From the President
Greetings!
Hillary Goodner, PAC NW Section President, Yakima Valley College

Happy New Year! Depending on where you are, you may be experiencing a mild or wild winter. No matter the case, I hope you are getting the chance to enjoy it. For me, winter is one of the best times of the year to experience the vast ecological differences of the region. You can hike in the basins east of the Cascade Mountains without the intense sun beating down on you, or snowshoe and ski up along their snowy ridges. The vast temperature and precipitation differences in the Pacific Northwest allow for a great deal of opportunity to explore.

Just before the New Year, my husband, Chris, and I decided to explore beyond the Pacific Northwest this winter. We do not always get the chance to do a winter road trip to the upper Midwest, but when we do it is incredible the difference in “winter” between areas of the same latitude. We were concerned about traveling through the Idaho and Montana Rockies this time of year, but found them to be the most enjoyable of our experience even with the short days around the solstice.

Our drive east was relatively uneventful until we entered the Great Lakes Region. Having grown up in the Upper Peninsula of Michigan, I know that lake effect snow can be quite the event, and that isn’t even looking at the Snow Belts. We made note that the forecast mentioned a slight chance of snow, but we knew it would be quite the opposite. In a matter of a few hours we managed to transition from just few inches of snow on the ground to snowbanks tall enough to covered front porches and business signs.
One of my favorite activities while in Michigan is snowshoeing. By mid-December, the area had already experienced over 125” of snow this season and as such it takes very little effort to get out and explore the winter wonderland that blanketed everything. We strapped on our snowshoes and found our way through feet of snow and trees rising like sentinels.

Our winter road trip also took us to eastern Wisconsin where it was snowless but windy. The Great Lakes, which can be quite placid, were transformed into a wave driven torrent that thrust tumble polished rocks onto the once sandy shores. It was difficult to resist pocketing only a few of these beautiful Inland Sea gems the icy wave action of the Great Lakes seasonally expose.

Our travel back west to Washington was a bit more of an adventure to say the least. The weather forecast claimed to be mostly mild with patches of snow and wind in western Wisconsin and eastern Minnesota. The forecast turned into a full-blown, mid-latitude cyclone that engulfed nearly the entire Midwest and attempted to stop us in our tracks several times along our way. As we pushed west, we counted the many vehicles left stranded along the roadways. Eventually we expected the weather would break and we would have clear travel, except it did not. We drove for far more hours than we anticipated and the storm continued to lick our heels and threatened to delay our homeward bound trip for days. The snow was piling up, the roads were slick, and blowing winds caused snowdrifts to reduce visibility. We finally broke free from the storm and found shelter for the night towards the western edge of North Dakota. When we woke the next morning, we found I-94 closed between Fargo and Bismarck, the very area we were lucky enough to get through the night before.

As we continued our trek westward under sunny skies with occasional cloud cover the eastern Great Plains and Midwest got buried to a standstill for two days. Needless to say, the weather forecast can call for some inclement conditions, but sometimes Mother Nature has its own plans. One thing this trip solidified into our plans is when it comes to winter driving, keep an eye on the sky but be prepared for anything and know your limits.

As the new decade flowed over the entire planet, we found ourselves back in the Pacific Northwest, and as many do, we made a resolution to get out and experience nature at least once per week. Even after seven years of living in Washington, I am still awestruck by the wide range of winter opportunities that only a single hour of driving can offer. We look forward to more hikes and snowshoeing adventures before the season turns to spring, which seems to be just around the corner already. It shouldn’t be difficult for those who value the geology, geography, ecology, and climate of the region to get out and enjoy the season, but time sure does slip by without you noticing.

For those of you in education, I hope you had a great break and welcome back to the new session. I hope you have all had an inspiring New Year and are ready to get this new decade started on the right foot. Wishing you all the best for 2020!

In this newsletter, you will find information about the upcoming 2020 conference in Pendleton, Oregon, updates at the National level of NAGT, and other happenings around the region!

See you in Pendleton, cheers!

**From the National Scene**

*Frank Hladky, NAGT Secretary / Treasurer*

It’s been a busy fall and winter with the transition of officers to new positions on the Executive Committee. The changes took place at the September 22, 2019 annual meeting held in conjunction with the GSA Annual meeting in Phoenix, AZ. The changes were: Karen Viskupic, president; Jen Wenner, vice president; Margaret Crowder, 2nd vice president, and David McConnell, past president. In addition, two new councilors-at-large filled vacancies caused by rotations off the committee: Steve Mattox of Grand Valley State University and Ryan Hollister of Turlock High School.

In December, Anne Egger became the association’s new executive director, replacing Cathy Manduca whose many years of storied service have largely defined the shape and purpose of NAGT as we know it today. Anne’s new role left a vacancy at the JGE editor-in-chief position which is now being filled on an interim basis by Eric Riggs of Texas A & M. The association also recently installed a new editor for In the Trenches: Redina Finch of Western Illinois University. On January 10, 2020, the Executive Committee adopted changes to the association bylaws. A description of the changes and the process for objection can be found here: https://nagt.org/nagt/about/proposed_bylaws_2019.html.
2020 NAGT Pacific Northwest Section Conference!
Blue Mountain Community College, Pendleton Oregon (contact Philip Schmitz, pschmitz@bluecc.edu)
June 16-19

**Tue. June 16** – Afternoon Field Trip (space limited) to Mountain Home Metamorphic Complex.

The Mountain Home Metamorphic Complex represents some of the oldest basement rocks in the region and are comprised of variably metamorphosed Permian and Triassic aged igneous and sedimentary rocks. Although initially associated with either the Baker terrane or the Wallowa Terrane, more recent work suggests the MHMC may be an island arc terrane that amalgamated onto the Baker Terrane in the Late Jurassic.

**Wednesday, June 17** - Conference Day, Blue Mountain Community College. Presentations, posters, section business, and an evening dinner/social with a keynote speaker.

**Thursday, June 18** – All day field trip to the Tower Mountain Volcanic complex.

The field trip will head south of Pendleton over the Blue Mountain anticline into the Ukiah Valley. From Ukiah the trip proceeds to the Tower Mountain volcano complex. The caldera forming eruption 32 Ma, produced ring fractures from which domes of rhyolite and dacite emerged which can be viewed from the road. After lunch, the trip will stop at andesite and rhyolite flows associated with Tower Mountain, and as we return back to Pendleton, we will make a final stop to look at Permian Aged Elkhorn Ridge Argillite.

**Friday, June 19** – All day Field Trip to look at exposures of Columbia River Basalt and Missoula Flood Features.

The field trip on Friday will head west through the Umatilla River canyon where there are exposures of the Grande Ronde and Wanapum Flows. From there, the field trip will head north through Wallula Gap, and then east along the Walla Walla River looking at additional outcroppings of Columbia River Basalt and some rhythmite associated with the Touchet Beds. The trip will end at a local winery with a discussion of the terroir of the Walla Walla River Basin.

**Lodging** – Due to other events occurring in Pendleton, room availability may be reduced. A block of rooms has been reserved at the Red Lion Hotel for $99 + tax. Individuals must make their own reservations by calling the Hotel Direct at 541-276-6111 by 05/26/2020. Please identify as a member of NAGT. Reservations must be guaranteed and accompanied by a first night room deposit or guaranteed with a major credit card.

**Abstract Deadline** - May 1, 2020. If you would like to present a talk (15-20 minutes) or poster (teaching techniques, geology research, undergraduate research, etc.) submit your abstract to Philip Schmitz at pschmitz@bluecc.edu.

Please include “NAGT Conference Abstract” in the subject heading of your email. Make sure that your abstract includes:
- Whether an oral presentation or poster is being submitted
- Title
- Author(s) name, affiliation, and contact email addresses
- Abstract length: maximum 1 full page (8.5” x 11”) in Times New Roman, 12-point font. You may include legible line diagrams, graphs or tables. Must maintain at least 1.0” margin on all four sides.
Deadline — May 1, 2020 Due to the limited amount of time during conference day, acceptance for oral presentation will be based on first submitted, first granted basis. If time slots for oral presentations fill before the deadline date, you’ll be contacted in regards to a poster option.

New Section Officer
Dr. Craig Nichol is a Senior Instructor at the University of British Columbia Okanagan Campus and the Associate Head of the Department of Earth, Environmental and Geographic Sciences. He has a PhD in hydrogeology and specialized in water movement in soils and issues around mining reclamation. He joined UBC Okanagan in 2006, and continued to work on groundwater resources, surface water – groundwater interaction, irrigation strategies, and nitrate movement in soils. He teaches undergraduate courses in hydrogeology, groundwater contaminant transport, geophysics, Earth history and soil physics and leads a summer geosciences field school. He is involved in curriculum development for the Earth and Environmental Sciences program and is active in promoting professional registration and professional skills for students in the geosciences.

Serendipity in Southern Idaho
Shawn Willsey, College of Southern Idaho

Living along the rim of the Snake River Canyon in Twin Falls, Idaho, two major geologic events dominate the local geology: Pliocene to Holocene basaltic volcanism and the Bonneville Flood. Over the past few years, I have taken a keen interest in the landscape battle between lava and water, particularly how the path of the Snake River has been affected by eruptions of basaltic lava. One of the most recent events occurred 52,000 years ago when McKinney Butte, a local shield volcano, erupted lava which traveled west and poured into the Snake River Canyon near Bliss (north of Hagerman Fossil Beds). The lava filled much of the canyon forming a leaky lava dam constructed of pillow lava and minor amounts of tephra. Eventually, the river (and subsequent Bonneville Flood) wiped out much of the dam and reestablished the Snake River’s path.

When it comes to field work, serendipity often plays a big role. Recently, I was helping some friends develop a new local climbing area they discovered in the Snake River Canyon near Pillar Falls. Most of the cliffs in the Snake River Canyon are difficult to access due to few roads. Even boat access is tricky with cascades and waterfalls along the river. Getting to this new cliff involved two spicy options: a 20 meter rappel or a somewhat exposed scramble down a tunnel/gully.

Once my descent was accomplished, they proudly showed me the 15-meter tan basalt cliff. While the rock looked great for climbing with clean faces and sufficient, yet challenging climbing holds, what really caught my eye was the eastern edge of the cliff band. Here, the thickness of the cliff abruptly decreased and was replaced by a 3-4 meter thick section of fluvial gravels and sand (see below). These stream deposits were overlain by pillow basalt which graded into subaerial basalt.

Scanning the cliff and gathering visual observations quickly led me to the fascinating story of this amazing outcrop. The gravel and pillow basalt filled a paleochannel about 100 meters wide (see below). The size of the channel along with a quick look at the quartzite and other clast types in the gravel indicated this was once part of the Snake River’s path. An eruption of basaltic lava poured into the ancestral Snake River, forming pillow lava atop the sand and gravel along the river bed. This eruption, like countless others, displaced the Snake River from its channel, forcing it to carve a new channel nearby. With dozens (or more) of volcanic vents in the Snake River Plain, who knows how often this process has played out and how frequently the Snake River and other regional drainages were displaced.
A word on language: Canadian English, and Canadian geology, follow a mixture of British and American traditions. For example, British geologists will always speak of “geological structures” whereas Americans may say “geologic structures”. The British Carboniferous Period is equivalent to the Mississippian and Pennsylvanian in the U.S. Canadian geology follows a mixture of both traditions which can sometimes seem aggravatingly inconsistent. However, we encourage readers to embrace this diversity in the interests of encouraging communication between those interested in the Earth on both sides of the Atlantic!

Steve’s Madness Method

Steve Carlson, Portland State University

Portland State University has sponsored a very successful “field trip” program for non-majors. Trips are taken to Portland, the Columbia River Gorge, the Willamette River valley, the Oregon Coast Mt. Hood, and both sides of Mt. St Helens. Each professor had their own way of doing the trip but students in my classes, then research the areas and write short papers with pictures and references as to the geology, hazards, and a paragraph on how the geology might related to their majors. That usually is the most interesting part of the paper and surprises me every time. For example, after the Coast trip a psychology major asked me a question on “Why don’t people pay attention to the evidence for the tectonic quake and tsunami you showed us today?” I asked her what she thought but my response was, “That’s your paragraph!” She found out it’s called “optimism bias,” it’ll never happen to me. The Willamette River trip is about the soils and the economic value. The Gorge trip is my favorite and we tell the story of the building of the Cascades. The Mt. Hood trip is mostly about the “hazards” associated with the Volcanoes of the Cascades and how magma chambers can produce such a variety of volcanic material. The Portland trip is full of faults, folds, and features. From Rocky butte, you can pretty much tell the story and the visit to the Zoo MAX station to see the core of the West Hills seals the deal. Mt. St Helens West Side is pretty much about the volcanism of this active volcano, and the east side is about lava tubes, lava cast forests and lahars. Each of my trips has a movie during the driving time between stops and then “Challenge” questions afterward. I don’t use a formal textbook as there are more than adequate resources on line for this kind of course.

In order to get credit on my trips for the "participation credit on the actual field trip," students must answer at least one “conceptual Challenge” question during the trip. Example, “Why does Mt. Tabor and the other Boring
volcanoes look so much different than Rock Butte?” Or on the Coast Trip, “What happens the Oregon coast line to cause the sequence of "bay muds, sands, peat, and bay muds" in the Tsunami cores of most of the bays. What it does is makes the people on the bus into a “learning community” as they start teaching each other. I have my graduate assistant sit midway on the bus and record credit and relay answers and questions. I also purchased a “Blue tooth Tailgater amplifier” the Grad Student passes around for answers.

During our Friday organizational meeting I have students fill out a 3 X 5 card with their name, major, an emergency contact number, and any accommodations needs as all students are welcome. I had my first blind student this fall and she was amazing. I use those cards as grade sheets, attendance, and information. By the way, I ask the questions before I pull a student’s card as if you pull a card first, that’s the only student that pays attention. “And, I don’t repeat questions. Makes them all pay attention the first time and I will repeat important questions several times.

I have them turn in their papers on-line and have them scan any on trip assignments as attachments. I like to have them take a black and white map of an area and fill in the formations using colored pencils. This is especially important on Mt. Hood as they soon realize Hood is a jumble of volcanic debris and the only solid rocks are the intracanyon flows and Domes. On St. Helens, it gives them the opportunity to internalize the various devastation areas.

There’s a method to my madness, in order for most students, especially a non-major, to understand a science concept they have to experience it in more than one instructional way. My course always includes a Power Point of the geology and stops, the field trip with Challenge questions, producing a geologic map of their own, and the summary paper. Many students comment that they are surprised how much they learn. The rigor of the course, even as a pass no-pass, seems to eliminate the students that just want a grade as students pass information around about Prof’s. Fine by me. My classes for this spring are already full and have waiting lists.


If you teach any aspect of climate change, this is a book you should have on your shelf. It lists and ranks 100 “techniques, practices, and/or technologies” that can significantly reduce atmospheric CO₂. It provides data, including CO₂ reduction numbers vs. costs vs. savings numbers, in an easy to understand manner. In fact, this book would make for an excellent (and affordable) seminar text.

The following is a review by Goodreads: “In the face of widespread fear and apathy, an international coalition of researchers, professionals, and scientists have come together to offer a set of realistic and bold solutions to climate change. One hundred techniques and practices are described here—some are well known; some you may have never heard of. They range from clean energy to educating girls in lower-income countries to land use practices that pull carbon out of the air. The solutions exist, are economically viable, and communities throughout the world are currently enacting them with skill and determination. If deployed collectively on a global scale over the next thirty years, they represent a credible path forward, not just to slow the earth’s warming but to reach drawdown, that point in time when greenhouse gases in the atmosphere peak and begin to decline. These measures promise cascading benefits to human health, security, prosperity, and well-being—giving us every reason to see this planetary crisis as an opportunity to create a just and livable world.”
Tobacco Root Geological Society, 2020
Annual Field Conference, Hamilton Montana, July 23rd – 26th. Awesome Northern Rockies geology! For more info, go to: https://www.trgs.org/field-conference

Flat irons & the Bitterroot detachment, photo, Jeff Lonn.

Time to Renew! - IF YOU HAVEN’T renewed your dues, it’s that time of year again, time to renew your NAGT membership for 2020. We need you! Plus, there are all the great benefits such as:

- In the Trenches
- JGE
- Professional development opportunities
- SERC access, and so much more!

Come on, do it now. It’s easy. Go to: https://nagt.org/members/?return_url=%2Fmembers%2Faccount%2F%3Fserc_source%3Dtrack-20191008-g7rb1sbyxv4dren

OEST – Outstanding Earth Science Teacher Award is always seeking nominations for deserving K-12 teachers in your region! Please, take a little time and seek out a great K-12 ES teacher in your area and nominate them! The award is significant and they (and Earth Science) deserves your support. For more info on this important award, go to https://nagt.org/nagt/awards/oest.html, or contact our section OEST coordinator Jodie Harnden at jharnden@pendletonsd.org.

The Pacific Northwest section of NAGT is STILL seeking nominations for:

Web-site editor—updates section website (at national), uploads latest newsletters and links and

GEO2YC Division

Foundations Newsletter submissions are due June 1 and September 6. Please submit your stories, experiences, experiments, photos and awards to the editor sukismaglik@gmail.com anytime prior to each deadline.

NAGT Award Nominations

The following NAGT awards have upcoming deadlines:
- Outstanding Earth Science Teacher (OEST) awards: A listing of the deadlines and contact people for each Section is listed on the award website. Check out your Section’s deadline and submit your nominations via the website.
- James H. Shea Award, deadline 4/1/2020.
- Dorothy Lalonde Stout Professional Development Grants: Nomination deadline is April 15.
- Outstanding Teaching Assistants: Nomination deadline is June 15.
- Robert Christman Distinguished Service Award: Nominations are accepted on an ongoing basis.

Central Washington University, Public Lectures & Field Trips: http://www.geology.cwu.edu/lectures/

Ice Age Floods Institute: website, events, field guides: http://iafi.org/

Washington Science Teachers Association: https://wsta.wildapricot.org/


Geologic Society of the Oregon Country: https://www.gsoc.org/

Columbia Basin Geological Society meets monthly in Spokane, the last Tuesday of the month. Contact Chad Pritchard at EWU for more info: cpritchard@ewu.edu
Idaho Museum of Mining & Geology: homepage and link to field trips: http://www.idahomuseum.org/

2020 GSA Cordilleran Section Meeting, Pasadena (CA), May 12-14th:
https://www.geosociety.org/GSA/Events/Section_Meetings/GSA/Sections/cd/2020mtg/techprog.aspx

2020 GSA Rocky Mtn. Section Meeting, Provo (UT), May 4-5th:
https://www.geosociety.org/GSA/Events/Section_Meetings/GSA/Sections/rm/2020mtg/home.aspx

Field-trip guides to selected volcanoes and volcanic landscapes of the western United States, USGS Scientific Investigations Report 2017-5022
https://pubs.er.usgs.gov/publication/sir20175022

GENERAL SECTION NEWS

Alaska: -Sonia Nagorski, University of Alaska Southeast, Juneau

Last May-October, the Alaska State Museum was blessed with an exhibit called “Cruisin’ the Fossil Coastline,” a fascinating and beautiful art exhibit that was the joint work of Alaskan artist Ray Troll, and Kirk Johnson of the Smithsonian National Museum of National History (https://museums.alaska.gov/TemporaryExhibits/). The exhibit, which highlights the beauty of the geologic timescale and fossil sequences with colorful and witty reconstructions of ancient life, brought in swarms of K-12 students, university students, tourists, and locals. Local geologists led some hands-on fossil activities with kids in the summer, and Ray Troll taught a kid’s fossil art class. This is a highly recommended exhibit that comes out of the Anchorage Museum!

Fast forwarding to the Anthropocene, geoscience students at the University of Alaska Southeast conducted the first known sampling of microplastics in glacial-fed lakes, streams, and adjacent coastlines in the Juneau area. They were surprised to find detectable plastic fibers and/or particles in all their samples, even in these remote glacierized environments. The class learned that microplastic detection is fairly simple with the use of a common dissection microscope, allowing for an easy discovery of the particles and ensuing discussions about human impacts on the atmosphere and hydrosphere. (Photo below: UAS students sampling glacial Mendenhall Lake (with Mendenhall glacier in the background).

Speaking of our local Mendenhall glacier, the Visitor’s Center there hosts a public presentation series every winter-spring called “Fireside Chats.” https://www.fs.usda.gov/detail/tongass/about-forest/offices/?cid=stelprdb5400800. These Friday evening lectures on a variety of geoscience, ecology, and natural history topics are free and open to the public.
Juneau continues to have many other opportunities for teachers, students, and others to engage in hands-on scientific learning. For example, in late January, there was a “Curiosity Unleashed” event, where dozens of scientists provided hands on science, technology, engineering, art and math activities for elementary students and their families. Also, a local high school’s “Future Women in Science” club hosted an event to connect girls with current female scientists, many of whom were geologists. Additionally, girls aged 16-17 in the Pacific Northwest might be interested in an awesome (and free!) wilderness science program called Girls on Ice, which now has programs in both Washington State and in Alaska (on the Gulkana Glacier) this coming June https://www.inspiringgirls.org/alaska.

**British Columbia:** see *Geological Structures: A practical Introduction, Waldron and Snyder,* *University of Alberta* above.


Monthly field trips to OSU-Cascades for tours of the former pumice mine: [http://www.cogeosoc.org/field-trips](http://www.cogeosoc.org/field-trips).

**Field Trippin’ Fridays** - just as Hal did at Everett CC, he’s using Fridays as an opportunity to run field-based classes during the normal academic year. At COCC, Hal is running "Cascade Volcanoes" every Spring & Fall term, taking students all over Central Oregon every Friday to dive deeply into perhaps the most extraordinarily diverse volcanic environment in North America.

**Idaho:** Stay tuned for new edition of *Roadside Geology of Idaho* coming in 2021(?). The authors, Shawn Willsey, Paul Link, and Keegan Schmidt guarantee this to be an awesome new updated edition!

**Washington:** CWU’s Nick Zentner will be hosting another Transfer Weekend at CWU Geology in Ellensburg. Potential geology majors thinking about transferring to CWU are welcome! Nick will offer lectures and field trips specifically geared to the visiting students. Visit Friday afternoon, April 3 and/or Saturday morning/afternoon, April 4. Free and open to all! CWU vans will transport you to Drumheller Channels, Yakima River Canyon, and more. Lodging and meals not included. Email nick@geology.cwu.edu for more information.

“Nick On The Rocks” - a PBS TV series - returns for a new season. 6 new episodes of the geology series will be airing on PBS stations all across Washington, Oregon, and Idaho. New shows: Smith Rock, Saddle Mountains, Teanaway Valley, Olympic Mountains, Ape Cave, and Mt St Helens Crater. “The Nick Zentner Geology Podcast” is the #1 geology podcast online. Subscribe and begin listening wherever you get your podcasts. Or go to nickzentner.com to listen to the episodes.

**Washington State Geology News** - this blog published by the Washington State Survey has lot’s to offer: [https://washingtonstategeology.wordpress.com/](https://washingtonstategeology.wordpress.com/)

- Geo Information Portal update
- New Geologic Mapping published
- And more!

**Cool!** Washington lidar data and screen savers: [https://washingtonstategeology.wordpress.com/tag/washington-geology/](https://washingtonstategeology.wordpress.com/tag/washington-geology/)

**Washington Science Teachers Association (WSTA):** [https://wsta.wildapricot.org](https://wsta.wildapricot.org); Check out Wenatchee 2020!

**Newsletter Materials!** If you have anything that you would like to share with the section, please don’t hesitate to send it to either Frank or Andy. We’re always looking for information and items to put in the newsletter. **Got a great field or lab sample photo you want to share?** Send along with a description. Book or article review? Or, heaven forbid, how about writing a relevant piece on something that may be of interest to the rest of us. Please submit!
Mafic enclaves in granite within mixing zone, Sierra Nevada batholith, Sixty Lakes Basin. Photo, Andy Buddington.

Nick Zentner pontificating to the masses high above the Columbia. Photo, Nick Zentner.