# VOLCANO REVIEW

FREE

A VISITOR'S GUIDE TO MOUNT ST. HELENS NATIONAL VOLCANIC MONUMENT



# Fire and Ice: The Rise and Fall of the Crater Glacier

The recent eruption of Mount St. Helens provided scientists with an unprecedented opportunity to observe the extrusion of a new lava dome through the middle of a glacier. Between 2004 and 2008, the volcano constructed a 1,300 foot tall lava dome and erupted enough lava to fill Portland's Rose Garden Sports Arena more than 150 times. As the dome grew, it split the Crater Glacier in two, squeezing it against the crater walls and doubling its thickness. As the heaped-up ice relaxed, the east and west arms of the glacier flowed north, eventually joining together north of the "old" 1980-'86 lava dome (cover photo). Geologists were amazed by how fast the ice moved (up to 3 feet per day) and how little ice was melted (10% of total glacier volume).

In 1980, Mount St. Helens amazed us with its enormous power and capacity for sudden dramatic change. Over the past four years, we have been privileged to witness its equally impressive continuous, mostly non-explosive process of rebuilding. In the months ahead, we will watch North America's most closely monitored volcano and eagerly await the next chapter in Mount St. Helens' dramatic history.

#### Online Information:

Mount St. Helens Visitor Information: www.fs.fed.us/gpnf/mshvm Eruption Geology and Monitoring: www.vulcan.wr.usgs.gov Earthquakes: www.pnsn.org/HELENS/welcome.html (see 'webicorders' for real-time earthquake monitoring)



Photo by K. McGee, USGS

Aerial view of the stacked up and cracked surface of the Crater Glacier in September, 2005. Edge of growing lava dome is seen pushing glacier from right. Dust on left side of photo is from rock fall off the east crater rim.

#### **Crater Glacier and Eruption Facts**

1986 to 2004 – Snow and ice accumulate in the crater (about 650 feet thick) forming North America's youngest glacier. At 0.4 square miles the glacier's area is  $^{1}/_{5}$  that of all of the pre-1980 glaciers combined.

**October 2004** – Eruptive activity resumes with more than 1000 small earthquakes per day and small steam and ash eruptions. A new lava dome rises through the Crater Glacier at a rate of 1 dump truck load per second.

**2004 to 2008** – The quiet extrusion of mostly gas-free, semi-solid lava continues until the extrusion pauses in February 2008. During the 3-year long eruption, a total of 7 lava spines are extruded, filling the south crater with a 1,300 foot tall pile of fragmented rock (taller than the Empire State Building and  $^2/_3$  mile long by  $^1/_3$  mile wide).



#### Welcome to Mount St. Helens

At Mount St. Helens our job is growing. While our volcano has been busy growing a new lava dome and new forest we have been busy building new partnerships that help share the wonder and protect this special place.

We invite you to join our friendly staff and partners for a day, a week or a summer-long volunteer experience. Join us for a weekend work party or sign up for a guided climb or field seminar. We guarantee that you'll make new friends and leave with an enhanced appreciation of this special place. With the help of our partners, we will strive to make your visit memorable and enjoyable.



## Help us to Care for and Share the Wonder of Mount St. Helens

Join the friendly staff and volunteers of the **Mount St. Helens Institute** and help out for a weekend project or for an exciting summer-long experience. Volunteers are needed to help provide visitor information, manage the backcountry and climbing program and maintain volcano trails and facilities.

We invite you to sign up for one of our guided climbs, field classes and to become a

MSHI member. We are a not-for-profit partner of the Mount St. Helens National Volcanic Monument. Our mission is to awaken in people of all ages an appreciation of the natural processes and cultural heritage of the Pacific Northwest's volcanic landscapes.



INSTITUTE

For more information, visit our website or contact us: www.mshinstitute.org

Email: info@mshinstitute.org Phone: (360) 449-7887

The Volcano Review is produced by the Northwest Interpretive Association (NWIA) in cooperation with the US Forest Service – Published May 2008

NWIA is a non-profit organization that operates bookstores at parks and forests throughout the Pacific Northwest. Proceeds are used to fund interpretive programs, this newspaper and much, much more. To order books, videos, posters and other educational materials visit www.nwpubliclands.org or contact:



Northwest Interpretive Association 3029 Spirit Lake Highway Castle Rock, WA 98611 Phone: (360) 274-2125, FAX (360) 274-7124 www.nwpubliclands.org

The US Forest Service is an equal opportunity provider and employer.

## Take Care of Your Pet and Help Protect the Monument

To protect plant and animal life and provide for visitor safety, pets are prohibited at all recreation sites and trails within the monument's restricted area (see shaded section of map on page 7). Pets are permitted only in designated pet areas and must be on a leash. Lack of shade and summer heat can endanger pets left in cars.

For the safety and comfort of your pet, please arrange to leave your pet at home.

Contact any Forest Service office for information on where it is safe and legal to bring your pet.



## Gifford Pinchot National Forest Centennial (1908-2008)

On July 1, 1908, President Theodore Roosevelt signed an

Forest. In 1949, the forest was renamed to honor Gifford Pinchot, the first Chief of the Forest Service. We invite you to explore and connect with this special place. Visit our website for forest history, photo gallery and a calendar of special events

www.fs.fed.us/gpnf/heritage/centennial.shtml

#### **Your Fees Help Support the Monument**

Interpretive services and facilities on the west side of Mount St. Helens are supported by your purchase of a Monument Pass. Wrist band passes are \$8 per adult (youth 15 years old and younger are free). Passes are required at the Johnston Ridge Observatory, adjacent trails and at the Coldwater Lake Recreation Area. Monument Passes can be purchased at Johnston Ridge.

On the northeast and south sides of the monument a National Forest Recreation Pass is required at designated sites. The cost is \$5 per vehicle per day. Annual passes are \$30. Passes are sold at Forest Service offices and at self-service pay stations around the monument. Details at: www.fs.fed.us/r6/passespermits/nfdp.shtml

## Purchase Your Annual Pass at Mount St. Helens and Help Support the Monument

Passes are honored nationwide at Forest Service, National Park, BLM, Bureau of Reclamation, and US Fish & Wildlife sites charging entrance or standard amenity fees.

Fees from pass sales are used to provide the services and maintain the facilities that you enjoy during your visit.

An Interagency Annual Pass is available for \$80. It has two signature lines and can be used by two pass holders. At per person fee sites it admits the pass holder and up to three persons. Interagency Annual, Senior, and Access passes are available at Johnston Ridge and Forest Service offices. Information about the interagency annual pass program is available at: www.fs.fed.us/passespermits/annual.shtml

### Welcome to a Living Laboratory

Photo by Charlie Crisafulli

In 1980, fiery avalanches of pumice and gas removed all traces of life from the Pumice Plain. The opportunity to study the rebirth of an ecosystem from scratch is providing scientists with important insight into processes of recolonization and habitat development. (Photo shows small mammal being weighed before release).

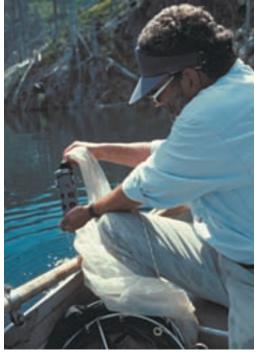


Photo by Peter Frenzen, USFS.

Crystal-clear mountain lakes were transformed into organic-rich microbial brews. Long-term studies are revealing how aquatic systems are responding to the 1980 eruption and the gradual return of forest vegetation.

#### May 18, 1980 Eruption Facts

- In less than 10-minutes, the eruption leveled 230-square miles of forest.
- The mountain lost 1300 feet of height and 0.67 cubic miles of total volume.
- The eruption began with a massive landslide (debris avalanche) that buried 14 miles of river valley to an average depth of 150 feet.
- The landslide released trapped magma and gas, producing a sideways explosion (lateral blast) of hot rock and ash killing trees up to 17 miles north of the volcano.
- Cement-like slurries of glacial melt water and boulders called lahars scoured and buried streams draining the volcano.
- A vertical ash eruption rose to a height of 15-miles above the crater and continued for 9-hours. Ash drifted to the northeast
- Fiery avalanches of pumice and hot gasses called pyroclastic flows flowed into the valley north of the crater.

## We Invite You to Explore and Help Protect one of Nature's Youngest and Most Dynamic Landscapes

The Mount St. Helens National Volcanic Monument was established by Congress in 1982 to protect natural features and processes and provide access for recreation, research and education. The monument has become an internationally renowned laboratory for the study of earth processes and ecosystem recovery following large-scale disturbance. The quality and duration of data collected here over the last 28 years is unparalleled and the volcano continues to attract scientists, teachers, and students from around the world.

As you explore, look for evidence of the 1980 eruption and observe plants and animals that are thriving in a forest shattered by volcanic eruption. As you enjoy the wonder of nature's recovery please help us protect life's fragile foothold. Stay on developed roads, viewpoints and trails and have a very safe and enjoyable visit.

#### **Return of Life Facts**

**Birds in the Blast Area:** Standing dead trees provide important foraging and nesting habitat for birds like woodpeckers, mountain bluebirds, and swallows. Surprisingly, the Vaux's swift, a bird associated with old-growth forests, is common among standing dead trees in the monument.

**Amphibians Thrive in the Blast Area:** Although amphibians are declining in many places, they have fared much better than expected at Mount St. Helens. Frogs, toads and salamanders survived the 1980 eruption in many locations and are thriving in a landscape that has fewer predators, disease and parasite outbreaks.

**Small Things Make a Big Difference:** Tiny creatures like the willow stem-boring beetle have a big influence on ecosystem recovery. The larvae of the stem borer feed on and girdle willow stems often causing them to die. This greatly reduces the abundance of willow shrubs altering the habitat available for birds and small mammals.

Landscape Management is a Challenge: With few natural predators, elk populations have expanded in the open blast area. During severe winters, elk diebacks have occurred due to a lack of winter forage. Hungry elk are influencing the return of forest vegetation by eating and breaking shrubs and trees and trampling other plants. Elk are spreading the seeds of non-native grasses and other plants in their droppings. Federal and state managers are working together to try to protect natural processes and features in the monument and restore a more natural balance.



Photos by Dan Dzurisin and Seth Moran, USGS

The 2004 to 2008 eruption provided an opportunity to develop and test new remote monitoring technology. Time lapse cameras in the crater (see arrow) allowed geologists to observe the dome building eruption safely. GPS "spider" instrument packages (see inset) provided for real-time measurement of dome growth (spider appears as black dot in yellow circle).

#### **Planning Your Visit**



Photo by Jon Major, USGS

Climbers on the south crater rim with Mt. Adams in the distance (South side, Forest Road 83).

#### Climbing Mount St. Helens

Climbing Permits are required for travel above 4800 feet (tree line) year round. Between April 1st and October 31st a fee of \$22 is charged for each permit. Starting February 1st, permits are sold in advance online on a first-come-first-served basis. Climbers should be aware that in rare instances rock and ash from small explosive eruptions can reach the crater rim. Visit the climbing website for detailed information about volcanic hazards, safety equipment, and how to purchase a climbing permit online: www.fs.fed.us/gpnf/recreation/mount-st-helens/

#### School Groups

Teachers, registration for field trips is online, easy, and is required! Our website will help prepare you and your students for your visit to Mount St. Helens. You will find online



registration forms, suggested itineraries, downloadable lesson plans and descriptions of ranger-led programs. Also included are descriptions of our sites, driving times, maps and directions.

www.fs.fed.us/gpnf/mshnvmeducation/teachers\_corner

#### **Help Protect Mount St. Helens**

In 1982, Congress established the 110,300 acre Mount St. Helens National Volcanic Monument to provide for scientific research, education, and recreation.

- Stay on paved areas and designated hiking trails.
- Do not disturb or remove any natural feature.
- Do not feed the animals.
- Keep pets on the leash and in designated pet areas.

#### **Mount Margaret Backcountry**

Trails in the Mount Margaret Backcountry climb over 2,000 feet in elevation and may be snow-covered until mid-summer. Eight designated campsites are available at four lakes and four ridge top locations, some with crater views. Backcountry permits are required and camping is limited to designated campsites only (maximum of four people per campsite). Pets, pack stock, and fires are prohibited. Permits are available at Monument Headquarters in Amboy, Johnston Ridge Observatory and Cowlitz Valley Ranger Station. Additional details are online: www.fs.fed.us/gpnf/04mshnvm/backcountry/index.shtml or by calling (360) 449-7800.

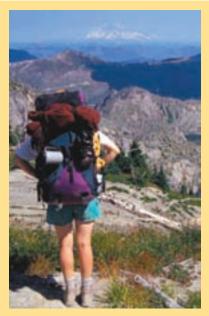


Photo by Todd Cullings, USFS

A backpacker looks north into the Mount Margaret Backcountry.

#### Be Prepared for Volcanic Ashfall!

Volcanic ash is rock dust blown into the air by a steam or gas eruption, rock fall, or high-winds.

#### If you encounter volcanic ashfall:

- Remain calm. Ash is not toxic.
- Seek shelter inside a building or vehicle.
- Cover your nose and mouth with a moist cloth or towel and wait until ash settles.
- Drive slowly, ash reduces visibility and traction.



www.experiencewashington.com

3/8/05 Photo © Barbara Fox

#### **Contact Information**

<b>Emergency (Police, Medica</b>	al, and Fire)		· · · · · · Dial 911
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Forest Service Offices
Mount St. Helens National Volcanic Monument Headquarters (Amboy)· · · · · · · · (360) 449-7800 www.fs.fed.us/gpnf/mshnvm
Johnston Ridge Observatory · · · · · · · · · · · · · · · · · · ·
Cowlitz Valley Ranger Station (Randle) · · · · · · · · · · · · · · · · · · ·
Gifford Pinchot National Forest Headquarters (Vancouver) · · · · · · · · · · · · · · · · · · ·
Mt. Adams Ranger Station (Trout Lake) · · · · · · · · · · · · · · · · · · ·
Other Resources
Mount St. Helens Visitor Center at Seaquest State Park· · · · · · · · · · · · · · · · · (360) 274-0962 www.parks.wa.gov/mountsthelens.asp
Climber's Register (at Lone Fir Resort, Cougar) · · · · · · · · · · · · · · · · · · ·
National Recreation Reservations (Federal Campgrounds) · · · · · · · · · · · · · · · (877) 444-6777 www.recreation.gov
PacifiCorp (campgrounds at reservoirs south of Mount St. Helens)
Washington State Parks· · · · · · · · · · · · · · · · · · ·
Mount St. Helens Institute· · · · · · · · · · · · · · · · · · ·
Northwest Interpretive Association · · · · · · · · · · · · · · · · · · ·
Mount St. Helens Forest Learning Center · · · · · · · · · · · · · · · · · · ·

## Hiking and Camping Near Mount St. Helens



Photo by Scott Hinderman

Crater and valley north of the volcano as seen from the Boundary Trail east of the Johnston Ridge Observatory.

West side (State Route 504)	Round Elevation Trip Change		Description		
Birth of a Lake Trail #246 (E) SR504, Trailhead is located at Coldwater Lake Picnic Area.	0.6 miles	2490 feet to 2475 feet	Paved trail explores 1980 landslide deposit and developing life in a lake that was dammed-up by the 1980 eruption.		
Eruption Trail #201 (E) Trailhead is located at Johnston Ridge Observatory viewing plaza.	1 mile	4200 feet to 4300 feet	Paved trail explores 1980 eruption impact on ridge. View shattered trees and amazing crater and valley views.		
Hummocks Trail #229 (M) SR504, Trailhead is 2 <sup>1</sup> / <sub>4</sub> miles south of Coldwater Visitor Center.	2.4 mile loop	2520 feet to 2400 feet	View hill-sized chunks of shattered volcano, ponds and river-carved canyon on 1980 landslide deposit.		
Lakes Trail #211 to Coldwater Trail #230 (MD) SR504, Trailhead is located at Coldwater Lake Boat Launch.	9.0 miles	2700 feet to 5200 feet	Explore blowdown and developing forest. At 4 miles, end of lake makes a good turn around point. Continue ½ mile to junction with Coldwater Trail 230.		

East side (Forest Road 99)	Round Trip	Elevation Change	Description		
Meta Lake Trail #210 (E) Forest Road 99, 0.1 miles west of junction of Road 99 with Road 26.	0.6 mile	3620 feet to 3640 feet	Paved trail explores blowdown forest and sparkling lake. View forest that survived eruption under thick snowpack.		
Independence Pass Trail #227 (M) Forest Road 99, 1½ miles south of Cascades Peaks.	0.5 mile	4040 feet to 4680 feet	Trail climbs (1/4 mile) to ridge top view of Mount St. Helens, Spirit Lake, and the blown down forest.		
Windy Ridge Sand Ladder (M)  North end of the Windy Ridge Viewpoint Parking Lot.	0.5 mile	4070 feet to 4270 feet	Climb 368 steps to hilltop view of Spirit Lake and crater. Use caution as loose pumice can make for unstable footing.		
Harmony Trail #224 (MD)  Forest Road 99, 2½ miles north of Windy Ridge Viewpoint. Off-trail travel, pets and bikes are prohibited.	2 miles	4100 feet to 3400 feet	Trail descends steeply to Spirit Lake (this is only trail to shoreline). View the effects of lateral blast and "tidal" wave formed as landslide slammed into lake.		
Truman Trail #207 and Willow Springs Trail #207A (MD) Forest Road 99, trailhead at south end of Windy Ridge parking lot. Off-trail travel, pets and bicycles prohibited.	11 miles	4200 feet to 3600 feet	Trail follows old road into Spirit Lake basin. Wooden posts mark path across boulder-filled floodplain. Willow Springs Trail (0.8 mile) connects with Loowit Trail 216 and other loop opportunities.		



Photo by Gregg Pohll, USFS

Sand ladder stairway at Windy Ridge Viewpoint. Barren gray area visible along trail is result of damage from off-trail travel.



Visitors can crawl through the cast of an ancient tree at Trail of Two Forests.

South side (Forest Road 83)	Round Trip	Elevation Change	Description		
Trail of Two Forests #233 (E) Forest Road 8303, ½ mile E of Ape Cave.	0.6 mile 1860 feet to 1885 feet		Boardwalk guides you across 1,900 year old lava flow and tree casts that record an ancient forest consumed by lava.		
June Lake Trail #216B (M)  Forest Road 83 temporarily closed due to flood damage. Park at Marble Mtn  Snowpark and follow temporary trail signs to June Lake trail.	3.2 miles	2700 feet to 3400 feet	Trail climbs along rushing stream before reaching lake nested between basalt cliff and 1,900 year old lava flow. Lake offers ideal lunch stop before continuing ½ mile to junction with Loowit Trail 216.		

Campgrounds	# sites	\$ Fee	<del>7</del>	F			Â	2.	II.	Ť
Highway 503 & FR 90										
Cresap Bay *	73		20	•	•	•	•	•	•	•
Cougar	60			•	•	•	•	•		•
Beaver Bay *	78	yes for	5	•	•	•	•	•	•	•
Swift	93	all sites	6		•	•		•	•	•
Lower Falls	42	SILES	4	•		•			•	•
Lewis River Horse Camp	8			•					•	
Forest Road 81										
Kalama Horse Camp	28	yes	2	•					•	
Merrill Lake	8	yes	6		•	•		•		•
Forest Road 25										
Iron Creek **	98	yes	12	•		•			•	•
Forest Road 23	Forest Road 23									
Tower Rock **	22	yes								•
State Route 504										
Seaquest State Park	90	yes	many	•			•		•	•

<sup>\*</sup> Reservations are required: Call (503) 813-6666 \*\* Reservations are accepted. Call (877) 444-6777.

(E)=EASIEST (M) = MORE(MD) = MOSTKEY: Users require DIFFICULT DIFFICULT Users require limited skill and Users require a encounter few some skill and high degree of challenges. experience more skill and challenging experience. terrain.

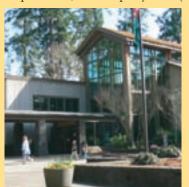


#### Explore the Three Sides of Mount St. Helens

#### Westside: State Route 504

## **Mount St. Helens Visitor Center at Seaquest State Park**

Located 5 miles east of Interstate 5, the center offers exhibits on the 1980 eruption and area history, ranger talks, walk-through model volcano, movie, bookstore and wetland boardwalk trail. The center is operated year round by Washington State Parks and has a \$3 per adult, and \$1 per youth (7-17 years) admission



fee. Open daily 9:00 a.m. to 6:00 p.m., from May 1st to September 30, 2008. Off-season hours are 9:00 a.m. to 4:00 p.m. (360) 274-0962.

Photo by Tina Lynch

#### **Johnston Ridge Observatory**

View the steaming lava dome from a visitor center overlooking the crater and learn how the landscape was reshaped by the 1980 eruption. The center offers: live seismographs, geologic exhibits, 16-minute eruption movie, ranger-talks, and bookstore. Open from 10:00 a.m. to 6:00 p.m.. mid-May through October (closed in winter). Pets are



not allowed at viewpoints or on trails. A Monument Pass (wrist band) is required and available here.

#### **Coldwater Ridge Visitor Center is Closed**

Limited resources are being focused on providing visitor services at the Johnston Ridge Observatory.

#### **Coldwater Lake Recreation Area**

Visit a 28-year-old lake that was formed when water backed up behind a natural dam created by a massive landslide during the 1980 eruption. Coldwater Lake offers restrooms, public telephone, picnic area, paved interpretive trail and boat launch (electric motors only). Fishing requires a WA state license. Access is via small boat, float tube, and at two designated water access points along the Lakes Trail.



Monument Passes
(wrist bands) are
required here.
Purchase passes at the
Johnston Ridge
Observatory.

#### **Northeast Side: Forest Road 99**

#### **Blowdown Forest and Spirit Lake Viewpoints**

Experience the full impact of the 1980 lateral blast as you drive through miles of standing-dead and blown-down forests. View Spirit Lake and its immense floating log mat. Forest Road 99 is generally accessible after snow melts (late-June through October; Closed in winter). Opportunities include: scenic viewpoints, hiking trails, and gift shop with snack bar. A Northwest Forest Pass is required for each vehicle and is available at Cascade Peaks and self-service fee stations at Bear Meadows, Meta Lake, and Windy Ridge.



Photo by Jim Hughes, USFS

#### Southside: Forest Road 83

#### **Ape Cave and Trail of Two Forests**

Explore ancient lava flows and Ape Cave lava tube. Ape Cave has uneven terrain, 42 degree F temperature, and is open for self-guided exploration year-round. Warm clothes, sturdy shoes and at least two light sources per person are recommended. Pets are not allowed in the cave. Between late June and early September services offered include: lantern rentals, bookstore, and cave tours. A Northwest Forest Pass is required and available here. Nearby Trail of Two Forests explores casts of old growth trees buried by lava flows.



Photo by Pat Leeson

Lower section of Ape Cave lava tube.

Driving Times (Hours: Minutes)	Ape Cave	Lava Canyon	Windy Ridge	Randle	Mount St.Helens Visitor Center	Coldwater Lake Recreation Area	Johnston Ridge Observatory
Ape Cave	_	0:15	1:45	1:45	1:30	2:30	2:45
Lava Canyon	0:15	_	2:00	2:00	1:45	2:45	3:00
Windy Ridge	1:45	2:00	_	1:15	2:45	3:45	4:00
Randle	1:45	2:00	1:15	_	1:30	2:30	2:45
Mount St. Helens Visitor Center	1:30	1:45	2:45	1:30	_	1:00	1:00
Coldwater Lake Recreation Area	2:30	2:45	3:45	2:30	1:00	_	0:15
Johnston Ridge Observatory	2:45	3:00	4:00	2:45	1:15	1:15	_
Portland/Vancouver	1:30	1:45	3:00	2:30	1:15	2:15	2:30
Seattle	3:30	3:45	3:45	2:30	2:00	3:00	3:15
Carson	1:30	1:45	2:15	2:15	2:45	3:45	4:00
Woodland	1:00	1:15	2:30	2:30	0:45	1:45	2:00
Mt. Rainier National Park	2:45	2:45	2:15	1:00	2:30	3:30	3:45

#### **Report Vandalism and Resource Damage**

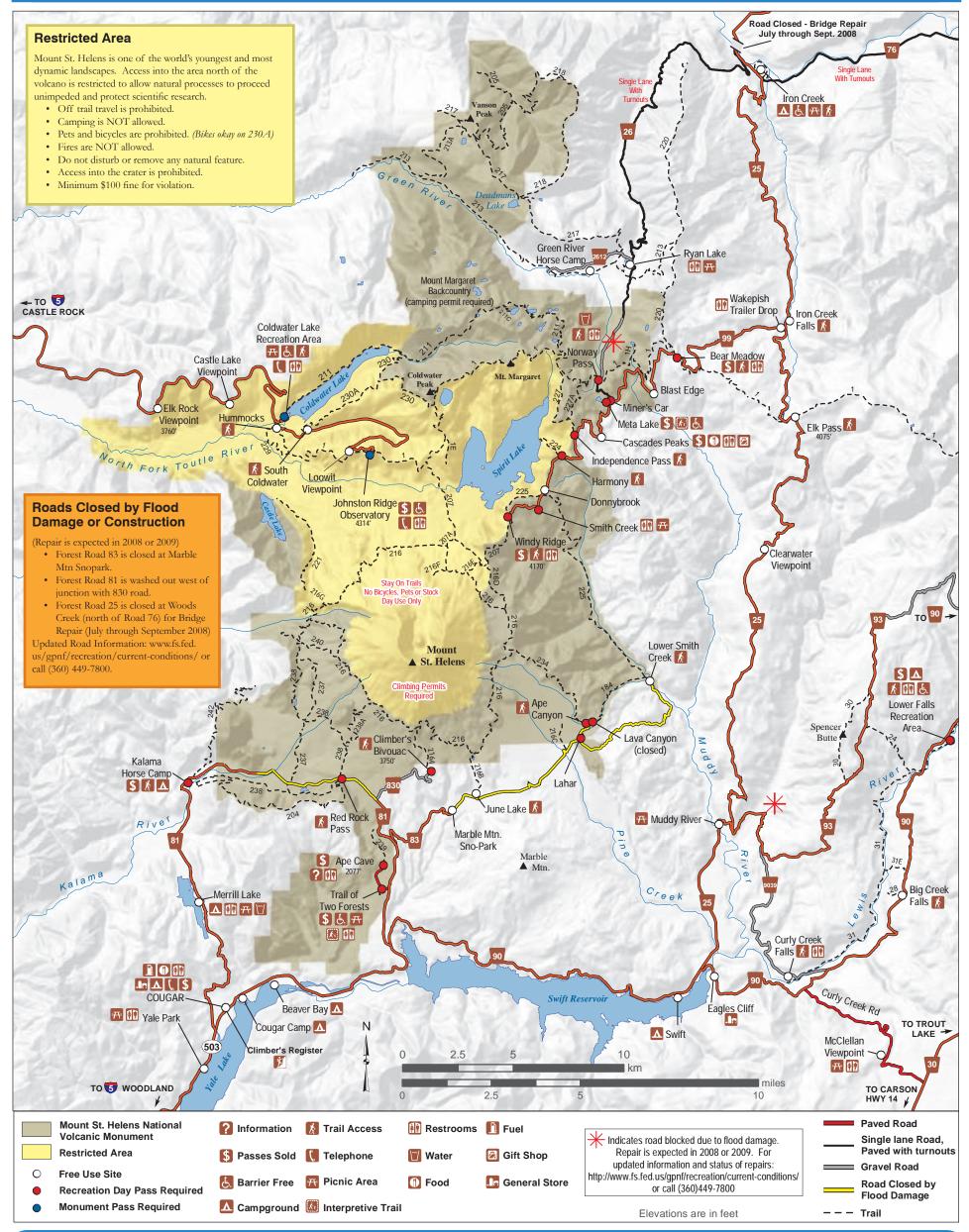
CALL: 449-STOP • (360) 449-7867

CALL 911 to Report Emergencies or Crimes in Progress (Sheriff's Office, Emergency Medical and Fire)



## MOUNT ST. HELENS NATIONAL VOLCANIC MONUMENT







#### MOUNT ST. HELENS VICINITY



