



The Geological Newsletter

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Geology of Eastside Portland and Johnson Creek

by Paul Edison-Lahm and Carol Hasenberg

Moments after the election of the new GSOC board of directors, President-elect Paul Edison-Lahm addressed a near-record crowd at our February 9th Friday Night Lecture with his presentation "An Amateur's Guide to the Geology of Johnson Creek and Eastside Portland." He explained that since a creek cuts down through vegetation and construction into layers of earth otherwise unseen, the rocks in the creek can tell us the geologic history of the surrounding countryside. Grey basalts and dull orange quartzites, found in the Reed College Lake near his home for example, are clues to earlier epochs of catastrophic volcanism and icy inundation.

See Johnson Creek, Page 14



Basalt and quartzites in the Reed College Lake.

Calendar

GSOC Annual Banquet

March 11, 2018

83rd Annual Banquet at 1:00 p.m. at Ernesto's in Beaverton. Speaker Ellen Morris Bishop, geologist, author and award-winning photographer, will present "Mountains out of Molehills: A Brief History of The Willows"

*see [Banquet Flyer](#)
[online](#) and the January/February edition
of *The Geological Newsletter**

Friday Night Lecture

April 13, 2018, Cramer Hall, Portland
State University

Speaker Tom Pierson, senior USGS CVO research scientist, will present "Large, Abundant Landslides in the Western Columbia Gorge."

see [Landslides](#), Page 12

Friday Night Lecture

May 11, 2018, Cramer Hall, PSU

Speaker Ray Wells, USGS. Topic will focus on the rotation of the Pacific Northwest.

GSOC Friday Night Lectures are held the second Friday evening of most months, 7:30 p.m., Rm. 53, Cramer Hall, PSU, SW Broadway at SW Mill St., Portland, Oregon. Join GSOC members at Pizzicato Pizza, 1708 SW 6th Ave., at 6:00 p.m. before the lectures for an informal dinner and conversation. Check the GSOC website (www.gsoc.org) for more information and updates to the calendar.

Hourly rates for parking are available in some parts of PSU parking structures. PSU Parking Structure #2, 1724 SW Broadway across from Cramer Hall is \$5.00 flat rate in the evening. Park in permit (NOT reserved) spaces and pay at the kiosk by entering your vehicle license number. There is also on street pay parking, and many mass transit options. Street parking is \$2.00 an hour, but free after 7:00 pm. More info available [here](#).

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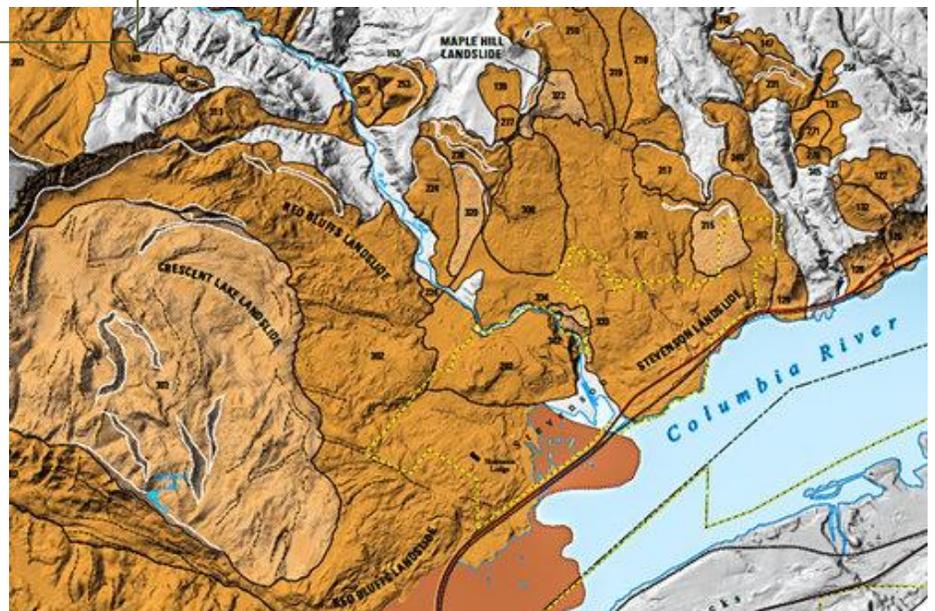
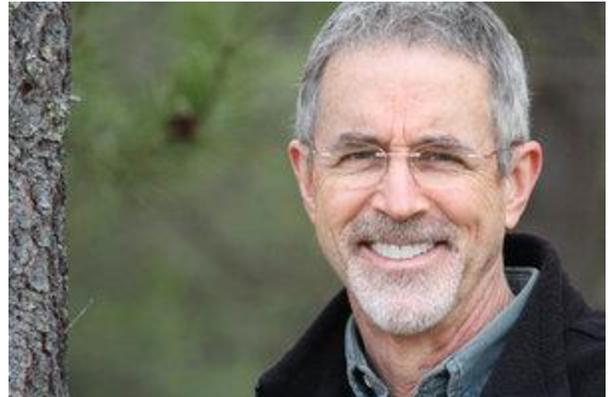
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Landslides

April 13, 2018, 7:30 to 9:00 pm

Recent lidar mapping of large landslides in the western Columbia Gorge in Skamania County, WA, shows that there are many more landslides than previously thought. The mapping area contains at least 215 discrete landslides of various ages — ranging from more than 15,000 years old to currently active.

Tom Pierson is a senior research scientist at the USGS Cascades Volcano Observatory in Vancouver, Washington, where his investigations focus mainly on volcano hazards involving lahars (mudflows), floods, and landslides— processes occurring both during and following volcanic eruptions.



GSOC Board Meeting Notes

February 10, 2018

GSOC President Rik Smoody called the meeting to order at the home of GSOC Director Martha Muncie. In attendance were GSOC Board members Rik Smoody, Sheila Alfsen, Paul Edison-Lahm, Dawn Juliano, Martha Muncie, Larry Purchase, Carol Hasenberg, Bo Nonn and Janet Rasmussen, constituting quorum. Also in attendance were Director-elect Megan Faust, Dave Olcott, Doug Rasmussen, and Clay Kelleher.

December board meeting minutes were approved.

EVENTS

Friday night lectures

Congrats go to board member Paul for the very informative lecture last night on the Johnson Creek Watershed and surrounding stratigraphy. Paul included a lot of basic info for attendees new to geology. Attendance was counted at 123 persons at the lecture.

Sheila Alfsen reports that lectures are scheduled for the March banquet, April, and May. She is planning to schedule a June lecture and possibly July.

June lecture is rescheduled from June 8 to June 15, and the board meeting will be June 16.

Camp Hancock/President's field trip is planned for September 14-15, so the board may want to reschedule GSOC Friday night meeting that month, which would normally be held September 14.

Rik reports projector purchase is still pending. Name brands Canon, EPSOM, and HP are targeted for reliability.

Annual Banquet

Plans are proceeding on the banquet and task assignments have been discussed.

Field Trips

Camp Hancock/President's Field Trip Sept 14-15: A reconnaissance trip with Paul, Rik, Bo, Sheila, Barbara, and MaryAnn will occur May 12 at with the spring RCA star party. First day will be reconnaissance around the camp itself and another day in Fossil and John Day Monument area. Paul will meet with RCA officers prior to reconnaissance.

The Snake River Plain and Albion Mountains Trip, Jun 2-8, is full. Dave discussed some of the details with the board. Dave is working on coordinating lodging.

Portland Ancient Walls Trips: June 16 is scheduled for the north tour, October 6 is schedule for the south tour. Cris Morgante, Paul and another possible guide are ready to lead these popular trips.

Mt. St. Helens Helicopter Tour: Sheila reports MSH trip has been scheduled for August 18, 2018. This trip will focus on the 1980 eruption and its lasting effects on the landscape. Sheila will give a brief presentation on the eruption before the flight and will prepare participants so they can interpret the landscape from the air.

Other Field Trips: Board discussed the possibilities of an East Portland Field Trip, Salem buildings field trip and trip to the Condon Collection. These trips will occur in 2019 or later.

OLD AND NEW BUSINESS

The slate of nominees were approved at the Friday night meeting last night. The new board of directors include President Paul Edison-Lahm, Vice President Sheila Alfsen, Secretary Carol Hasenberg, Treasurer Dawn Juliano, Directors Megan Faust, Julia Lanning, and Larry Purchase. Rik Smoody and Bo Nonn are Past Presidents on the board.

BOARD MEETING NOTES

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Welcome to Megan Faust as a newcomer to the board and also welcome to Julia Lanning, who has previously served. Megan hails from Illinois and received her master's degree in geology at University of Vermont. She teaches geology at PCC and PSU and is also involved with AWG Northwest chapter. She will be acting as liaison to AWG for GSOC.

Bylaws Committee: Board members stayed for a work session marking up some needed revisions to the GSOC bylaws regarding membership definitions, changes to the way GSOC produces the newsletter and a couple of other minor changes. According to procedures outlined in the current bylaws, the proposed changes will be submitted to each of the board members at least seven days prior to the next board meeting. After they have been approved by the board, they will be sent to the membership to be ratified at the February 2019 Annual Business Meeting of the Society.

Member Database Committee: Rik and Dawn are coordinating the editing of the GSOC membership roster on database. This work includes updating club status awards.

Next GSOC Board Meeting will be held 10:00 am, April 14, 2018 at Martha Muncie's house.

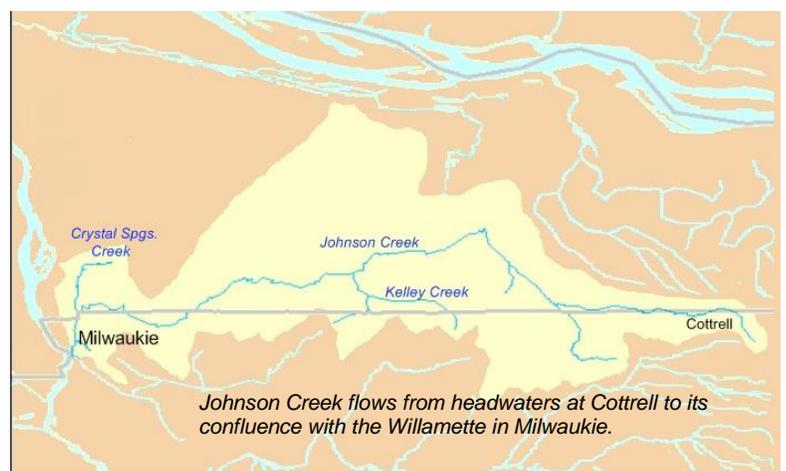
Notes compiled by Carol Hasenberg.

Johnson Creek

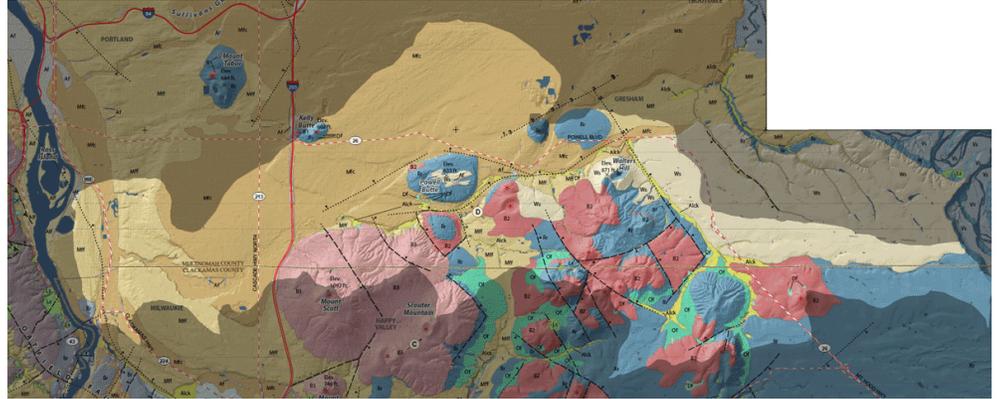
Synopsis of the GSOC Friday night lecture given on February 9, 2018, with speaker Paul Edison-Lahm, Secretary of GSOC

The lake is part of the Crystal Springs watershed, which in turn is part of the larger Johnson Creek watershed. Johnson Creek cuts a swath through Eastside Portland along the Multnomah/Clackamas county border, between the Sandy River watershed to the east and the Willamette River to the west. The creek flows west from its headwaters at Cottrell across farmlands; then skirts northwest around the numerous buttes formed by Boring Volcanoes including Mt. Scott; continues west over a plain overlain by Missoula Flood deposits; and finally makes a sharp left-turn southward to its confluence with the Willamette River near the Waverley Country Club.

Rocky outcrops are few among the rolling farmlands near the headwaters, but a clue to the underlying geology comes from the fact that the Sandy River immediately to the northeast has incised deep meanders in the uplifted plain: the curving ravines at Oxbow Park. Edison-Lahm showed a beautiful map of surficial geology (created by Lina Ma and Ian Madin at DOGAMI) projected on a Google Earth view of the Sandy River ravine. This view shows that the headwaters plain is topped by a layer of glacial loess (windblown silt) which overlays ancestral Columbia River gravels — the Troutdale Formation — deposited in the Miocene and Pliocene. The loess is responsible in large part for the great fertility of the headlands. The Troutdale formation, found throughout the Portland basin, is readily identified by the orange quartzite cobbles which originated in the Montana fold belt and were brought here by the ancestral Columbia river.



Moving further downstream, the creek bed now contains vesicular basalt-andesite cobbles from the adjacent Boring volcanic buttes. Edison-Lahm showed a composite photo of Mt. Tabor erupting, reassuring the audience that, even though we are still likely in the era of Boring Volcanism



which has continued intermittently for the past 2.7 million years, it is unlikely that we will have another eruption in the Portland area for a few more millennia yet. There are more than 80 Boring vents in the Portland metro area, including those in the Johnson Creek area such as the Mt. Scott, Powell Butte, Jenne Butte, and Walters Hill. Curiously Mt. Tabor, Powell Butte, and Kelly Butte contain Boring lava vents, and yet are primarily composed of the much older Troutdale formation due to processes that are still the subject of speculation by geologists.

Image detail from DOGAMI map (Ma, Madin, et. al) showing Johnson Creek Watershed boundary. Moving east to west: cream represents windblown sediments (loess); blue is ancient river rock, predominantly Troutdale formation; pinks are Boring Volcanics; tans are Missoula deposits; and a sliver of grey indicates the Waverley formation basalt.

The remaining reaches of Johnson Creek flow west past Mt. Scott over Missoula flood sand and gravel deposits. The catastrophic Missoula floods from the ice-dammed Clark Fork River in Montana rushed into the Portland basin at least 40 times during the Pleistocene, covering the landscape to a depth of 150 meters, and leaving behind voluminous sand and gravel deposits. In the northeast sections of the Portland basin, the deposits are coarser-grained as foreset beds of gravels were laid down when flood waters slowed on emerging from the Columbia River gorge. A 1934 photo of the Division Street gravel pit (now Portland Sand and Gravel) shows the cross bedding of the gravel deposits, which demonstrating the direction of the depositional environment. To the south and west, deposits are finer grained where the waters had the chance to pool as temporary "Lake Allison." The slackening waters deposited graded beds of sand, silt, and gravel, called rhythmites. When exposed in cross-section in hillsides close to the Willamette River, these rhythmites show up to 40 successive pulses occurring. The location of these deposits is a critical concern for people living on the Eastside, since the Cascadia quake will be much more destructive for



Missoula floods covered East Portland to a depth of 150 meters.



Waverley Basalt at Johnson Creek/Willamette Confluence.

people who live on top of the fine rhythmite deposits than those who live on the bedded gravel deposits.

As Johnson Creek descends off the gravel terraces, it joins with Crystal Springs, takes a sharp left turn into an abandoned channel, and flows south. The Eastside channel containing the creek runs five to six miles north-south between Portland's Central Eastside and Milwaukie, along Highway 99E and the Union Pacific tracks. The geologic origins of this channel are something of a mystery. Historically streams have flowed through the channel to the Willamette both to the north and to the south; although perhaps it was also a

backflow channel during the Missoula floods, created when the floodwaters flowed north out of the Portland basin.

Johnson Creek then continues south to its confluence with the Willamette River in Milwaukie immediately south of the Waverley Country Club. Waverley is the type locality for the Waverley Formation basalts, first identified by geologist Terry Tolan. Recent unpublished work by GSOC members Dr. Paul Hammond and our newly elected Director Megan Faust, shows that the Waverley formation may originate from the same mantle plume as the Yellowstone Hot Spot and Columbia River basalts. Hammond's work shows that, when the hotspot track is projected backwards in time, the clockwise rotation of Oregon and the Pacific Northwest can account for the presence of the Waverley formation in the Portland area.

In the course of his research, Edison-Lahm learned of two Native American artifacts that had been discovered just blocks from his home in the Crystal Springs watershed: one a projectile point possibly 8,000-10,000 years old, the other a quartzite implement of uncertain age. Edison-Lahm discussed the political and historical difficulties of ensuring that the last 14,000 years of Native American presence in the watershed be recognized and that the artifacts not be presented out of the context of their current significance to the many modern day tribes in Oregon and Washington.

Finally, Edison-Lahm thanked the many contributors to this project, including the Johnson Creek Watershed Council,

emphasizing that being a successful amateur — in addition to requiring a good map and a hand lens — depends on the successful collaboration between professionals and amateurs.

ADDITIONAL READING

[Geology.com](#) site for general information about geology.

Madin, Ian, "[Portland, Oregon, geology by tram, train, and foot](#)", Oregon Geology, Volume 69, Number 1, Fall 2009.

Russell C. Evarts, Jim E. O'Connor, Ray E. Wells, Ian P. Madin, "[The Portland Basin: A \(big\) river runs through it,](#)" GSA Today, Volume 19, Issue 9 (September 2009)

Seattle Hazards Symposium Report

On Saturday, February 17, 2018, Doug and Janet Rasmussen attended a free public day organized by the Northwest Geological Society ([nwgs.org](#)) of Seattle, Washington. The public day was part of a three-day Geohazards Symposium, "Living with Earth Hazards in Western Washington." A four-hour program with 11 speakers at each session, repeated morning and afternoon. Speakers covered the geology of the state, science reporting, landslide risks, earthquake and tsunami hazards, volcanoes, floods, and government planning and response to emergencies. During the breaks they browsed over tables set up by the sponsors including the United States Geological Survey, Washington Geological Survey, Washington Sea Grant, the Washington Dept. of Natural Resources, and many commercial engineering and construction firms. Computers were set up with volunteers assisting the public to locate their homes or businesses and examine any hazards in their area on a new program.

The Rasmussens missed the first day in which additional speakers presented more technical information on the same topics. Those who paid for the first day, which was not free, were eligible to attend a field trip organized on Sunday to examine local geology.

NWGS President Jim Miller advised that their organization is meeting to discuss whether to produce a similar event for next year. They have hosted meetings before in 2007 and 2013.

AWG FIELD TRIP ANNOUNCED

The [Pacific Northwest Chapter of the Association for Women Geoscientists \(AWG\)](#) will host a field trip to the Klamath Mountains, Oregon Caves and Josephine Ophiolite this September 8-10, 2018.

This trip will focus on the Klamath accreted terranes, comprised of a classic ophiolite sequence and varied metamorphic rocks. The leaders are AWG-PNW member and geology instructor Sheila Alfsen and retired education director at Oregon Caves National Monument Roger Brandt. Please see the trip flyer for more details.

The AWG website will soon post a link to a registration form. [Click here](#) for more information on the trip.

WELCOME NEW MEMBERS!

Nicholas T Legg
 Nelda and Ronald Skidmore
 Thomas Kaldenbach
 Terrance and Dennea Hedding
 Trish Rolin
 Jonathan and Dana Tree
 Kathleen Kerner
 Rafael Suarez and Akiko Sulisufaj
 Andrea Bowen
 Bruce Thiel
 Hank Schottland and Elka Grisham
 William Burgel and Charlotte Finn
 JoLynn Lords
 Sally Kenney
 MaryAnn Amann
 Bruce Howard
 Madison Ball
 Melanie Klym
 Lucas Fleetham
 Pam Hepper
 Herb Dirksen
 Charlie Carr
 Sue and Glorie Gary
 Tim Taylor

