M O U N T S T . H E L E N S I N S T I T U T E

Issue 9 - March / April 2015

What If You Had Been at Lahar Viewpoint on May 18, 1980?

FIELD NOTES By Tom Pierson, Research Hydrologist, USGS Cascades Volcano Observatory

Imagine that you are standing at Lahar Viewpoint on the southeast side of Mount St. Helens a little after 8 AM on Sunday morning, May 18, 1980, sipping a freshly poured cup of coffee by your camp stove. Try to visualize it. *The sky is clear. Looking across the wide active Pine Creek floodplain, your view of St. Helens' iconic snow-clad cone (Fig. 1) is unobstructed. You can hear birdsong as the sun begins to burn away the morning chill. Then suddenly, just after 8:30, the birds inexplicably stop singing; it becomes eerily quiet. Moments later you feel the ground tremble beneath your feet, and you begin to hear (almost feel) a deep distant rumbling that is pierced by the high-pitched staccato of clattering, cracking rock. You look up toward the source of the sound—the summit. Your coffee is forgotten. You see, as if in slow motion, the top of the mountain begin to disappear from view. The 1980 eruption of Mount St. Helens has begun.*

Lahar Viewpoint on the volcano's southeast side would have offered a safe but limited view for the fist few minutes of the eruption, because initial events disrupted only the north side of the volcano. That earthquake you would have felt marked the breakaway of the entire north flank of the cone as a gigantic landslide, which generated continuous ground shaking as billions of tons of rock avalanched into the North Fork Toutle valley. Part of the avalanche mass hurtled up and over the saddle on Johnston Ridge. The landslide "uncorked" the highly pressurized, partially molten magma bottled up within the volcanic cone. Searing fragments of the semi-solidified magma body exploded outward to the north and raced across the landscape as a lateral blast, preceded by a near supersonic shock wave that mowed down hundreds of square miles of conifer forest in a minute or two.

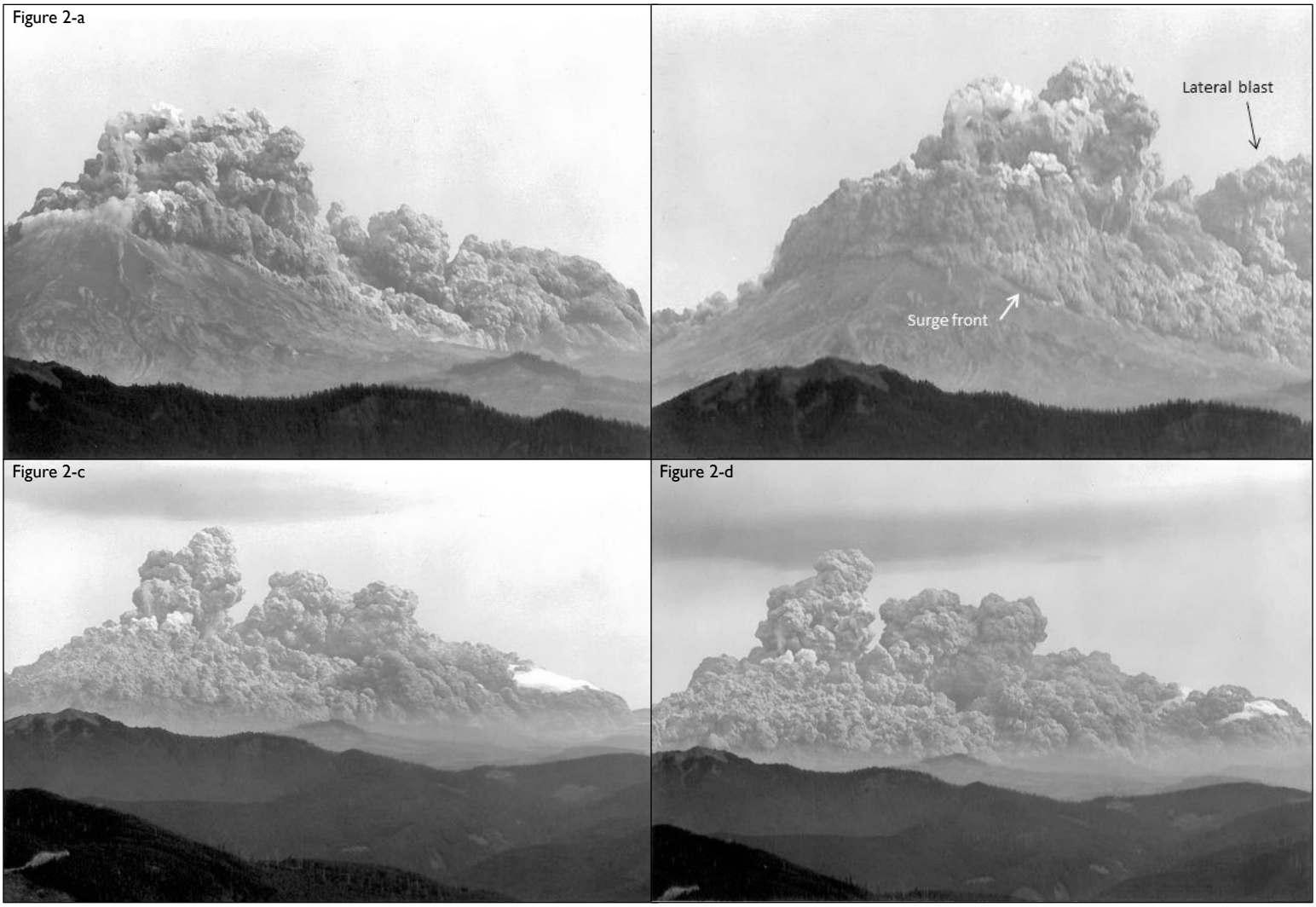
Figure 1. A pre-1980 view of the SE flank of Mount St. Helens, showing the Shoestring Glacier descending the deeply eroded Shoestring Notch. Meltwater from the glacier formed the headwaters of Pine Creek flowing toward the left side of the photo and Muddy River flowing down to the right. Lahar Viewpoint would be close to the left edge of the photo near Pine Creek.

Inside this issue:

It's now almost 8:34 AM and the southeast flank of the mountain is still untouched. Awestruck, you have just witnessed the top 1,000 feet of the mountain incrementally drop out of sight as the first two major blocks of the landslide broke loose. Now, where the summit used to be, you notice a slowly roiling black cloud appearing and then hovering threateningly a few hundred feet above the new crater rim. After a few tens of seconds the dynamics of the eruption shift as the third huge block of the landslide breaks loose. The hovering black cloud now begins to swell and "boil over" the outer rim of the crater (Fig. 2a). You start to feel panic as you watch that dark, ground-hugging cloud begin to sweep down the southern and eastern flanks of the volcano—descending directly toward you at about 100 mph (Figure 2b-d).

If you really had remained there long enough to see this approaching cloud, you would not have survived what happened next. The ground-hugging cloud was a pyroclastic density current—a turbulent, searing, gravity-driven flow of hot rock, gas, and entrained air. As it rushed down the mountain, gravity separated the initially homogeneous current into a dense basal avalanche of rock debris (a pyroclastic flow) and an overriding cloud of churning hot dust and ash (a pyroclastic surge). (Fig. 3). The surge swept from the crater rim to the base of the steep part of the cone (to about the 4,000-ft level) in a little over one minute at an average velocity of 110 mph. The thinner, denser flow that was hidden beneath the surge was moving at between 70 and 90 mph when it reached the base of the cone. The nature of the deposits found there indicates that this dense flow, which had started as a hot pyroclastic flow, had already transformed by this point to a relatively cool lahar—a dense water-saturated slurry resembling wet concrete. The pyroclastic flow sweeping down the snow-covered mountainside had scoured, entrained, and melted the eroded snow, mixing it with the rock debris to form the lahar. Post-eruption surveys showed that an average of 20 feet of dense snow had been eroded from the mountain's southeast flank, more than enough needed to saturate and transform the dry pyroclastic flow to a wet lahar.

Figure 2. Sequence of photographs taken by Mr. Ken Seibert from Calamity Point, about 19 miles SSW of the volcano (from Pierson, 1985). The start and end times of the photos were obtained by correlating a number of different photo sets, a videotape, and a key radio transmission with accurately timed satellite imagery (Moore and Rice, 1984). Note that from this vantage point both the south-side surge cloud and the northward-directed lateral blast are visible.



At about 8:37 AM it was "lights out" at Lahar Viewpoint. The expanding surge cloud stalled about a mile upslope of the Viewpoint, having become progressively slower and more airborne with distance. But the lahar kept coming. Just above Lava Canyon, the lahar was half a mile wide, 10 feet deep, and speeding across the ground at 45 mph. Along with one last great adrenalin rush, you would have felt the ground shaking again and heard a deafening roar. You would have seen boulders up to 4 feet in diameter and huge logs being swept along and smaller boulders actually floating on the seething brown surface of the flow. In an instant the lahar roared over Lahar Viewpoint, the force of the flow sufficient to shear off, right at ground level, all but one of the old-growth Douglas firs growing there. That single but mortally wounded forest giant stood there for many years, exhibiting the gashes and abrasion of that unequal contest in 1980. It died and toppled over a few years ago.

Just upstream of Lahar Viewpoint the lahar split into two branches, one descending Lava Canyon (the Muddy River lahar) and one enveloping Lahar Viewpoint before crashing its way down Pine Creek (the Pine Creek lahar). The trim line of the Muddy River branch can be seen still today in the canyon where the lahar stripped everything away—the forest and even the soil—right down to bare bedrock. About 20 minutes after the lahar split, the two branches rejoined again in the Lewis River and then flowed into Swift Reservoir, where together they deposited about 18 million cubic yards of debris and raised the reservoir level 2 ½ feet. By 9 AM, Lahar Viewpoint was surrounded by a vast oozing expanse of rocks and quicksand, shifting locally and slowly settling under its own weight. Consolidation of the slurry expelled water to the deposit's surface, where it gathered in a network of muddy rivulets, ever so slowly starting the process of forming a new stream channel. By early afternoon, pumice and ash were falling from the enormous eruption column,

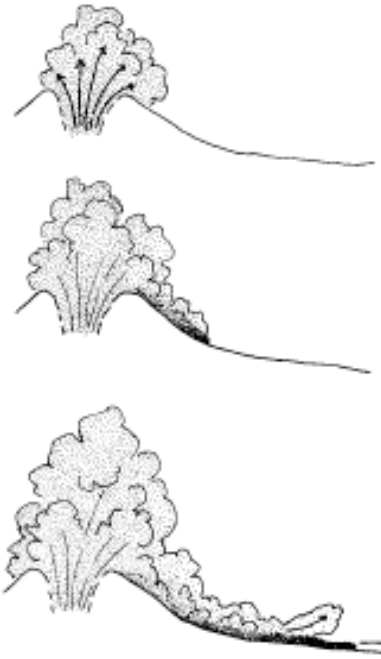


Figure 3. Schematic representation of gravity segregation of a pyroclastic density current (from Pierson, 1985). Notice how the denser part of the flow (shown as darker part) settles out of the density current and becomes a separate flow. The depleted overriding surge cloud becomes less dense and more turbulent, allowing it to loft upward and stall. The dense flow, now a lahar due to admixed meltwater, continues downslope.

covering the fresh muddy deposit and turning Lahar Viewpoint into a bleak and colorless wasteland. The only sounds would have been the patter of falling pumice fragments, the sound of those myriad rivulets, and a whisper of wind.

By the end of this one day of May in 1980, the desolation was complete and seemingly irreparable at this little piece of real estate, but from the broader perspective of geologic time, it was a momentary perturbation—one among dozens that have buried, seared, swept, or scoured this very spot in the 300,000-year history of this young Cascade volcano. The 1980 lahar left yet one more geologic layer—another page in the geologic record of the volcano's history for visitors to contemplate today and for future geologists to read in the centuries to come.

Ray's Book Pick

Montserrat Our Home: Live with a Lava Dome

By Sonja Melander

In the last newsletter, I encouraged people to listen to a fairly depressing spoken word short story about an alcoholic jockey who goes home to visit family at Christmas. Let's completely change direction- "Montserrat Our Home: Life with a Lava Dome" is an excellent children's book appropriate for a variety of ages written and illustrated by our very own Science and Learning Center Educator, Sonja Melander! The book relates volcano basics in the context of the beautiful Caribbean island of Montserrat, where Sonja worked as an Educator and Outreach Officer at Montserrat Volcanoes Observatory. Concrete volcano facts are presented at a level appropriate for 10 year olds, while my 3 year old loved the book for its vivid illustrations and fun poetic verse. Even I learned a lot about Montserrat and its volcanoes! There are not many books out there that remain relevant across that span of ages.

Mount St. Helens and Early Career Development

By Abi Groskopf, Science Education Director

Following the 1980 eruption many young ecologists and geologists launched careers that were marked by the power of change and scientific curiosity. Mount St. Helens – the landscape and forces at play – were the perfect training ground for young minds; minds that would go onto shape our understanding of volcanology, ecology and land management.

In the last 35 years, Mount St. Helens continued to shape careers in interpretation, land management, geology, ecology and recreation. Every summer young enthusiasts work at Mount St. Helens; they are field technicians, graduate students, interpreters, trails and recreation rangers and they are trained in an extraordinarily transformative place that builds not just lava domes but careers. Many come back – hooked by the mountain and the potential for continued growth.

Every summer, the Mount St. Helens Institute doubles its staff with young and excited minds that develop their careers and fall in love a little bit with the volcano. My career path was changed course and was set into motion by an education internship in college. When the internship was over, I was proud of my resume. Many years later and now at Mount St. Helens, I immensely enjoy supporting the development of seasonal staff. We hire fisheries technicians, guides and guide assistants, educators and conservationists. They each give tremendous energy to the mission of the organization and to the mountain. When they leave (if they leave), they finish their undergraduate degrees, go to graduate school, work as educators for other non-profits, work for the US Forest Service, the National Park Service and private companies.

Where are they now? **Who's Next?**

After her Education Internship in 2012, Mariah completed her undergraduate degree in Earth Sciences, worked at Mount Rainier and is now headed to Columbia's Teachers College in August.

Lindsey arrived in 2012 to work as an Intern and Guide. She returned in 2013 to collect data on invasive plants of the blast area and work as a guide. Since then, she has been a part-time Educator and works at the City of Portland's Bureau of Environmental Sciences.

Heather Latham was a Conservation Corps Crew Leader in 2006. She now works as a Wilderness Forestry Technician for the Mount St. Helens National Volcanic Monument. She got hooked on Mount St. Helens.

KatyInne Schaumberg: Assistant Guide 2013, graduated with degree in environmental education now at Colorado Outward Bound.

Ray Yurkewycz arrived at Mount St. Helens as a graduate student at WSU-Vancouver in 2007, studying pocket gophers on the Pumice Plain. He has been with the Institute since 2011 and has been in love since day one.

Jamis was our 2013 Conservation Corps Intern. He is currently enrolled in the Environmental Sciences Masters Program at Western Washington University.

Trail Work Volunteer Vacation in the Mt. Margaret Backcountry

By Amy Tanska, Volunteer Programs Director

Join the Mount St. Helens Institute and US Forest Service in an exciting stewardship adventure this summer! We are now accepting registrations for inclusion on our 8-day Mt. Margaret Backcountry (MMBC) trail maintenance work party. Participants arrive on Saturday July 25 (airport pickup available) and will be transported to our science research field camp where our staff will cook and serve a delicious dinner around the campfire; and stay overnight in two spacious canvas tents with woodburning stoves. Sunday begins early with a 6.5 mile backpack to Panhandle Lake, which will serve as base camp for the week, and the crew will focus their efforts on the Lakes Trail #211 beginning on Monday. A mid-week day off on Wednesday affords the crew time to explore the area, swim in alpine lakes or just kick back and relax. Participants will hike out on Saturday morning to a shuttle waiting to whisk them to rustic civilization in the form of kit cabins, campground showers and a hot meal. Sunday's plan is loose and relaxed, with a shuttle to the airport (and anywhere locally as needed) for those with flight plans, bringing the 2015 MMBC Volunteer Vacation Adventure to an end.

Wildflowers and Panhandle lake in the Mt. Margaret Backcountry

Volunteer improving the Shovel Lake Trail in 2013

Volunteers building a rock wall and steps along the Lakes Trail in 2012.

INFO: Arrive Saturday July 25th and depart on Sunday August 2nd. Transportation to and from Portland International Airport (PDX) provided. Fee is $225 and includes all meals and lodging. For more information, contact Luke Wakefield at 360.891.5199 or lwakefield@mshinstitute.org. To fill out an application (you won't be charged anything), click below:

MORE INFO

Crater Glacier View Climb

9 miles round trip - $195 per person

The exclusive climb affords one-of-a-kind views of Crater Glacier and the 1980-1986 and 2004-2008 lava domes. The views include Spirit Lake, Mount Adams, Mount Rainier, Goat Rocks Wilderness, wildflowers, Johnston Ridge and the best eye-level view of Crater Glacier.

MORE INFO

Summit Climb

10 miles round trip - $195 per person

This classic climb to the rim of Mount St. Helens offers an amazing opportunity to reach the top of the Pacific Northwest's most spectacular volcano and learn about the area's natural history in the comfort of a guided group.

MORE INFO

Into the Crater Hike

12 miles round trip - $600 per person

This is a bucket list adventure that few receive the opportunity to experience - a hike into the Mount St. Helens crater to the snout of Crater Glacier. This is as close as you can get! Plus, there are astounding views of Mount Rainier, Mount Adams and Spirit Lake! The trip begins Friday at the Mount St. Helens field camp where we will treat you to an amazing dinner alongside the camp fire and a fireside lecture by a geologist. Guests are welcome to stay Saturday evening for dinner and another nights rest in the shadow of the volcano.

MORE INFO

Summit Climb with a Geologist

10 miles round trip - $225 per person

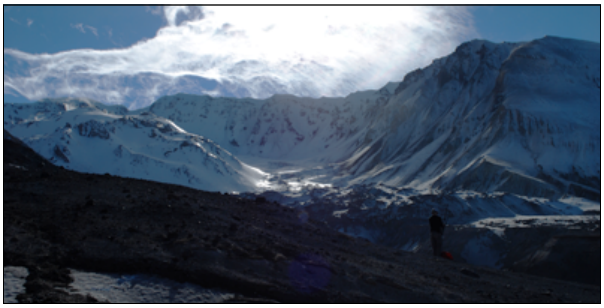
Climb to the rim with a trained geologist to discover the complex geology of Mount St. Helens. Your adventure will start Friday evening with a fire side chat. Climb will begin early Saturday morning.

MORE INFO

Zach's First Adventure

By Zach Sumner, Vets To Work Intern, Mount St. Helens NVM

The initial start of my position as a *Vets To Work* Intern with the USFS Mount St. Helens National Volcanic Monument and Mount St. Helens Institute (MSHI) has been very emotional. Each morning I wake up, excited to come to work, anxious to start a project on my own. So far, there has been many meetings and learning events so to become familiar with my new position. Finally, last week I was given my first assignment. The project: to film a promotional video of MSHI's Crater Glacier View climb to be posted on MSHI social networking sites.



The Crater Glacier View climb takes place on the north side of the volcano, where it erupted in 1980. Typically, the Crater Glacier Viewpoint is not accessible until later in the summer, but as this winter has been unseasonably warm in the Pacific Northwest, we saw an opportunity to safely climb to the viewpoint in February.

I met my guide, Alex, on a Wednesday at 6:00am. It was hard to not start filming right out of the gate. Every view of the mountain seemed more gorgeous than the last, but I somehow managed to find the restraint so to save my camera's battery and memory. At 11:00am, we made it to the Crater Glacier Viewpoint. It was there where I finally set loose to film everything I possibly could – from various angles of the mountain to mountain goats and elk.

I was unaware of how amazing the footage I captured was until I reached my laptop waiting for me at home. My most pleasant surprise was my "in the moment awareness" of the amazing wildlife I had captured on film. My first encounter was with two mountain goats that I spotted across a ridge from where I was filming in the early afternoon. They were digging in the dirt for food and doing their seemingly regular routine of repeatedly trotting up and down a hillside. My focus then shifted from the hillside to a creek that drained off from Crater Glacier. All of a sudden, nine goats appeared towards the bottom of my focus, jumping through the creek. What another tremendous surprise! In preparation for my climb, I had expected to only film a still mountain. How wonderful it was to witness active movement of abundant wildlife.

Around 4:00pm, Alex, warmly instructed me to begin packing up, so we could begin our descent in order to make it off the mountain before dark. I was grateful for his instruction, otherwise I would have completely lost track of time. Feeling overjoyed from all that I had filmed, I became even more excited to capture a herd of elk bounding down the mountain during our descent. I wondered, were they headed home, too?

Exhausted from a tremendous day of climbing, somehow I found it difficult to fall asleep once I had made it home and to bed. I had seen and experienced much more than I had anticipated. Instead of counting sheep to fall asleep, I found that I laid awake, happily counting the mountain goats and elk I had seen that day.

The following Monday, I was excited to show all that I had filmed to audience, my MSHI colleagues, for feedback on my first project. We were all pleased to see that I had successfully captured the phenomenal and dynamic Mount St. Helens landscape on film. Now, in the midst of film editing I am experiencing the difficulty of condensing over two hours of video footage into a 45 second film. As director, camera man, and film editor I wish I could share every moment of my footage, share every moment of my experience. However, the most important thing that I keep in mind as I am in the final stages of video production is the intended purpose of my video. It's not to share my own story of Mount St. Helens; it's to inspire people to create their own.

Species Spotlight!

Snowshoe Hare (*Lepus americanus*)

The snowshoe hare is a common mammal in the forests around Mount St. Helens. In the winter, tracks and scat are abundant and easily identifiable in the snow. Snowshoe hares are most active at night and dawn and dusk (crepuscular) and eat leaves in the summer and twigs, buds, needles and bark in the winter. Snowshoe hares have an amazing adaptation to change the color of their fur from rusty brown in the summer to pure white (with black ear tips) in the winter. Scientists believe that snowshoe hares change color based on day length (photoperiod) and not the presence or absence of snow. That means that in low snow years, like this winter, snowshoe hares stand out to their predators: coyotes, bobcats, pumas and large predatory birds. As climate changes, scientists wonder if snowshoe hares will adapt new behaviors to protect themselves or if they will evolve.

Volcano Views and Brews

Doors at 5:00pm, program starts at 6:30pm.

$5 suggested donation for attending Volcano Views and Brews.

What's Brewing at Yellowstone

Dan Dzurisin, USGS Cascades Volcano Observatory

When and Where:

March 17 | Loowit Brewing Company | 507 Columbia St. Vancouver, WA

March 19 | Hop - N - Grape | 924 15th Ave. Longview, WA

MORE INFO

Cascadia Big Fishing Year

Tyler Hicks, angler and conservationist

When and Where:

March 18 | Lucky Labrador Quimby Beer Hall | 1945 NW Quimby St. Portland, OR

MORE INFO

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Give a Gift - Get Involved on Mount St. Helens

By Tod Thayer, Executive Director

As the New Year is well under way I am reminded of how much the iconic landscape of Mount St. Helens gives to us. There are so many benefits from exploring the mountain to the educational, scientific and research opportunities that abound. Hike the many trails, hike into the crater, climb to the summit or dare the Ape Cave and you get a profound sense of the beauty and majesty of this volcanic landscape. There are so many sites, so many discoveries, and so many memories that can be made. The mountain truly gives so much to those who take the time to appreciate her. Ask yourself "What will Mount St. Helens erupt in me?"

We hope you'll erupt with a renewed sense of commitment to give to the Mount St. Helens Institute this year. Like the mountain we offer many ways to express your gift. Become a member of the Institute. You will receive the benefit of knowing that your membership dollars are providing support for educational programming that brings youth ages 8 to 18 to the mountain to experience first-hand, through relevant field study, exploration and scientific research, the ever changing dynamics of Mount St. Helens.

Make a tax deductible donation. Support efforts to pilot new programming like GeoGirls. A pilot program beginning in August will bring middle school girls to the mountain for one week of intensive field study with the U.S.G.S. and female scientist mentors to study volcanoes in their own backyard, the effects these volcanoes have and the science behind their study.

Purchase a guided hike or climb. Whether you have hiked or climbed before or not, experience a guided hike or climb with our experienced guides who will bring alive the flora and fauna, history and culture of the mountain. Book a special family hike, corporate team building event or that bucket list item today!

You can support the Institute when you sponsor our annual Boots and Bow Ties auction October 24th, 2015. A table sponsorship or auction item will provide much needed funds to continue our reach into new communities, our development and support of current programming and our efforts to continue building awareness of our incredible programs.

You can support us when you shop! Go to Amazon Smile and they will donate a percentage of sales to the Mount St. Helens Institute. Do you shop at Fred Meyer? Customers can enroll their rewards card at the Community Rewards Page. Just link your card to the Mount St. Helens Institute. You will continue to earn fuel points and rebates. At the end of each quarter Fred Meyer will make a donation based on the accumulated spending of reward customers linked to the Mount St. Helens Institute.

Finally, you can donate your time. Volunteer with the Mount St. Helens Institute! Whether you become a Mountain Steward, Volcano Naturalist, or enjoy other volunteer opportunities you'll have a chance to get outdoors, help others and support a great organization! The mountain is calling. What will it erupt in you?

Poetry Corner

Fireweed

By Vi Gale, © 1959

Sprouting its name the lance-like leaves
Start slow and mild as milk
But thrust to six-foot height on torches,
Magenta, flagged in silk,
Which summer long run blossom-riot
Over blighted land
And waste laid by an element
Got out of human hand,
Till fall when swaying flares bloom down
To embered seed and coal;
When, as if doused, they blow in clouds,
In puffs of drifting wool.

Viola M. Gale (1917-2007) was a well-known Portland poet and founding publisher of Prescott Street Press. She wrote five books of poetry and helped launch the careers of many regional poets by publishing their first books. This poem about fireweed was written almost 30 years before the May 18, 1980 eruption of Mount St. Helens but celebrates how the wildflower can—in a single summer—spread like wildfire.

MOUNT ST. HELENS INSTITUTE

D O N O R L I S T 2 0 1 4

THANK YOU SUPPORTERS! We express our sincere thanks to over 300 individuals, families, special event guests, businesses, corporations, and foundations who gave generously to Mount St. Helens Institute in 2014. Your gift, no matter how small or large, is leveraged to help us advance understanding and stewardship of Pacific Northwest volcanic landscapes. Thank you!

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