blocks of four square miles each were randomly selected in



Cougar photographed at photo station with identification label in background.

each park. Within these blocks, two survey sites were randomly chosen. By using this survey design, developed by the U.S. Forest Service, National Park Service research results can be compared with data from other land-owners to make accurate regional comparisons.

Different survey sites were baited with a whole chicken, a can of tuna, a dab of skunk oil, or a dab of "Marten lure." A camera triggered by a passive infrared sensor was then set and focused on the bait. These stations were checked as often as possible, with once a week being optimal, but every 2-3 weeks being the norm. Data was collected at each station for at least 28 nights.

THE RESULTS

In the winter of 2001, Mount Rainier NP established 27 survey sites equipped with cameras. A total of 820 pictures were taken at these 27 stations, resulting in 607 (74%) photographs of animals. Of these photos, 531 were mammals. The most common carnivore detected was the American Marten, a member of the weasel family (314 photos), followed by Spotted Skunk (65 photos), Red Fox (38 photos), and Bobcat (28 photos). Deer Mice were also captured in 40 photos.

The following year, Mount Rainier NP set up 19 bait stations and, once again, attracted a range of forest carnivores including mustelids (skunks, weasels, martens), canids (foxes, wolves, coyotes), and felids (wild cat species). A total of 609 additional animal photos documented seven species of mammals and three species of birds. No new spe-

cies were recorded. The American Marten was again the most numerous photo subject, captured in 355 of the 609 pictures.

In Olympic NP, 28 camera stations were established and sampled in 14 areas in 2002. Over 900 animal pictures of 15 species were taken. The most frequently photographed carnivore was the Spotted Skunk (511 pictures), followed by Short-Tailed Weasels (67 photos), Bobcat (22 photos), Long-Tailed Weasels (15 photos), Black Bear (5 photos), Cougar (2 photos), and Coyote (2 photos). 2003 data is still being gathered. So far, the only new species detected at the camera stations in 2003 is a Northern Spotted Owl - going after a mouse that was going for the bait! There have been no detections thus far of either Fishers or American Martens.

In 2003, a Northern Spotted Owl was detected at a camera station in North Cascades National Park.

North Cascades NP's efforts for 2003 are also still underway. Like Mount Rainier NP, they are also finding a lot of success in capturing photos of American Marten. To date, North Cascades NP has sampled 23 camera stations. From 803 photographs, North Cascades staff have identified American Marten (340 photos), Spotted Skunk (229 photos), Cougar (22 photos), Short-Tailed Weasel (5 photos), Coyote (2 photos), and Bobcat (1 photo). Black-Tailed Deer (6 photos), Northern Flying Squirrels (4 photos), Douglas Squirrel (5 photos), Deer Mice (5 photos); Gray Jays (26 photos), and one Steller's Jay were also photographed.

So far, none of the three parks have detected Fisher, supporting the belief that they are extirpated from Washington State. Why no American Marten, the most common forest carnivore in Mount Rainier and North Cascades NPs, has been detected in Olympic NP is a bit of a mystery and a cause for concern.

Amphibians in Washington's National Parks

The wet environments of western Washington and Oregon national parks provide ideal habitat for amphibians. Amphibians are generally abundant and are important prey for birds, mammals, fish, and reptiles. They are also predators of insects and smaller animals. Amphibians depend on clean air, trees, land, and water to live; therefore, they thrive in old growth forest ecosystems with their clean air and mix of terrestrial and aquatic environments.

Amphibians absorb and lose moisture through their skin, so they are more vulnerable to environmental degradation from pollutants and ultraviolet radiation than animals with less porous skin. Combined, their specific habitat requirements, breeding habits, and porous skin make them more sensitive to environmental changes than most wildlife. This makes them good indicator species of ecosystem health.

When amphibian populations decline, scientists suspect that the ecosystem may be in danger. Through the Natural and Cultural Resource Challenge, national parks have begun to monitor the health of amphibian populations as indicators of overall ecosystem health.

Beginning in 1996, amphibian inventories have been conducted in several of Washington's national parks in an effort to learn more about these important animals. From 1996-1999 National Park Service (NPS) and US Geological Survey (USGS) Biological Resources Division Staff studied streams and lakes in Mount Rainier, North Cascades, and Olympic National Parks (NPs) to learn about the size and variety of amphibian populations.

At Mount Rainier NP, this was the first comprehensive amphibian survey ever conducted. Rare terrestrial-breeding amphibians such as the Van Dyke's and Larch Mountain Salamanders were found in this survey, but only in a few scattered populations. The Western Toad was found in only a few locations in the Park, suggesting they may

have declined in recent years. Similar results were found in Olympic and North Cascades NPs where Western Toads were rare at higher elevations. At North Cascades NP, special attention is given to the Columbian Spotted Frog because it is a "Species of Concern" under the Endangered Species Act.

In 2002, amphibian inventorying projects continued and expanded to include studies at Ebey's Landing National Historical Reserve, San Juan Island National Historical Park, and Fort Clatsop National Memorial.

Further studies at Olympic and North Cascades NPs found that aquatic-breeding amphibians in these two Parks have not faced the population losses that other regions have experienced. The initial studies indicate that these amphibian populations appear healthy. However, researchers are mindful that environmental changes and resulting population declines can occur rapidly and that potential threats to amphibian populations do exist.

Experiments in Oregon have confirmed that ultraviolet light (UV-B) radiation from the sun can cause death and deformity in some species of amphibians. UV-B radiation may also weaken amphibians by making them more susceptible to disease and parasites. Cascade Frogs were the most common pond-breeding amphibian in Olympic NP and appear to be unaffected by UV-B radiation. It may be that ponds such as those found in Olympic NP protect frogs from these dangers.

One of the unique species of Northwest amphibians, the Tailed Frog, has the largest eggs of all North American frogs because they fertilize their eggs internally before they lay them. Scientists from the US Geological Survey Biological Resources Division sampled streams throughout Olympic NP to study Tailed Frogs and their population patterns. Researchers



Tailed Frogs, a species unique in the Pacific Northwest, are found in Olympic National Park.

found six Tailed Frog nests in five streams. This is a large number considering that prior to this survey only about a dozen nests of this species had ever been documented in the wild, and only two in coastal areas. The study found one nest that contained 182 eggs. This suggests that Tailed Frogs may deposit their eggs communally.

Most mountain lakes in Mount Rainier, North Cascades, and Olympic NPs have no naturally occurring fish due to their remote locations. From the early 1900s, many of these lakes were stocked with Brook and other Trout species for recreational fishing. This practice was stopped in the 1970s in most parks. Before the fish were introduced, Long-Toed and Northwestern Salamander larvae were found in many of these lakes. Studies in North Cascades and Mount Rainier NPs that counted salamander larvae in lakes with and without introduced fish, suggest that larval salamander numbers were reduced because the introduced fish eat the larvae of native salamanders. Park managers are considering removing certain fish from some park lakes in order to better protect the native amphibian populations. Fish are no longer introduced in Olympic and Mount Rainier NPs in order to restore and protect native aquatic ecosystems.

High Elevation Archeological Survey of the Cascades and Olympics

In the fall of 2001, archeologists from Mount Rainier, North Cascades, and Olympic National Parks began working together on a three-year high elevation archeology project. Their goal is to explore archeological sites that date back thousands of years to learn about the use of some of the mountainous areas of Washington State. This partnership will create new methods for surveying and documenting archeological sites. From their efforts, park visitors will have an opportunity to learn about indigenous inhabitants of high elevation landscapes in the Cascades and Olympic Mountains.

This archeological effort resulted in the discovery of fifteen previously unknown prehistoric sites, two historic sites, and eight newly discovered artifacts.

Visitors to the Parks' subalpine meadows may believe that ancient peoples avoided such remote and harsh environments. However, archeologists recognize that these landscapes have been used by humans for thousands of

years. Before the project began, less than 5% of the high elevation terrain in the three Parks had been surveyed for archeological resources. The project has the potential for discovering new prehistoric sites and artifacts.

When studied, these resources will show the unique relationships between high elevation habitats, indigenous settlement, and subsistence strategies across the Pacific Northwest region. The project gives Park Archeologists the opportunity to share this information with one another and later with the Parks' visitors. It will allow researchers to compare their findings in terms of variation in stone tool material, artifact size, and other key site characteristics between the three Parks.

In the first year of the project, planning work and field surveys were completed and the information was compiled in a new database. The database yielded the first ever compilation of decades of archeological data from the region's three largest national parks. This allows for accurate and consistent measurement of archeological artifacts found at the different parks. Survey teams with representatives from each park surveyed tracts in the Twisp Pass/Stiletto Peak area on the eastern

side of the North Cascades National Park, Cat Basin in the north central region of Olympic National Park, and upper Cowlitz Basin on the southwest side of Mount Rainier National Park.

Park Archeologists will present their project results at national and international scientific conferences. Presentations at these conferences will place the Parks' archeological records into a meaningful regional context, contributing new information relevant to the archeological record of Pacific Northwest high elevation landscapes. More information about the results of this project will be made available through professional journal articles and education programs.

The High Elevation Archeological Survey of the Cascades and Olympics has laid the groundwork for continued archeological research and collaboration between Mount Rainier, North Cascades, and Olympic National Parks. It has created important tools and procedures for future research in the North Coast and Cascades Network and for National Park Service Cultural Resources staff in other high elevation landscapes. This project is an example of collaborative research that will add to the scientific and cultural values that we all appreciate in our national parks.



Park archeologists unearth clues to the past.

Cultural Resources

Each national park has its own unique sense of place that provides a meaningful experience to those who visit. We recognize and celebrate the various values that people place on our parks.

Whether we conduct a tour, a talk, an archeological dig, or an experiment, we are sharing treasures that have been enjoyed by others for generations. With each visitor and each visitor's experience our national parks evolve, contributing to an even greater sense of our nation and its heritage.

Mount Rainier's Oral History Project

Since the 1950s, the staff at Mount Rainier National Park has been conducting oral history projects, resulting in the completion of 47 interviews. Thanks to our predecessors' foresight, we can share the memories of individuals like the first seasonal Naturalist, Charles Landes, pioneer Len Longmire and Climbing Guide Errol Rawson. With the help of volunteers, a dozen new interviews were completed during the Park's Centennial in 1999.

Oral histories are a form of storytelling that allows us to learn directly from the people who personally participated in or witnessed the making of history. They bring history to life in a way that no piece of paper or photograph could ever accomplish. At Mount Rainier National Park, the Oral History Collection allows us to hear about the early development of the Park from pioneers like the Longmire Family. The Collection also reveals the evolution of the early Park Naturalist Program.

The heyday of the Rainier National Park Company operations is described in oral histories by a number of former inn and guide service employees. Other interviews with former Park staff reveal the touchingly personal, and sometimes humorous, sides to living and working in Mount Rainier National Park. These interviews provide a unique opportunity to discover hidden history through the lives of the Park staff and their families.



Construction of Camp Schurman located at the base of Steamboat Prow on the northeast face of Mount Rainier, elevation 9,510 feet.

Some of the people sought as candidates for oral history interviews include former and current National Park Service employees and their families, former concessionaire employees, veterans of the Civilian Conservation Corps, long-time Park visitors, and residents of gateway communities.

Expansion of the Park's Oral History Program continues with preparing tape summaries, updating the Oral History Index, maintaining interview files and making back-up cassettes. Summaries of the completed interviews are being compiled so that they will be more accessible for researchers. Additional oral histories continue to be taken with key figures in the Park's history.

To date, seven new interviews have been conducted, including:

- Beatrice Hall, daughter of Mount Rainier's second Superintendent, Edward Hall, described her childhood growing up in the Park and her own work at the Park until her retirement in the early 1960's.
- Herman Kelsch, a member of the Civilian Conservation Corps (CCC) in the 1930s, served as clerk for Chief Naturalist C. Frank Brockman. Mr. Kelsch also donated several copies of the in-park CCC newsletters and his CCC pins.
- Tom Osborn, whose father homesteaded on Kernahan Road in 1899, worked at the Park from 1969 to 1980 in Buildings and Utilities.
- John Simac (pictured above) helped found the Tacoma Mountain Rescue and participated in numerous searches and rescues in the 1950s-60s. He was also one of the volunteers who financed and built Camp Schurman



John Simac is one of the participants in the Oral History Project at Mount Rainier National Park.

(see picture at bottom left) on the north side of Mount Rainier as a tribute to former Climbing Guide Clark Schurman.

- Chuck Heacock began his career as a seasonal Trail Crew worker, later became a permanent employee, and was the Roads Crew Supervisor through much of the 1990s. He also recounted many of the stories of his father's work as a Fire Lookout at the Park.
- John Wilcox, former Muir District Ranger, worked at the Park from 1972 to 2000. He recounted his experiences during the development of the Park's Backcountry Management Plan in the 1970's.
- Peter Sabin served as a Fire Lookout and Guard at Gobbler's Knob, Lake James, and Mt. Fremont from 1959-1963. During two winter seasons he also operated the Paradise rope tows.

To learn more about the history of Mount Rainier National Park, please visit the web page at: www.nps.gov/mora/ncrd/historic.htm

North Coast and Cascades Network Science and Education Program

THE CHALLENGE

Through the Natural and Culture Resource Challenge (NCRC), seven National Park Service (NPS) units have collaborated to form the North Coast and Cascades Network (NCCN). The NCRC is a major endeavor to advance the understanding, management, and protection of natural and cultural resources in the National Park System. The science branch of the Network conducts inventory and research projects to learn what resources national parks really have and then conducts long-term and in-depth studies to monitor these resources. Educators share this information with park management, visitors, students, and the general public through a variety of informational formats and educational programs.

INVENTORY

Many national parks do not know all the plant and animal species that live within their boundaries or the extent of their cultural resources. Park researchers are now completing baseline inventories of vascular plants, animals, physical features, and cultural resources in Network parks. Data is also being collected on the distribution of selected species in order to design Network monitoring strategies. The inventory plans are being designed in conjunction with development of the Network's long-term monitoring plan.

MONITORING

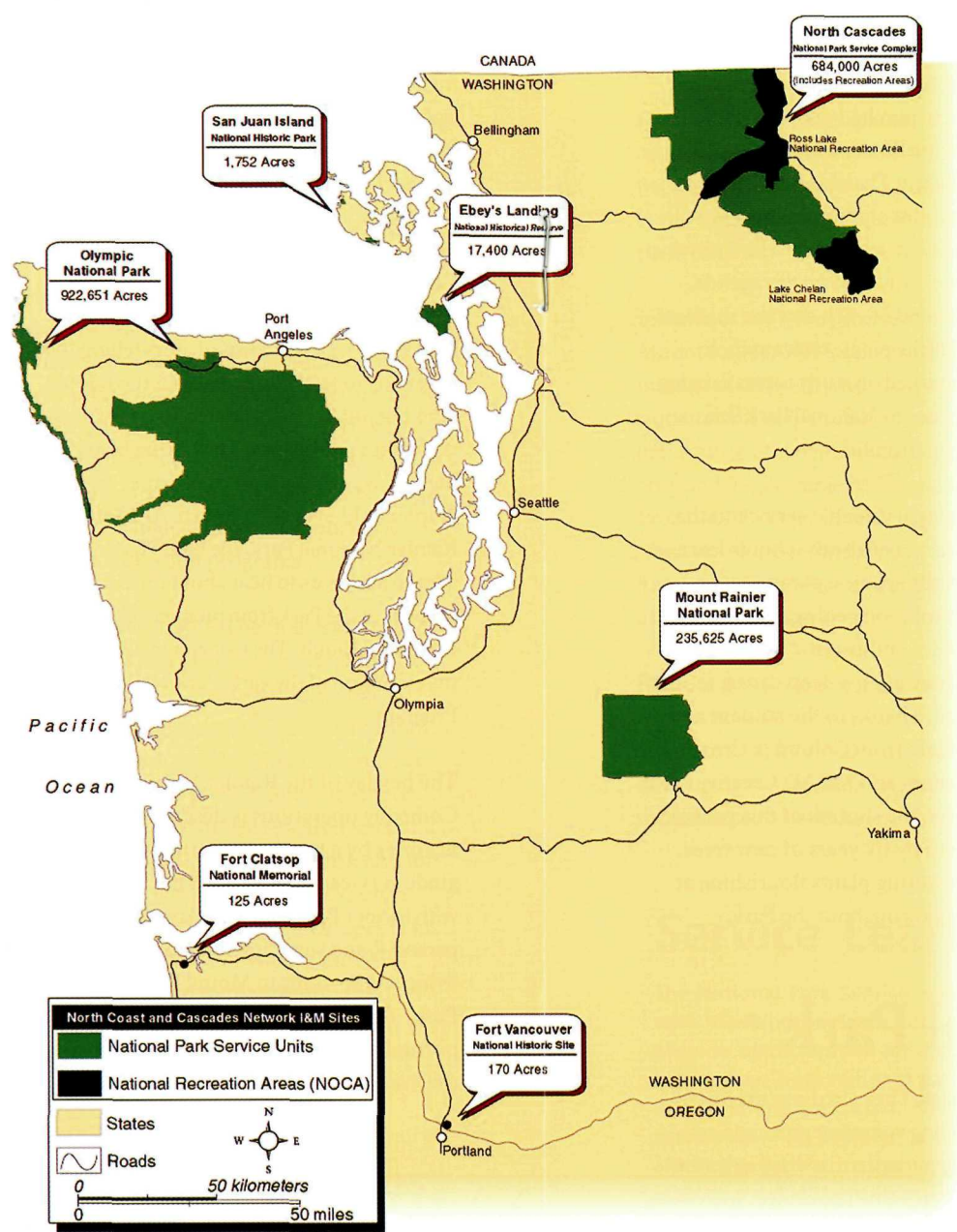
The seven national parks within the NCCN constitute a diverse network of parks. These parks have a wide spectrum of issues and challenges. Three of the largest parks are essentially wilderness in character, and face issues stemming from visitor use and threats from outside park boundaries. The remaining parks are largely historic in nature, and by virtue of their size and proximity to rapidly urbanizing areas along their borders, also face particular challenges. These challenges arise from a rapidly growing visitor base as well as land and water development pressures nearby.

In response to these challenges, Network Parks are collaborating to develop an integrated program for monitoring natural resource conditions. This will provide timely and relevant information about the nature and proximity of threats to these ecosystems. This coordination provides an extraordinary opportunity to define a vision for monitoring priorities. Through this collaboration, both within and outside of the Network, all member Parks will gain expertise and maintain a sufficient level of knowledge about natural and cultural resources that will pay dividends to park management well into the future.

This study also includes the ecological functions and key processes provided by non-living components of these ecosystems. These include climate, soils, geological processes, and landscape features. These studies will become more fully integrated into the program during the design and protocol development phase. Once completed, this program will help guide park managers to make decisions that ensure national parks and all the things that live in them are protected “for the enjoyment of future generations.”

RESEARCH

The first step in implementing the Natural and Cultural Resource Challenge is for national parks to increase their inventory and monitoring programs to gather the baseline data that documents the status and trends of each ecosystem and its processes. The next step is to increase and improve research studies conducted in the parks. Over time, such research will provide a body of scientific knowledge that will increase our understanding of natural and cultural resources as well as ecological processes. This knowledge will help us make informed decisions to better fulfill our management responsibilities as stewards of these unique lands.



Proposals for research projects come from many corners of the Network. Some include partnerships with other government agencies, academic institutions, and conservation organizations. Important research in the coming years includes the following topics which span multiple parks and disciplines:

- Stream and river modeling and monitoring that will show how natural and human disturbances affect the living and non-living parts of these ecosystems
- Wetland studies in glacial lakes found in many of the mountains of the Network Parks
- Atmospheric and climate modeling and long-term monitoring that will be useful in interpreting and understanding changes in species composition, community structure, water and soil chemistry, and related landscape processes over time
- Research of representative glaciers in North Cascades, Mount Rainier and Olympic NPs
- Wildlife research that demonstrates the external influences on animals and their habitats, and monitoring of species like elk, small mammals, bats, insects, and birds
- Plant ecosystem studies to consider how climate, geology, natural disturbances, and human activities change vegetation composition over both the short- and long-term

THE NORTH COAST AND CASCADES LEARNING NETWORK (NCCLN)

Imagine living laboratories where science and education are combined to increase our knowledge and understanding of the natural world and our relationship with it. Picture places where natural and cultural scientists conduct groundbreaking research that helps national park managers develop solutions to the challenges facing the seashores, forests, subalpine meadows, and other natural and cultural resources in their care.

In this setting, educators work with scientists to communicate the significance of these findings. Consider, too, that these learning centers and networks are the product of partnerships between national parks and their neighbors, other federal agencies, universities, state agencies, and community organizations. This is the vision behind 32 learning centers and networks located in national parks throughout the US and its Territories.

The North Coast and Cascades Learning Network (NCCLN) is one of the earliest established learning networks. The Network is formed by a partnership of the seven Network parks, universities and colleges, non-profit organizations, state and federal agencies and Seattle's Klondike Gold Rush National Historical Park. Through this Network, these Parks have dramatically increased the number of outside funded park research projects and coordinated education programs that reached over 16,400 people in 2002.

The Learning Network has increased collaboration and coordination among parks and park partners which has resulted in enhanced efficiency and effectiveness as well as new projects. These projects included improved research facilities in Network Parks and a streamlined research permitting process designed to encourage outside researchers to use parks. Educational programs have involved people in citizen and student stream monitoring programs and programs that teach inner city and rural students

about their national parks.

Next year, we will be able to report back on a program in which Olympic Peninsula tribal elders provide information and background about Olympic NP's Basketry Collection. College students will record this process on video. In addition, two partner institutes, North Cascades Institute and Olympic Park Institute, will have results from their student and citizen science projects that monitor stream health. This is an exciting time to participate in science in action. Whether you are a Ph.D. researcher, or a student who has never been to a national park before, parks are open for learning. For descriptions and contact information about our education programs, see pages 8 through 10 of this newsletter.

For more information about doing research in a Network Park, check our website at: <http://science.nature.nps.gov/permits/index.html>. For more information about the Inventory and Monitoring Program, please visit the web page at: <http://science.nature.nps.gov/im/networks.htm>

Transplanting Project at Mount Rainier

How do you get seven trees, 168 shrubs, and 7,400 flowering plants into the ground in just four days? You start with great Greenhouse and Ecological Restoration Programs, partner with enthusiastic teachers, and bring students from Columbia Crest Elementary School and The MEAD Creative Learning Center to the Park to help.

For the Columbia Crest students, it's a three-part project. In the spring, Greenhouse, Restoration, and Education staff from Mount Rainier National Park visit the fifth grade class to talk about the purpose of national parks and how important it is to prevent and repair human-caused damage to vegetation and soil. The fifth-graders view a slide show that features sixth grade Columbia Crest students working on a revegetation project in the Park and illustrates the causes and types of damage and the methods used to restore the meadows. Before the school year ends, the students visit the Park Greenhouse, adjacent to the school, where they pull weeds, fill pots with soil, and transplant several hundred native plant seedlings into the pots. The following fall, the students, now sixth-graders, come to the Park ready to give the trees, shrubs, and



Columbia Crest students transplanting trees at Paradise Ski Dorm in September of 2002 .

flowering plants a permanent home. It's quite an exciting morning of planting!

During the fall of 2002, after weeks of preparation, 39 students and six faculty traveled to the Park from their high school, The MEAD Creative Learning Center, in Spokane, Washington. They spent three days spreading soil, planting native plants, and collecting seed at various revegetation sites as part of

their annual service learning project. To reach one of these restoration sites, near an overlook named Panorama Point, the students hiked up the challenging Skyline Trail and then spent the rest of the day perched on steep slopes planting subalpine flowers. It was a particularly memorable day. There's no doubt an embellished account of the grueling hike will be passed on to next year's class! Hard physical labor was not the only item on the agenda, however. At the end of each day, the students gathered around the picnic tables at their campsite and worked on study topics ranging from wildlife issues to National Park Service employment opportunities.

While performing a valuable service to the Park, the students from both schools learned about native plant species, planting techniques, and restoration ecology. The students and teachers were enthusiastic workers and learners, demonstrating a deep caring for the Park and nature. Thanks to the student and teacher volunteers from Columbia Crest Elementary School and MEAD Creative Learning Center, the success of this program can be measured by six years of new trees, shrubs, and flowering plants flourishing at restoration sites throughout the Park.

Restoration at North Cascades National Park

Two hundred students from inner city Seattle rolled up their sleeves this past summer to help North Cascades NP restore natural ecosystems. Students helped prepare the North Cascades NP's Greenhouse for fall plantings and pulled over 6,000 feet of non-native or invasive plants. In return, students learned about the ecosystems they were restoring through fun, interactive lessons. One student asked, "Can we do this in Seattle?"

That question has led Seattle City Parks' Community Centers to consider how they can develop this program in students' home communities. The Community Centers have already secured funding to develop training sessions for their Teen Development Leaders

so they can be more prepared to take advantage of the National Park Service restoration workshops planned for this summer. Teen Development Leaders will develop restoration and stewardship education skills. They will also learn more about natural and cultural resources in both national and City parks. Teen Development Leaders will apply these skills to developing projects in their local parks.

EarthCorps, a non-profit Seattle-based restoration group, led the field program in partnership with the Resource Education and Natural Resources Staff of North Cascades NP. EarthCorps competes for restoration contracts with the US Forest Service, City of Seattle, King County, and other land man-

agement agencies. They also have extensive experience leading volunteer groups in restoration work - experience that was key to the success of this program. The project was coor-

Thanks to funding by the Public Land Corps, this project has evolved into a multi-layered partnership between the National Park Service, EarthCorps, the City of Seattle, and numerous other non-profit youth groups.

continued on page 9

minated by North Coast and Cascades Learning Network staff, adding another layer to the rich partnership that made this program successful.

For most of the participants and many of the adult leaders, this was their first visit to a national park. Thanks to Seattle City Light, many were able to spend their first night in a park.

In summer 2003, the program will expand to Mount Rainier NP. Students will work on a number of different projects. For example, students will help to educate people about the importance of staying on trails in the extremely busy and fragile Paradise Meadows Area. Programs like this create an opportunity to reach out to the communities near Mount Rainier National Park and additional students in the Puget Sound area.

Because this project integrates students' experiences in national parks and their home communities, it provides a good model for developing stewardship awareness and values that transcend boundaries.

Service Learning

The National Park Service is working with Washington State educators to provide opportunities for students to learn about how national parks are managed and protected. Through these service learning projects, students learn about things that matter to them, while making a valuable contribution to their national parks. Service learning is popular with both educators and students because students are actively engaged and empowered by the visible difference their efforts make.

Service Learning projects have included trail construction and maintenance, studying the health of park streams and prairies, and organizing historic photos of Seattle's Klondike Gold Rush, and others. Everyone wins when students gain important life skills and parks get needed support to protect these special places.

Tackling Invasive Plants at San Juan Island National Historic Park



Invasive plants like Scot's Broom are being removed on San Juan Island.

Through a cooperative agreement, San Juan Island National Historical Park (NHP) hosts an Oregon Museum of Science and Industry (OMSI) summer science camp from mid-June to late August each year. Student campers attending the one- or two-week sessions range in age from 10 to 18 years. Programs and activities take place in the Park and at other natural area locations in the San Juan Islands and surrounding waters. Based at the Park's English Camp unit, student campers learn about nature and science in fun, experiential ways.

In summer of 2002, San Juan Island NHP hosted the OMSI summer science camp with 82 student campers. Student campers came to the Park to learn about the natural environment of the Island which includes prairie, forest, species such as Orca Whales, and tidepool ecosystems. They also learned about the important history of the Park and its role in the 1859 boundary dispute with Great Britain over the US's Northern Boundary.

Park Resource Management Staff and OMSI student campers collaborated in a non-native or invasive plant monitoring and control project. Under the guidance of the Park's seasonal Biological Technician, student campers monitored treatment and control plots of

Canada and Bull Thistle. These plots were established in 2001 to determine the effectiveness of different methods of removing these invasive plants.

In the summer of 2002, groups of student campers counted the number of thistle plants in a set of previously cut and uncut plots on the American Camp Prairie. The Biological Technician tallied the results so the OMSI student campers could see the progress made by fellow student campers over the previous summers of the project. The results clearly showed student campers that their efforts made a difference in removing the invasive thistles! Each group subsequently hand-pulled or cut the thistles on their identified treatment plots and removed them from the prairie, setting the stage for next year's monitoring effort.

Why do we need restoration in national parks?

In 2001 and 2002, a study was conducted in the Paradise Meadows area in Mount Rainier National Park to better understand impacts of off-trail hiking. One hundred thirty-five random points were sampled to obtain an average number of plants trampled by a single footstep. Outlines of three shoe sizes: a men's 11, women's 8, and child's 2, were used to count the number of plants damaged. The average number of plants trampled per footstep in an open meadow was found to be 20 plants for the men's shoe size, 18 for the women's, and 14 for the child's. Park staff estimate that approximately 235 people leave trails during daily visits. Based on the findings of the study of off-trail hiking at Paradise, at an average of 10 steps per person, more than 40,000 plants are being trampled each summer day at Paradise.

The Mountain is a Volcano!

Among local residents, Mount Rainier is commonly referred to as “the Mountain.” Unlike nearby Mount St. Helens, Mount Rainier’s true volcanic nature is frequently dismissed with terms such as “dormant,” or erroneously, “extinct.” Active steam vents, periodic earth tremors and reported historical eruptions provide ample evidence that Mount Rainier is, in fact, an active volcano. Mount Rainier National Park staff has a long history of working with US Geological Survey (USGS) scientists. This collaboration between rangers and scientists has resulted in a much higher level of awareness about geologic hazards and preparedness for future volcanic unrest.

Mount Rainier looms above the Puget Sound lowland about forty miles southeast of Tacoma, Washington. Although Mount Rainier is not presently in an eruptive stage, it is entirely capable of waking from its slumber and producing volcanic ash falls, lava flows, and hot avalanches of gas and rock called pyroclastic flows. During previous volcanic events, these hot eruptive products melted

At 14,410 feet, it is not only the highest peak in the Cascade Range, but also supports as much snow and ice as all of the other Cascade volcanoes combined.

snow and ice causing lahars, slurries of mud and boulders that whisk down valley at speeds of 40 mph or more destroying everything in their paths. Abundant geologic evidence documents past eruptions and extensive deposits from lahars that have inundated valleys around the mountain. More than 100,000 people now live on the rocks, mud and debris that have flowed down from the great volcano in the last 6,000 years.

In 1995, scientists from the US Geological Survey’s Cascades Volcano Observatory began an intensive outreach campaign intended to inform communities at risk, National Park Service staff, emergency manag-



Summit of Mount Rainier

ers, and media about the geologic processes and geohazards at Mount Rainier. The efforts were quickly expanded through the involvement of State and local emergency managers, community leaders, local educators and National Park Service staff. Through frequent interactions, members of the Mount Rainier Volcanic Hazards Work Group provide information through response plans, media reports, signage, presentations, brochures, exhibits, websites, and educational materials.

In 1999, this multi-agency group created a working document to serve as a guide for regional response to large volcanic disturbances. Placement of early warning devices on the Carbon and Puyallup Rivers and establishment of signed evacuation routes in Pierce County are some of the achievements of this multi-agency effort.

Interpretive staff have developed a “Geohazards Awareness Campaign,” implemented annually through a variety of in-park interpretive programs, bulletin board messages, and Park literature. Visitor center exhibits, developed with the USGS, provide in-depth explanation. New exhibits proposed at Paradise and Sunrise will have a strong emphasis on geology and geologic hazards. Through ongoing cooperation with the

USGS, the Park has been able to train their staff, conduct a Summer Speakers Series, and sponsor an annual teacher workshop. Park Education Staff is also working with area teachers and the USGS to develop a new middle school curriculum guide about the volcanic processes, products, and hazards of Mount Rainier. Other results from the partnership include fact sheets, bookmarks, a poster, and the USGS-produced film “Perilous Beauty” which is shown at the Park’s visitor center at Paradise.

In 2001, there were two events that served as further wake-up calls for Park staff and area residents. In February, the ground shook and the Park evacuated staff and visitors during the 6.8 magnitude “Nisqually Earthquake.” In August, a small debris flow originated on a lip of the Kautz Glacier and cascaded down Van Trump Creek, temporarily closing the road to Paradise and halting trail use in the area for several weeks. Fortunately, neither of these events caused much lasting damage but they have focused attention on the dynamic geology of the area and the importance of preparing for future events.

The Mountain is a volcano and the National Park Service in partnership with the US Geological Survey will share their knowledge of the danger that accompanies this beautiful place.

News from Around the North Coast and Cascades Learning Network

Olympic National Park

Olympic National Park (NP) Visitor Center is adding another component to their student-friendly Discovery Room in Port Angeles, Washington. The Discovery Room is a self-guided, hands-on learning center for children. Detailed murals portray park wildlife and plants from coast to mountaintop. Touch tables and kid-size puzzles inspire inquisitive minds. Children can unlock the mysteries of the "Discovery Drawers" or embark on one of the scavenger hunts to explore and learn about the Visitor Center exhibits or surrounding forests.

The Park piloted a Discovery Room second grade curriculum-based program last fall. Focusing on plants and life cycles, the program complements the current Port Angeles School District curriculum requirements and Washington State Essential Academic Learning Requirements (EALRs). If you want to find out more about these programs, go to our website at www.nps.gov/olymp/students.htm, or contact the Park at (360) 565-3146.

Olympic Park Institute

Located on the shores of Lake Crescent in Olympic National Park, the Olympic Park Institute provides educational programs to students, teachers and adults. Thousands of students learn about forest, marine, and alpine ecosystems through hands-on, field-based science programs. Through summer programs, youth explore the Park at the Institute or through backcountry adventures. Classes for adults and teachers teach about Park ecosystems, inquiry-based science, or exploration through art, backpacking, or writing. To learn more about Olympic Park Institute programs, check out their website at www.yni.org/opi or call them at (360) 928-3720.

North Cascades National Park

At North Cascades NP students and teachers are co-producing web pages focused on park research. Web pages will cover issues such as glaciers, tropical and migratory birds, and a forest carnivore study. North Cascades National Park is hoping to have the project run-

ning next year. If you want to find out more about education programs at North Cascades National Park, go to our website at www.nps.gov/noca or call (206) 386-4495 x19.

North Cascades Institute

Learn more about North Cascades National Park through North Cascades Institute. Teaching all ages, the Institute encourages hands-on discovery and stewardship of the North Cascades. School and summer youth programs, teacher workshops, and adult education field seminars focus on the natural and cultural history within and around the Park. The Institute also offers volunteer and internship opportunities and a graduate program in environmental education. In March 2004, the Institute will open the North Cascades Environmental Learning Center in partnership with the National Park Service and the City of Seattle. The Center is located at the base of Sourdough Mountain on the shore of Diablo Lake in North Cascades National Park. To find out more about North Cascades Institute programs, visit www.ncascades.org or call (360) 856-5700 x209.

Mount Rainier National Park

The Park curriculum-based education program offers in-park programs for visiting school groups; Best of the Northwest programs, multi-day education experiences for upper elementary students, with its many regional partners; curriculum enrichment programs in the classroom and after school programming at nearby partner school Columbia Crest Elementary, where we are working with teachers and administrators to develop a National Park Resources Magnet School. At this year's second annual National Park Week/Earth Day Event students remove, counted, and weighed over 1,600 invasive plants along School/Park boundary.

One of the projects Park Education Staff are working on is a middle school curriculum that focuses on the volcanic processes, products, and hazards associated with Mount Rainier, partnering with the US Geological Survey (USGS) for curriculum development

and teachers for curriculum review and pilot testing. This summer, the Park will host a joint volcano teacher workshop with the USGS. Also this summer, through an NCCLN grant, Mount Rainier NP and Seattle's Klondike National Historical Park will bring teachers to their parks as Curriculum Teacher Advisors to help develop on-site, pre-, and post-visit lessons and activities.

For more information about the Park's programs and various partners and projects, check out the Park's new education web site at www.nps.gov/mora/education/index.htm or call (360) 569-2211 x3319.

Fort Clatsop National Memorial

Fort Clatsop National Memorial (NMem) is developing a science project that integrates the history of the Lewis and Clark Expedition and the National Science Education Standards. Fort Clatsop NMem has begun to develop a companion teacher's guide and a guide to the scientific discoveries of the Lewis and Clark Expedition. They are also working with other agencies to develop site-specific lesson plans for Lewis and Clark sites along the lower Columbia River. The lesson plans will look at the impacts of change over time, using the Lewis and Clark Expedition as a baseline for the timeline. Lesson plans will include natural history inventories and habitat restoration among other activities. Fort Clatsop NMem also plans to develop curriculum guides for teachers, teacher workshops, site-specific guides, and traveling trunks in the near future. For more information, go to our website at www.nps.gov/focl/erpl.htm or contact the Park at (503) 861-2471.

Seattle's Klondike Gold Rush National Historical Park

In addition to partnering with Mount Rainier on the NCCLN Park Curriculum Teacher Advisor Program grant, Klondike NHP will host this summer's first ever regional National Park Service Teacher Workshop. For more information about Park education programs, call (206) 553-7200 x331 or visit the website at www.nps.gov/klse/KLSE_Education.htm

continued on page 12

San Juan Island National Historical Park
San Juan Island NHP's on-site education programs tell the story of the Pig War and the colorful boundary dispute between the US and Great Britain. In addition, Park programs are being developed that feature Jakle's Lagoon Estuary. The Park is partnering with local schools to provide in-class curriculum enrichment programs. The Pig War 4th and 5th grade curriculum and traveling trunk are available for loan. For more information about our educational programs, visit our website at www.nps.gov/sajh, or call the park at (360)378-2240.

The Columbia Cascades Support Office (CCSO) in Seattle

In the greater Seattle area, the National Park Service has been connecting with youth and educators in a number of ways. Through various youth groups, over two hundred students visited a national park last summer by volunteering their service to restore park ecosystems (see second article on page 9). Through teacher trainings, the CCSO has provided educational materials to over 50 teachers in the Seattle area. In addition, high school students have utilized their creative and scientific talents by developing web pages on park science projects. If you want to find out more about these programs, contact the Support Office at (206) 220-4017.

National Park Service
U.S. Department of the Interior



The National Park Service cares for the special places saved by the American people so that all may experience our heritage.

Make a virtual visit!

To learn even more about each of the parks in the North Coast and Cascades Learning Network, we encourage you to visit our websites:

Mount Rainier National Park

www.nps.gov/mora

North Cascades National Park

www.nps.gov/noca

Olympic National Park

www.nps.gov/olym

Ebey's Landing National Historical Reserve

www.nps.gov/ebla

Fort Clatsop National Memorial

www.nps.gov/focl

Fort Vancouver National Historic Site

www.nps.gov/fova

Seattle's Klondike Gold Rush National Historical Park

www.nps.gov/klse

San Juan Island National Historical Park

www.nps.gov/sajh

2002 NCCLN Partners

In its first year the Learning Network provided science, environmental, and resource stewardship programs to at least 16,400 children, teenagers, and adults who would not have otherwise been contacted.

Below is a short list of organizations that have partnered in Learning Network activities in 2002.

EarthCorps

Earthwatch Institute

North Cascades Institute

Northwest Indian College

Olympic Park Institute

Public Land Corps

Seattle Parks Department

Seattle Youth Forum

Skagit County Historical Society

Skagit River Stewards

United States Forest Service

United States Geological Survey

Washington's Schools & Universities

Wilderness Technology Alliance

University of Washington

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