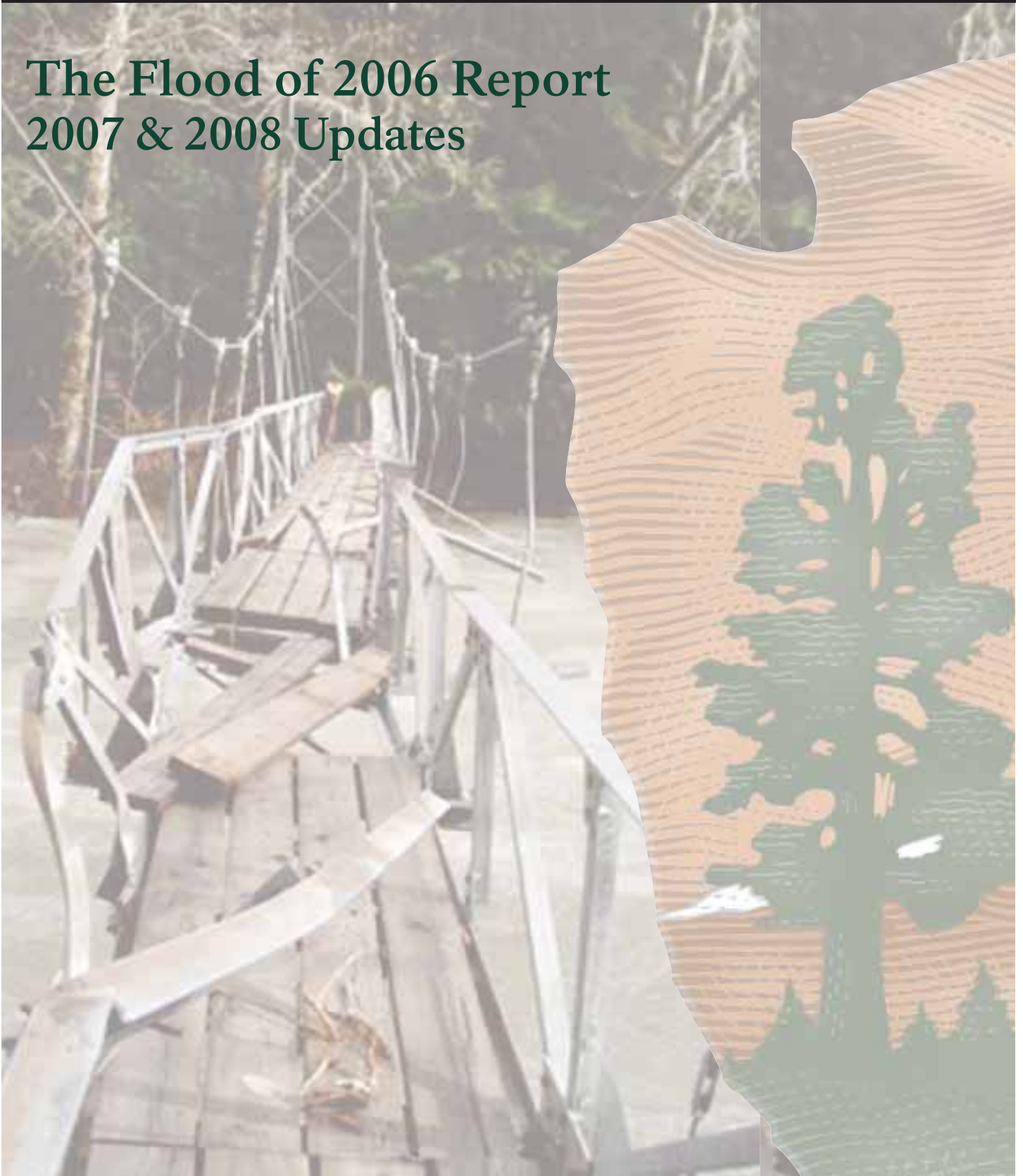


Mount Rainier National Park

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The Flood of 2006 Report 2007 & 2008 Updates



March 2009

Contents

2007 Update

Introduction	4
The Flood	6
The Emergency Response	7
Assessing the Damage	9
Flood Damage	14
Congressional, Agency and Volunteer Support.....	17
Congressional and Agency Leaders Offer Help	
Northwest Parks & Public Lands Storm Recovery Coalition	
Volunteer Support	
Flood Recovery Funding	22
Cost Savings Approaches	
Volunteer Contributions Maximize Cost Savings	
Spreading the Word	23
Public Information Meetings Held	
Park Flood Makes Headlines	
Accomplishments through December 2007	25
Repair Options	
Looking Ahead to 2008 and Beyond	30
Projects To Be Accomplished	
Flood Protection	
The Year in Review	

2008 Update

Progress in 2008	33
-------------------------------	-----------

2007 & 2008 Expenditures

Budget Summary	40
-----------------------------	-----------

2009 and Beyond

The Work Ahead	42
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The Flood of 2006: 2007 Update

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December 2007

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Raging flood waters hiss as debris from Mount Rainier National Park washes downstream.

Park staff flood memory –

*“Watching the water rise behind Longmire and slowly take out trees.
The noise the river made, like thunder.”*

Introduction

On November 6-7, 2006, Mount Rainier National Park (MORA) was inundated with 18 inches of rainfall in a 36 hour period. The rain unleashed raging torrents of water in rivers and streams and landslides of mud and rock. All park visitors and most employees evacuated from the park Monday, November 6. By the time the water receded, park roads were impassable, power and water systems were out, and some campgrounds had literally disappeared from the map. The park would be forever changed.

The flood was a natural event unlike any other that has been recorded in Mount Rainier National Park's 108 year history. Mount Rainier has experienced many other floods and mudflows that have changed the natural landscape and threatened the security of structures. None of these events left the park without utilities and roads, a safe entry corridor or removed campgrounds throughout the four corners of Mount Rainier as the November 2006 flood did. Damage to the park resulted in an historic six-month closure of the park.

One year later, the park is still recovering. Following the initial emergency response to the flood, the park's primary focus became re-establishing access to the park and restoring the park's utility infrastructure. Road repairs began immediately on the Nisqually Road, and utility crews worked to restore severed utility lines, commercial power, phones, sewer systems and water to the park. Throughout the winter months, repairs continued and on May 5, 2007, six months after the flood, the park celebrated the opening of the gates to visitors once again.



Congressman Norm Dicks, Congressman Dave Reichert and Park Superintendent Dave Ueberuaga swing the gates at Nisqually Entrance to reopen Mount Rainier National Park on May 5, 2007.



On Nov. 7, 2006, park staff began evaluating the damage and initiating repairs.

The summer was filled with healing as volunteers came by the hundreds to help rebuild the park. Backcountry assessments conducted once the snow melted revealed damages throughout the park's trail system. Each passing day, more and more recovery projects were completed as the park continued to reopen areas to visitors.

The road ahead looks a little brighter for 2008. Silver linings are abundant throughout the park as partnerships and volunteer support are stronger than ever. The breadth of projects yet to be completed gets smaller each day.

Park staff flood memory -

"It was by far the most emotional experience of my life. I evacuated the park with the other employees and broke into tears when I arrived home. Mother Nature had brought me to my knees only to weep in her bittersweet majesty."

The Flood

The scale of the event made history. The 18 inches of rainfall recorded at Paradise in 36 hours exceeded all previous records in the history of Mount Rainier National Park. Snow levels during the storm stayed above 10,000 feet in elevation, with the majority of precipitation falling as rain. Some existing snow above 7,000 feet melted during the storm, adding to the runoff in the rivers.

As the rain flowed down mountainsides and roads to the main watersheds, it caused extreme soil erosion and slides. It uprooted large areas of trees that eventually caused logjams that redirected water flow.

Park staff flood memory -

"I was asked to help evacuate equipment from the Nisqually fee station. When I arrived, I walked out to the river to see how it looked. Besides seeing the river channel completely full, surging ahead, I also saw a lot of junk – culverts, wood, plastic. Only later did I realize that it was Sunshine Point being washed away!"

The event resulted in the undermining and removal of roadways, campsites and utilities. The flood also washed away multiple foot bridges and sections of hiking trails, rendering some unsafe for travel.

Another exacerbating factor to the flooding is aggradation, a process by which the park's glacier riverbeds fill with rock and cause the water level to rise. This occurs as Mount Rainier's glaciers melt. Boulders, rock and silt are captured by the moving glacier and trapped within the frozen ice. All of the embedded material is released into the river as the ice melts. The river gradually tumbles the rock downstream, piling it up in river channels. During the November flood, the riverbed where Tahoma Creek flows under the Nisqually Road rose more than four feet. Because of aggradation, the White River is, at some places, 12 feet above adjacent State Route 410. Parts of the historic Longmire Village are well below the current elevation of the Nisqually River, and the river is nearly level with the park road in several places.



Kautz Creek left its channel more than a mile upstream from the park road. It flowed through the forest and then over and under the park road 200 yards east of the bridge.

The Emergency Response

The tasks that began while the flood was in progress mainly dealt with personal safety and the security of property. In the days immediately following the flood, assessment and stabilization turned to recovery efforts as road crews rebuilt sections of the Nisqually Road. Teams were established to evaluate trails and wilderness conditions. Power and sewer lines were restored.

“During the peak of the storm, we were already ordering rock and heavy equipment so we could start repairing the Nisqually Road,” Superintendent Dave Uberuaga said.

Park staff flood memories -

“I remember how everyone worked together as one and began rebuilding everything that was damaged. The camaraderie was great. Thank you for letting me be a part of this organization.”

“Being in a hole for three weeks.” (utility crew member)

“The teamwork that it took to install the temporary power poles at Kautz Creek.”

“The awesome power of Nature. Unstoppable.”

Flood recovery tested staff capacity and organizational strength. The flood displaced 55 park employees, and 82 employees were assigned to the flood incident. Park employees pulled together to rebuild and recover, many working many long hours and often outside their official position descriptions. The park maintained a sustained emergency response for ten months, accumulating record hours of overtime and stretching resources to their limits. In fiscal year 2007, 14,078.75 hours of overtime were recorded as a result of flood recovery. Park staff rallied to respond to the crisis and accomplished remarkable things in a very short time.

Park staff flood memory -

“The new Education Center being filled with park staff instead of school kids for several months.”



At Sunshine Point, construction began on a replacement road on November 8, 2006.

Assessing the Damage

Road Damage

All the main access roads to Mount Rainier National Park, except for State Route 410 in the northeast portion of the park, sustained damage. However, the White River did overflow its banks inundating State Route 410 for several miles during the height of the flood.

- As the Nisqually River swelled, it took out 200 yards of the Nisqually Road at Sunshine Point. At mileposts 5 and 9, road embankments were severely undercut, requiring stabilization and reconstruction of the road in those areas.
- Kautz Creek changed course about a mile above the Kautz Creek Bridge and flowed instead through the forest and across the road 200 yards east of the bridge.
- State Route 123, the major road connecting Ohanapecosh to White River and Sunrise, washed out in four places. One washout, at milepost 11.5, cut across both lanes to a depth of 70 feet.
- The Stevens Canyon Road washed out in three places. One landslide on Backbone Ridge collapsed the road 1500 feet down to the Ohanapecosh River.



State Route 123 was heavily damaged during the flood.



Aerial and ground surveys found washouts at three places on the Stevens Canyon Road. One washout was 80 feet deep, and another sat atop a landslide 1500 feet long above the Ohanapecosh Campground.

Campground Damage

Campgrounds suffered varying degrees of damage around the park. The worst hit by far was Sunshine Point Campground, the park's primary year-round camping area. Carbon River's Ipsut Creek Campground had minimal impacts to the actual camping area, but access was lost to it with the heavy flood damage on the Carbon River Road. As a result, Ipsut Creek Campground is open only for walk-in camping.

- The Nisqually River breached protective levees to reclaim about five acres of land from Sunshine Point Campground.
- Erosion caused damage to campsites, the access road and the amphitheater along the edge of the White River.
- A landslide that swept 1500 feet down to the Ohanapecosh River from Stevens Canyon Road destroyed several campsites at the end of the C loop in the Ohanapecosh Campground.
- The Carbon River Road washed out, eliminating car camping at Ipsut Creek Campground. Walk-in camping is available.
- Four backcountry campsites were closed.



Sunshine Point Campground was gone, along with 200 yards of road.

Trail Damage

- Damage ranged from sections of trail being obliterated to embankments being undercut.
- Trees, boulders and other debris blocked passage on miles of trail in the park.
- More than 28 bridges and footlog crossings were damaged or washed away.
- The debris laden Ohanapecosh River destroyed the suspension bridge leading to the island at Grove of the Patriarchs.
- The Tahoma Creek suspension bridge was significantly damaged.
- The Carbon Glacier Trail and Glacier Basin Trail were severely damaged, requiring the park to reassess the routes and develop plans for rebuilding these popular trails.

Utilities and Infrastructure

- Flood waters broke the park's main utility lines leaving Paradise and Longmire without sewer, phone, water and commercial power.
- Water entered the Ohanapecosh Visitor Center resulting in minor damage.
- The Kautz Helibase lost part of its footprint to Kautz Creek.
- Backcountry structures lost roofs and radio towers.
- The new Emergency Operations Center was threatened by the Nisqually River literally at its doorstep.
- The original Longmire flood wall washed away.

Park staff flood memory -

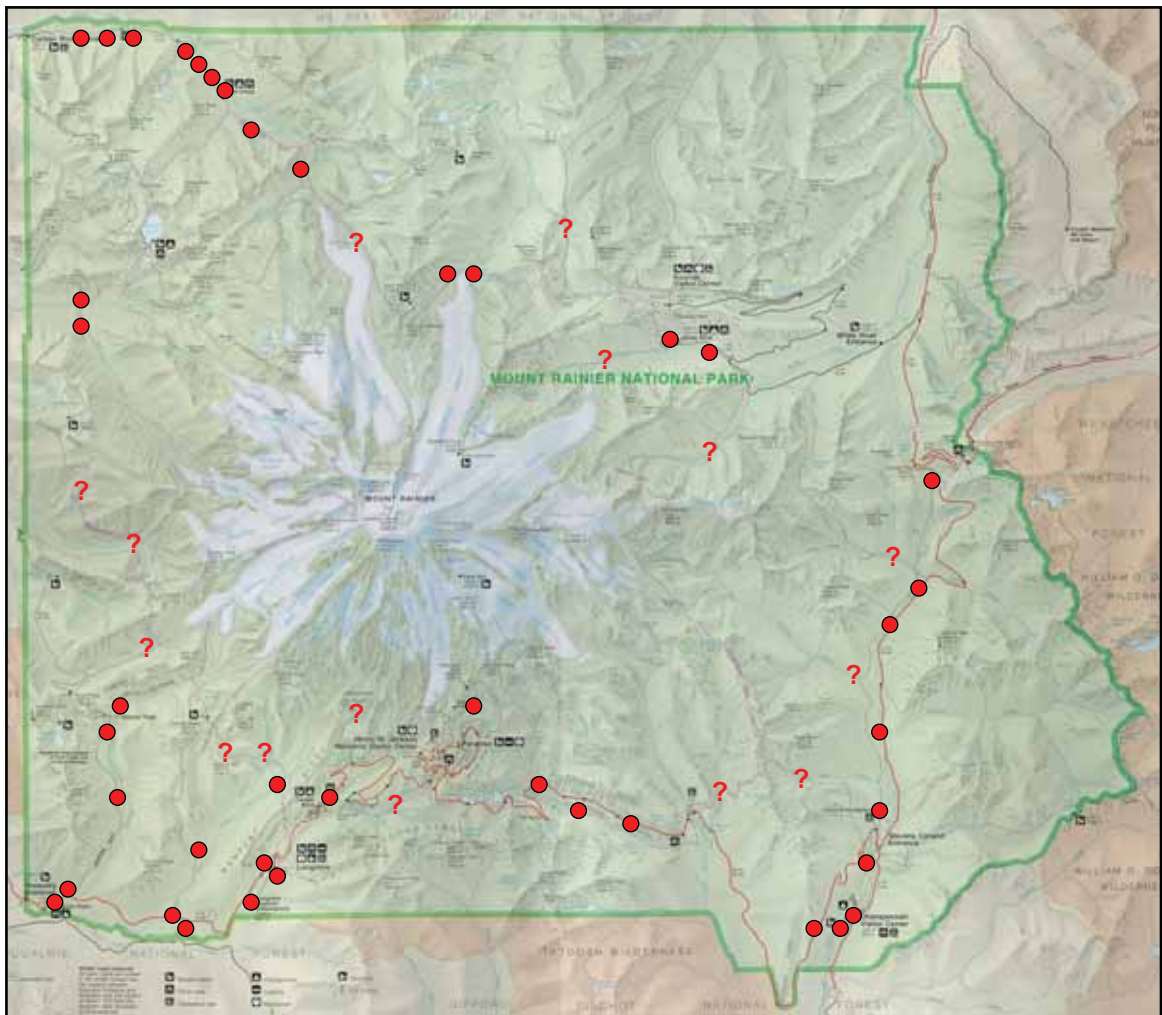
"I'll remember being parked on the Westside Road as the water started to come up and feeling the road shake as it was being washed out. Our exit was hurried to say the least!"



The park's buried power line was destroyed for a length of 1200 feet at Sunshine Point, shorted out at Kautz Creek and exposed by erosion in two other places. The overhead line to the water treatment plant at Longmire was also broken.



The Emergency Operations Center at Longmire was especially vulnerable. Sixty feet of levee and river bank eroded away during the storm, leaving one corner of the building hanging over empty space.



Areas of flood damage.

Park staff flood memory -

“My home phone ringing at 5:00 a.m. and my son, who is on the road crew, saying ‘Mom, we lost the road.’”

Flood Damage by Site

Sunshine Point

The Nisqually River breached protective levees to reclaim about five acres of land at Sunshine Point, including 200 yards of the park road and much of Sunshine Point Campground. The park's main utility lines were broken, including the buried cable that provides commercial power to Longmire and Paradise.

Westside Road

Flooding from Tahoma Creek damaged long stretches of this dirt road.

Park staff flood memory -

"Driving up on the Westside Road as the flood hit. A trickle became a stream as the earth shook with the weight of water."

Kautz Creek

Kautz Creek changed course about a mile above the road bridge and flowed instead through the forest and across the park road 200 yards east of the bridge. The flood undermined the road, damaged the buried power line and caused severe erosion through the Kautz Helibase and maintenance yard.

Nisqually Road

The Nisqually River severely eroded the bank of the roadway in two places, at mileposts 5.2 (one mile below Longmire) and 9.1 (one mile above Cougar Rock Campground). At both locations the flood left the roadway partially unsupported above a sheer drop off and in danger of collapsing into the river.

Longmire

The Nisqually River destroyed long stretches of levee at Longmire, eroding the bank on both sides of the channel. On the north side, the river undercut a corner of the park's Emergency Operations Center. On the south side, the park's service road washed out in several places. Power and sewer lines were destroyed where they crossed the river, and the water system was flooded with debris.

Park staff flood memory -

*"Watching the water rise behind Longmire and slowly take out trees.
The noise of the river made, like thunder."*

Paradise

Like the one at Longmire, the water reservoir at Paradise filled with mud and debris during the storm. Freezing weather following the storm burst a water pipe in the Paradise Inn, causing some water damage.

Stevens Canyon

The Stevens Canyon Road washed out in three places. This road is typically buried by snow during winter, so the full extent of the damage could not be determined until late spring when the

road reopened. The worst washout, on Backbone Ridge on the east end of the road, sits atop a landslide that sweeps thousands of feet down to the Ohanapecosh River.

Ohanapecosh

The Ohanapecosh River destroyed several campsites at the end of C loop. High winds toppled numerous trees. Water runoff pooling behind the visitor center caused water damage to the building's walls and floors.

The Grove of the Patriarchs

Flooding buried this popular island of old growth trees in a layer of silt four feet deep. The debris-laden Ohanapecosh River destroyed the suspension bridge leading to the island and knocked the board walk through the Grove off its foundations.

Highway 123

This major highway through the park washed out in four places. One washout, at milepost 11.5, cuts across both lanes to a depth of 70 feet. The Federal Highway Administration initiated repairs on this road in June that were completed in September.

*Park staff flood memory -
"Kayaking down SR123."*

Highway 410

The White River overflowed its banks during the storm, inundating Highway 410 for several miles. However, the highway did not sustain any long-term damage.

White River Road and Campground

Erosion caused damage to campsites and an amphitheater along the edge of the White River. The shoulders of the campground's access road were also eroded.

Mount Fremont and Gobbler's Knob Fire Lookouts

Either during the storm in November or a severe windstorm in December, high winds tore the roofs from the historic Mount Fremont and Gobbler's Knob fire lookouts. At Gobbler's Knob, two of the walls caved in as well.

Carbon River

Flooding from the Carbon River partially or completely destroyed two miles of road between the park entrance and Ipsut Creek Campground. In places, only culverts and road signs remain to remind visitors that new river channels used to be roadways. The historic Ipsut Creek Patrol Cabin was undermined when a channel of the river flowed directly beneath it. The windstorm in December toppled dozens of trees across the damaged roadway.

Trails

Following the storm, it was difficult to estimate damages to the park's trail system because of the large amounts of snow that buried them. A complete survey of the damage was not possible until the snow melted in July. Once the damages were able to be assessed, it became evident that the trail system had lost many low-lying trail bridges and that major sections of trail collapsed or were scoured down to bedrock.



High wind tore the roofs from the Fremont and Gobbler's Knob Fire Lookouts.



More than two miles of road were destroyed along the Carbon River. Ipsut Creek cut a deep channel directly beneath the historic Ipsut Creek Patrol Cabin.

Park staff flood memory -

"Walking what was the Carbon River Road in February and seeing all those old growth trees down. The destruction was unbelievable."

Congressional, Agency and Volunteer Support

Congressional and Agency Leaders Offer Help

Immediately following the storm, support came pouring in. The Pacific West Region of the National Park Service facilitated assignment of incident support staff and equipment from Yosemite National Park, Sequoia and Kings Canyon National Parks, Dinosaur National Monument and Redwood National Park. Pacific West Regional Office, park headquarters budget office and Denver Service Center staff provided administrative, design, contracting and financial support when it was needed most.

Supporting partners including Guest Services Incorporated, Federal Highway Administration, Washington Department of Transportation, U.S. Geological Survey, Pierce County Sheriff, Pierce County Fire Station 23 and Lewis and Pierce County governments, also provided emergency response and support in the initial recovery of the park. Federal Highway Administration continues to provide support to the recovery of the park's road system.

On November 17, 2006, National Park Service Director Mary A. Bomar visited Mount Rainier National Park with Pacific West Regional Director Jon Jarvis and Pacific West Associate Regional Director Rory Westberg. They met with park staff and inspected some of the more accessible areas in the park that were damaged by the severe flooding, including Sunshine Point Campground, Kautz Creek, Longmire and the Nisqually to Paradise Road; they spoke at length with employees working on the short- and long-term recovery efforts.



National Park Service Director Mary A. Bomar and Regional Director Jon Jarvis visited the park and toured the damage.

Congressman Norm Dicks (WA -6th) was one of the first elected officials on site during the evaluation of damages to the park. During a tour of the storm-ravaged park on November 21, 2006, Mr. Dicks voiced his commitment to help the park rebuild. "This won't happen overnight," he said, "but securing funding to repair Mount Rainier will be my first priority in Congress." He

was stunned by the worst weather-related damage in the park's 108-year history. "It was unbelievable," Dicks said. "Sunshine Point campground was completely devastated; it is gone. Roads were knocked out. Rivers had jumped out of their channels. ... It was bad."ⁱ

As Chairman of the House Appropriations Committee Subcommittee on Interior, Environment and Related Agencies, Congressman Dicks was instrumental in securing emergency flood recovery funding for Mount Rainier. Since the flood, Congressman Dicks made three visits to Mount Rainier: seeing the damage, celebrating the park's reopening on May 5, 2007 and launching National Public Lands Day on September 27, 2007.



Congressman Norm Dicks surveyed damage in late November and expressed his commitment to secure funding for recovery efforts.

On July 11, 2007, on the floor of the U.S. Senate, Senator Maria Cantwell (WA) commended the staff of Mount Rainier, Olympic and North Cascades National Parks for their commitment to repairing and restoring facilities damaged by the storms. "Their efforts exemplify the mandate of the National Park Service 'to provide for the enjoyment of [the parks] in such manner and by which means as will leave them unimpaired for the enjoyment of future generations,'" Cantwell said. "Without the extraordinary efforts of Park Service employees, it is likely that the parks would be decades from completing repairs, to the extent that they would be completed at all. It is my honor as Senator of the State of Washington to recognize the heroic efforts of these men and women and express my gratitude on behalf of my constituents and all Americans that enjoy and treasure these parks as sanctuaries of enjoyment, recreation, learning, and personal renewal."

Northwest Parks and Public Lands Storm Recovery Coalition



In response to the fall storms of 2006 and with the assistance of REI, the National Parks Conservation Association, the Student Conservation Association, the Washington Trails Association and the Washington's National Park Fund formed a coalition to facilitate the restoration of Northwest national parks and forests. Mount Rainier National Park and the Student Conservation Association formed a partnership to manage an army of volunteers, supported by the Northwest Parks and Public Lands Storm Recovery Coalition. The result was extraordinary public support for Mount Rainier at a time when the park needed it the most.

Volunteer Support

Volunteer support at Mount Rainier in 2007 was unprecedented. Following the flood, thousands of concerned supporters called the park to offer assistance in the flood recovery. The response showcased the best that the community and the National Park Service could offer. Letters, emails and phone messages as well as monetary donations flooded in from individuals and community groups who wanted to help with flood recovery.



Help came in many forms, including this crew of store managers from REI.

In January, the Student Conservation Association (SCA) was selected to direct volunteer flood recovery efforts at Mount Rainier National Park. The Association has over 50 years of history in Washington State, and is now a nationwide force of volunteers committed to protecting and preserving the environment. Through internships, conservation jobs and field crews, SCA members meet environmental challenges while gaining hands-on experience in every conservation discipline. Mount Rainier also dedicated a full-time volunteer coordinator to flood recovery, a position the park plans to continue in future years.

It took several months before the park's infrastructure was repaired enough to reopen to the public, and a few months more before the snow melted enough to actually do much. Even so, when the time came, people stepped up in record numbers to follow through on their offers of help; many volunteers for the first time. Corporations such as Starbucks, Recreational Equipment

Inc. (REI), Boeing and Wal-Mart sent teams and financial support to help with the recovery. Supporters returned to volunteer for multiple projects throughout the summer, and developed a new passion for Mount Rainier that will continue long into the future. Many are already calling to ask how they can sign up for next year.

After a tremendously successful summer, the first season of the Mount Rainier Recovery program came to a triumphant close on September 29 with a final, festive day of hands-on service and celebration. More than 150 enthusiastic individuals of all ages showed up on a chilly autumn day to honor the park and National Public Lands Day and to do one more favor for the mountain. Most of the volunteers were people who had served the park this summer and were returning to connect with others who had been part of the effort. The feeling of camaraderie was evident in smiling faces and cheerful conversation as volunteers worked on projects of re-routing a washed-out trail, clearing debris from a flooded campground and planting willows in flood-damaged areas.



Mount Rainier National Park was featured on the annual 2007 National Public Lands Day poster and Ranger Doug produced this commemorative Mount Rainier Recovery poster as a thank you to Mount Rainier volunteers.

Park Superintendent Dave Uberuaga spent the day smiling broadly and thanking volunteers. After a celebratory barbeque dinner, he addressed the group, expressing deep gratitude for everything the attendees and others have done to help the park this season. More than 1,700 volunteers have come to the park's aid this year, contributing a record 84,000 hours of service. Over half the trail work completed in the park this summer was done by volunteers. The monetary value of this service donated to the park exceeds \$1.5 million.

2007 Volunteers by the Numbers

Number of Volunteers	1,724
Total Volunteer Hours	84,038
Value of Volunteer Time ⁱⁱ	\$1,577,393
Increase from 2006	92%

2007 Volunteer Program Highlights

Activity	Hours
Campground Maintenance and Restoration	1583
Cultural Resources Assistant	201
Culvert Clearing	244
Education Program	1834
Flood Documentation and Compliance	1424
Japan Volunteer-in-Parks Association	990
Lakes, Aquatics and Fish Crew	1110
Revegetation	1343
“Sherpa” projects	241
Trail Repair	41,062
Wilderness Clean up	197
Wildlife Surveys	440



2007 Japanese Volunteer-in-Parks

SCA Contributions in 2007

Activity	Completed
SCA Mount Rainier Corps	11,343.5 hours
Campgrounds Opened	4
Campsites cleared or maintained	346
Backcountry campsites constructed	4
Historic cabins deconstructed	1
Road culverts cleared	222
Roadside erosion control	40,660 ft. ²
Seedlings planted	2,000+
Trails brushed	39,670 ft.
Trails raked	79,700 ft
Ditches cleared	7,808 ft
Drains cleared	1,242
Check steps constructed	27
Retaining walls built	9 totaling 124 ft.
Stumps removed	110
Trail reroute constructed	3,600 ft.

Flood Recovery Funding

The flood recovery at Mount Rainier was *initially* estimated to cost \$36 million, but was revised to \$24-27 million.

- \$24 million was targeted from the Federal Highway Administration's (FHWA) Emergency Repairs of Federally Owned Roads (ERFO) program. Because of cost saving approaches, Mount Rainier now estimates that these costs will be significantly less than original estimates, coming in between \$11.5 and \$14 million.
- \$12 million was also committed from the National Park Service's budget for flood damages including repairing trails, buildings, utilities and the initial flood response. Current estimates project the final cost to the National Park Service to be \$12.7 million.

Cost Savings Approaches

- Mount Rainier used existing park crews in lieu of awarding contracts to perform a majority of the recovery work, providing significant saving through reduced overhead and anticipated cost mark-ups associated with those remote sites.
- At Kautz Creek park crews were able to install culverts in lieu of major bridge construction. Highway 123 had a major washout and FHWA also installed culverts instead of a bridge.
- Solutions were engineered with consultants to apply alternative methods to road repair projects. For example, at White River, an estimated \$1 million repair was completed for only \$400,000 by using river barbs, a lower cost alternative to rip rap.

Volunteer Contributions Maximize Cost Savings and Protection of Wilderness Areas

- Many volunteers have contributed to the recovery efforts, accounting for over \$1.5 million in savings. Volunteers also enabled the park to use less expensive solutions to recovery projects. For example, volunteers from Starbucks made three trips in to Stevens Canyon carrying wooden bridge planks, saving the park from having to contract for a helicopter to deliver the planks into the canyon.
- Volunteers removed antiquated telephone cables by hand in the wilderness areas near the Ohanapecosh Visitor Center and hand-cleaned ditches and culverts to protect aquatic species along roadways.
- Volunteers also provided a more eco-friendly solution to flood recovery projects in the park's wilderness areas by using crosscut saws and other hand tools instead of power tools.
- Volunteers did a great deal of routine recurring maintenance with roads, trails and campgrounds, allowing park crews to focus on more complex repairs to the park.
- Partners, including Mount Rainier Recovery Coalition, Student Conservation Association (SCA), National Parks Conservation Association, The Mountaineers, Washington's National Park Fund and Washington Trails Association helped offset costs through fundraising and volunteer efforts.
- REI made an initial corporate donation of \$75,000, to jumpstart our partner organizations in what has become the Mount Rainier Recovery Coalition.

Spreading the Word

Public Information Meetings Held

Between November 2006 and January 2007, Superintendent Dave Uberuaga invited the public to attend flood recovery information sessions in gateway communities of Mount Rainier National Park. At these meetings he provided residents with information about flood damage and plans for recovery.

“The magnitude of this event affects not just the park roads, visitors, and staff, but also the local communities who rely upon the park for their livelihood and their recreation,” he said. “We feel it is extremely important to engage park neighbors and to keep them abreast of the ongoing recovery efforts.”

Sessions included a presentation of flood impact photos and the opportunity to ask questions of park managers.

Community Flood Recovery Information Sessions

- ▶ November 16th (3 p.m.), Green River Community College, Enumclaw
- ▶ November 16th (7 p.m.), Eatonville Elementary School, Eatonville
- ▶ December 11th (7 p.m.), Fire Station on Hwy 123, Packwood
- ▶ December 12th (7 p.m.), Enumclaw Library, Enumclaw
- ▶ December 13th (7 p.m.), Fire Station 23, Ashford
- ▶ December 14th (7 p.m.), Eatonville Community Center, Eatonville



The headlines.

Park Flood Makes Headlines

While the park focused on rebuilding, the news media kept the story in the headlines throughout the year, aiding in the park's recovery process by educating the public, communicating the park's need for volunteers and rallying support throughout the country. Featured on television, radio, newspapers and magazines, Mount Rainier's story captured the interest of the public as supporters sought out information on the park's recovery. Large regional newspapers such as *The News Tribune* (Tacoma), *The Seattle Times*, the *Seattle Post-Intelligencer*, and nationally distributed papers such as *The New York Times* and the *Los Angeles Times* all carried feature stories on flood recovery. Talk radio and nationally syndicated news programs such as National Public Radio's *Morning Edition* featured stories and updates on the flood recovery.

Even though the gates were closed, the internet and blogs played a key role in keeping information flowing to the outside world during the flood recovery.

Accomplishments through December 2007

All major public road construction projects were complete by the end of November; electrical, water and sewer utilities have been restored to full service; major campgrounds were reopened; and many trails throughout the park were reopened, including the Wonderland Trail in early August. Substantial progress has also been made on flood protection at Longmire, and will continue in to the coming year.

Sunshine Point

Mount Rainier's road crews rebuilt the road at Sunshine Point, restored the park's buried utility line and completed paving in February 2007, marking the first project completed in the park. More than 10,000 tons of rock was used to reconstruct the road and protect it from the Nisqually River.

Westside Road

The Westside Road has been repaired as far as Dry Creek and is now open to that point.

Kautz Creek

Park maintenance crews have installed three 30-inch culverts and two 12-foot culverts to accommodate the new creek channel. Temporary overhead power lines were installed to restore power to Longmire and Paradise. Most of the overhead power lines have now been buried.



Two 12- foot culverts accommodate the new Kautz Creek channel at Nisqually Road.

Nisqually Road

Park road crews rebuilt the road embankment along this road. Access to Longmire was re-established in December and the National Park Inn was allowed to reopen on a part-time basis

before Christmas 2006. The road was reopened to public access on May 5, 2007. In October and November, park road crews repaired the Van Trump Curves segment of the Nisqually Road to stabilize creek embankments and protect the road from further damage.

Longmire

Park crews restored power, sewer and water services at Longmire. The Emergency Operations Center was stabilized, and the washouts leading to the park's service entrance were repaired. The National Park Inn and Longmire Museum are now open daily. Park employees based at Longmire returned to their regular offices as well. In October 2007, a new flood wall was constructed on the west bank of the Nisqually River to improve flood protection for the National Historic District and the Emergency Operations Center was reopened.



Re-establishment and improvement of flood protection structures at Longmire are underway with the Longmire levee now complete.

Paradise

Despite 10 feet of snow on the ground at Paradise, park maintenance crews were able to dig out the flooded Edith Creek water reservoir. Contractors continued the ongoing renovation of the Paradise Inn, scheduled for completion in April 2008 and construction of the new visitor center scheduled for completion in fall 2008. Paradise is fully operational and snow play is scheduled for this winter.



Power, sewer and water utilities were restored, despite 10 feet of snow on the ground at Paradise.

Stevens Canyon

Repairs were made to two washed out areas on Stevens Canyon Road, allowing the road to be open all summer for visitor traffic. This fall, Stevens Canyon Road was closed for repairs to the major washout at Backbone Ridge and completed in mid-November.

Ohanapecosh

Most of the campground at Ohanapecosh was repaired and opened May 25. Structures only received minor damages and were able to be repaired. Riverside walk-in campsites that were lost will not be replaced.

The Grove of the Patriarchs

Crews replaced the damaged suspension bridge and repaired the board walk, reopening the Grove of the Patriarchs in October.

Highway 123

A contractor completed repairs to the damaged washout at milepost 11.5 and park road crews cleared and re-established culverts. Washington State Department of Transportation made repairs to areas of the road that were undermined during the flood. Culvert maintenance is ongoing on this road.

Highway 410

No major repairs were necessary and the road reopened as scheduled in May.

White River Road and Campground

Repairs have been made in the campground area and to the access road.

Park Staff Memories -

"I'll remember the months of withdrawal from my 'mountain fix,' as access to the park was so limited. I'll remember my 1st hike up the Carbon River Road – now a creek – and the huge amounts of devastation. It makes the last washout look like a rut. That's the beginning of when the damage throughout the park began to sink in. Every day reveals more evidence."

Mount Fremont and Gobbler's Knob Fire Lookouts

Park crews removed the walls and damaged structures down to floor level and rebuilt the lookouts, securing the roofs prior to the onset of winter weather.



Mount Fremont and Gobbler's Knob Fire Lookouts now have roofs and interior restoration will continue into 2008.

Carbon River

The historic Ipsut Creek Patrol Cabin was dismantled, flown to Mowich Lake, and trucked to Tahoma Woods for restoration.



The historic Ipsut Creek Patrol Cabin, undermined by flood waters, was deconstructed in August and transported to Tahoma Woods for restoration.

Trails

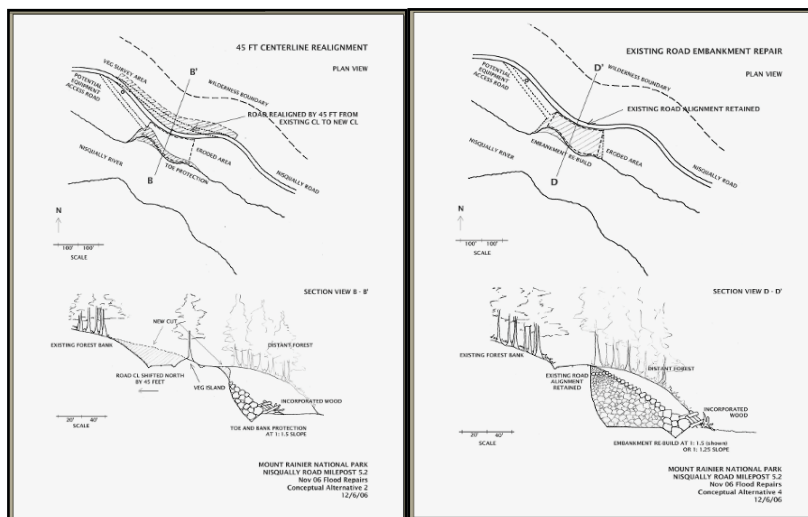
Work on the backcountry trail system was initiated in early 2007 with the help of more than 1700 volunteers. During the summer, crews were able to repair the suspension bridge at the Grove of the Patriarchs, replace 20-foot logs and repair or replace six trail bridges. The 93-mile Wonderland Trail, which circumnavigates the park, was reopened in August with only a 4-mile road walk required in Stevens Canyon.



With the help of volunteers and park crews, six backcountry bridges, have been replaced, such as this one over the North Puyallup River.

Repair Options

Throughout the recovery process this year, park crews and engineers have assessed the best possible options for recovering the park's infrastructure. Alternatives considered took into account long-term sustainability, cost, impacts to the natural environment and the historic landscape of the park. In many cases, cost savings were realized by the park through design alternatives such as using river barbs instead of rip rap, installing culverts instead of bridges, and using volunteer labor.



Repair options must be weighed carefully based on cost, impact on the park's natural and historic resources and long-term durability.

Looking Ahead to 2008 and Beyond

While much progress has been made to repair the park, many projects are ahead. While the past year focused on re-establishing access to the park, the coming year will shift focus to the backcountry to address structures that were damaged by the storms in November and December 2006.

Projects to be Accomplished:

Sunshine Point Campground – Because of the dramatic loss of land to the Nisqually River, Sunshine Point remains closed to the public. The park anticipates that Sunshine Point Campground will eventually reopen as a smaller campground or picnic area. Options for Sunshine Point will be assessed in 2008.

Westside Road – While open from the Nisqually Road to Dry Creek, the road was washed out repeatedly beyond this point in recent years and has been closed to traffic since 1986. Below Dry Creek, a smaller washout has reduced the road to one lane and park road crews completed repairs on this section before winter.

Longmire – On the Community Building and campground side of the river, additional flood protection is proposed to be constructed in the spring of 2008. Relocation of the sewer line at Longmire required removing portions of the campground road alongside the river. Crews repaired this road and paving in spring 2008 will complete this project.

Kautz Helibase and Maintenance Yard – Some damage remains at the maintenance yard. The park is still assessing the best alternatives for the long term relocation of the helibase away from the river. Temporary overhead power lines will need to be buried this coming year.

White River Road and Campground – Construction on the campground amphitheater has begun and will be completed in the summer of 2008. Road repairs are largely complete with paving scheduled for next spring.

Mount Fremont and Gobbler's Knob Fire Lookouts – Awaiting snow melt in spring to continue repairs to the interior and conduct the finishing work to the lookouts.

Carbon River – An Environmental Assessment is underway to determine the future of the Carbon River Road. Dismantling of the historic Ipsut Creek Patrol Cabin has been completed and the cabin is being stored at Tahoma Woods until a decision is made as to where the cabin will be placed next summer, pending the outcome of the Environmental Assessment.

Trails – Much of the trail recovery work is yet to be accomplished and may take two more seasons to complete because of the short window of opportunity to make repairs. With the arrival of snow on the mountain, most trail work has been suspended until June 2008. Environmental reviews have been initiated for the Carbon Glacier Trail and Glacier Basin Trail. Repairs are also anticipated for 2008 on a four mile section of The Wonderland Trail in Stevens Canyon that was severely damaged during the flood.



The White River now runs 12 feet above the elevation of Highway 410 for three miles.

The Year in Review

While the flood caused devastation throughout the park, the outcome of the flood is one of inspiration. Through the recovery process, the park received an enormous outpouring of support that is impossible to quantify fully. Park staff and volunteers showed tremendous leadership and perseverance during trying times. It is the strength and support of people that is making the park whole once again.

The Flood of 2006: 2008 Update

Prepared by:

Jennifer Mummart

October 2008

Mount Rainier National Park, working side by side with the community, concessionaires, partners, volunteers and businesses, has made great strides in the two years since the flood. The park is committed to ongoing scientific research to foster understanding of the environmental changes its landscape and ecosystems will endure, and will continue to work to ensure that Mount Rainier National Park provides the recreational opportunities and great family memories for generations to come. This update is a snapshot of the park's progress in 2008.

Progress in 2008

Sunshine Point

Light Detection and Ranging (LIDAR) technology to collect topographic data was completed when the weather cleared at Longmire and Sunshine Point. Mount Rainier staff members are working with National Park Service engineers and a consultant to revise restoration cost estimates based on the information collected. A first draft of an environmental assessment for the area is expected late in 2009. A consultant will help the park determine the future flood protection alternatives for the Sunshine Point area and Pierce County flood levee by evaluating the river hydrology (peak discharge for 2-500 year flood events, hydraulics, and sediment and debris transportation, including scour depths).

Westside Road

Below Dry Creek at milepost 3.1 – National Environmental Policy Act (NEPA) compliance has been completed for stabilizing the road bank and constructing two rock barbs.

From Fish Creek to Tahoma Creek Trailhead – NEPA compliance, by categorical exclusion, for road repairs from Fish Creek to Texas crossing, was approved on September 29, and work began the same day. A nationwide permit from the United States Army Corps of Engineers (USACE) for temporary diversion of Tahoma Creek for work above Texas Crossing was approved on September 26. Instead of a temporary bridge over Fish Creek, the park is proposing a rock crossing for heavy equipment. Repair work at two locations on the first three-mile section (at milepost 0.1 and milepost 3.1, the section open to public vehicular travel) up to Dry Creek has been completed. The revegetation crew will be planting salvaged plants and seeding this fall. Work to re-establish four wheel drive administrative access from Fish Creek to Tahoma Creek Trailhead is near completion.



Volunteer works on a revegetation project.

Kautz Creek

A bridge, on loan from the Federal Highway Administration (FHWA), was delivered at the end of September. A categorical exclusion under NEPA is expected to allow heavy equipment to cross Kautz Creek in the maintenance yard and to install the bridge over Kautz Creek to allow the park to remove equipment and materials from the storage area on the opposite side. Bridge installation is expected by early November.

Nisqually Road

Repairs at seven sites (Sunshine Point area, box culvert at intersection with Westside Road, Tahoma Creek Bridge, Kautz Creek area, milepost 5.1, milepost 9.0, and Upper Van Trump Curve) have been completed. The revegetation crew will be planting willows, Thimbleberry, Salmonberry, and Devil's club and seeding and planting salvage plants this fall. The revegetation work will be from the shoulder of the road down slope to the estimated high water line.

Longmire and Sunshine Point Flood Protection

LIDAR has been flown and the resulting maps are expected in November. River cross sections have been completed on the Nisqually River at both Longmire and Sunshine Point. The information collected will be compared with pre-flood cross sections to calculate deposit changes. Both Longmire and Sunshine Point will be addressed in the same Environmental Assessment. The park will pave a 1,200-foot long section of road from the Longmire Suspension Bridge past the Community Building to the point where the road turns away from the Nisqually River and into the Longmire Campground. There are no plans to pave or repair the road through the campground to the sewage treatment plant and to the back gate.

Paradise

The pumps for the sewage treatment plant will be installed this fall. The work must be done while the Paradise Inn is closed.

Stevens Canyon

Repair work by both the contractor at milepost 16 and park crews at three locations farther west is complete. Revegetation crews have stabilized the road shoulder to prevent erosion. This section of roadway is scheduled for rehabilitation in FY 2011 through the Federal Lands Highway Program (FLHP) at which time crews will fully revegetate the roadway shoulder.

Ohanapecosh

Campground C Loop – Superintendent Dave Uberuaga signed a Categorical Exclusion under NEPA on September 3. The park plans to remove the old roadway asphalt, scarify the old roadbed, install a split rail safety barrier fence, and rough out the new loop's connection road this fall. Paving the short roadway section will likely begin in the spring or summer of 2009.

Highway 123

The contractor completed the repair work, and the road was reopened to the public in the fall of 2007. Revegetation work, which included planting trees in planting pockets on the repaired road embankment and hydro-seeding, was also completed in the fall of 2007. Ongoing work in this area includes routine weed and exotic plant monitoring and removal.

White River Campground Access Road

Damage to an 820 foot long section of the White River Campground access road between mileposts 0.4 and 0.6 (five miles up on the White River/Sunrise Road from intersection with SR 410) has been repaired. A revegetation crew is planting salvaged plants, staking and seeding this fall.

White River Entrance and Campground

The potable water intake for the campground has been cleared of the rock and gravel that blocked it; and the repair work is complete. The damage to the small earthen dam for potable water intake at the White River Entrance was obliterated by the flood, and the park constructs temporary intakes each spring. The park staff has suggested a location for a small concrete structure to remedy the problem, however its construction would require a wilderness boundary adjustment. The park would seek funding for the structure from the NPS Repair/Rehabilitation account.

Mount Fremont and Gobbler's Knob Fire Lookouts

Work has been completed at the lookouts.

Carbon River Road

The park completed minor road stabilization work in the fall of 2007, and the future of the area is being determined with input from public scoping meetings. The park staff is working to revise alternatives that consider public comments and will work on the Environmental Assessment. The park will conduct subsequent public review meetings during 2009. Dependent upon the final preferred alternative, work to repair or decommission portions of the roadway will begin, at the earliest, in the fall of 2009.

Park Trails

A heavy snowfall and late snowmelt resulted in getting a late start on trail work. In addition, the heavy snow broke numerous trail bridges that had to be replaced. The park's trail crew made great progress on repairing the flood damages of 2006, despite the challenging weather conditions this year.

Washington Trails Association crews worked on park trails every weekend throughout the summer, concentrating their efforts on the White River Area, especially the Glacier Basin reroute. In addition to the weekend work, the Association provided two, week-long crews of 12 people each, and contributed many hours of high-quality work to restoring and improving park trails.



Trail crew hard at work.

- The trail crew completed trail reroutes on the Stevens Canyon section of the Wonderland Trail, which had been closed all of 2007. The lower of the two reroutes was about 1,600 feet long and was completed by the Student Conservation Association (SCA) and volunteer groups. The upper section of reroute was located on an extremely steep exposed slope. This project required the use of explosives and at times required that people be secured to safety lines to prevent falls from the mountainside. NPS trail crews and Washington Conservation Corps crews worked on this section with the WCC crew doing most of the earth moving and completing the task.
- On the Silver Falls Trail at Ohanapecosh, the park trail crew finished building a 63-foot long steel and wood trail bridge. This bridge replaces one that failed during the flood and is located on a very popular hike in the Ohanapecosh area.



New bridge over Laughingwater Creek on the Silver Falls Loop Trail.

- Work has begun on the 1.25 mile reroute of the Glacier Basin Trail in the White River area. The crew expects to complete about 1,000 feet of trail this season with work continuing through 2009 and likely into 2010.
- The Trail Crew replaced a 55-foot footlog across Cataract Creek on the Wonderland Trail near the Carbon Glacier. This crossing provides access to the Carbon River Camp.
- A half-mile reroute of the Wonderland Trail between Longmire and Cougar Rock was completed this season.
- A new 30-foot steel and wood bridge on the Eastside Trail at Chinook Creek has been installed.
- Environmental compliance work is proceeding on a proposed 1,500-foot reroute of the Wonderland Trail along the Carbon River. If approved, crews could begin work on this section of trail in the spring of 2009.
- Work has been completed on the beautiful and popular Grove of the Patriarchs Trail.
- Remaining repairs to trails include a minor reroute of the Wonderland Trail near Kautz Creek, a 50-foot log bridge at Deer Creek on the Eastside Trail, three small bridges on the Owyhigh Lakes Trail, and constructing 100 feet of guardrail on the Silver Falls Trail.

Volunteers

The Northwest Parks and Public Lands Storm Recovery Coalition, which formed in the aftermath of the 2006 flood, has become the Washington Parks and Forests Coalition and has redirected its mission to issues beyond flood recovery. The coalition coordinates publicity, recruitment, fundraising, and, for shared events such as National Public Lands Day, logistical support, for the member organizations. Projects during the summer of 2008 that have involved support from all of the members of the coalition included National Parks Conservation Association's (NPCA) educational seminars in Seattle and at REI stores; SCA's fundraising efforts, which have resulted in support from Boeing and other organizations; and organizing National Public Lands Day and National Trails Day.

Student Conservation Association Mount Rainier Recovery Corps

2008

Volunteer projects 107

Volunteers 657

Volunteer hours 3,871

Corps hours 7,104

Public training hours 2,126

Total hours 13,101



Mount Rainier Recovery Corps. We couldn't do it without volunteers!

Accomplishments in 2008 and plans for 2009

The Mount Rainier Recovery Corps, sponsored by the Student Conservation Association, worked on projects this summer similar to those of 2007, including major efforts to repair, rebuild and maintain trails and trail bridges; revegetate, collect seeds, and remove exotic species; restore the Longmire Campground; shovel snow; and rove the meadows. The Recovery Corps also expanded its efforts in several new areas, especially citizen science in soundscape monitoring, amphibian surveys and archeological surveys. With help from a grant from Boeing, the Corps also made a major push to train volunteers, including courses in Wilderness First Aid, Wilderness First Responder and crosscut saw certification.

Next year the park will be without the Recovery Corps. There is flood recovery work remaining including reconstruction of the Wonderland Trail along Carbon River and continuing to reconstruct the Glacier Basin Trail. Revegetation work in areas disturbed by the flood is ongoing. The backcountry maintenance program will have many opportunities for volunteers to get involved in the summer of 2009.

Mount Rainier's volunteer program received three awards in 2008 in recognition of its flood recovery efforts:

- The Cooperative Conservation Award, presented by the Department of the Interior in April 2008 for the park's partnerships with the Northwest Parks and Public Lands Storm Recovery Coalition,
- The George B. Hartzog, Jr. Award for Outstanding Volunteer Service, presented by the NPS in May 2008 for the park's volunteer program, and
- A Take Pride in America Federal Land Manager's Award, presented in July 2008 to recognize Superintendent Dave Uberuaga's leadership in building and promoting partnerships and volunteerism.

The Flood of 2006: 2007 & 2008 Expenditures

Prepared by:

Randy King and Eric Walkinshaw

March 2009

Budget Summary

Mount Rainier has benefitted from broad support and generous supplemental funding to recover from the flood of 2006. Two sources of supplemental funding have been used to pay for most repairs to date: NPS Storm Damage Funding and Federal Highway Administration Emergency Relief for Federally Owned Roads Funding (ERFO).

The ERFO program is intended to help pay the unusually heavy expenses associated with the repair and reconstruction of Federal roads and bridges seriously damaged by a natural disaster over a wide area or catastrophic failure. Restoration in-kind to pre-disaster conditions is expected to be the predominate type of repair.

Mount Rainier has received ERFO funding authorizations of \$5,601,639 and \$6,203,673 – a total of \$11,805,312. \$6,203,673 funded Federal Highways' administered contracts for major repairs to SR123 and the Stevens Canyon Road, as well as design and construction management services for repairs on the Nisqually Road. The park's road crew expended most of \$5,601,639 authorized to complete major repairs to the Nisqually Road at Sunshine Point, Kautz Creek, milepost 5.2 and milepost 9.1.

The park's road crew completed another \$2.011 million in road repairs and flood protection work at Upper Van Trump Curve, the Longmire Back Road and the White River Campground Road. These repair costs were determined ineligible for ERFO funding and were paid with NPS Storm Damage funding.

The only remaining road repairs potentially eligible for ERFO funding includes portions of the Carbon River Road and the Sunshine Point Campground entrance road. Planning is still underway to determine the extent and type of repairs at both locations, which will in turn determine ERFO funding eligibility.

NPS Storm Damage Funding in the amount of \$11,512,000 has been authorized for Mount Rainier repairs. This fund source has paid for extensive repairs to trails, buildings, utility systems, flood protection structures, non-public roads, campgrounds, etc., essentially all repairs not otherwise eligible for ERFO funding. The park has expended or obligated \$11,056,179 of the authorized Storm Damage funding to date. Remaining repairs are estimated at \$5,507,000 million, for an overall potential funding need of \$16,560,000. Firmer cost estimates won't be available until repair decisions are made for the Carbon River Road and the flood protection structures at Longmire and Sunshine Point. No additional NPS Storm Damage funding is available. Other NPS fund sources will be sought to complete remaining flood repairs in 2009 and beyond, including 18 trail projects (\$898,406), Longmire back road paving and flood protection (\$375,152), and Sunshine Point and Longmire flood protection structures (preliminary estimate, \$2,800,000).

The total cost to repair all damages from the November 2006 floods is currently estimated at \$27,945,734.

Flood Recovery Funding and Expenditures 2006 - 2008					
Funding Source	Initial Damage Estimate (2007)	Authorized	Obligated/Spent (through Jan. 2009)	Projected Expenditures -FY09/FY10	Total Anticipated Expenditures
ERFO	\$23,497,000	\$11,805,312	\$10,719,892	\$1,029,858	\$11,749,750
NPS Storm Damage	\$11,512,000	\$11,512,000	\$11,056,179	\$5,506,953	\$16,563,132
Total	\$35,009,000	\$23,317,312	\$21,408,853	\$6,536,811	\$27,945,734

The Flood of 2006: 2009 & Beyond

The Work Ahead

This report highlights the incredible progress made in repairing the 2006 storm damages and making Mount Rainier National Park whole again. More work remains to complete repairs from the Flood of 2006. The following table summarizes the storm damage repairs to be accomplished in 2009 and beyond, as planning is completed and funding available.

Remaining 2006 Storm Damage Repairs as of March 2009		
Project	2009 Cost Estimate	Project Description
Narada Falls Tread and Railings	\$25,000	Repair tread and replace railing
Cowlitz Divide Trail	\$4,023	Replace washed out footlog at Ollalie Creek Camp
Emmons Moraine Trail	\$20,087	Construct approximately 750' of trail
Eastside Trail: Deer Creek Bridge	\$50,459	Construct new bridge
Eastside Trail: Suspension Bridge	\$17,658	Replacement of some structure and decking
Glacier Basin Trail	\$224,833	Clear corridor and construct 1.25 miles of new trail through forest, including footlogs, bridges and board walk
Lakes Trail West: Bridges and Tread	\$22,103	Replace 3 bridges and repair tread damage in various locations
Laughingwater Creek Trail	\$15,011	Several bridges that washed out need to be reset or replaced with longer bridges
Owyhigh Lakes Trail: Culvert Washout	\$5,886	Culvert washed out near Mile 2, 30' wide; needs to be replaced with a bridge
Silver Falls Loop Trail: Ohana River Bridge Guardrail	\$32,543	Construct new guardrail near Falls
Skyline Trail: Tread	\$25,012	Repair tread and retaining walls throughout trail
South Puyallup Trail	\$5,009	Repair tread near South Puyallup Camp
Spray/Seattle Park Loop Trail	\$32,566	Replace gravel in damaged tread
Tahoma Creek Suspension Bridge	\$10,000	Stabilization
Tahoma Creek Trail	\$162,297	Rehabilitate existing trail, layout of new trail around washout areas
WT-1: Kautz Creek Tread and Footlog	\$15,241	Replace 200 yards of missing tread

WT-1: Carbon Reroute (mile 1.7-2.4)	\$198,635	Clear corridor and construct 2,500' of trail through forest and across bedrock; requires blasting
Paradise River Historic Bridge	\$32,043	Complete two bridge replacement projects now at 80% and 30% completion
Longmire Back Road Paving and Flood Protection	\$317,152	Construct 300' of rock and concrete wall to protect Longmire Back Road and Community Bldg; pave damaged road
Asphalt Sewer Line Road at Longmire	\$58,000	Pave Longmire Back Road where sewer line was damaged and repaired
Carbon River Road Plan	\$750K - \$1.5M	Complete planning and compliance in 2009 to determine scope of repairs and funding requirements
Longmire and Sunshine Point Flood Protection	\$1M - \$4.5M	Complete planning and compliance in 2009 to determine scope of repairs and funding requirements
Restoration	\$135,370	Restoration of 39 damaged sites, including roadsides, trails, campgrounds
Sunshine Point Campground and Picnic Area	\$204,886	Repair or demobilization costs, depending on outcome of flood protection plan for Sunshine Point
Ipsut Campground Repair and/or Demobilization	\$122,135	Repair or demobilization costs, depending on outcome of Carbon River Plan
Kautz Creek Storage Area/Heliport	\$189,000	Construct new heliport; move buildings and materials storage areas away from Nisqually River and Kautz Creek
Relocate and Assemble Ipsut Patrol Cabin/Ranger Station	\$30,000	Relocate historic Ipsut Patrol Cabin to Carbon River Road corridor; location to be determined

References Cited

ⁱ By [DEBERA CARLTON HARRELL](#), Storm damage at Mount Rainier is 'unbelievable', *Seattle Post-Intelligencer*, December 30, 2006.

ⁱⁱ Valued at 2006 value of \$18.77 per hour from the Independent Sector, www.independentsector.org