Nature Trails

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The Eugene Natural History Society is based out of the traditional homelands of the Kalapuya peoples, most of whom are citizens of the Confederated Tribes of Grand Ronde and the Confederated Tribes of Siletz Indians. These Indigenous people stewarded this land for millennia and continue to play an active role in local communities. We commit to supporting the many Tribes and Indigenous scholars and organizations working to shape the future of these lands and waters that we mutually cherish.

Anne Thompson, ocean sampling. *Kelly Sutherland*

The Invisible Forest: Life and Death of the Ocean's Superabundant Microorganisms

Anne Thompson

Department of Biology and Center for Life in Extreme Environments
Portland State University

Friday, 20 March 2026, 7:00 pm

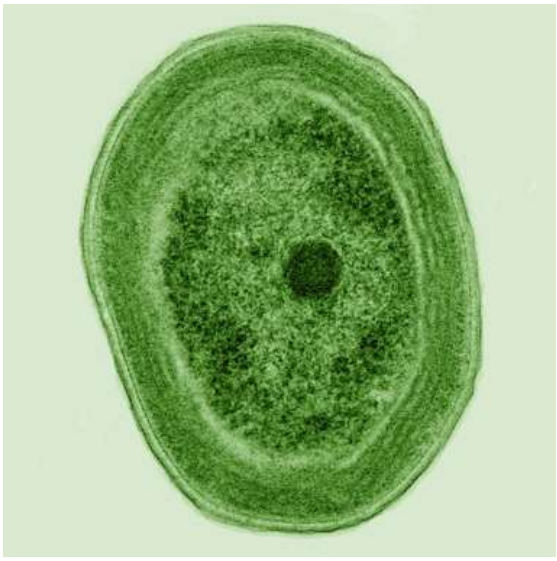
This month's meeting will be a hybrid of in person and real-time Zoom. The in-person lecture will be held at **7:00** in **221 Allen Hall, University of Oregon campus.** **Snacks provided!** The Zoom lecture link is https://zoom.us/j/97499095971?pwd=eE9sdG9hSHMvOHhIUEJuU21wT20rdz09 or see our website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

This Month's Speaker: Anne Thompson

One of the joys of life is when you encounter "yes" people, people who are optimists and enthusiastic and like to share ideas and generally do stuff. Such as accept invitations to give talks! I heard about Anne Thompson from my friend and colleague, Mike Murphy, an ornithologist at Portland State University (and recent ENHS speaker). Mike, who is himself a "yes" person, told me that Anne would likely respond positively to an invitation to give a talk to the ENHS, and he was right.

Dr. Anne Thompson is currently an assistant professor in the Department of Biology at Portland State University, where she heads the Microbial Ecology Lab. Her research focuses on the ecology of microbes, in particular marine cyanobacteria (what we used to call blue-green algae). Anne grew up in San Francisco, where her parents cultivated in her a love of nature and the outdoors, especially during their frequent visits to the beaches of Marin County. Like many developing scientists, she credits her science teachers in grade school and high school for nurturing her early interest in science. But when she went off to Middlebury College in Vermont, she tried out a range of different majors, from art history to geology and even French history. Ah, the dangers of a liberal arts college! Eventually, she got back in touch with her inner biologist, thanks largely to a wonderful course in microbiology.

At first, she enrolled in the undergraduate premedical program, thinking that would be the most reliable path. Then she learned about marine microbes, especially a bacterium called *Prochlorococcus marinus* (*Pro* for short). *Pro* is the most abundant photosynthetic organism on Earth, even though, at about 0.5 µm, it is also one of the smallest. It is in a group of cyanobacteria that are part of the photosynthetic picoplankton. These organisms were first discovered by Penny Chisholm at the Massachusetts Institute of Technology with Robert Olson of Woods Hole Oceanographic Institution. For this discovery, in 2019 Chisholm was awarded the Crafoord Prize, one of the world's most prestigious scientific honors (the ecology equivalent of the Nobel Prize), by the Royal Swedish Academy of Sciences and the Crafoord Foundation. The abundance of *Pro* cells in the world's oceans almost defies belief, with about half a million of them in a teaspoon of ocean water. We now know that *Pro* dominates the nutrient-poor regions of the ocean and is responsible for up 50% of the global production of oxygen!



Prochlorococcus marinus. Luke Thompson, Nikki Watson

Anne learned about this research from her college microbiology teacher, and she was accepted into a joint graduate program at MIT and Woods Hole to work with Dr. Chisholm directly. After earning her PhD degree at MIT, Anne worked as a postdoctoral researcher with Jonathan Zehr at University of California, Santa Cruz where she and colleagues discovered a symbiotic relationship between cyanobacteria

and a single-celled alga, functioning as a nitrogen-fixing organelle. Anne then took a position as senior scientist at the Institute for Systems Biology in Seattle, working at BD Biosciences where she developed techniques in flow cytometry to study diverse microbial systems. In 2016 Anne joined the faculty at Portland State University, where she continues her studies of microbial ecology, focusing on predation and symbiosis of photosynthetic picoplankton in both marine environments and in the Great Lakes. Predators of *Pro* include viruses, protists, and some large filter-feeding zooplankton.

As a modern ecologist, she has had to develop a wide range of research skills in both the field and the lab, from classic microbiology and oceanography to molecular biology and computational biology. One of her more harrowing field experiences occurred when she was part of an international collaboration involving oceanographic research in the Indian Ocean on the infamous ship *Tara,* a 36-meter-long French-built schooner, whose previous owner had been killed by pirates on the Amazon River. Anne was the only English speaker on the Indian Ocean expedition, and although she faced challenges of seasickness, an on-board fire, fist fights, running out of fuel, and a constant fear of pirates, she successfully collected the research data she needed.

Anne values her teaching position at PSU, working with first-generation college students and students from minority backgrounds and introducing them to geosciences and microbiology. Her latest project is a popular science book to both raise awareness of *Pro*, the microorganism that dominates the oceans of the world, and to highlight the importance of serendipity in the process of scientific research. Here is her description of her presentation.

> Every drop of water in the Earth's open oceans is teeming with microbial life that plays a large part in the energy and nutrient cycles of our planet. Particularly numerous in this system are the picocyanobacteria, including *Prochlorococcus* and *Synechococcus,* the most numerous photosynthetic cells on Earth. I will describe what has been learned about these cells in the last 40 years since their discovery and the opportunities that exist to learn more. The researchers in my lab work on understanding the predators of these abundant cells and how their life processes support vast ecosystems. I will also discuss what we can learn as humans and scientists from these immensely successful organisms.

Please join us on Friday, 20 March 2026 at 7 p.m. in 221 Allen Hall on the UO campus to hear Dr. Anne Thompson's talk "The Invisible Forest: Life and Death of the Ocean's Superabundant Microorganisms." As always, the cookies will be there waiting for you.

If you can't join us in person, connect with us on Zoom: https://zoom.us/j/97499095971?pwd=eE9sdG9hSHMvOHhIUEJuU21wT20rdz09 or join from our website at https://eugenenaturalhistorysociety.org/

—Stan Sessions

Saving Sagebrush by Reida Kimmel

East of the Cascades lies the sagebrush range, covering over half of Oregon and stretching across 13 states and three Canadian provinces, 382 square miles in all and still such an intact ecosystem that it could be compared to the Amazon or the Serengeti. But like those fabled places, the sagebrush range is also imperiled. What are the threats? Certainly oil and gas development and the growing menace of large-scale mining. Huge acreages have been converted to irrigated agriculture. Aquifers and ground water are depleted. But ask anyone who thinks about threats to the sagebrush biome and the answers will be: cheatgrass, trees, and (dare we mention it?) cattle.

The drama and beauty of this vast area can only be appreciated when you get close, as anyone who has travelled to Steens Mountain, the Owyhee Mountains, or Hells Canyon knows. Amidst the bunch grasses and the big- and small-leafed sage shrubs are lovely flowers, especially after a wet winter. Even the soil is interesting, delicately colorful. Called the biocrust, it is made up of lichens, mosses, green algae, and cyanobacteria. Seemingly too odd and dry to be a "real" soil, biocrust forges strong partnerships with mycorrhizal fungi, feeding the bunch grasses and shrubs that form the land's natural

landscape. Pronghorn, coyotes, badgers, mule deer, jackrabbits, and many other mammals live here, as do myriad birds from Golden Eagles to tiny Brewer's Sparrows and, of course, the Greater Sage-Grouse.

Before European settlement there may have been 16 million Greater Sage-Grouse. Now there are about 350,000. Since 1965, Greater Sage-Grouse populations have declined by 80%. With 760,000 acres of core sagebrush being lost every year, the question is how to protect what remains. Core areas are those that have seen the least disturbance. Oregon is rich in these, although Montana has the most. Efforts to save sagebrush country and its most iconic species have focused on restoring degraded landscapes. In 2024, 70+ researchers published new conservation strategies in a special edition of *Rangeland Ecology and Management.* An important suggestion was that we should be spending our limited funds on maintaining and defending the core and focus on degraded areas only secondarily.

As long ago as 1949, Aldo Leopold deplored the spread of cheatgrass, which now covers millions of acres. Introduced accidentally in the 19th century, the seeds are carried in the hooves and coats of grazing animals. It is an insidious enemy. Sprouting early and producing two crops each year, its shallow roots suck up the water that more deeply rooted native bunch grasses and forbs need when they emerge later in spring. Cattle trample the delicate biocrust soil, preparing seedbeds for even more cheatgrass. This invasive grass will respond to herbicides, but these must be used very cautiously to avoid killing native plants and poisoning the soil. Cheatgrass seeds are fire resistant. The livestock-cheatgrass-fire cycle prevailing across public lands in the western states is driven by the dry vegetation, which ignites easily. In a wind of only 20 miles/hour, the flames can shoot up to 8 feet high. Pinyon pine–juniper woodlands, previously with native grass understory and relatively fire resistant, will convert to a dense cover of cheatgrass after a fire. The best way to prevent this conversion is to avoid logging native woodlands.

But that is a hot point. It has been policy to remove all trees from sagebrush land, based on the idea that tree removal is healthier for sagebrush and for grazing. Methods of tree removal include "chaining" (dragging trees down and away) or masticating entire stands of trees with heavy machinery. Either way, the compacted torn soil is damaged and ready to become a cheatgrass monoculture almost immediately. Although Greater Sage-Grouse and Brewer's Sparrows breed more successfully in tree-free landscapes, the pinyon-juniper woodlands also are a natural and important part of the ecosystem. These woodlands conserve carbon, encouraging soil building symbiotic microbes. Pinyon-juniper woodlands have been spreading into sagebrush range for the last century. Is their spread part of a natural ebb and spread of woodland or an ongoing menace? Some researchers point to woodland advance and recession as part of the landscape for thousands of years. Some say the woodlands are beginning to retract. In the 1990s, Joy Belsky (Oregon Natural Resources Council) advocated for protecting the trees. Now some other researchers agree. On tribal lands there is a growing policy of hand-managing trees, cutting down the saplings and leaving the old trees. It seems some junipers are 1,000 years old. Remnants of a less fiery world, they really do belong.

But it's the cattle that are really controversial, and few people other than environmental advocates want to consider that cows are a problem. When the western states were settled, open sagebrush country was seen as free for the taking. Vast herds of beef cattle were sent out to graze where once buffalo, pronghorn, and deer had used the land with a far lighter touch. Ranching is not just a livelihood; it is the foundation of a powerful culture complete with histories and heroes. The ranches produce only 2% of the beef consumed in this country, but federal lands in sagebrush country are managed by either the Bureau of Land Management or the U.S. Forest Service, who regard ranching as the primary use of the land. Originally there was neither control nor environmental regulations. When grazing permits were set up to standardize who grazed where, these vast allotments sold for only a tiny fee. This is still true. Cattle trampled the soil, fouled the watering places, and reduced native bunch grasses to stubble. Welcome cheatgrass! To make better grazing, the government encouraged or planted crested

wheatgrass. Cows like it, but it does not meet the nutritional or nesting needs of native animals. In recent decades, efforts have been made to heal degraded parts of the range, fencing off trampled creeks, planting appropriate trees, and introducing beavers or "beaver analogs" to create ponds and raise the water table. Small steps. However, within the past year the current administration has moved to increase the number of grazing allotments, worked to end important environmental protections, and is barging ahead with oil, coal, and mineral development. It all seems hopeless.

There is a solution, but it is not an easy one. Just get the cattle off the land! Hart Mountain National Antelope Refuge had been grazed for 120 years. When cattle were banned from the refuge, the land rebounded. In just 23 years, bare soil decreased by 68%. Rushes, willows, and aspen flourished. The refuge, one of the largest ungrazed areas in the Great Basin, now has one of the largest Greater Sage-Grouse breeding populations. The Western Watersheds Project encourages buyouts to get landowners to quit grazing. The Oregon Natural Desert Association, Nature Conservancy, and others are buying lands, acquiring grazing allotments, and working with ranchers willing to change their practices and restore native habitat. Tribes, including the Shoshone-Bannock and Burns Paiute tribes in Oregon, are taking a leadership role in acquiring more acreage and converting portions of their reservations to benefit wildlife. We cannot expect any help from the federal government now, but concerned people working together across divides may solve the problem of what to do to preserve this wonderful ecosystem.

Single-leaf Pinyon and Utah Juniper woodland along Interstate 80 in the Wood Hills of Elko County, Nev. *Wikimedia Commons*

2013-07-07 15 41 55 Great Basin Sagebrush steppe along Three Creek Road, in Owyhee County, southwestern Idaho. *Famartin*

Let's Go Salamandering!

Saturday, 4 April, 9 am, join the Eugene Natural History Society and Nearby Nature for a FREE salamander outing in the Coast Range! Salamander experts Tom Titus and Stan Sessions will lead a search for these secretive amphibians. Optional easy walking. Rain or shine. Families welcome. Bring water, lunch, and walking shoes. We'll return to Eugene by mid to late afternoon. Meet in the northeast corner of the South Eugene High School parking lot (corner of 19th and Patterson) to carpool and caravan to our site near the Whittaker Creek Recreation Site.

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
  First Fridays, 9:30am. Explore the Willamette Confluence. See the MRT website for more information.
  Second Saturdays, 8am–4pm. Living River Exploration Day. Green Island, bilingual.
- **Native Plant Society of Oregon, Emerald Chapter** https://emerald.npsoregon.org/
  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.
  Monday, 16 Mar., 7–9pm. Bees as Botanists. Presenter: August Jackson from the OSU Oregon Bee Atlas. Amazon Community Center, 2700 Hilyard St., Eugene.
  Saturday, 11 Apr., 1–3pm. Botany Workshop and Plant Walk. Amazon Community Center, 2700 Hilyard St., Eugene.
- **Mt. Pisgah Arboretum** https://mountpisgaharboretum.com or 541-747-3817.
  Saturday, 14 Mar., 9am–noon. Daffodil Dig-Up. Help remove invasive daffodils and encourage native plants. You can take home any bulbs you dig up! Tools, gloves, and parking pass provided. Sign up online.
  Saturday and Wednesday, 14 and 25 Mar., 10am–noon. Spectacular Seeds Family Tour with Nurturely. Preregistration required. Members and kids under 4 FREE, Nonmembers $5 per person.
  Sunday, 22 Mar., 10am–noon. Fire Ecology Tour with FUSEE. Firefighters United for Safety, Ethics, and Ecology staff will talk about fire ecology, Indigenous fire stewardship, and restoration programs on Mount Pisgah. Preregistration required. Members and kids under 4 FREE, Nonmembers $5 per person.
  Saturday, 28 Mar., 9am–noon. Wildflower Garden Work Party. Clear out undesirable species, resurface trails, and prep beds for future plantings. Tools, gloves, and parking pass provided. Sign up online.
- **Coast to Cascades Bird Alliance** www.laneaudubon.org or 541-485-BIRD; maeveanddick@q.com or 541-343-8664
  Sunday, 15 Mar., 11:30am–2:30 pm. Native Plants in Your Garden Workshop. Multiple experts will be on hand to provide tips to help you enhance your garden with native plants to attract wildlife. Amazon Community Center, 2700 Hilyard St., Eugene. Tickets are $35 through Eventbrite. For more info, contact habitat@ccbirdalliance.org.
  Saturday, 21 Mar., 8–11am. Third Saturday Bird Walk. For more info, contact Lalla at tolalla@gmail.com.
  Tuesday, 24 Mar., 7–8:30pm. Colorful Birds: Iridescence and Other Color Attributes. Presenter: Dan Gleason. Campbell Center, 155 High St., Eugene.
  Saturday, 4 Apr., 8–11am. First Saturday Bird Walk. In celebration of inclusivity and diversity, birders of all levels and backgrounds are welcome. For more info, contact Sarah: 1satbirdwalks@ccbirdalliance.org.
- **Museum of Natural and Cultural History, University of Oregon** https://mnch.uoregon.edu/museum-home
  Ongoing exhibits: Oregon—Where Past Is Present; Explore Oregon; Roots and Resilience: Chinese American Heritage in Oregon; ReEnvisioned: Contemporary Portraits of Our Black Ancestors
  Thursday, 12 Mar., 6pm. Listening to the Pulse of the Past. Artist and poet Sam Roxas-Chua Yao has worked alongside archaeologists in Astoria, The Dalles, and John Day to explore Chinese history in Oregon through audio field recordings, calligraphy with inks made from collected material, and poetry inspired by site surveys and subject matter experts.
- **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. Spring session begins 31 March.
  Tuesdays and/or Fridays afternoons. Natural Neighbors. After-school program outdoors in our Learnscape. Spring session begins 31 March.
  Monday, 30 Mar. Misty Mountain Magic. No-school-day adventure in Hendricks Park, Eugene.
  Saturday, 4 Apr., 9am–3pm. Salamander Field Trip to Whittaker Creek. With Tom Titus and Stan Sessions. See information box above.
  Friday, 10 Apr. Soil Scientists. No-school-day adventure.
- **Lane Country Butterfly Club** https://www.lanebutterflies.org (new website)
  We foster enjoyment, knowledge, and conservation of butterflies through education and presentations, field trips, monitoring and habitat conservation.
  Wednesday, 8 Apr., 7:15–9pm. The Butterfly Sleuth. Neil Bjorklund will discuss his new book, *Finding Lane County Butterflies.* Hilyard Community Center, 2580 Hilyard St., Eugene.

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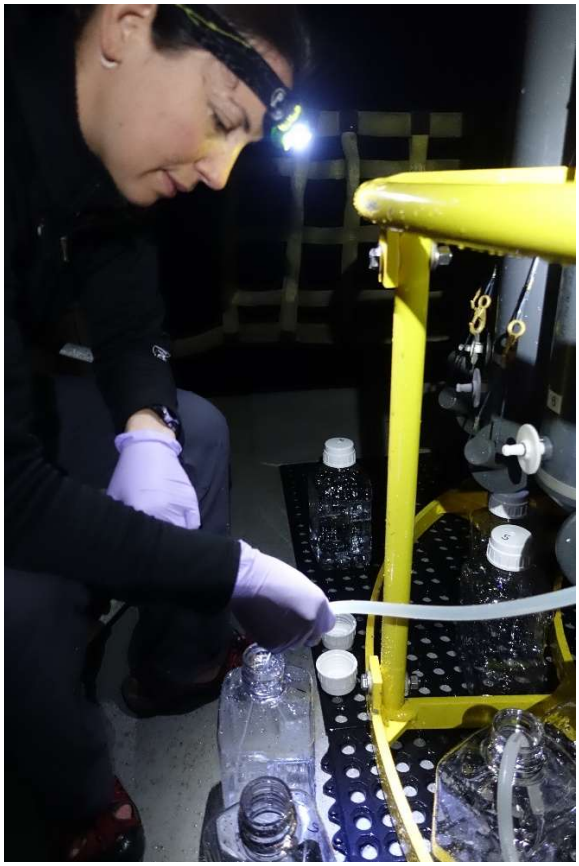

Anne Thompson with sampling apparatus. *Allison Cusick*

Eugene Natural History Society
P.O. Box 5494
Eugene, OR 97405

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/

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2025–2026 Speakers and Topics

19 Sept.	**Joe Moll**	**The Audacity of Perpetuity: Land and Water Conservation in Uncertain Times**
17 Oct.	**Jamie Cornelius**	**Amazing Adaptations: How Birds Survive Stormy Weather**
21 Nov.	**Matt Betts**	**Can We Have Our Cake and Eat It Too? Conserving Forest Biodiversity in the Age of Humans**
12 Dec.	**Paul Bannick**	**A Year in the Life of North American Woodpeckers** (cosponsored with the Coast to Cascades Bird Alliance)
16 Jan.	**Marie Tosa**	**The Curious World of a Stinky Neglected Carnivore**
20 Feb.	**David Wagner**	**Sex Life of Plants**
20 Mar.	**Anne Thompson**	**The Invisible Forest: Life and Death of the Ocean's Superabundant Microorganisms**
17 Apr.	**Heron Brae**	**Oak Savannah Communities** (cosponsored with the Emerald Chapter of the Native Plant Society of Oregon)
15 May	**Samantha Hopkins**	**The Relationships among Paleontology, Climate Change, and Extinction**