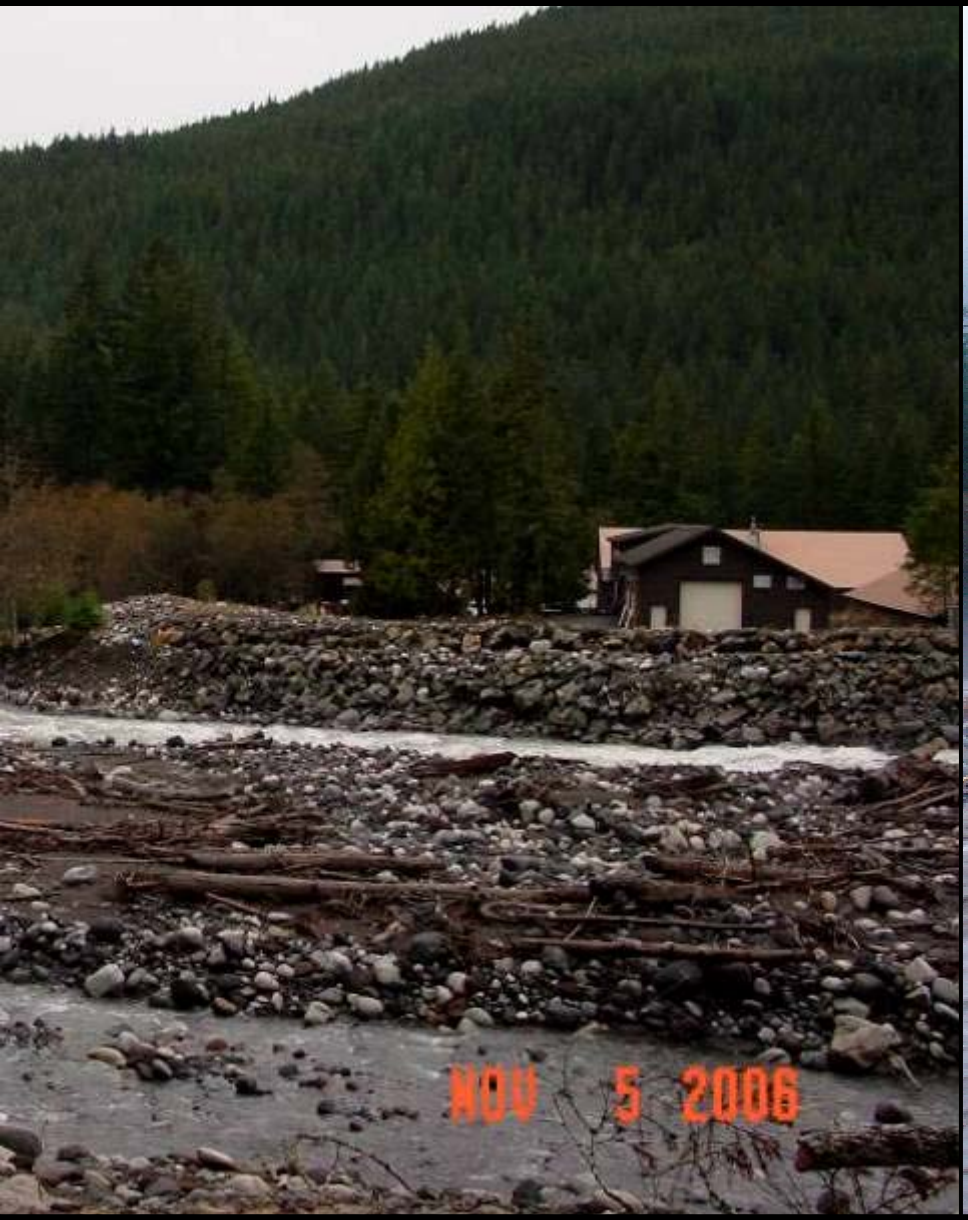
Mount Rainier National Park

The Great Flood of November 2006

Updated February 24, 2007

Mount Rainier National Park

The Great Flood of November 2006



The storm that began November 5, 2006 looked like any other winter storm—but quickly grew into something unique.

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The Great Flood of November 2006

18 inches of rain fell in 36 hours, flooding roads like Highway 410 that usually stay dry.

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The Great Flood of November 2006

On the afternoon of November 6, as the rain continued to fall, park staff and visitors evacuated the park.

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The Great Flood of November 2006

When the first rangers returned on the morning of November 7, the damage was instantly apparent.

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The Great Flood of November 2006

Aerial surveys confirmed that rivers had left their banks all over the park.

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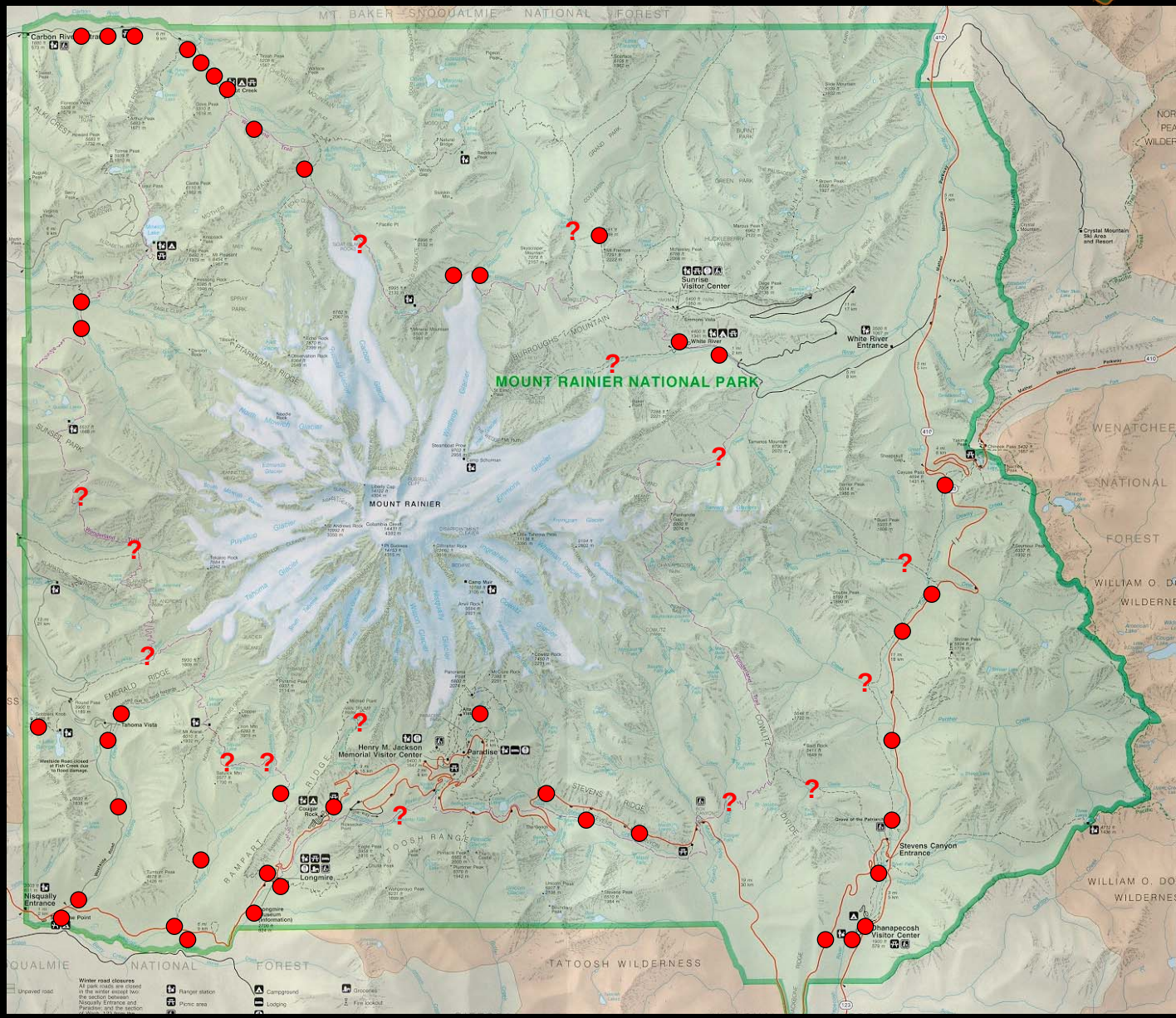
The Great Flood of November 2006



The damage was extensive. Some areas haven't even been surveyed yet, due to winter snow.

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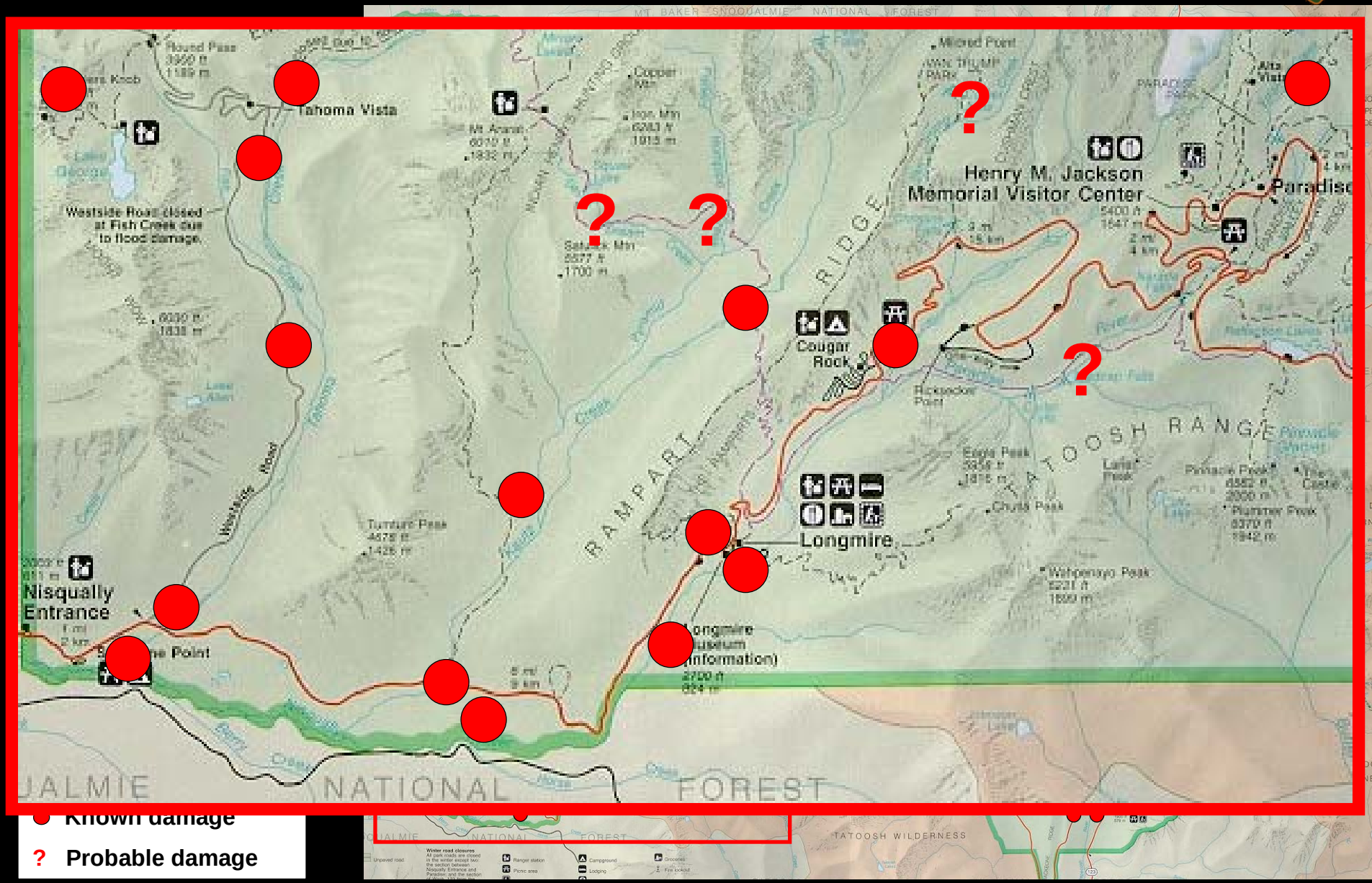
The Great Flood of November 2006



The southwest corner of the park is popular for winter skiers and snowshoers.

Mount Rainier National Park

November 2006 Flood Damage

At Sunshine Point, the Nisqually River now flows where there once was a campground.

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November 2006 Flood Damage

More than half of the campground was obliterated.

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November 2006 Flood Damage

In all, more than 5 acres of land were washed away.

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The Great Flood of November 2006

A mile up the road, Tahoma Creek caused extensive damage to the Westside and Nisqually Roads.

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The Great Flood of November 2006

Two miles further, Kautz Creek no longer flows under the road bridge.

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The Great Flood of November 2006

Instead, it crosses the park road a quarter mile east of the bridge.

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The Great Flood of November 2006

During the flood, it also flowed down a service road, carving a channel through the park's primary helibase.

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November 2006 Flood Damage

Aerial surveys showed that the creek had changed course more than a mile upstream from the road bridge.

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The Great Flood of November 2006

At Milepost 5.2—a mile below Longmire—the Nisqually River carved away the embankment to the edge of the park road.

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The Great Flood of November 2006

Similar damage occurred at Milepost 9.1, above Cougar Rock Campground.

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The Great Flood of November 2006

At Longmire, most of the protective levee was washed away.

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The Great Flood of November 2006

The park's Emergency Operations Center was undermined by the river.

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November 2006 Flood Damage

Across the river, a service road, which doubles as an emergency exit, was also undermined in several places.

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The Great Flood of November 2006

The flood caused extensive damage to power, sewer, and water utilities at Sunshine Point, Longmire, and Paradise.

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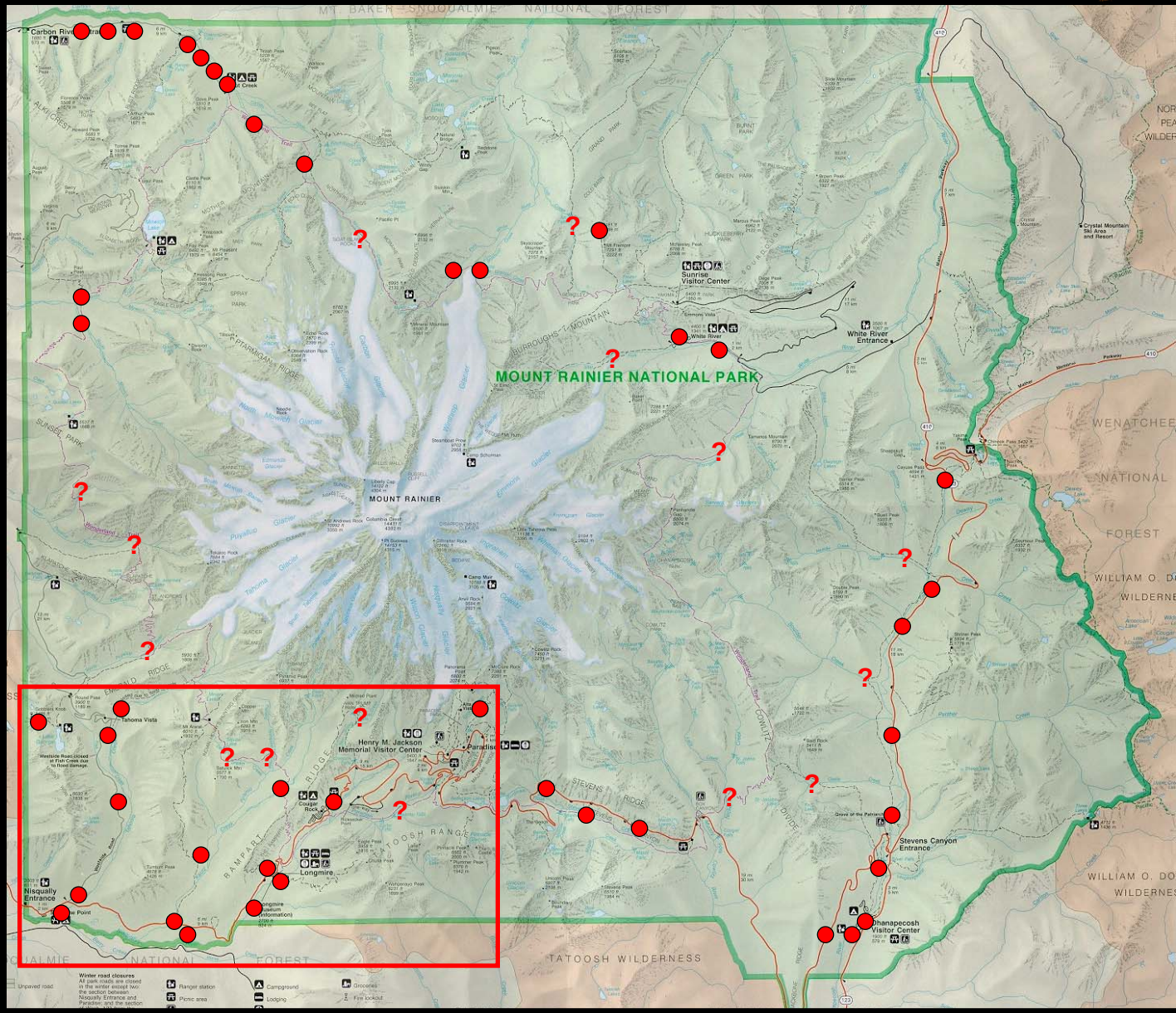
The Great Flood of November 2006



The east side of the park fared no better.

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The Great Flood of November 2006

Helicopter flights revealed three washouts in Stevens Canyon.

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The Great Flood of November 2006

The worst, on Backbone Ridge above Ohanapecosh, sits atop a landslide thousands of feet long.

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The Great Flood of November 2006

The bottom of the landslide is visible across the river from the Ohanapecosh Campground.

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November 2006 Flood Damage

Highway 123 washed out in four places.

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November 2006 Flood Damage

The worst washout, at Milepost 11, cuts across both lanes to a depth of 70 feet.

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The Great Flood of November 2006

Debris covers the road in many places, and the edge is undermined.

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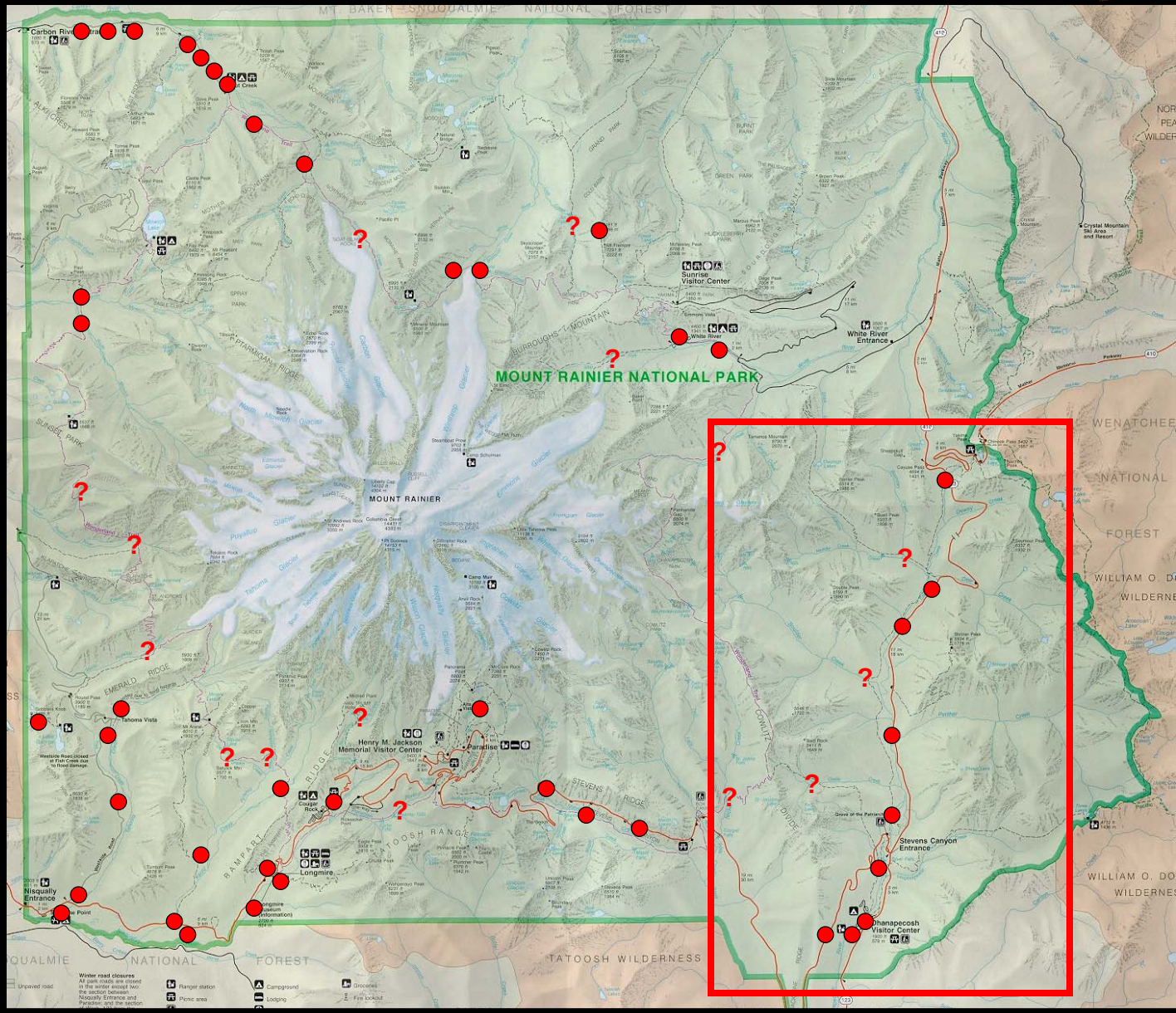
The Great Flood of November 2006



Some of the most dramatic damage occurred along the Carbon River.

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The Great Flood of November 2006

The Carbon River Road was damaged or destroyed in numerous places.

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The Great Flood of November 2006

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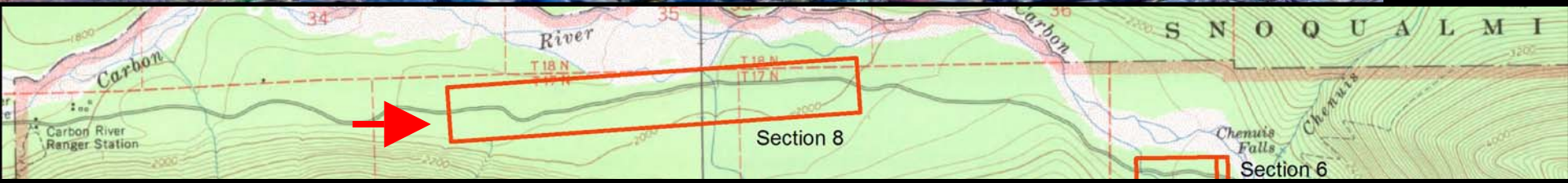

In all, about two miles of road were destroyed.

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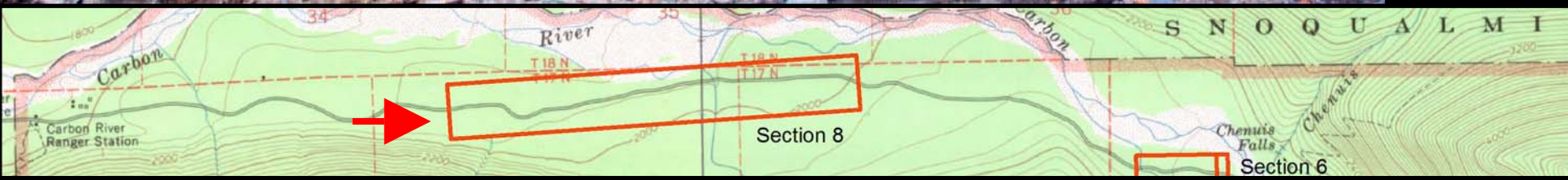
The Great Flood of November 2006



Much of the surviving roadway is heavily eroded.

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The Great Flood of November 2006

In some places, the river erased the roadway entirely.

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The Great Flood of November 2006

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In others, it scoured new channels as much as 12 feet deep.

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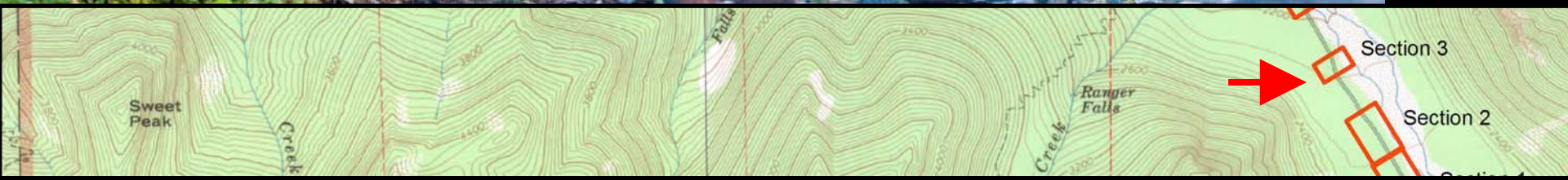
The Great Flood of November 2006



In many places, the only reminders that a road used to exist are the road signs still standing alongside new river channels.

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The Great Flood of November 2006

In other places, orphaned road culverts protrude from the jumble of debris.

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The Great Flood of November 2006

The historic Ipsut Creek Patrol Cabin was undermined by a stray branch of the river, but fortunately did not wash away.

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The Great Flood of November 2006

A windstorm in December added more debris to the road and trails.

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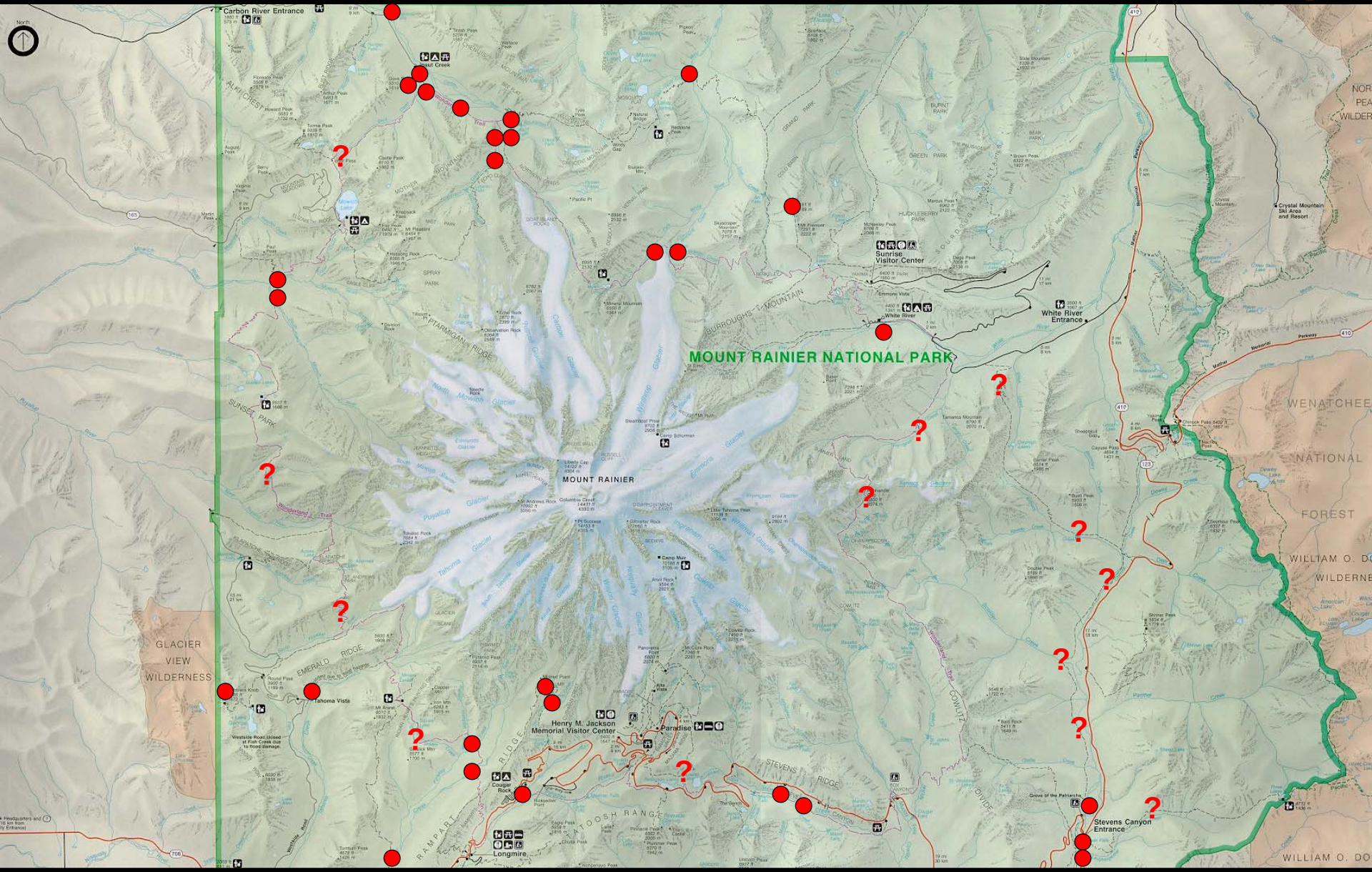
The Great Flood of November 2006



In addition to roads, trails were damaged all over the park. Much of the damage remains hidden by the winter snow.

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The Great Flood of November 2006

Aerial and ground surveys (including Carbon River and the Wonderland Trail at Kautz Creek) have found extensive damage.

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The Great Flood of November 2006

Trail bridges were damaged or destroyed all over the park, including the suspension bridge at the Grove of the Patriarchs.

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The Great Flood of November 2006

High wind, with gusts up to 120 miles per hour, ripped the roofs off the Fremont and Gobbler's Knob Fire Lookouts.

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The Great Flood of November 2006

Damage assessment and recovery planning began immediately.

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The Great Flood of November 2006

Road repairs at Sunshine Point, in fact, began on November 8, the day after the storm.

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The Great Flood of November 2006

More than 10,000 tons of rock were used to rebuild the road at Sunshine Point.

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The Great Flood of November 2006

The new road was completed and paved in early February.

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The Great Flood of November 2006

The future of Sunshine Point is uncertain. It may reopen as a smaller campground, or just as a picnic area or wayside.

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The Great Flood of November 2006

Park crews cleared clogged culverts and ditches at Kautz Creek, keeping the creek from flowing across the road most of the time.

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The Great Flood of November 2006

Three new 30-inch culverts were installed to help accommodate the creek in its new location.

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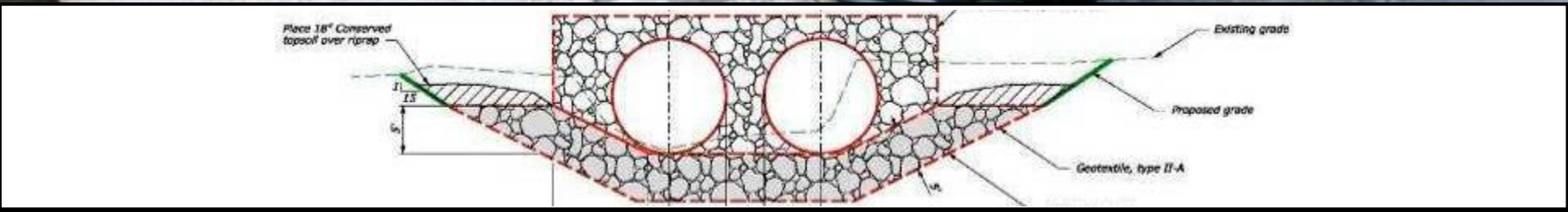
The Great Flood of November 2006



Two more culverts, each 12 feet in diameter, will complete the project.

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The Great Flood of November 2006

Trucks now deliver rocks weighing as much as 15 tons each to the construction sites at Mileposts 5.2 and 9.1.

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The Great Flood of November 2006

Park road crews will use the rock to rebuild the roads' embankments from the ground up.

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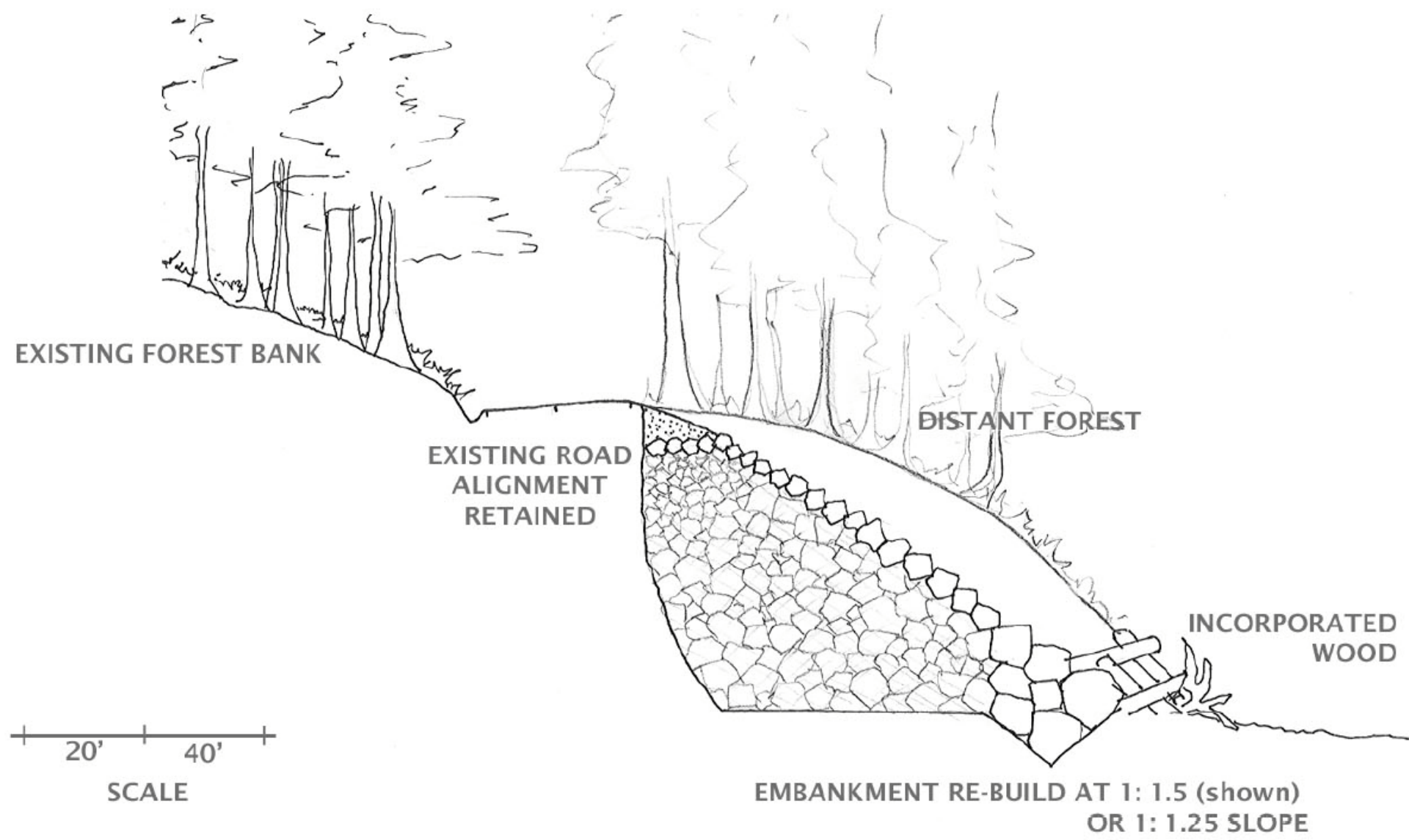
The Great Flood of November 2006



If weather cooperates, the work should be finished around the end of April.

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The Great Flood of November 2006

At Longmire, broken levees have been repaired.

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The Great Flood of November 2006

The Emergency Operations Center has been stabilized, in preparation for further work this summer.

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The Great Flood of November 2006

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

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The Great Flood of November 2006

June 2007

July 2007

August 2007

September 2007

Stevens Canyon might reopen by August, and Highway 123 by October—if spring snowmelt doesn't cause further damage.

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At Carbon River, the park's trail crew has opened the road to hikers and bicyclists.

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The Great Flood of November 2006

The road will be rebuilt, but construction will proceed slowly to protect endangered spotted owls, marbled murrelets, and bull trout.

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The Great Flood of November 2006

Rebuilding the park's trail system will begin in April or May, when the trails melt out from winter snow.

Mount Rainier National Park

The Great Flood of November 2006

The Student Conservation Association

Washington's National Park Fund

The National Parks Conservation Association

The Mountaineers

The Washington Trails Association

Mount Rainier National Park has established partnerships with several groups to help raise funds and coordinate volunteers.

Mount Rainier National Park

The Great Flood of November 2006

Learn more about the Mount Rainier Recovery Project, and how you can become a volunteer, on the websites of the Student Conservation Association (www.theSCA.org) and Mount Rainier National Park (www.nps.gov/mora).

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The Great Flood of November 2006

Meanwhile, park managers are looking for lessons in the flood to help them plan for the future.

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The Great Flood of November 2006

Several research projects are underway to gain a better understanding of the causes and effects of the flood.

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The Great Flood of November 2006

One key factor is an entirely natural characteristic of the park’s glacier-fed rivers.

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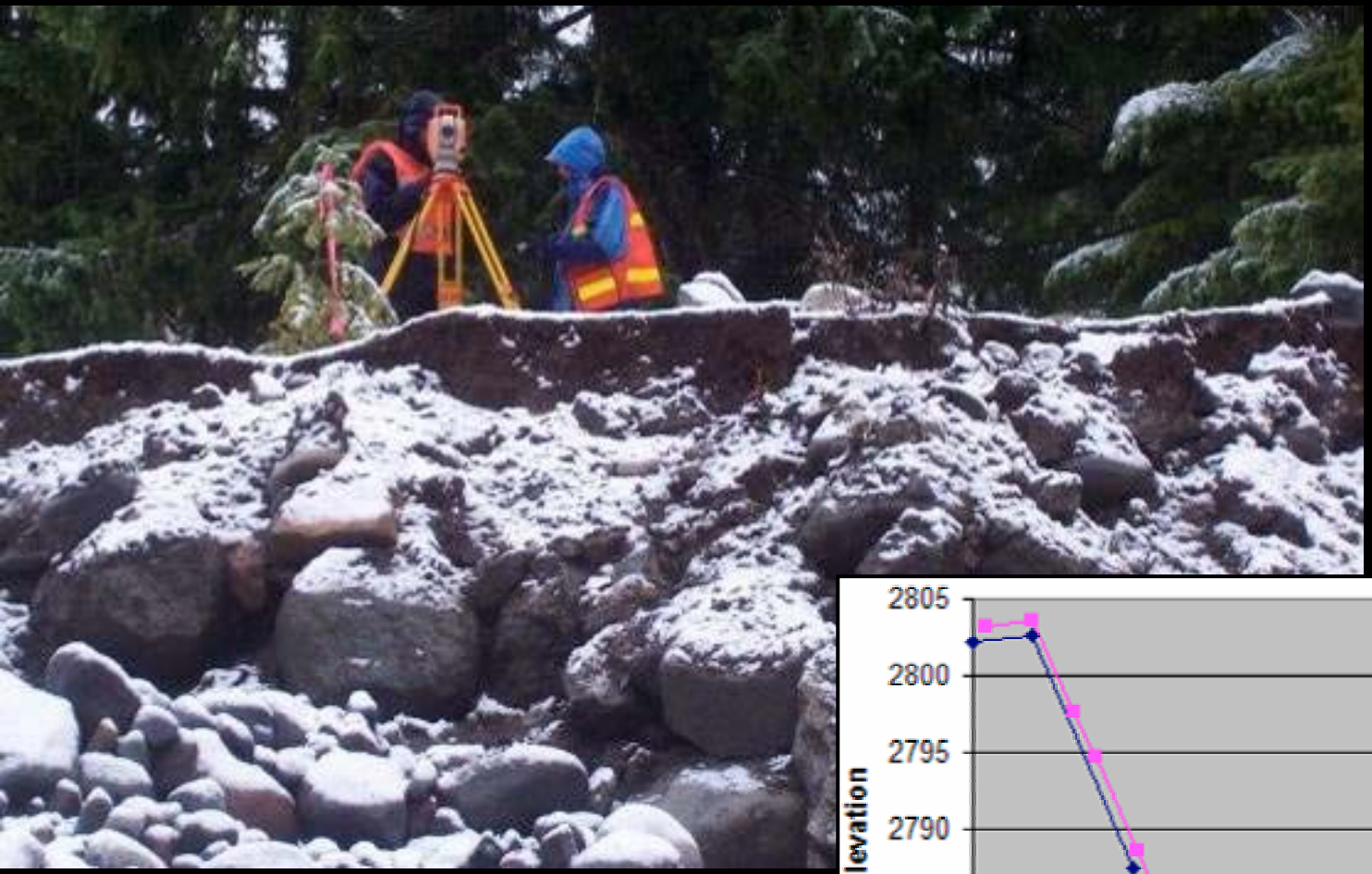
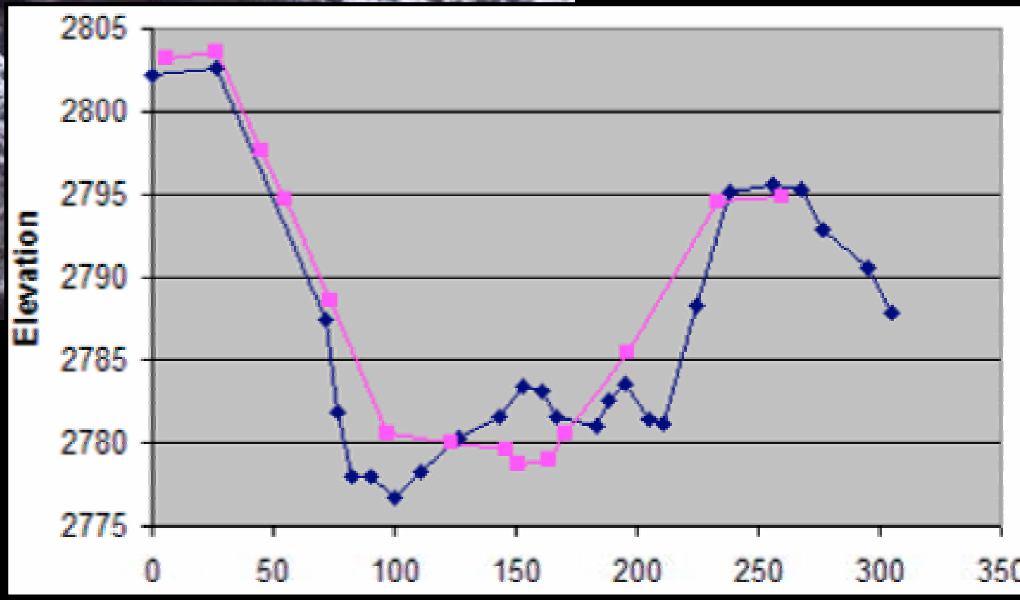
The Great Flood of November 2006





Debris carried down the river from the glaciers causes the riverbed to fill in at an average rate of 6-12 inches per decade.

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The Great Flood of November 2006

In some places, the process is much faster, causing riverbeds to rise tens of feet over the past century.

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The Great Flood of November 2006

On the way to Paradise, the Nisqually River flows even with the park road where surveys in 1910 showed a shallow canyon.

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The Great Flood of November 2006

The White River now runs as much as 14 feet above the elevation of Highway 410 for three miles.

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The Great Flood of November 2006

The Nisqually River flows up to 12 feet higher than parts of Longmire.

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The Great Flood of November 2006

The riverbed under the Tahoma Creek Bridge rose more than four feet during the November flood.

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The Great Flood of November 2006

The rocky debris is carved and collected by Mount Rainier’s active glaciers.

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The Great Flood of November 2006

As the glaciers melt, they dump their collections of rock into the river channels.

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The Great Flood of November 2006

The rivers carry the rock downstream and use it to build up and rearrange the riverbed.

Mount Rainier National Park

The Great Flood of November 2006

However, as the riverbeds rise, the roads and campgrounds and buildings next to them remain at constant elevation.

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The Great Flood of November 2006

At places like Longmire, bigger and bigger levees keep the river at bay.

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The Great Flood of November 2006

ca. 1920

2006

Meanwhile, Mount Rainier's glaciers have gradually melted during the historic period.

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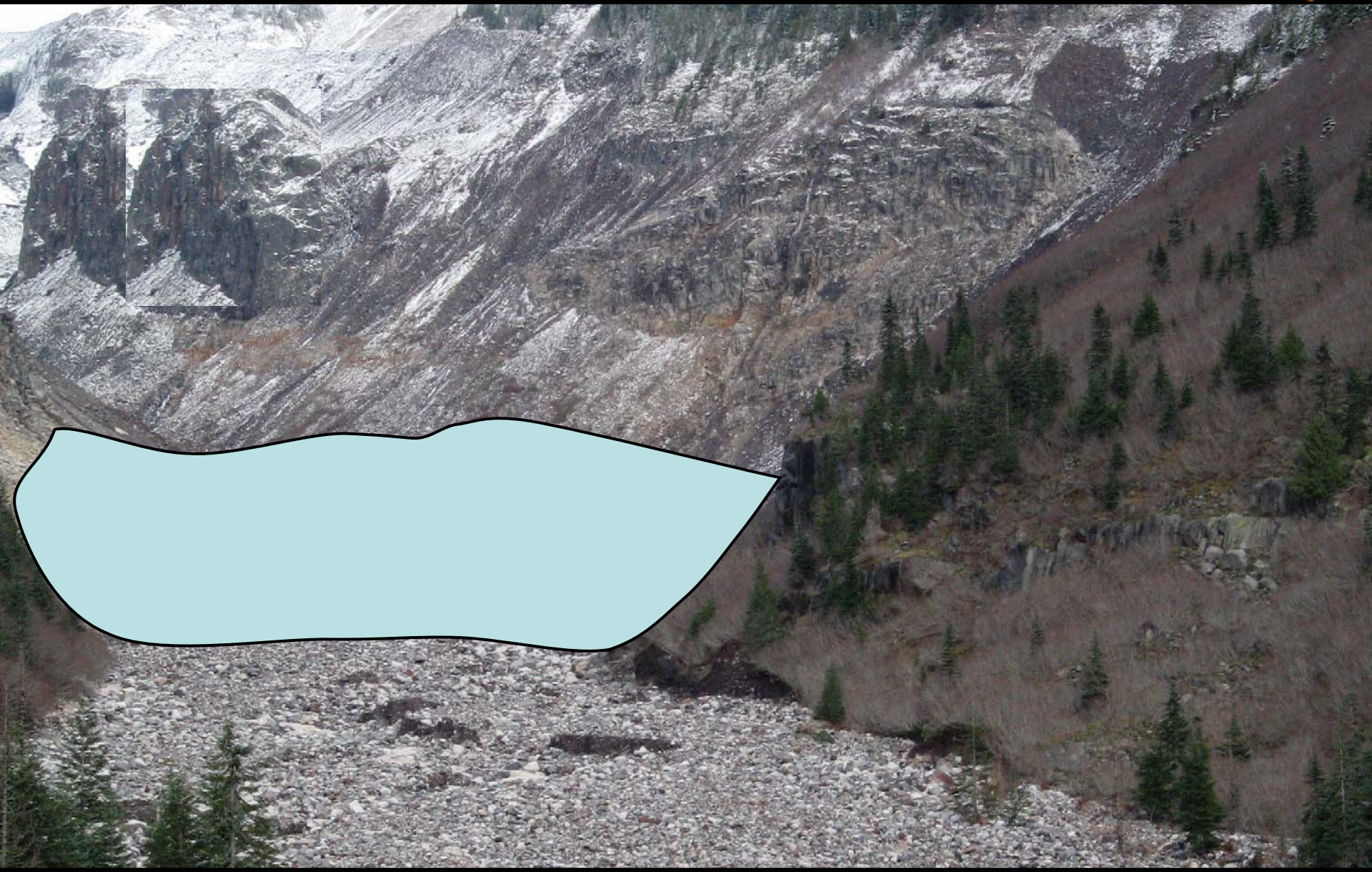
The Great Flood of November 2006



Over the last century, the Nisqually Glacier has retreated almost out of sight from the road bridge.

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A comparison of the Nisqually Glacier in 1974 and 1994 shows glacial retreat in a single generation.

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The more the glaciers melt, the more debris is dumped into the rivers.

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The Great Flood of November 2006

As the glaciers melt, their moraines become exposed and erode into the rivers as well.

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The Great Flood of November 2006

Mount Rainier’s melting glaciers fit a pattern that is not just local, or even regional, in scope.

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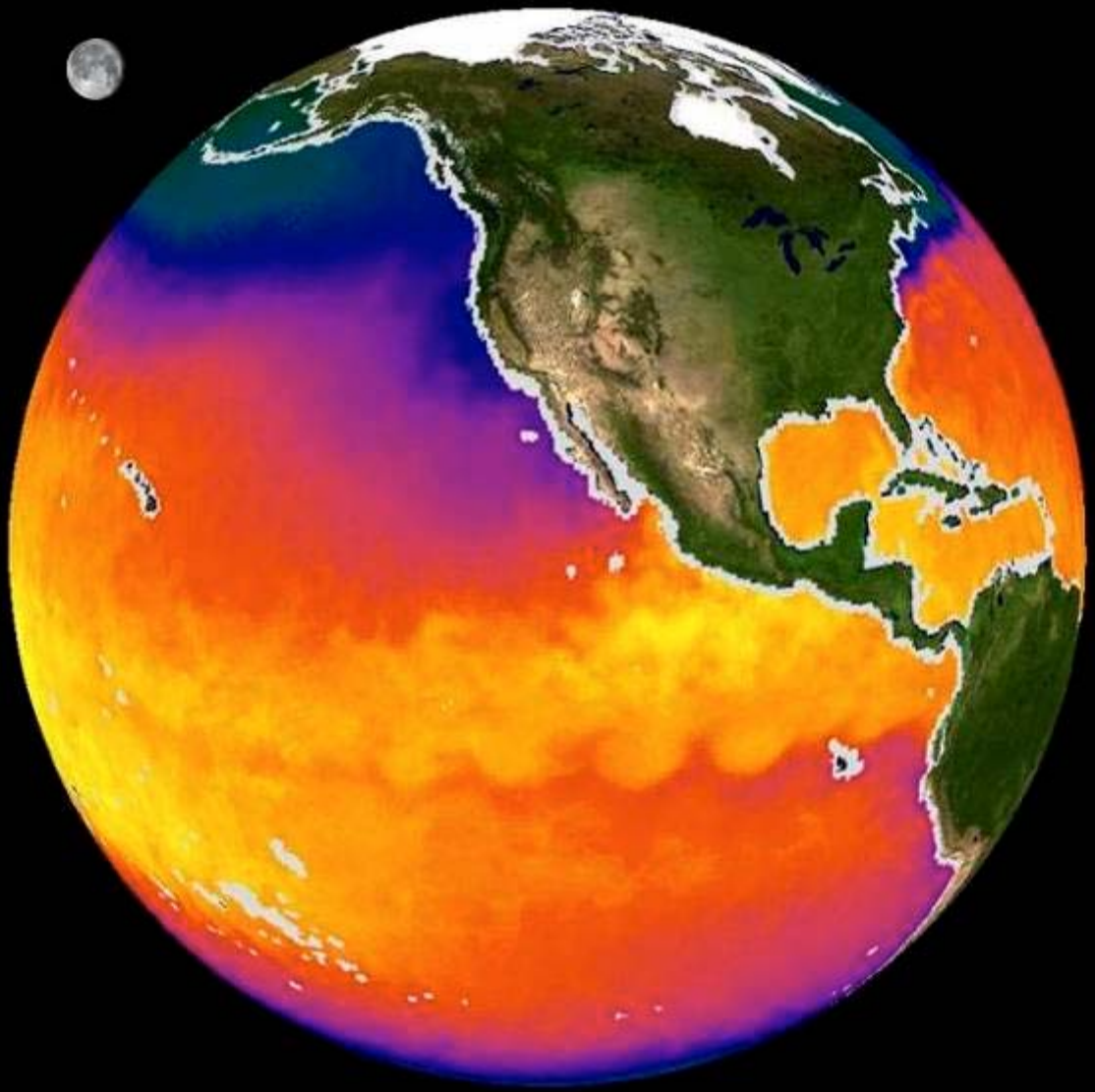
The Great Flood of November 2006



It is part of a pattern of global climate change—a pattern most scientists believe is strongly influenced by human activity.

Mount Rainier National Park

The Great Flood of November 2006

Our management choices are local, but the challenges are global in scope.

Mount Rainier National Park

The Great Flood of November 2006

These are challenges that will face Mount Rainier National Park for many years to come.