Nature Trails

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The Eugene Natural History Society is based out of the traditional homelands of the Kalapuya peoples who stewarded this land for millennia. Today most Kalapuya people are citizens of the Confederated Tribes of Grand Ronde and the Confederated Tribes of Siletz Indians and continue to play an active role in local communities and in the stewardship of this land.

Sea stacks and setting sun at Bandon Beach, OR. December 2020. *Marli Miller*

Oregon Geology: West to East and Back

Marli B. Miller

Department of Earth Sciences, University of Oregon, Eugene

Friday, 17 May 2024, 7:00 pm

This month's meeting will be a hybrid of in person and real-time Zoom. The in-person lecture will be held **at our new time and room: 7:00 in 221 Allen Hall, University of Oregon campus.** The Zoom lecture link is https://zoom.us/j/97499095971?pwd=eE9sdG9hSHMvOHhIUEJuU21wT20rdz09 or see our website at https://eugenenaturalhistorysociety.org/

This Month's Speaker: Marli Miller

Marli Miller last spoke to the ENHS in 2018 not long after *Roadside Geology of Washington* was published. We had coffee a few weeks ago, and she told me that her earlier biographical history "hasn't changed much." Nevertheless, repetition can be good. I'm reprinting John Carter's excellent early biographical sketch here with an update of Marli's more recent activities, which are both copious and compelling.

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Miller grew up in Cincinnati, OH. Her interest and long experience in photography started while she was a teenager, when a neighborhood friend taught her darkroom techniques. As you will see if you come to her talk, her skill with a camera has reached a high level. As a child she got to go to a summer camp in Colorado and fell in love with mountains. And rocks. When it came time for college, she returned to Colorado, to Colorado College in Colorado Springs.

She already had a hunch that she was going to dig geology, so she took a geology class her first year at CC. However, she didn't do well; she got a C+ and began to think maybe history might be more to her liking. But while on a road trip she had an epiphany. She was watching water cascade from the top of a road cut and realized that the erosion she was watching was geology in action, and she got excited again about the discipline. Even with this renewed interest, geology did not come easily to her, but she finished at CC in 1982 with a BA degree in geology. The Department of Geology there hired her as an assistant for their lab and field classes for the year following her graduation, and during this year she discovered she liked to teach. Miller now realizes her initial difficulties with her chosen field have helped her be a better teacher, because she can empathize with those who struggle in her classes.

Following her time in Colorado, Miller took a year off from her formal education. Among her destinations during that year was Death Valley, where Lauren Wright took her under his wing. Wright had begun working in Death Valley in the late 1940s and was a leading authority on the geology of the region. The two continued to collaborate over the following decade and coauthored several publications, including the 2002 book *Geology of Death Valley National Park: Landforms, Crustal Extension, Geologic History,* now in its third edition. After that year of experiential learning, Miller went on to graduate school at the University of Washington. There she completed her MS thesis on a fault zone in southern British Columbia but maintained her fascination with the geology of Death Valley, where she focused her PhD work at the University of Washington. She became especially interested in the Black Mountains on the eastern edge of Death Valley and the three turtlebacks in that range: Badwater, Copper Canyon, and Mormon Point. The exposed faults in these places provide a natural textbook for those few who make the effort to visit.

Miller is a structural geologist, and her current research focus has grown out of her early efforts. She wants to reconstruct the structural and kinematic histories of fault zones and is especially interested in the brittle-to-ductile transition in these zones. Fault zones, besides being fertile ground for geologic research, also provide a rich source of photographic subject matter. Her experience as a teaching assistant at the University of Washington coupled with the teaching she had done at CC convinced Miller that what she wanted to do with her professional life was to teach geology at the college level. After finishing her PhD she taught for 3 years at the University of Wisconsin, Eau Claire. She is now a tenured Senior Instructor in the Department of Earth Sciences at the University of Oregon.

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Since 2018, Marli has continued to follow her passions: geology, teaching, writing, and photography. Following publication of her 2014

Roadside Geology of Oregon, she teamed up with Darrel Cowan in 2017 to write *Roadside Geology of Washington.* Four years later she followed her two roadside books with the first of what she calls "the rocks series": *Oregon Rocks! A Guide to 60 Amazing Geologic Sites.* Because many of those 60 sites are understudied, they required repeated visits, and the project became a 3-year extension of Marli's geological road show. "People want to see things," she says, so her camera is a constant companion. I brought a copy of this new book with me to our interview, which she graciously signed. Then the passion erupted, and she was practically out of her chair flipping through pages of the book to show me her favorites in a book of favorites.

Marli's books rock on. In 2021, she teamed up with former UO geology student Magdalena Donahue to coauthor *Colorado Rocks! A Guide to Geologic Sites in the Centennial State*. Yet she has never wavered from her connection to Death Valley. The evolution of faulting exposed in that desert landscape is her continuing research focus, and she travels to Death Valley two to four times a year. As you might have guessed, *Death Valley Rocks! Forty Amazing Geologic Sites in America's Hottest National Park* is forthcoming from Mountain Press in 2024.

Her enthusiasm for Death Valley extends beyond her research and writing to include working at the "Ask a Geologist" drop-in table at the Furnace Creek Visitor Center. Her most common interaction with visitors? "I bet you know where the bathrooms are." Personally, I'd rather know about the exposed walls of Titus Canyon and find the bathroom on my own. But I can see Marli smiling and pointing the way. As with her teaching and her books, it's all about public accessibility.

Also publicly accessible are Marli's photography and writing at her website https://geologypics.com/. In addition to a vast database of pictures that are freely available to geology educators, she maintains a blog. My favorite recent post is "35 Minutes of Humanity," an artful interspersion of photographs and prose set at a road cut just south of Eugene. She places the short history of humans on this planet within the context of 4.54 billion years of earth history compressed into one calendar year. On the naming of the Anthropocene epoch, Marli comments poignantly from the perspective of geological time: "But to call this human time period a geological epoch seems to imply a certain longevity to both the period and its trademark origin: *Homo sapiens*—and since 1950, the earth has aged barely half a second in its year-long calendar. I wonder how much longer we can last."

Fortunately, we won't need to wait much longer to hear Marli Miller speak. On Friday, 17 May, at 7:00 p.m. in 221 Allen Hall on the U of O campus, her presentation will be entitled "Oregon Geology: West to East and Back." The Eugene Natural History Society is extraordinarily fortunate to have her as a speaker. Her knowledge, enthusiasm, photography, and teaching skills are a rare combination. Come in person if you can, because in addition to a great presentation, Marli's books will be available for sale. And there will be cookies! Otherwise, join us on Zoom at https://zoom.us/j/97499095971?pwd=eE9sdG9hSHMvOHhIUEJuU21wT20rdz09, or find the Zoom link at our website, https://eugenenaturalhistorysociety.org/

—Tom Titus

Moving North by Reida Kimmel

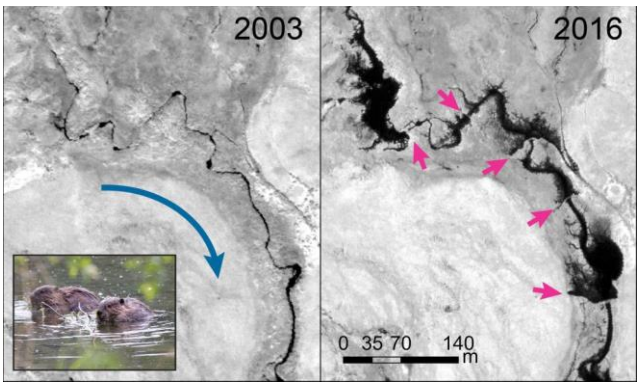
Picture Alaska or northern Canada, close to the Arctic Circle, the vegetation dwarfed by the long relentless winters and the dry climate. This is home, calving, and feeding grounds for North America's last great herds of ungulates, the caribou. They share the land with other cold-adapted species: muskox, moose, brown bears, Arctic hares, and mink. The Seward Peninsula juts west into the Bering Sea, vegetated with mosses, lichens, dwarf willow and birch, grasses, sedges, and small berry-bearing members of the heath family. We think of this Arctic tundra as immutable, perhaps because nothing else could live there. But then there is global warming. The Arctic is warming twice as fast as the rest of the earth. South and even north of the Arctic Circle, there are now more willows, and they are growing tall. The ground cover vegetation is lusher. The climate also is wetter, and a new inhabitant has moved in, *Castor canadensis*, the American beaver. In Europe and Asia, the native beaver *Castor fiber* is also moving north as the planet warms. Near Kotzebue in Alaska's northwest, there were 50 times as many beaver dams in 2019 as there had been in 2002. In NOAA's *2021*

Alaska Report Card, beavers are called "a new disturbance, transmogrifying the tundra, stream by stream and floodplain by floodplain." Why should NOAA or anyone see beavers so negatively? They do amazing good deeds, creating ponds, raising the water table, and preserving wetland environments that sequester carbon. The ponds create perfect environments for salmon and trout to breed and for fry to feed and shelter.

Curiously, as if they know that life will be tough in the north, beaver "colonists" build on a very large scale. Dams can be 100 feet long and 8 feet high. The associated lodges, 10 feet high and 30 feet wide, are monumental . Beaver ponds and the myriad streams opened by these hydroengineers have created large areas of absolutely new habitat for salmonids. Equally unwittingly, the pioneering beavers are responsible for new and amazingly diverse wildlife habitats for insects, small mammals, and birds from ducks to warblers. Large mammals also thrive in this wetter world. What's not to love?

Well, there are problems, big ones. Native peoples object to the dams and ponds because of washed-out roads and collapsing houses, the results of melting permafrost. Access to spawning areas has become difficult for the most abundant species of whitefish north of the Alaska Range, seven species that constitute an important part of the traditional diet. But the most serious problem for everyone is methane. It is true that in the long run the effect of the many thousands of beaver dams in Alaska and northern Canada will be the sequestration of enormous quantities of carbon, but at present, beaver dams are responsible for a great increase in methane, which is released from former peat and tundra lands. The underwater tunnels and cavities that beavers dig ensure that the ponds will not freeze solid and that cached willows for food and dam repairs will be accessible during the long dark winters. But what does all this stored water do? Water melts permafrost. Beaver tunnels move water laterally out into the ponds' surrounds, and the permafrost melts, collapses, and releases the methane sequestered for hundreds of years. Blocks of melted permafrost surround older beaver ponds. Even when a beaver family abandons a pond, the effects of their bioengineering, huge blocks of melted and collapsed permafrost, remain.

Much of the research on the northern spread of beaver populations is the work of Ken Tape from the University of Alaska, Fairbanks. Although native people had been reporting the spread of beavers northward for a half century, Tape and his students have, in the last decade, done annual studies of permafrost decline around ponds and their ongoing geophysical changes. By using satellite imagery, Tape and colleagues follow the increasing numbers of ponds and changes from simple stream channels to more numerous and complex channelization.



Beaver engineering dramatically altered a tundra stream on the Seward Peninsula in western Alaska between 2003 and 2016. The enlarged black areas are new beaver ponds, the blue arrow (left) shows flow direction, and magenta arrows (right) denote dams. Ikonos satellite image: 6 Aug 2003, Worldview satellite image.

There are some interesting questions, both historical and philosophical, that remain to be asked. Are beavers alien invasives or true natives returning after having been exterminated by climate or trapping? Paleontology offers few answers. The climate was indeed warm enough at the end of the Pliocene and during the warmings between ice incursions in the Pleistocene to provide the tree and shrub growth that beavers need, albeit in a world where winters, warm or cold, were always dark. The earliest beaver fossil is, however, only 8,000 years old. Native Arctic people have no traditions of beavers in their cultural world. It would thus seem that beavers may not be historically native to the Arctic Circle environment. Philosophically, however, can we condemn as alien a species that is native to and compatible with the environment of North American lands immediately to the south of Arctic Canada and Alaska? If not, then we cannot advocate for that species' extermination.

Ben Goldfarb, author of *Eager Beaver*, made a trip to Arctic Alaska to observe Tape at work and to experience the environmental changes since the beavers arrived. He wrote about what he saw and learned in "Appetite for Construction" (*Audubon Magazine*, spring 2024), pointing out that the methane released by beaver ponds is minute compared with methane releases that occur from oil and gas production, both ongoing and proposed. Energy companies are the real guilty parties.

The beaver ponds in the Arctic and the transformation of ancient tundra environments demonstrate the resilience of Earth's creatures. What I would have imagined as a dying environment is transforming into a thriving new world welcoming diversity, providing refuge and hope for many

species, for sure more than we have yet to notice. The beavers are there. We did not want change, but it is here. There will always be places for tundra, high places still dry and cold, along the shores of the Beaufort Sea or on Canada's northern islands and Greenland. There still are many suitable places for beavers to settle north of Nome, or they could swim the sea, cross the mountains, and inhabit all the north. If they want to move on, they can and will. They are beavers, remodelers of the world.

Beaver lodge (center), dam (bottom center), and pond on the Seward Peninsula in western Alaska. August 2021. *Ken Tape*

Ecosystem and Art by Ardea Eichner

Every system is a work of art. A machine functions thanks to the precision of its composition. Social systems are formed of pieces, each informed by the last, sketched and collaged together to govern or connect the world. An ecosystem is likewise composed—a complexity of individual needs, collective resources, and highly involved webs of codependence.

The structure and composition of the ecosystem's Earth canvas have cascading impacts that can be seen first in the ecosystem's primer coat: the first line of soil creators. Early evolutionary extremophiles learned to live on rocky substrates in difficult nutrient environments and laid the groundwork for the ground!

In her book *Gathering Moss,* Robin Wall Kimmerer discussed the early regrowth of life at an abandoned iron-ore mine in the Adirondacks. In the desert of mineral-rich iron tailings and sand, *Polytrichum* moss and a mutualistic microbial crust similar to a lichen were uniquely capable of survival. The growing underground rhizomatic structures of the moss began to solidify the sand, and the nutrient-fixing microbial crust was able to begin metabolizing under the shade of its plant neighbor. In time, the sand became sturdier, and the microbiome developed more robust and hospitable stores of nutrients. Kimmerer and one of her graduate students found that the mats of moss and crust were prerequisites for all life that managed to take hold at the old mine. These mats provided an environment for seeds, from wildflowers to aspen trees, which in turn began making their own leaf litter soil.

This primer coat offers some context for the complex artistic masterpieces in higher order ecosystems such as my home-base ecosystem, the wetlands of the Willamette Valley. The artistry of interactions can be appreciated robustly even from the surface. Look at the floodplain, and the composition shows itself off.

Trees, shrubs, and grasses in vibrant colors speckle the marsh. In the soft underwater spaces, a diversity of bugs and small fish flit from one sheltering patch of plant bulbs to the next bundle of organic matter, reliant on the nutrient buildup of ages. Waterbirds feed on some of the creatures or seek out succulent plants hiding in the tangle of reeds. Birds of prey frequent the area too, hunting smaller creatures: avian, aquatic, mammalian. From the bottom up, each organism is evolutionarily influenced by its neighbor.

Mosses grow here too, abundantly. Like filter feeders, these "gills" of the floodplain and temperate rainforest rise and fall with humidity and precipitation. Drawing from the larger composition, the structural comparison is an apt adaptational metaphor. Here I am, amidst the rainy windward extension of the intertidal zone.

Each organism and abiotic factor is like a color of paint, a new melodic line, a single thread in a swathe of fabric. Each is both distinct and complementary, each informed by the structure of what grows around it. But there's one element of the ecosystem composition that may be less evident, at least without a mirror.

Adding the human element of an ecosystem raises an interesting issue of defining systems as "art" by art's classical definition: what or who is the artist!? *Sure,* a sceptic might reply to my initial claim, *ecosystems form compositions with themselves and practical webs of interaction. But art is an expression of creativity, an endeavor of will unique to humankind.*

I argue that art doesn't necessarily require an artist. But certainly a creator-centered definition of art is a useful one. As Matthew Fox was quoted by Derrick Jensen in *Listening to the Land,* "Art is not for art's sake, it's for creativity's sake, which is for

evolution's sake." Human ingenuity is unique, and ingenuity is directly relevant to these systems.

When European settlers came to the Americas, they were amazed by the lush forests and the abundance of life. However, although these settlers did not know it, these ecosystems often were highly cultivated. Indigenous peoples have been living in relationship with the land since time immemorial. Plants such as sweetgrass have evolved alongside human use and influence. Thriving marshes and savannahs may never have formed if not for regular, controlled burning by their human neighbors. "America the beautiful" existed thanks to the artistry of generations.

It's easy to lose sight of the artists, although humans still influence our ecosystems. Each time priorities are defined, whether expansion, extraction of resources, or monocultures above complex ecosystems, they also have an impact. We can see the positive capacity of human artistic potential on ecosystems in the results of restoration. Utilizing our few remaining stretches of old growth forest as context, we begin repropagating through new growth. Local rewilding efforts of old fields and parks follow this approach too, re-creating vital habitats that support wildlife in dwindling populations.

In *Listening to the Land,* Dave Foreman emphasized the way beauty, vitality, and climate justice go hand-in-hand. "We need to walk in respect on the earth, not out of a sense of duty, but out of a sense of joy. ... [Wendell Berry said] that deep ecology needs to ... be something that wells up from within." In many ways, we human animals have all the creativity it takes to envision cleaner works of ecosystem art.

I dream of a future of protected ecosystems, acknowledged as weaving the world together. The possibilities are limitless, especially when we regular people can no longer ignore the severity of our climate crisis. As hopeful U.S. companies count potential profits from oil under militarily seized lands, the parts of history I'd like to leave in the past make their presence known. But that destruction doesn't have to be the art we continue to make.

Through appreciating ecosystems and seeking reciprocity with our resources, we can all find a way to make a difference. We are animals too, understanding once again how much we rely body and soul upon those ecosystems. We need our planet, just as it needs us. After all, it's all one composition!

Volunteers needed for ENHS booth at the Mt. Pisgah Arboretum Wildflower Festival Sunday, 19 May, 10am–5pm.

See announcement below. No experience necessary; you will be paired with a trained volunteer. Booth sitting is a great way to learn interesting things and meet interesting people! We usually work in 3-hour shifts, but other time slots are possible. Contact Kim Wollter to sign up: kwollter@comcast.net

ENHS Spring Potluck: 2 pm, 23 June, at the Kimmel's, 30306 Fox Hollow Rd. All members and nonmembers are welcome. Bring a dish and beverage to share. If you need directions, contact Reida at rkimmel@uoregon.edu or call 541-345-4919. Check the ENHS website for last-minute changes of venue!

Upcoming Events

(for complete listings and details, see individual websites)

- **McKenzie River Trust** https://mckenzieriver.org/events/#event-listings or 541-345-2799
  Wednesdays, 9–11:30am. Watershed Wednesdays at Green Island. Projects include invasive species removal, habitat care, planting, and tree establishment. Sign up
  Second Saturdays, Mar.–Dec., 8am–4pm. Living River Exploration Day at Green Island. Free, no preregistration.
  Tuesday, 14 May, 7:30–9pm. Making Space for Salmon. Waite Ranch Restoration community conversation, City Lights Cinema, Florence.

- **Native Plant Society of Oregon, Emerald Chapter** https://emerald.npsoregon.org/
  Thursday, 16 May, 5:45–6:45pm. UO Riverfront Plant Phenology Monitoring Plot Demo. Join UO ecologists Sarah Erskine, Katelin Kutella, and Jeff Diez and retired LCC botany instructor Gail Baker on a tour of a new ecological experiment embedded within public spaces in Eugene.
  Anytime. Self-guided Tour of Laurelwood Bog. Go south on Agate St in Eugene to the dead end at 29th. The entrance to the Bog is clearly signed, and the trails are covered with bark.
- **Mt. Pisgah Arboretum** https://mountpisgaharboretum.com or 541-747-3817.
  Wednesday, 15 May, 4:30–6:30pm. Evening Wildflower Tour. Join August Jackson for an evening tour of wildflowers at the Arboretum. If the weather is good, we'll also take a look at some of our native pollinators. Rain or shine. $5; FREE for Arboretum members. Limited to 18 attendees. Preregistration required. Click here to register.
  Sunday, 19 May, 10am–5pm. 2024 Wildflower Festival. Attendance is limited; tickets are required, FREE for Arboretum members.
- **Lane County Audubon Society** www.laneaudubon.org or 541-485-BIRD; maeveanddick@q.com or 541-343-8664
  Third Saturdays, 18 May and 1 June. Bird Walks. For all participants. For more info, contact tolalla@gmail.com
  First Saturday, 1 June. Bird Walk. Holding intentional space for women, BIPOC, and LGBTQUIA= people. To sign up, contact Sarah1stsatbirdwalks@laneaudubon.org
  Tuesday, 28 May, 7–8:30pm. Winged Flowers. Presenter: Sue Anderson. Local butterflies and moths. Biology, metamorphosis, migration, habitat requirements, links to plants, and butterfly gardening. Campbell Community Center, 155 High St., Eugene.
- **Museum of Natural and Cultural History, University of Oregon** https://mnch.uoregon.edu/museum-home
  Ongoing exhibits: Oregon—Where Past Is Present; Explore Oregon; Underwater Forests—Oregon's Kelp Ecosystems.
  Thursday, 16 May, 2–4pm. Paleontology at the MNCH. Meet students doing research projects in the lab and see the fossils they work with.
  Thursday, 23 May, 6–7:30pm. Connecting the Pacific Northwest to the Larger Black Freedom Struggle. Meet Marc Robinson, author of *Washington State Rising. Black Power on Campus in the Pacific Northwest*.
- **Nearby Nature** https://www.nearbynature.org/ or 541-687-9699, 622 Day Island Rd., Eugene (Alton Baker Park)
  Monday, Wednesday, Friday mornings. Wonder Keepers. Preschool program outdoors in our Learnscape.
  Tuesdays and/or Fridays afternoons. Natural Neighbors. After-school program outdoors in our Learnscape.

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Eugene Natural History Society
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Monthly meetings:
When: September–May: third Friday;
December: second Friday
Where: **221 Allen Hall** (UO campus) **and/or on Zoom** at
https://zoom.us/j/97499095971?pwd=eE9sdG9hSHMvOHhIUEJuU21wT20rdz09
Time: **7:00 pm**
Parking for UO events is available at the UO Physical Plant lot: From Franklin, turn north onto Onyx, go 1 block to the lot. After 6pm, it's open to the public.
See our website for more details.
http://eugenenaturalhistorysociety.org/

The May meeting is our annual Business Meeting. Members will be asked to vote on whether to accept the changes in the officers for 2024–2025:
Stan Sessions: President
Tom Titus: Vice-President
(All other officers and Board members continue as per 2023–2024, listed below)

ENHS Officers and Board Members 2023–2024

Interim President: Tom Titus tomtitus@tomtitus.com
Vice President: Stan Sessions
Immediate Past President: August Jackson
Secretary: Monica Farris
Treasurer: Judi Horstmann horstmann529@comcast.net
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Website: Tim Godsil tgodsil@uoregon.edu
Nature Trails editor: Kim Wollter kwollter@comcast.net

2024–2025 Speakers and Topics

20 Sept.	**Patty Garvey-Darda**	**Why Did the Ecosystem Cross the Road?**
18 Oct.	**David Mildrexler**	**Northeastern Oregon Conservation**
15 Nov.	**David Lewis**	**Reconstructing Traditional Environments of the Willamette Valley**
13 Dec.	**Michael Murphy**	**The Modern Bird World … Living for the City** (cosponsored with the Lane County Audubon Society)
17 Jan.	**Charles Lefevre**	**Oregon Truffles**
21 Feb.	**Guido Rahr**	**Salmon Conservation**
21 Mar.	**Nina Ferrari**	**Forest Canopy Birds**
18 Apr.	**Sara Hamilton**	**Taking Care of Oregon's Kelp Forests** (cosponsored with the Emerald Chapter of the Native Plant Society of Oregon)
16 May	**Clara Bird**	**Gray Whale Foraging Behavior**