

15th Anniversary Issue

Has it been 15 years?! While the events of May 18, 1980 seem like they happened just yesterday, 1995 marks the fifteenth anniversary of the eruption. A lot has happened in fifteen years. Homes, roads, and bridges have been rebuilt. Private timberlands have been salvaged and replanted. More than 110,000 acres have been set aside by Congress as the Mount St. Helens National Volcanic Monument. Color and life have returned to the blast zone as hardy survivors are joined by ever-increasing numbers of colonizing plants and animals.

This anniversary issue of the "Volcano Review" reflects on the changes that have taken place since 1980 and highlights the scientific lessons we have learned in the aftermath of the eruption.

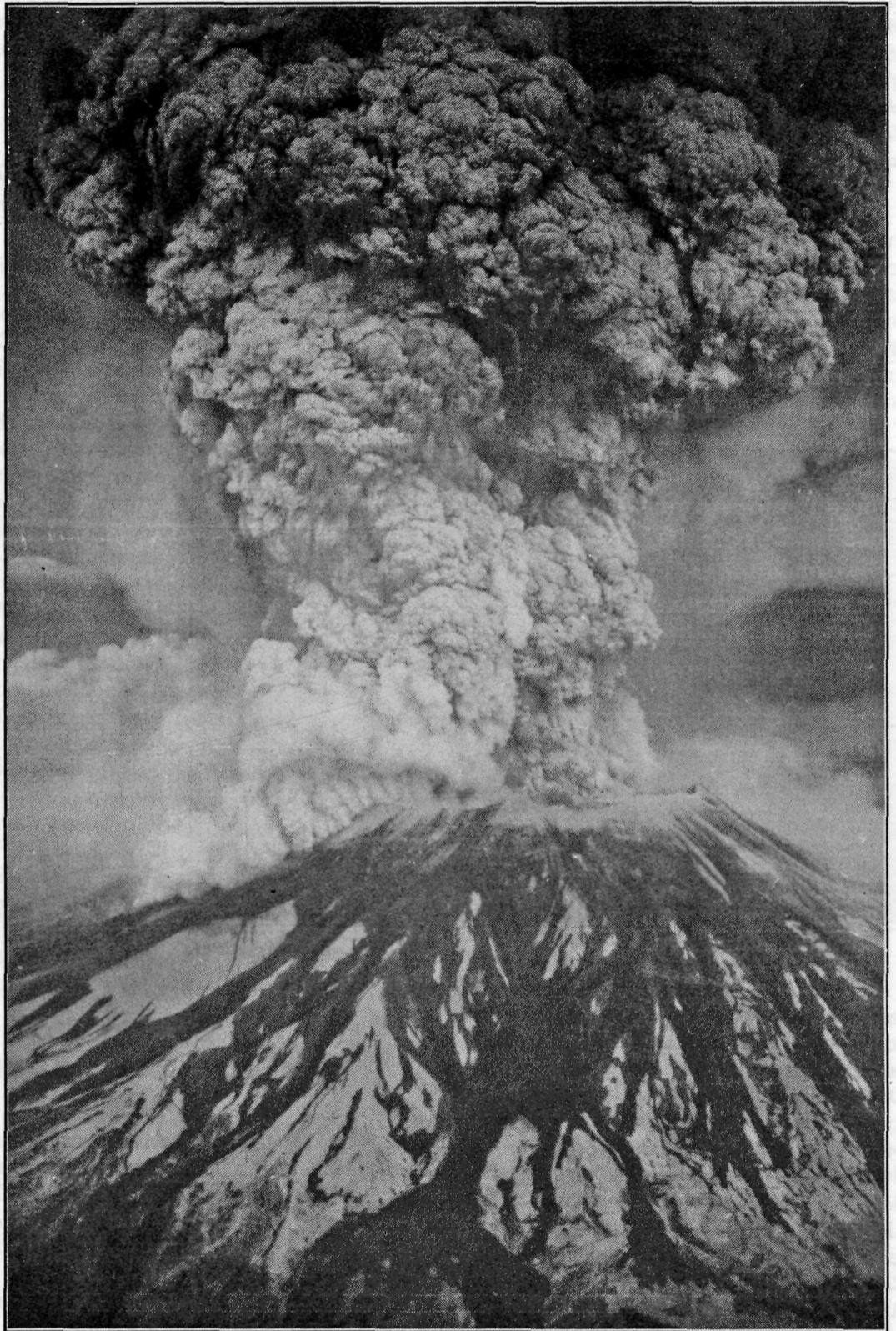
▼▼▼▼▼Seismic Signals▼▼▼▼▼

Back in 1980, earthquakes occurring beneath the mountain provided the first clues to scientists that the volcano was waking up. Scientists continue to monitor the seismic (earthquake) activity at Mount St. Helens, keeping a finger on the pulse of this still active volcano. Dr. Steve Malone is a research professor with the Geophysics Program at the University of Washington.

"My involvement with Mount St. Helens actually began in 1973 during a study of the small earthquakes that are common under Cascade Range volcanoes. In 1979, we were funded by the U.S. Geological Survey (USGS) to monitor seismicity relating to geothermal activity under the mountains. When the first big earthquake struck Mount St. Helens on March 20, 1980, we sprang into action and installed ten new seismographs around the mountain in just 10 days!

The 1980 eruption at Mount St. Helens was one of the first major volcanic eruptions to be actively and extensively monitored with a computer-based system. This allowed us to obtain, display, and interpret the data much more quickly than had ever been possible before. It provided a real-time record of what was happening on and under the mountain.

It's hard to believe that fifteen years has already passed! The field equipment we use hasn't changed much in that time, it's just sturdier. It is in the recording end of things that big leaps have been made. We are able to process the data not only quickly but automatically. This led to a successful effort by USGS scientists when Mt. Pinatubo erupted in 1991 in the Philippines. Scientists were able to install the equipment quickly and anticipate what would happen. This saved lots of lives and millions of dollars in property damage.



May 18, 1980 - May 18, 1995

What is significant about our studies of Mount St. Helens is the amount and duration of monitoring that has gone on over the last 15 years. We not only have a thorough record of what happened during the eruption but we have been able to compile a more complete profile of how the mountain behaves between eruptions. While this information is specific to Mount St. Helens, it gives us clues for what to look for in other volcanoes as well."

Mount St. Helens brought home the lesson that while the immediate volcanic hazard from an eruption may dissipate, the hydrologic hazard continues for a long, long time. Downstream communities remain at risk for flooding and devastating mudflows years and decades following an eruption. Look at the efforts that went into pumping and then tunneling an outlet for Spirit Lake, or constructing a sediment dam on the Toutle River. These hazards are very real. My recent work has focused on Mt. Pinatubo in the Philippines. They have experienced terrible lahars, or mudflows, in each of the four years since the eruption.

Finally, the eruption of Mount St. Helens and the subsequent eruptions of Nevado del Ruiz in Columbia and Mt. Pinatubo reinforce the lesson that it's not enough to have a quick scientific response to a potential eruption. You need to have an equally quick civil defense response and public officials who are willing to make some hard decisions. More than 25,000 lives were lost at Nevado del Ruiz, a tragedy that none of us wants to see repeated. Evacuations are disruptive and costly, but ultimately, they are the only way to save lives. With each new lesson we learn, we can help people live, work, and visit volcanoes in safety, provided they are willing to step back when we see that a volcano is getting ready to erupt.

▼▼▼A Dome Grows▼▼▼

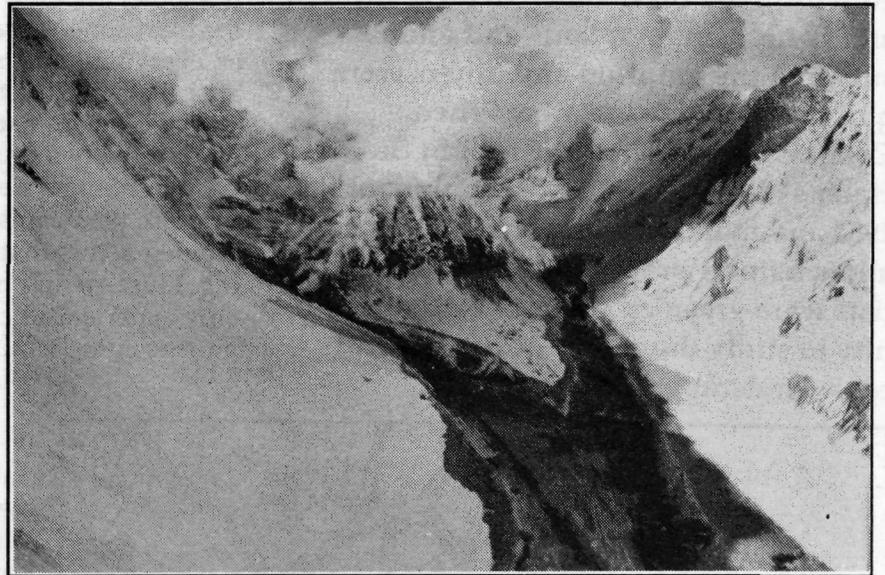
Cynthia Gardner is a geologist with the US Geological Survey. She has studied the development and collapse of lava domes at volcanoes in Alaska and the Pacific Northwest. She is currently working with other USGS scientists on a geologic map and volcanic hazards assessment of Oregon's Mt. Hood.

"Since the May 18, 1980, eruption, there have been several smaller eruptions at Mount St. Helens. Known as dome building eruptions, these later events extruded layers of thick, pasty lava onto the floor of the crater, eventually building a dome more than 800 feet high. Visitors often see steam rising from the still-warm rock.

While studying active volcanoes is always risky work, the sudden collapse of a lava dome poses a particularly serious hazard for volcanologists. In 1991, three scientists and forty journalists and civilians died during a lava dome collapse at Japan's Mt. Unzen. Among them was Harry Glicken, one of the scientists who was deeply involved during the Mount St. Helens eruption. Mount St. Helens is important to scientists because its lava dome rests on flat crater floor. We can study it in a relatively safe environment to learn how lava

domes grow and cool. We can also use it as a testing ground for different types of instruments. We can then apply that knowledge to lava domes in areas where it is not as safe to work.

"We have learned that lava domes can collapse without warning. We have also learned how to better recognize the pyroclastic deposits from a dome collapse event. As a result, we now know that dome collapse events have occurred at many of the Cascade volcanoes including Mount St. Helens, Mount Rainier, and Mt. Hood."



An early lava dome

▼Looking to Mt. Rainier▼

Carolyn Driedger is a volcanologist with the US Geological Survey and has spent several years studying Mount Rainier.

"The eruption at Mount St. Helens served as a sharp reminder that the Pacific Northwest's dormant volcanoes can reawaken at any time, threatening lives and property. Now our attention is turning to its neighbor to the north, Mount Rainier. While Mount St. Helens has been far more active than Rainier and has erupted more volcanic ash over time, the more we learn about Mount Rainier, the more we understand the hazards it poses.

The major threat at Mount Rainier is the production of debris flows—mixtures of mud, rock, and water that look and behave like flowing concrete. A debris flow usually forms in one of two ways. Hot, eruptive materials can melt summit ice and snow, sending a slurry of debris down the mountain. Or, a flank of the mountain itself can collapse in a massive landslide, triggering a very large flow.

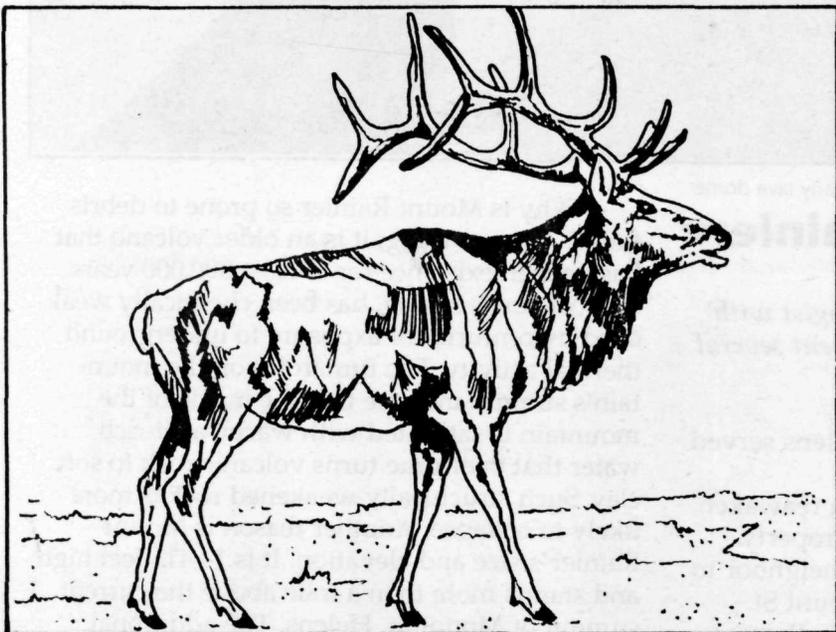
Scientists now know that large debris flows have occurred at Mount Rainier about every 500-1,000 years during the past 6,000 years. A study of the volcanic deposits around the mountain shows at least seven occasions when it has produced flows large enough to reach Puget Sound. One of these, the huge Osceola debris flow, traveled down the White River valley about 5,000 years ago. It left a scar on the volcano's east flank that is now covered by the Emmons Glacier. About 500 years ago, another debris flow known as the Electron,

broke loose from the west side of the Sunset Amphitheater and traveled down the Puyallup River valley.

Why is Mount Rainier so prone to debris flows? For one thing, it is an older volcano that has been in existence for at least 800,000 years. Its rock, once strong, has been chemically weakened by centuries of exposure to underground thermal activity. The fumaroles on the mountain's summit indicate that the inside of the mountain is saturated with warm, acid-rich water that over time turns volcanic rock to soft clay. Such structurally-weakened rock is more likely to collapse. Another reason is Mount Rainier's size and elevation. It is 14,411 feet high and stands more than a mile above the current summit of Mount St. Helens. The additional relief increases the possibility of future debris flows. Also, the summit of Mount Rainier holds 24 times more ice and snow than the pre-1980 cone of Mount St. Helens. Catastrophic melting during an eruption could initiate a large flow. Rainier's flows are likely to be much larger, and will probably flow farther and faster the debris flow that filled the North Fork Toutle River Valley in 1980.

While we know this type of event is likely to occur again, it will be difficult to predict when. This is due to the fact that some of the flows at Mount Rainier appear to have taken place during non-eruptive periods and may have been triggered by large regional earthquakes instead. When you add up all these factors and you consider the number of people now living near the volcano and the Puget Sound lowlands, you can see why we are definitely keeping an eye on Mount Rainier!"

In the wake of the May 18, 1980, eruption, many scientists feared that all life had been exterminated within the blast zone. To their surprise and delight, many plants and animals survived the eruption and others were quick to colonize the area. When Congress established the Mount St. Helens National Volcanic Monument in 1982 and mandated that it be protected to allow natural processes to unfold, scientists were given an unparalleled opportunity to study the return of life to a volcanic landscape.



For me, working at Mount St. Helens has been a life-changing experience. To read about the volcanic and biologic history of the Cascade Range is one thing but to experience it first-hand is another. I vividly remember my first trips into the blast zone. It was like being on another planet, everything was so strange and new. Right after the eruption, the rate of change seemed particularly dramatic. I remember the excitement of each newly discovered seedling or the thrill I had in finding a tree frog out in the blast zone, far from the nearest forest. To realize that it had jumped across that barren landscape was amazing. I just sat and held it for awhile. About the only experience I can think of that would be more exciting would be to explore another planet!

The Monument is collaborating with a number of universities to continue long-term biological research at the volcano. One involves tracking the primary succession on the Pumice Plain, an area sterilized by fiery, pyroclastic flow deposits. The Pumice Plain is significant because it was the only area in the blast zone where nothing survived. Scientists have marked, mapped and measured every individual plant on two sample plots since the first plant was observed in 1982. This information is helping mathematical modelers determine how well existing theory

decline of amphibian populations throughout the region. The Mount St. Helens blast zone and adjacent intact forests provides an interesting setting for examining the response of amphibian populations to disturbance.



When I think of Mount St. Helens, I don't think about the mountain as it was even though I climbed to its pre-eruption summit and appreciated its alpine beauty. Instead, I think about the mountain as it is. I am fascinated by the changes to the landscape both during and since the eruption. I think about all of the questions we still have and the lessons to be learned. Even though I've been studying Mount St. Helens for 15 years I never cease to be amazed by the changes underway in this strange and beautiful place!"

▼▼▼▼Life Returns▼▼▼▼

Peter Frenzen is the Monument Scientist for the Mount St. Helens National Volcanic Monument and has held this position since it was first created in 1987. He is responsible for coordinating all of the ongoing scientific studies at the volcano.

"Mount St. Helens has been a big part of my life for the past 15 years. The mountain erupted while I was studying the revegetation of a 33 year old mudflow at Mount Rainier. The opportunity to study plant succession right after an eruption led me to pursue graduate research at Oregon State University. During the next seven years I worked on a joint National Science Foundation / Pacific Northwest Research Station program to study vegetation recovery throughout the blast zone. Part of my job was coordinating the placement and protection of research studies around the volcano. One thing led to another and, before I knew it, I was offered the newly created job of Monument Scientist.

matches the actual "on the ground" seedling by seedling development of a plant population. A more recent study monitors the influence of elk and deer on vegetation recovery in the blast zone. To do this, we built three fenced areas, called exclosures, to keep elk and deer out. We study the number and abundance of plant species in the exclosures and compare them to unfenced control plots. Inside the exclosures plants that have been repeatedly nipped back by elk and deer are beginning to grow vertically again. It is still too early to reach any long-term conclusions about the influence of elk and deer since the oldest exclosure has only been in place for three years.

...Working at Mount St. Helens has been a life-changing experience... About the only experience I can think of that would be more exciting would be to explore another planet!

Not all of our studies focus on plants. Scientists from the Monument and Utah State University have been studying the recovery of amphibian species in lakes and streams within the blast zone. General population surveys are being conducted to document colonization rates, species distribution, and community composition. The results from this work are significant in view of the perceived

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The Volcano review is produced by The Northwest Interpretive Association in cooperation with The USDA Forest Service.



For more information contact:

Mount St. Helens
National Volcanic Monument
42218 N.E. Yale Bridge Road
Amboy, WA 98601
(360) 750-3900 (Information)
(360) 750-3902 (TTY)

VOLCANO REVIEW



A Visitor's Guide to Mount St. Helens National Volcanic Monument • Summer/Fall 1996

1979.....



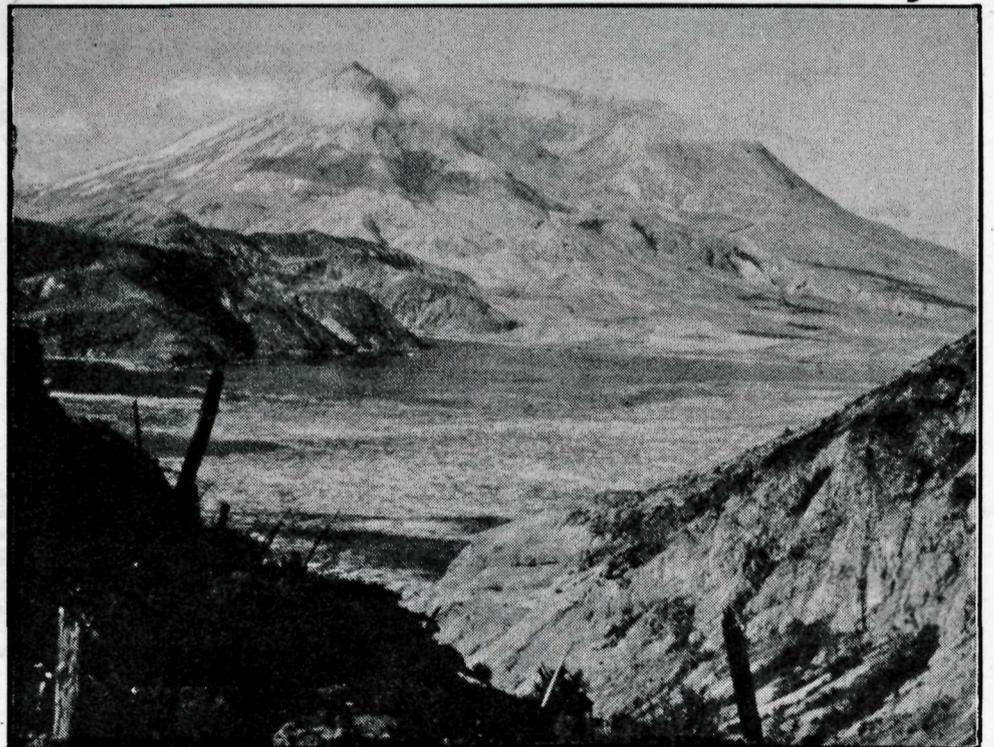
Mount St. Helens from the shore of Spirit Lake

At Mount St. Helens, natural forces are constantly at play changing the landscape in both subtle and dramatic ways.

“There is nothing permanent except change.”

Heraclitus

...Today



Mount St. Helens from Norway Pass

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Legend

- Paved Road
- Gravel Road
- Interpretive Trail (IT)
- Viewpoint (VP)
- Visitor Information (Info.)
- Trailhead (TH)
- Campground (CG)
- Restrooms
- Horse Access
- Sno-Park
- Spelunking
- Picnic Area
- Barrier Free Access
- Water
- Gas
- Food Concession
- Monument Boundary
- Restricted Area
Entry on approved trails only; research permits required for off trail travel. No camping allowed. Mountain bikes prohibited.

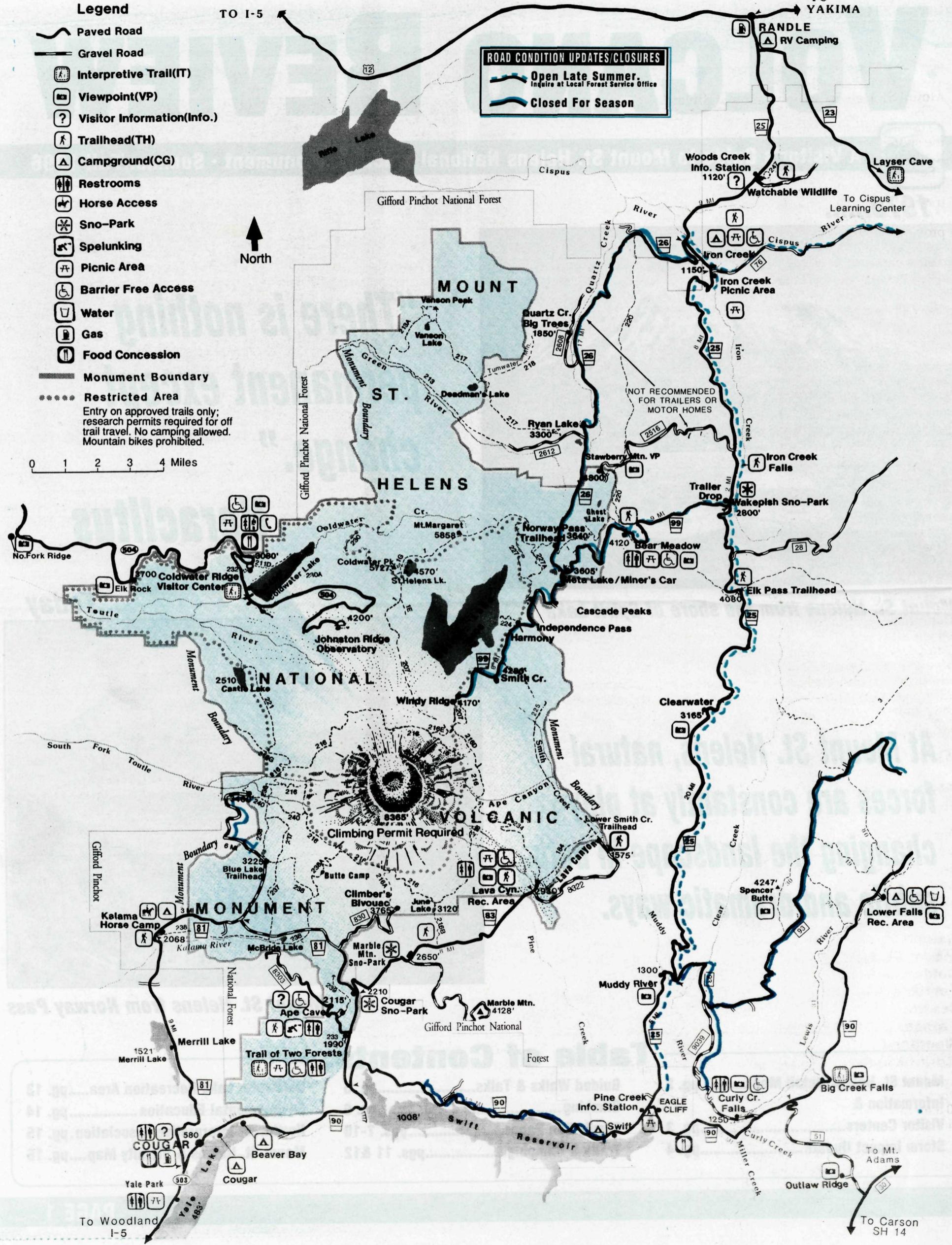
0 1 2 3 4 Miles

TO I-5

TO YAKIMA

ROAD CONDITION UPDATES/CLOSURES

- Open Late Summer. Inquire at Local Forest Service Office
- Closed For Season



To Woodland I-5

To Carson SH 14

Questions?

Visitor Centers

Mount St. Helens Visitor Center at Silver Lake

The Mount St. Helens Visitor Center is the western gateway to the National Volcanic Monument. Located five miles east of Castle Rock on the shores of Silver Lake, this center offers you an excellent introduction to the events of the May 18, 1980 eruption of Mount St. Helens.

Services include award-winning theater presentations, walk-through interpretive exhibits, a staffed information desk and a Northwest Interpretive Association book sales area.

A nature trail and magnificent views of the Silver Lake wetlands provide the curious visitor year-round opportunities to observe waterfowl, wildlife and native vegetation. Across the highway from the visitor center is Seaquest State Park which offers picnic, camping and recreational facilities.

Welcome to Coldwater Ridge Visitor Center!

Coldwater Ridge Visitor Center invites visitors to discover the fascinating ways that plants and animals have reappeared throughout the blast zone. Visitors to Coldwater enjoy panoramic views of the volcano, the newly formed lakes, and the debris-filled Toutle River Valley. The interactive exhibits, the paved 0.25 mile Winds of Change Interpretive Trail and live interpretive programs offer insights into the many ways life emerged from the ashes of the 1980 eruption.

Coldwater's restaurant includes a selection of sandwiches, soups, salads, and drinks, as well as an espresso coffee bar. The gift shop offers Mount St. Helens T-shirts and gifts, many crafted by Northwest artists. In the central hallway, the Northwest Interpretive Association's bookstore offers a variety of books, cards, and posters of Mount St. Helens and the Pacific Northwest.

With over one million visitors coming to Coldwater Ridge each year, it's important to stay on the trails and to help keep the area litter free. Thank you for your cooperation!

(Note: See information on Coldwater Lake Recreation Area Page 13)



Visitor center at Silver Lake

Mount St. Helens Visitor Center

Open Daily

9 a.m. to 5 p.m.

April 29 to September 30

Fall and Winter hours may vary. Please call ahead at (360) 274-2100.

Coldwater Ridge Visitor Center

Open Daily

10 a.m. to 6 p.m.

April 29 to September 30

September 30 - May 1 open 9 a.m. to 5 p.m.

Information Station

Randle Ranger Station

Open Daily

8 a.m. to 4:30 p.m.

May 25 to September 30

Information on traveling, permits and road conditions are available here. For more information call 360-497-1100. Randle Ranger Station is located three miles east of Randle on Highway 12. This facility may be closed for 1/2 an hour during the lunch hour.

Driving Times

Approximated Hours:

	Ape Cave	Cougar	Lava Canyon	Woods Crk. Info.	Randle	M.S.H. V.C.	Coldwater V.C.
Ape Cave	-	0:15	1:45	1:30	1:45	1:30	2:30
Cougar	0:15	--	0:30	1:30	1:45	1:15	2:15
Lava Canyon	0:15	0:30	--	1:45	2:15	1:45	2:45
Climber's Bivouac	0:15	0:30	0:30	1:45	2:00	1:45	2:45
Woods Creek Info. Station	1:30	1:30	1:45	--	:15	1:45	2:45
Randle	1:45	1:45	2:15	:15	1:30	--	1:00
Mount St. Helens V.C.	1:30	1:30	1:15	2:45	1:30	--	1:00
Coldwater V.C.	2:30	2:15	2:45	3:45	2:45	1:00	--
Portland	1:30	1:15	1:45	2:45	2:30	1:15	2:15
Seattle	3:30	3:15	3:45	2:45	2:30	2:00	3:00
Carson	1:30	1:30	1:45	2:00	2:15	2:45	3:45
Woodland	1:00	0:45	1:15	2:15	2:30	0:45	1:45
Mount Rainier	2:45	2:45	3:00	1:15	1:00	2:30	3:30

Apes' Headquarters

Open Daily

10 a.m. to 5:30 p.m.

May 25 to September 30

Explore the furthest reaches of a lava tube formed from an eruption of Mount St. Helens 1,900 years ago. Lantern rentals, book sales and travel directions are available. Lanterns can be rented until 4 p.m. Apes' Headquarters is located by Ape Cave on Forest Road 8303, south of the volcano.

Woods Creek Information Station

Opens May 24 to September 30

9 a.m. to 4 p.m.

Closed Wednesdays thru June

Woods Creek Information Station is a drive-through or quick stopping point. Forest interpreters can provide you with maps and information to make your trip more enjoyable. The staff is knowledgeable about camping and hiking opportunities and other features in the area, including Mount Rainier. You are welcome to come inside the building and take a look at the books, brochures, slides, maps, videos and postcards for sale through the Northwest Interpretive Association.

The facility may be closed for 1/2 hour during the lunch hour. The information station is accessible. It is located 6 miles south of Randle on Road 25.

If the information station is closed and you are in need of assistance, please backtrack to Randle and stop at the Randle Ranger Station which is located 1 mile east of Randle on Highway 12.

Mount St. Helens National Volcanic Monument Headquarters

Monday through Friday

Year-round

7:30 a.m. to 5 p.m.

The USDA Forest Service Headquarters for the National Volcanic Monument is located three miles north of Amboy on State Highway 503. Information on traveling, road conditions and permits is available here. Permits are required for the following activities: climbing the volcano, picking mushrooms and berries, cutting Christmas trees and firewood, or gathering forest products and minerals. For more information call (360) 750-3900.

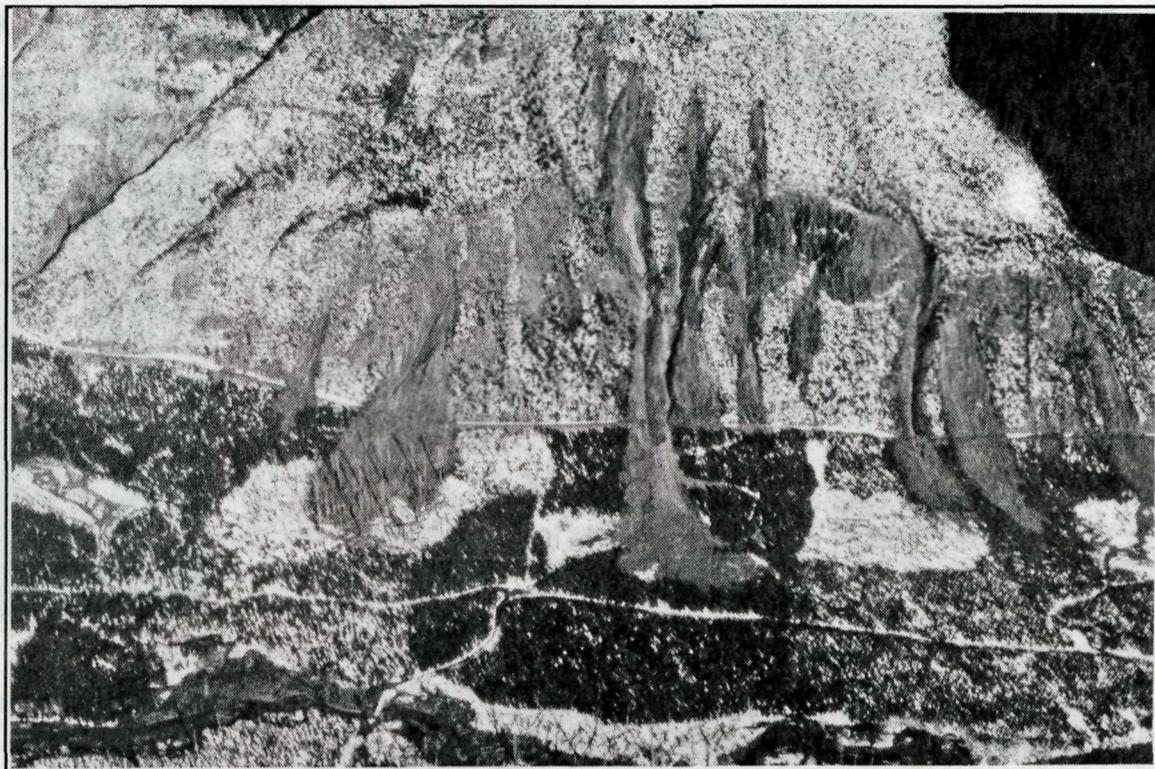
Storm Impact Update

During the winter of 1995-96 two large floods struck the Gifford Pinchot National Forest. Hydrologists rank the floods as two of the largest to hit the area in the last century. Landslides and washouts blocked roads and trails in dozens of places, greatly limiting access to some recreation sites. The Forest Service, private contractors, and Federal Highways Administration are working at a feverish pace to make needed repairs.

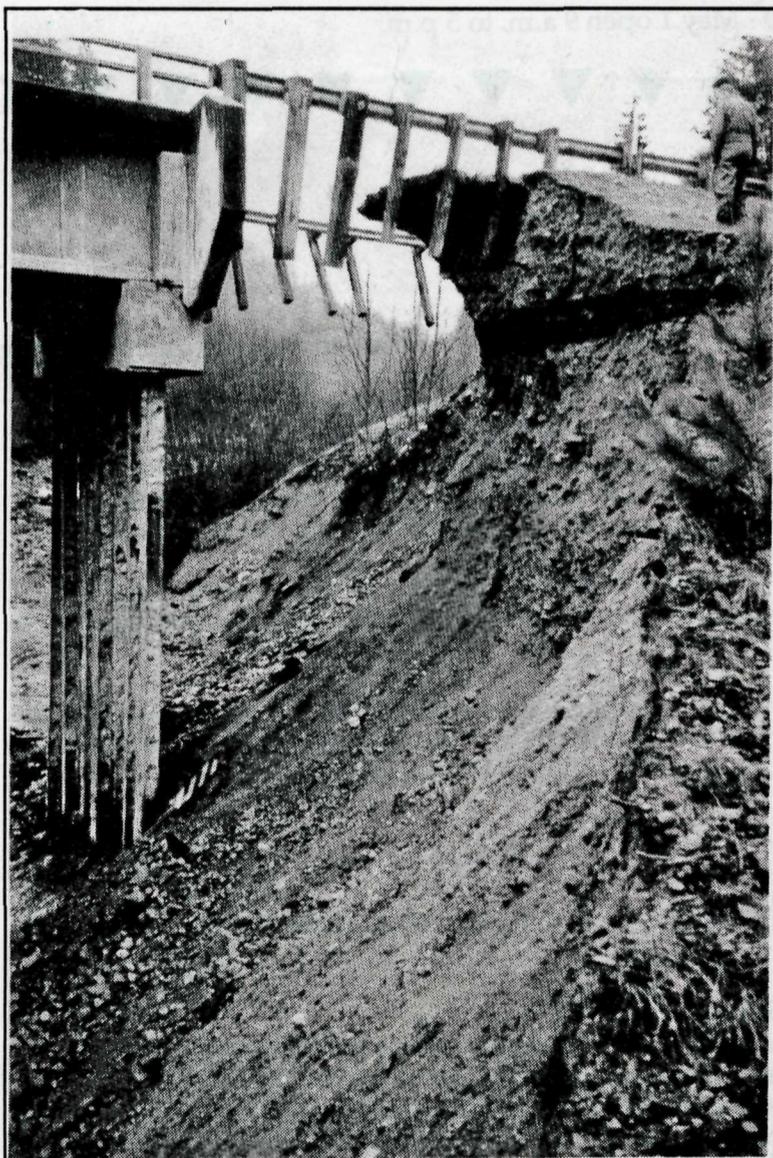
APE CAVE AND SOUTH SIDE CLIMBS OPEN

Access to popular destinations such as Ape Cave, Trail of Two Forests, Lahar Viewpoint, Kalama Horse Camp, and Lava Canyon Recreation Area have been restored. Access to Climber's Bivouac is open, as are opportunities for hiking, horseback riding, and mountain biking on the south and west sides of Mount St. Helens. The community of Cougar serves as the jumping off point for south side adventures.

Use of the popular south side of Mount St. Helens is expected to be higher than usual this summer. The Forest Service and local businesses are planning for an increased number of visitors. Visitors to the area will find lots to do, with an enhanced number of interpretive programs, guided walks, and well-maintained facilities. Look on page 5 in this issue for a listing of scheduled events.



Mudslides along forest roads



Pine Creek Bridge

HIGHWAY 504 VISITOR CENTERS OPEN

The Washington State Department of Transportation quickly removed slides from State Highway 504, restoring access to Hoffstadt Bluffs Visitor Center, the Forest Learning Center and the Coldwater Ridge Visitor Center. This highway is in good condition and the many facilities along the route offer a full range of visitor services.

PARTS OF FOREST REMAIN CLOSED

Road 90 / Lewis River Recreation Sites:

Forest Road 90 was blocked 10 miles east of Cougar when a large landslide swept down Marble Creek cutting an 80 foot deep, 180 foot wide gully in the roadway. Engineers estimate that it will take a year to construct a bridge and restore traffic.

Access to the popular Lower Falls Campground on the Lewis River and Northwoods on the east end of Swift Reservoir is by an alternate route. Follow the Wind River Highway north from the town of Carson in the Columbia River Gorge. Lewis River Trail #31 was severed in two places by massive landslides.

Road 25 & 99 / Windy Ridge Viewpoints

Forest Road 25, which is the principal north-south road connecting Randle with Swift Reservoir, was damaged by numerous landslides and washouts. Engineers estimate that it will take most of the summer before the north-south traffic is restored.

Forest Road 99 which leads to Windy Ridge and other popular Spirit Lake viewpoints was heavily damaged and is not expected to be open until the spring of 1997. Road 26 which offered an alternate connection between Roads 99 and 25 was also heavily damaged. Access to popular hiking trails along Road 99 will be limited by lack of access to trailheads and closures of flood damaged trails. Watch for possible opening of Road 25 out of Randle to Bear Meadows on Road 99 in late summer.

ACCESS INFORMATION UPDATED WEEKLY

Trail and road access information is updated weekly and may be obtained by calling the Monument Headquarters at (360) 750-3900, or on the internet at: [<http://washington.edu.1180/home/trails/helens.html>]. If you are planning a trip deep into the forest, call ahead to make sure the area is open. Monument staff will be happy to suggest alternate places to hike or camp, if your favorite area is unavailable.

Guided Walks & Talks

Meet with a forest interpreter and learn about the past, present and future of Mount St. Helens. Informative talks and special presentations will be offered throughout the summer season. Guided interpretive walks reveal some of the mysteries and wonders of this special place.

Mount St. Helens Visitor Center

Daily

Times posted at Center

Meet in the main lobby

Coldwater Ridge Deck Talks

Daily

Times posted at Center

Discover some of the mysteries and secrets of Mount St. Helens as an interpreter describes the incredible changes this landscape has endured. The deck is located at the rear of the visitor center. During stormy weather, talks will be held inside the center's main pavilion; allow 20 minutes.

Special Mid-Week Programs: enjoy skits, elk bugling, games, special guests, and other surprises on these "not-so-busy" mid-week days. Tuesday, Wednesday, and Thursday; allow 20 minutes.

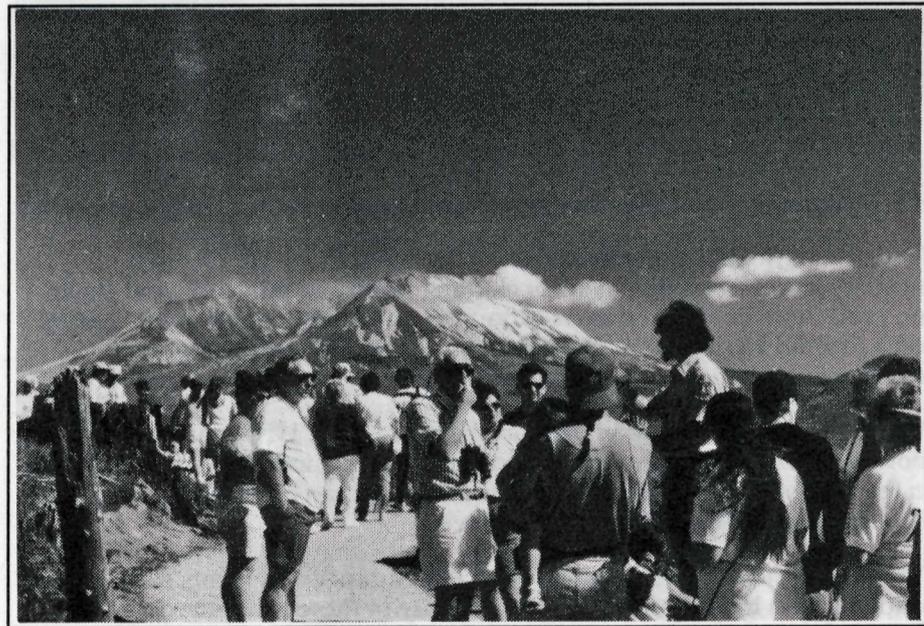
Winds of Change Interpretive Trail

Daily

Times posted at Center

Trail Difficulty: Easy

This is a 0.25 mile barrier-free loop trail located just 50 yards to the west of the Coldwater Ridge Visitor Center. Join an interpreter for this 45 minute guided walk or tour it on your own at any time. Discover how the stone wind of the 1980 eruption slammed into Coldwater Ridge and how with the gentle winds of time, plants and animals have returned. This trail offers sweeping views of the Toutle River Valley and Mount St. Helens.



Winds of Change Trail

Campfire Programs

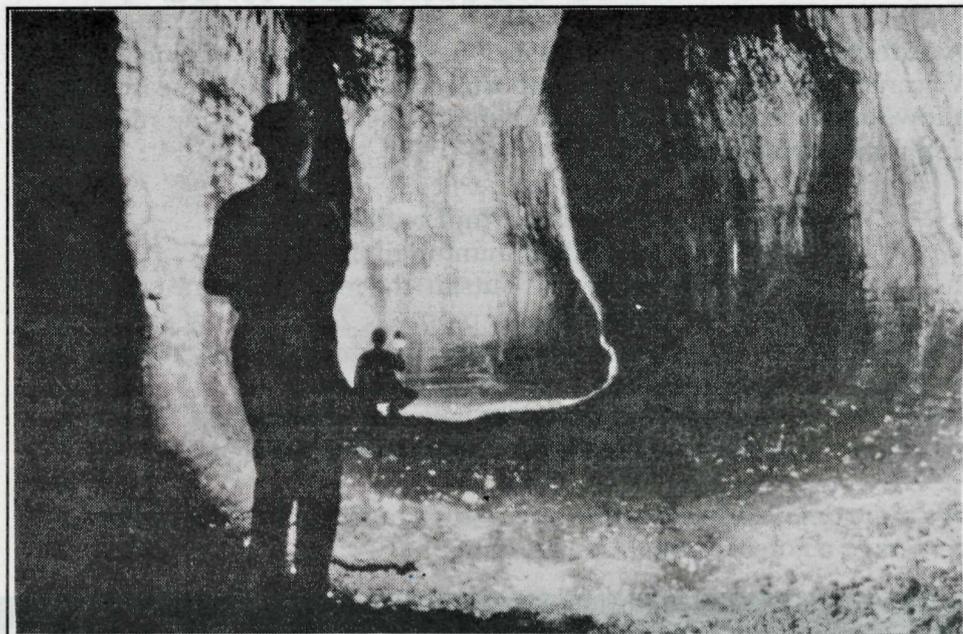
Cresap Bay Campground

Friday - Saturday 8:00 pm June and July
7:30 pm August

Cougar Campground

Friday - Saturday 8:00 pm June and July
7:30 pm August and September

Join a forest interpreter for an evening of games, stories, songs, and fun for all ages. Cresap Bay Campground is located approximately 7 miles north of the town of Amboy on State Highway 503. Cougar Campground is located just east of Cougar on SR 503.



Exploring Ape Cave

Ape Cave Lantern Walk

Daily

Weekends 10:30, 12:30, 1:30, 2:30, 3:30

Weekdays 10:30, 12:30, 1:30, 3:30

June 25 to September 30

Join a forest interpreter who will shed some light on the life and features of the cool, dark world of this 1,900-year-old lava tube. Wear warm clothes and sturdy shoes. Lanterns will be provided. Meet at Apes' Headquarters, 3 miles north of the junction of Forest Roads 83/90; allow 40 minutes. Apes' Headquarters is open daily from 10:00 a.m. to 5:30 p.m. Lantern rental available for \$4 from 10:00 a.m. to 4:30 p.m. Lanterns are due back by 5:00 p.m.

Lahar Talk

Daily

Weekends 10:30, 12:30, 2:00

Weekdays 10:30, 2:00

June 25 to September 30

Come hear how the south side of Mount St. Helens was affected by the May 18, 1980 eruption. A forest interpreter will tell you stories about the resiliency of life in this mudflow-scoured landscape at the Lahar Viewpoint, 10.5 miles east of the junction of Forest Roads 83/90; allow 15 minutes.

Lava Canyon Walk

Daily

Weekends 10:45, 12:45, 3:30

Weekdays 12:45, 3:30

June 25 to September 30

Discover more about Mount St. Helens' eruptive past. Join a forest interpreter for a guided 0.25 mile walk down a barrier-free trail. Explore a mudflow-scoured canyon with views of a waterfall plunging over an ancient lava flow. Meet at the trailhead of the Lava Canyon Recreation Area, 11 miles east of the junction of Forest Roads 83/90; allow 40 minutes.

From the waterfall viewpoint, visitors can either return to the trailhead or continue on a more difficult 0.75 mile loop that takes you to the opposite side of the canyon, then back via a breathtaking suspension bridge. The hike back up to the waterfall viewpoint is not recommended for visitors who dislike steep cliffs and narrow trails.

Trails: Know Before You Go

▼ Trails in the Restricted Area ▼

A restricted area has been established in the heart of the National Volcanic Monument to protect opportunities for scientific research and allow for the recovery of plant and animal life. The following rules apply in the restricted area:

- ▼ Stay on the trail; off-trail prohibited. (\$100.00 minimum fine).
- ▼ Camping allowed outside the restricted zone only. (Please see map pp. 6 & 7).
- ▼ Disturbing research plots or removal of any natural feature is strictly prohibited.
- ▼ Access into the crater is strictly prohibited.
- ▼ Fires are not allowed within the blast area.

For more detailed information and maps, contact one of the visitor centers or a Forest Ranger District Office.

▼ Trail Difficulty Definitions ▼

EASY - Level to gently rolling grades less than 20%. Trail treads 18-24" wide. Easy hiking, suitable for children or individuals seeking a leisurely walk.

MORE DIFFICULT - Moderate grades up to 30%. Trail treads 12-18" wide depending on level of use. Vigorous hiking for individuals of normal physical condition.

MOST DIFFICULT - Steep grades, narrow tread widths, low levels of maintenance. May require stepping over logs, traversing steep cliffs or fording streams.

Climbing

Prior to 1980, Mount St. Helens was a popular climb. Records from the 1970s show that more than 10,000 climbers a year attempted to reach the summit. All that changed on May 18, 1980.

The summit and north flank of the volcano collapsed in a giant landslide, transforming the symmetrical 9,677 foot peak into a truncated cone 1,300 feet lower. A gaping crater, more than 2,000 feet deep, now opens to the north and the alpine glaciers that once cloaked the summit are gone.

At 8,365 feet, the rim of Mount St. Helens now provides outstanding views of the crater, lava dome, blast area and surrounding volcanic peaks. The mountain was reopened to climbing in 1987. At that time, a mandatory permit system was initiated with a seasonal quota. This policy was developed to help protect natural processes while allowing for recreational climbing access.

Permits are required year-round to climb above 4,800 feet elevation. From May 15 through October 31, access is limited to 100 climbers a day. After October 31, permits are self-issued at the Climber's Register at Jack's Restaurant and Store, located 5 miles west of Cougar on State Route 503. Permits are free.

During the quota season from May 15 through October 31, up to 60 permits per day are available by reservation from the Monument Headquarters. These permits are issued to climbers applying in person or by mail. Weekends are in great demand and most Saturdays and Sundays during the summer are filled many weeks in advance.

Unreserved permits for 40 climbers are available daily at Jack's Restaurant and Store. These permits are distributed by lottery each day at 6:00 pm for climbers wishing to climb the following day. You may enter the lottery beginning at 5:30 pm. The lottery will take place promptly at 6:00 pm. All climbers present may enter the drawing. Lottery winners will be issued a permit for their group of up to four climbers. If your group is larger than four, someone from the group will need to compete for additional permits. Any permits remaining after the lottery will be available on a first come first served basis.

All climbers are required to sign in before and after their climb at the Climber's Register. The Register is located at Jack's Restaurant and Store on State Route 503, 23 miles east of Woodland (I-5 Exit 21) and 5 miles west of Cougar.

Climbers may choose to camp at Climber's Bivouac at the upper end of Forest Road 830. This site offers parking and toilets, but no water or other facilities are provided. Be sure to park vehicles on the gravelled parking areas only.

During the summer the most popular route to the summit is Monitor Ridge, starting at the Climber's Bivouac. Most climbers complete their round trip in 8-12 hours. The Monitor Ridge route is a non-technical scramble gaining 4,500 in 5 miles. The route begins on the Ptarmigan Trail #216A which gently climbs for about 2 miles to timberline. Above timberline, the route travels oversteep, blocky lava flows on the lower slopes and loose, sandy volcanic ash on the upper slopes.



Crater rim with Mt. Adams in the background

In early summer, snow is commonly encountered, especially in gully bottoms.

There is no drinking water available on the volcano. All climbers are encouraged to carry extra layers of clothing including rain and wind shells, sun protection for skin and eyes, extra food and water, sturdy boots, gaiters, and a first aid kit. If you plan to climb on snow, an ice axe is highly recommended.

Weather and climbing conditions can change rapidly. Wind, rain, fog and even snow can form quickly. For a safe and comfortable climb, always keep an eye on the weather. The temperature at the crater rim can be 20-30 degrees colder than the surrounding valleys. Be prepared!

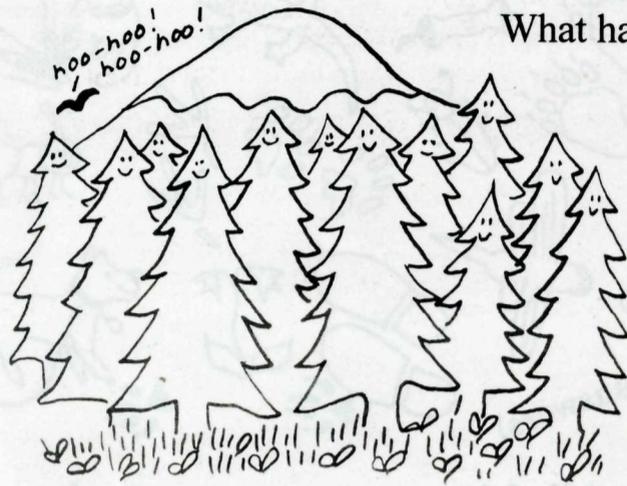
Though Mount St. Helens is not a particularly dangerous climb, some accidents with injuries do occur. The majority of these accidents occur when climbers slide down snow fields and lose control. If you choose to descend on snow, control your speed and always be able to stop yourself!

With more than 16,000 registered climbers ascending the mountain each year, it is important for each climber to help minimize human disturbance. Stay on established routes and avoid trampling sensitive alpine plants. Use the toilets provided at Climber's Bivouac and at timberline to reduce the amount of human waste on the volcano. Pack out all litter.

All climbing opportunities at Mount St. Helens are on the south slopes. The areas north of the South Fork of the Toutle River on the west and Windy Pass on the east are closed to all climbing and off-trail travel. Entry into the crater is strictly prohibited.

For current climbing conditions and permit information call the "Climbing Hotline" at 360-750-3961.

FAMILY FUN PAGES!



What happened to the forest in the eruption?

How has the landscape changed since?

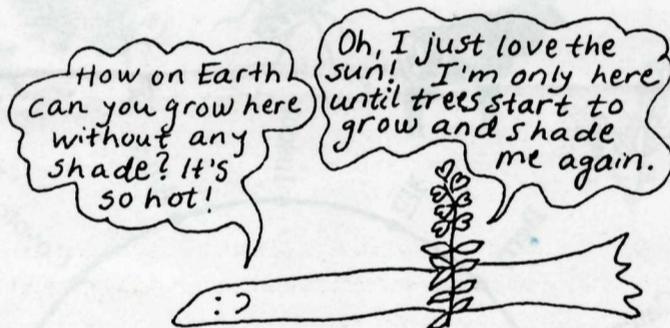
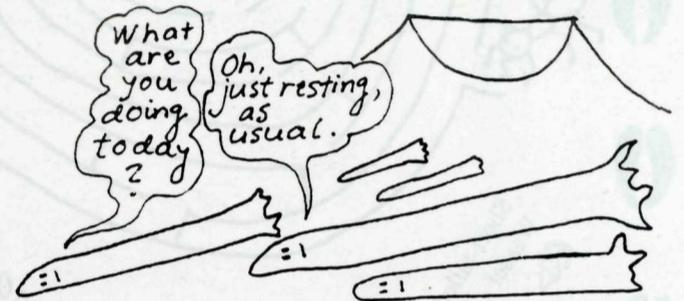
What might this place look like in the future? To find out, read the

Story of the **GRANDTREE**

Years ago I was one of the tallest Douglas firs near Mount St. Helens. I grew near this beautiful mountain and gazed at her first thing every morning as the sun rose. The ash that she had sent my friends and me over the centuries had made the soil very comfortable for us. All kinds of plants and animals lived around me. At night the owls would hoot in the forest, during the day they would roost on my branches.

I must admit that May 18, 1980 was probably the most exciting day of my 500-year life. The blast just blew me down like a blade of grass, scorched my bark and branches and covered me with a thick layer of ash! I had seen several eruptions in my long life, but never anything like this.

After the eruption it took me quite a while to get used to my new appearance. The world looked so different from this position! I guess the eruption had changed the view quite a bit, too. All my fellow trees lay all over the ground and there were few living plants. No wonder. There was no longer any shade, so the sunshine was much too bright for the plants that used to grow in the forest.

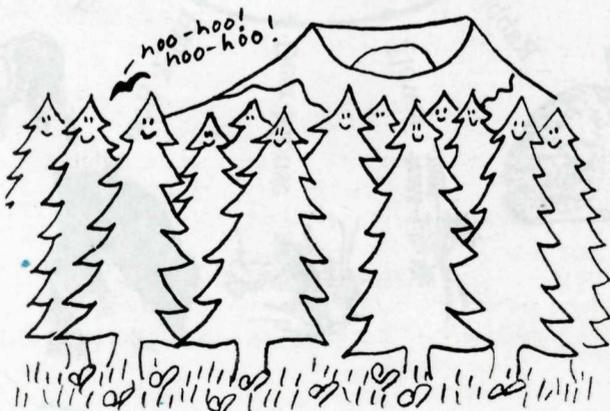


Then suddenly one day, two years later, I saw this pretty plant with pink flowers right next to me! She told me she was Fireweed and that the wind had blown her here as a seed. She said she actually loved the bright sunshine! Quite soon other sun loving plants showed up, too: Lupines, Pearly Everlastings, Thistles, False Dandelions, and shrubs, like Red Alder, Willow and Cottonwood. It was fun to have some young company. They called me their Grandtree!

Over the years, as the shrubs grew bigger, I grew smaller, because I was now decaying. Boy, it tickled me when all kinds of bugs turned the nutrients of my wood back into soil, for the plants to use! It was nice to think I was helping my young friends grow.

Soon, I had quite a lot of company. Woodpeckers pecked at me trying to find bugs, while Chipmunks and Ground Squirrels ran all over me. Elk and Deer soon found the tasty flowers and shrubs I was nourishing. They often stayed overnight with me, leaning on my side. A just-married junco couple found a safe place to nest below me. Soon the little chicks woke me every morning before sun rise with their hungry peeping. A lot of things were going on around me again! I felt quite useful and was so happy to be able to help those plants and animals. But sometimes I would wonder what became of my old friends, the Owls. Ever since the eruption I had not seen them, but every now and then I could hear them hoot in a far away forest that the blast hadn't touched.

One day, perhaps fifteen years after the eruption, something wonderful happened. A little Douglas fir sprouted right next to me! I was so happy that I almost rolled over!



With each passing year more and more Douglas firs, Pacific Silver firs and Western hemlocks sprouted. They grew along with the shrubs, slowly at first, but soon they stood taller than all the other plants. New plants and animals moved in every summer. But I couldn't see my friends Fireweed, Thistle and Pearly Everlasting any longer. I guess they needed to find a brighter neighborhood to live in.

I can only imagine what will happen in the next few decades. More and more plants and animals will settle here, and my conifer friends will grow bigger still. I will continue to grow smaller, and eventually I will disappear. Not really disappear, though, because my nutrients will become part of other trees. Sooner or later there will be a new forest here, and the owls will again hoot and roost on the branches of the trees.

Until Mount St. Helens erupts once more!

Make up your own story about a plant or animal that witnessed the eruption of Mount St. Helens and the return of life!

An Ever Changing Landscape

Events of the past year reminded us that the landscape around Mount St. Helens is a work in progress. The summer of '95 ended with a marked increase in the number of small earthquakes beneath the volcano. As winter began the earthquakes decreased and focus shifted from volcanic activity to weather. The winter of 1996 delivered two of the largest flood events experienced in the Mount St. Helens area in over a century. Millions of tons of ash and logs were swept into waterways as volcanic deposits gave way to torrential rains and rapid snow melt. These events reinforce our appreciation for the power of nature and how large-scale disturbances, though infrequent, shape the landscapes in which we live.

Cooling Magma Causes Earthquakes

Peter Frenzen is the Monument Scientist for the Mount St. Helens National Volcanic Monument and has held this position since it was first created in 1987. He is responsible for coordinating ongoing scientific studies at the volcano. Frenzen had the following to say about the most recent earthquake activity:

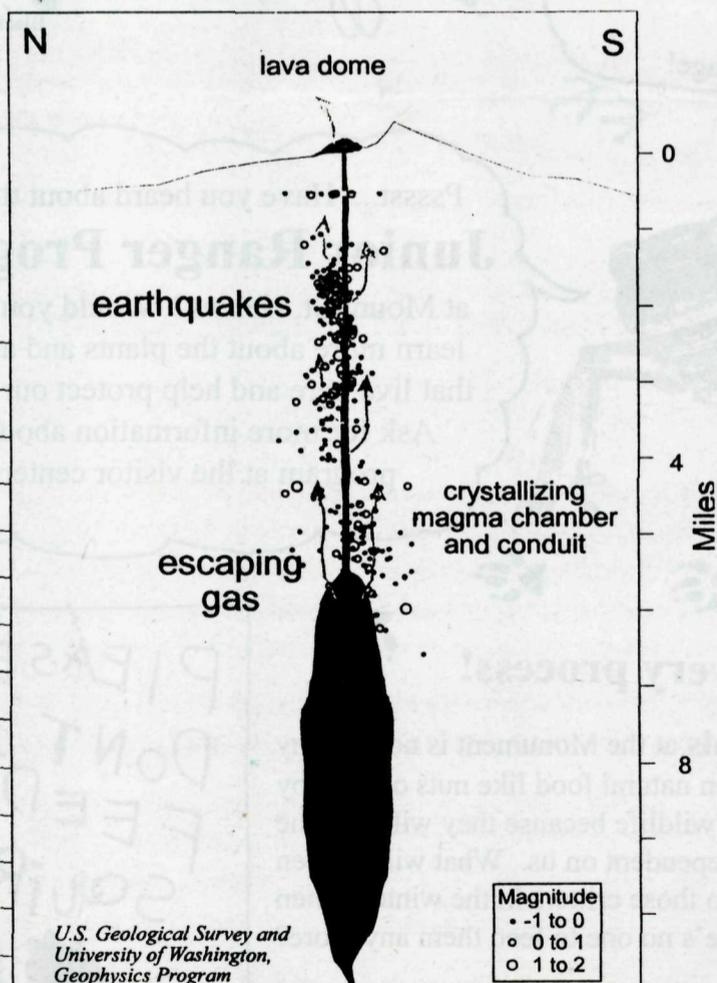
"When I learned that small earthquakes beneath the volcano had increased from virtually none in January of 1995 to 100 per month by the following September my first thought was that the volcano was waking up. In the life of a 40,000 year old volcano such a rapid change in earthquakes over a period of months is cause for concern. The last time we saw such a change was in 1991 when clusters of small (magnitude 1 or less) earthquakes were accompanied by small gas explosions. Some of the explosions were large enough to hurl rocks one foot in diameter one half mile from the dome, and produce ash plumes that rose more than two miles above the crater rim.

With the potential for gas explosions and mudflows from melting snow, the Monument closed hiking trails immediately north of the crater. By late November 1995,

geologists and Monument staff were confident that activity had returned to the normal background level of 20 earthquakes or less per month. At that point the trail closures were lifted.

Geologists believe the temporary increase in earthquake activity may have resulted from cooling of the magma body beneath the volcano. As magma cools and solidifies, gases trapped in the surrounding rock are squeezed and concentrated. Eventually, the pressure increases to a point where the surrounding rock is fractured, producing small earthquakes. When pressurized gases reach the surface they often produce small explosions and ash plumes. This process that produces pressurized gases in cooling magma is very similar to the process that causes the pressure to build within a frozen soft drink and "erupt" a mixture of gas and soft drink when opened.

Location of Earthquakes, 1995



When Floodwaters Meet Volcano

The winter of 1995-96 brought some dramatic flooding to the streams and valleys draining Mount St. Helens. A dramatic shift in the position of the upper atmosphere's jet streams produced major swings in temperature and precipitation. These shifts caused rapid melting of heavy snow packs and the resulting run-off produced record flooding.

As one rain storm followed another, saturated hillsides collapsed and flowed into the valleys below. Blast zone hillsides, lacking a protective forest cover and the binding strength of tree roots, failed more frequently than forested slopes. Streams that had developed stable pools and bank vegetation since the 1980 eruption were scoured by flooding. Many stream beds were buried by landslides and sediments filled flood waters.

Streams that were previously buried by debris avalanche and mudflow deposits during the 1980 eruption were particularly hard hit. The sediment-filled streams changed course, undercutting their banks and sweeping away adjacent deposits. The high flows and associated erosion swept away stream-side vegetation that had developed over the past fifteen years.

The 1996 floods killed many aquatic organisms and stream bank dwellers. However, it is important to realize that this was just another event in a long cycle of natural disturbances. The productivity of many Northwestern streams is built upon the deposits of past floods. Research has shown that, over the long-term, flood transported boulders, logs and other debris help promote the formation of stable pools and stream beds. In the absence of chronic sedimentation or other continuing disturbances these streams develop thriving new communities. This is not surprising given that this cycle of periodic disturbance and renewal has been repeated for thousands of years.

The events of the past year have reminded us that we live on a dynamic planet that is shaped by powerful natural forces. Our challenge is to better understand these forces and to learn to live in harmony with their rhythms.

Answers to the Mystery Animal Quiz

on the previous page:

The mystery Animals are **Elk** (Roosevelt Elk) and the **Northern Flicker**, which is a woodpecker. Both are abundant around Mount St. Helens, so you might see them during your visit!



▼ Intro To Hiking ▼

There are many trails at Mount St. Helens leading hikers into a variety of exciting environments. Crater views, new lakes, ancient lava flows, mudflows, and old-growth forest can all be found here. To ensure your safety: wear sturdy shoes, bring sunscreen, and carry one quart or more of water per person. Trail guides are available; inquire at any visitor center or other Forest Service Office in the area. Read on to discover hiking opportunities that await you. Keep in mind that you may encounter winter storm damage. Please report problems to any Forest Service official. (See page 6 for Trail Difficulty definitions.)

WEST SIDE TRAILS

LAKES TRAIL #211 and ELK BENCH TRAIL #211D

Trail Difficulty: More Difficult

The Lakes Trail #211 and the Elk Bench Trail #211D provide extended hiking opportunities from the Coldwater Ridge Visitor Center and the Coldwater Lake Recreation Area.

The Lakes Trail begins near the Coldwater Lake boat launch and parallels the northwest shoreline of Coldwater Lake. The trail is mostly level and provides views of the lake and the jagged peaks surrounding the upper Coldwater Valley.

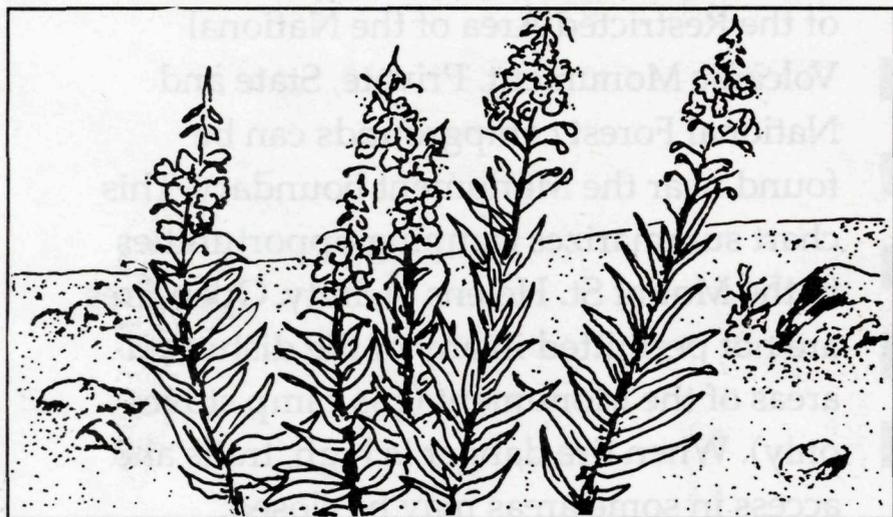
The Elk Bench Trail descends steeply from the visitor center to the Lakes Trail, dropping about 600 feet in less than a mile. The upper section of the trail offers views of the crater and lava dome of Mount St. Helens.

Both trails are within the Administrative Closure Area. Hikers are required to stay on the trail, and may not camp or build fires. Watch for wooden trail marking posts and carry water.

BIRTH OF A LAKE TRAIL

Trail Difficulty: Easy

Take a journey full of discovery, explore on your own along a 0.25 mile barrier-free trail that borders the shoreline of Coldwater Lake. Find out how this lake was formed in 1980 and how it supports organisms large and small. The trail features a boardwalk that journeys out over the lake and ends by hugging a huge hummock. This trail is located in the day use area at Coldwater Lake, just below the visitor center.



Woods Creek Watchable Wildlife Trail.

NORTH SIDE TRAILS

WOODS CREEK WATCHABLE WILDLIFE TRAIL #247 AND PICNIC AREA

Trail Difficulty: Easy

Located directly across from the Woods Creek Information Station, this 2.5 mile barrier-free trail system takes you through an array of plant and animal life. The trail leads into a mixed hardwood/conifer forest, breaks into an open meadow, crosses Woods Creek, passes several beaver ponds, climbs into an old-growth forest, then loops back into a hardwood forest. The picnic area is located at the trailhead. Facilities include nine individual picnic sites, three charcoal grills, a small picnic shelter and a restroom, all barrier-free. Trail guides are available at the trailhead for a donation. Environmental education packs have been developed for this site. Pick one up at the Woods Creek Information Station. These are a great way for the entire family to learn more about the area.

IRON CREEK OLD-GROWTH TRAIL #83

Trail Difficulty: Easy

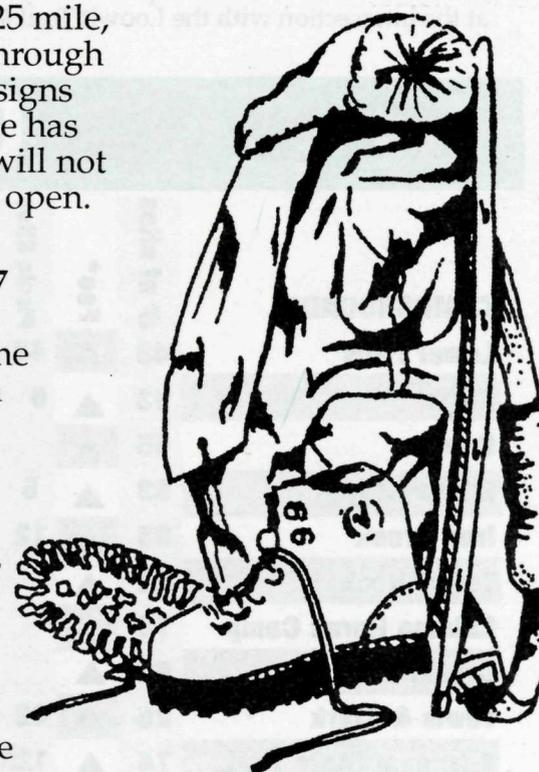
This barrier-free trail begins and ends at the Iron Creek Picnic Area. The 0.25 mile, compacted gravel trail loops through an ancient forest. Interpretive signs help explain how a root disease has changed this forest. This trail will not be accessible until Road #25 is open.

IRON CREEK CAMPGROUND TRAIL #187

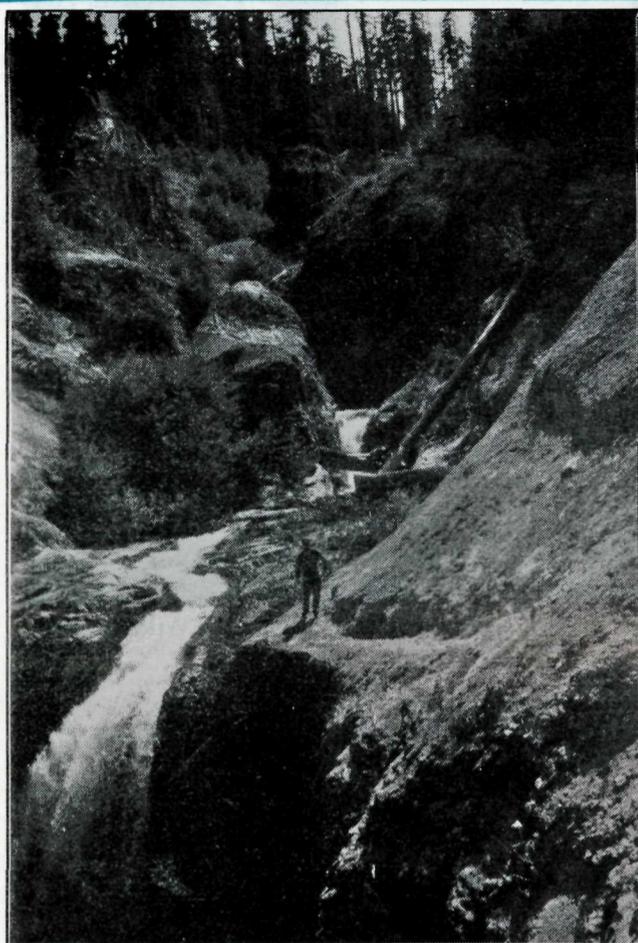
Trail Difficulty: Easy

You can start this trail from the Iron Creek Picnic Area or from many areas within Iron Creek Campground. The 1.5 mile trail follows the Cispus River and twists through magnificent Western red cedar and Douglas fir forests. The trail is barrier-free with a compacted gravel surface.

The trail will not be accessible until Road #25 is open.



Trails



Lava Canyon Trail

SOUTH SIDE TRAILS

Trail of Two Forests #233

Trail Difficulty: Easy
This 0.25 mile barrier-free boardwalk trail allows you to venture through a land of lava. Discover the molds or impressions of an ancient forest engulfed by a lava flow nearly 1,900 years ago, and an emerald forest that has risen from the black basaltic lava. If you bring a flashlight along, there is an opportunity to crawl through the mold of a tree that stood at this site 1,900 years ago.

Ape Cave

Trail Difficulty: Easy - Most Difficult

Named by members of an outdoor group

called the Mount St. Helens Apes, this cave is the longest continuous lava tube in the continental United States. Cavers should wear warm clothes, sturdy shoes and have at least two sources of light. Lantern rentals are available at Apes' Headquarters for \$4 from 10 a.m. to 4:30 p.m.

Two different routes of exploration exist inside the cave and an above-ground trail (Ape Cave #239) connects the main and upper entrances. The lower cave is a relatively easy 0.75 mile hike that takes 1 hour round trip. The challenging upper cave is 1.5 miles long, requires climbing over large piles of rocks and takes 2.5 to 3 hours.

June Lake Trail #216B

Trail Difficulty: Moderate

Trail #216B climbs gently for about 1.5 miles to the crystal blue waters of June Lake. After a short steep climb beyond the lake, the June Lake Trail ends at the intersection with the Loowit Trail #216.

This popular 3 mile round trip hike is a good choice for families and beginning hikers. Watch for a surprise at the inlet to June Lake and notice the large ancient lava flow that formed the lake. The path winds through young fir forests from the trailhead to the lake.

The June Lake trailhead is on Forest Road 83 about 4 miles west of the Lava Canyon Recreation Area. Please pack out all of your litter and practice no trace camping.

Lava Canyon Trail #184

Trail difficulty: Easy-Most Difficult

Follow the Muddy River as it plummets 1,400 feet down a mudflow-scoured canyon, cascading over an ancient lava flow. The 0.5 mile barrier-free upper section leads to a viewpoint of a waterfall. The middle section ventures along a 1 mile loop trail that crosses over the turbulent Muddy River. The 2.5 mile lower section descends into the depths of the rugged canyon and provides views of a series of spectacular waterfalls. Beware of slick rocks and steep drops. There was some damage to trail due to recent storms.

Loowit Trail #216

Trail difficulty: Most Difficult

The Loowit Trail #216 is a 27-mile loop that circles the volcano between 3,500-4,500 feet elevation. The trail offers a tremendous variety of terrain and traverses some of the most dynamic landscape at Mount St. Helens. The trail winds past old growth trees, across ancient lava flows and into standing dead and blown down forest. The northern portion of the loop crosses areas affected by the 1980 eruption's landslide, blast, pyroclastic flows and mudflows.

There is no direct access to the Loowit Trail. Instead, it is accessible from several "feeder" trails which add to the total loop length. The most popular feeder trails are the Ptarmigan Trail #216A and the June Lake Trail #216B.

Some portions of the Loowit Trail may be difficult to follow. Watch for wooden posts and rock cairn trail markers and use a topographic map. Use great care while crossing gullies or where loose rock is on the trail. Expect down trees along the forested portions of the trail. Water is very limited on this trail during most of the summer and should be treated before drinking.

Between Windy Pass on the east and the South Fork of the Toutle River on the west, the trail is within the Restricted Area. In this area hikers are required to stay on the trail, may not camp and may not build fires. this trail segment is 11 miles long, plan your hike accordingly.

Camping in the Monument

CAMPGROUNDS	# of sites	Fee*	Picnic Sites	Water	Restrooms	Showers	Trailer Sites	Disabled Access	Fishing	Swimming	Boat Ramp	Campfire Programs
Lower Falls	43	▲	43	▲	▲	▲	▲	▲	▲	▲	▲	▲
Swift	93	▲	6	▲	▲	▲	▲	▲	▲	▲	▲	▲
Cougar	45	▲		▲	▲	▲	▲	▲	▲	▲	▲	▲
Beaver Bay	63	▲	5	▲	▲	▲	▲	▲	▲	▲	▲	▲
Iron Creek	98	▲	12	▲	▲	▲	▲	▲	▲	▲	▲	▲
Tower Rock	22	▲		▲	▲	▲	▲	▲	▲	▲	▲	▲
Kalama Horse Camp	10	▲		▲	▲	▲	▲	▲	▲	▲	▲	▲
Cresap Bay	62	▲		▲	▲	▲	▲	▲	▲	▲	▲	▲
Lewis & Clark	25	▲	62	▲	▲	▲	▲	▲	▲	▲	▲	▲
Sequest State Park	74	▲	125	▲	▲	▲	▲	▲	▲	▲	▲	▲

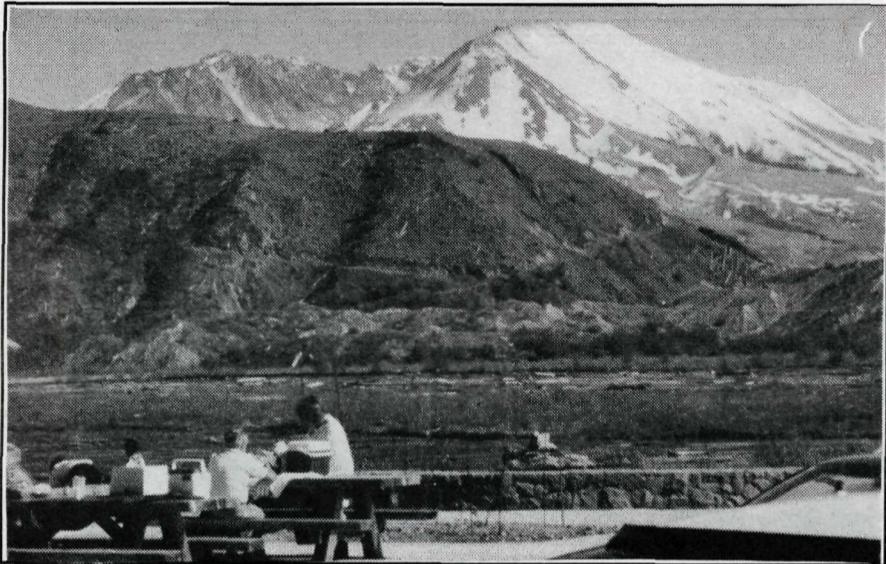
*Fees range upward from \$6 ▲ Service is present in campground.

Dispersed camping is permitted outside of the Restricted Area of the National Volcanic Monument. Private, State and National Forest campgrounds can be found near the Monument boundary. This chart summarizes camping opportunities in the Mount St. Helens vicinity. Open fires are not permitted in any of the disturbed areas of the Monument (gas camp stoves only). When fire danger is high, trails and access in some areas may be closed.

Coldwater Lake Recreation Area

▼▼▼▼ Lake Facilities ▼▼▼▼

The Coldwater Lake Recreation Area is located just east of Coldwater Ridge Visitor Center. Visitors to the lake can enjoy a beautiful closeup view of the lake and surrounding peaks with Mount St. Helens standing in the distance. Birds can be seen and heard all around while fish surface in the waters nearby.



Picnic area at Coldwater Lake

This area offers a variety of recreation opportunities including picnic facilities, a boardwalk interpretive trail, a small Discovery Area, and a boat launch. Restrooms, a fish cleaning station, and a pet area are also provided. These lake facilities can be reached by driving 2 miles east on State Highway 504 from the Coldwater Ridge Visitor Center.

▼▼▼▼ Please Remember ▼▼▼▼

While enjoying the Coldwater Lake Recreation Area, please remember:

- ◆ This is a Day Use Area only. **CAMPING IS NOT PERMITTED.**
- ◆ Pets must be kept on a leash and are permitted only in the designated pet area.
- ◆ Since plants "grow by the inch and die by the foot," stay on the trails and hard-surfaced plaza areas.
- ◆ A Discovery Area has been established to allow closer study of natural features along the outlet stream of the lake. Within the Discovery Area please step carefully and leave plants, animals and insects alive and well.
- ◆ The Birth of a Lake Trail is an interpretive trail for viewing wildlife and the natural features of the area. Fishing and swimming are NOT permitted from this trail.
- ◆ The boat launch is for launching and landing of watercraft only. Fishing and swimming are NOT allowed in the boat launch area.
- ◆ No gas-powered motors, all types of watercraft welcome.
- ◆ A valid Washington State Fishing License is required.
- ◆ Only artificial flies or lures with a single, barbless hook are allowed. Bait is prohibited.
- ◆ There is a one fish limit per person, per day. Minimum size is 16 inches.
- ◆ Shoreline fishing is allowed only from the three designated shoreline access points (see information display at boat launch for locations).

For Your Information

You can call or write the following sources for additional information:

Mount St. Helens
National Volcanic Monument
42218 N.E., Yale Bridge Road
Amboy WA, 98601
(360) 750-3900 (Information)
(360) 750-3903 (24 hour recording)
(360) 750-3902 (*TTY)
(360) 750-3961 (Climbing Hotline)
(360) 750-3901 (Fax)

Mount St. Helens Visitor Center
3029 Spirit Lake Hwy.
Castle Rock, WA 98611
(360) 274-2100 (Information)
(360) 274-2103 (24 hour recording)
(360) 274-2102 (*TTY)
(360) 274-2101 (Fax)

Coldwater Ridge Visitor Center
3029 Spirit Lake Highway
Castle Rock, WA 98611
(360) 274-2131 (Information)
(360) 274-2129 (Fax)

Gifford Pinchot National Forest
Forest Headquarters
6926 E. Fourth Plain Blvd.
P.O. Box 8944
Vancouver, WA 98668-8944
(360) 750-5000 (Information)
(360) 750-5009 (24 hour recording)
(360) 750-5003 (*TTY)
(360) 750-5045 (Fax)

Randle Ranger District
P.O. Box 670
Randle, WA 98377
(360) 497-1100 (information)
(360) 497-1101 (*TTY)
(360) 497-1102 (Fax)

Wind River Ranger District
1262 Hemlock Rd.
Carson, WA 98610
(509) 427-3200 (information)
(509) 427-4541 (*TTY)
(509) 427-3215 (Fax)

Packwood Ranger District
13068 U.S. Hwy. 12
Packwood, WA 98361
(360) 494-0600 (Information)
(360) 494-0601 (*TTY)
(360) 494-0602 (Fax)

Mt. Adams Ranger District
2455 Hwy. 141
Trout Lake, WA 98650
(509) 395-3400 (Information)
(509) 395-3422 (*TTY)
(509) 395-3424 (Fax)

Columbia River Gorge National
Scenic Area Waucoma Center
902 Wasco Avenue Suite 200
Hood River, OR 97031
(503) 386-2333 (Information)
(503) 386-8758 (*TTY)
(503) 386-1916 (Fax)

*TTY - Teletypewriter for the hearing impaired.

People and Mount St. Helens

▼ You and the Recovery Process ▼



Like the proverbial time traveler, visitors to Mount St. Helens have the opportunity to step back in time and see what the Pacific Northwest must have looked like in the aftermath of past volcanic eruptions. With this opportunity comes a

responsibility, for, like the time traveler of science fiction, the Monument visitor has the potential to change history forever. Actions that on the surface appear to be harmless, can be disastrous when multiplied by the many thousands of visitors who come to the Monument each year. What has taken nature more than a decade to establish can thoughtlessly be erased in only a moment. Picking a flower, collecting rocks or trampling plants by walking off-trail can forever alter the process of natural recovery.

▼ Science at Mount St. Helens ▼

When Mount St. Helens erupted in 1980, an outstanding scientific opportunity was created. As a result, scientists from across the country and throughout the world came to Mount St. Helens to observe geologic and biological processes first hand. The



Measuring a research plot at Coldwater Ridge

importance of Mount St. Helens as a national resource for scientific study of volcanic features and processes was recognized and, in 1982, Congress established the Mount St. Helens National Volcanic Monument in the Gifford Pinchot National Forest. In the 16 years since the eruption, research has been an important source of basic information for land managers and for visitors who come to learn about the geology and biology of the area.

Environmental Education

▼▼▼▼▼ A Variety of Opportunities ▼▼▼▼▼

Since its creation in 1982, the Mount St. Helens National Volcanic Monument has been a leader in promoting environmental and science education. This has been done by offering facilities and activities that encourage hands-on learning, developing curriculum guides, conducting teacher training workshops, and developing innovative partnerships with school districts and others.

More than 10,000 students a year travel to the Monument's two visitor centers. While on site, they view the theater presentations, complete assignments given by their teachers, hike area trails, and meet with interpretive staff as available to answer questions and learn more about the area. Some schools visit attractions on the Monument's south side including the Lahar Viewpoint, Ape Cave, and the Trail of Two Forests. Educational materials and a series

of Environmental Study Areas help make all of the above areas more meaningful for students. Special educational programs are made available to a limited number of groups. Teachers are required to call ahead to the visitor centers to arrange for these services.

For those teachers planning a more in-depth study of the volcano or the ecosystems around it, two curriculum guides have been developed. "A Living Laboratory: Volcanoes" is a teacher-generated curriculum that encourages middle school students to learn new thinking skills while discovering the many ways that volcanoes have helped shape the Earth. The recently developed NICHES (Northwest Integrated Concept/Process Hands-On Environmental Science) curriculum is designed to teach elementary students science concepts and process skills.

The Mount St. Helens "Fire and



School group completes an assignment

Life" videodisc is an interactive computer program that provides a rich resource for the study of volcanoes.

To receive a copy of our teacher packet contact:
Environmental Ed. Coordinator
MSHNVM
42218 NE Yale Bridge Rd.
Amboy, WA 98601
(360) 750-3900

