

Nature Trails

Published by the Eugene Natural History Society

Volume Fifty-five, Number Eight, November 2021

Pinniped Evolution



Kellum Tate-Jones and admirer, Washington, D.C. Zoo.
Photo credit: anonymous passerby.

Kellum Tate-Jones

Department of Earth Sciences, University of Oregon

Friday, 19 November 2021, 7:30 p.m.

The Eugene Natural History Society invites you to their November Zoom meeting. The Zoom meeting will open at 7:00 but our meeting will begin at 7:30. This allows everyone time to get connected and join in informal conversation. Time: 19 November 2021 07:00 p.m. Pacific Time (US and Canada). Join Zoom Meeting: <https://zoom.us/j/97499095971?pwd=eE9sdG9hSHMvOHhIUeJuU21wT20rdz09>

We had hoped to return to 100 Willamette this fall, but given the current state of the pandemic, the Eugene Natural History Society will continue to hold meetings via Zoom until it is safe to meet in person. We will use the same link for each meeting unless otherwise noted. The current link can always be found at eugenenaturalhistorysociety.org. Thank you for your continued support! August Jackson, President, ENHS

Our November speaker, Kellum Tate-Jones, grew up in Alabama, near Birmingham. One of her memories was of going with her family to the Birmingham Zoo, where she particularly loved to watch—and listen to—the sea lions. Getting there early in the day added to the experience because then she got to see them being fed. This experience may have planted a seed. After graduating from an International Baccalaureate high school there, she went to Harding University in Searcy, Arkansas. She bounced around at first, almost becoming an English major, but eventually settling on their nursing program. She graduated summa cum laude with a B.S.N., after which she worked for four and a half years as an intensive-care nurse in Little Rock, Arkansas. Tate-Jones was fulfilled by the personal aspects of nursing but she came to dislike intensely the emphasis on profit rampant in the healthcare system. During her years as a nurse she did postbaccalaureate work at the University of Arkansas at Little Rock, and there she was introduced to paleontology. When it became clear to her that nursing was not what she wanted to do long term, she began exploring graduate schools. In her visit to the University of Oregon, one of her hosts showed her some pinniped fossils and made the offhand comment that nobody worked on them. The light bulb went on. She thought, “I could work on them!” She went back to Little Rock, finishing at the University of Arkansas with a B.S. from the Department of Earth Sciences in 2017, again graduating summa cum laude. The next year Tate-Jones enrolled as a graduate student at UO, where she is advised by Professor Edward Davis in the Department of Earth Sciences. Why Oregon? She said the UO was fine with her stated desire to combine her pinniped research with efforts to become a more effective teacher. The other graduate schools she looked at were less interested in her desire to pursue teaching. Plus, she loved Eugene, the mountains, the coast ... we all know what she’s talking about in this regard.

And that is how we find Kellum Tate-Jones here at the UO, pursuing two of her greatest passions: vertebrate paleontology and teaching earth and life science. She is in her fourth year in the Vertebrate Paleontology Lab in the Department of Earth

Sciences studying “the origination and extinction of Cenozoic marine predators and the interfamilial relationships of pinnipeds and their locomotive evolution.” Her favorite pinniped at the moment is the walrus. She finds them to be constantly changing; one of her projects is looking at the effect of climate change on their natural range.



K. Tate-Jones digitizing a fossil. Photo by K. Klem

I asked her for a brief summary of what she’ll talk about: “For her presentation, Kellum will begin with an introduction to the evolutionary history of pinnipeds, including the critical role that the Oregon fossil record has played in our understanding of that history. She will then provide an overview of her own research into pinnipeds, including describing a new genus of fossil pinniped and exploring the evolution of pinniped swimming modalities. Finally, Kellum will conclude with a discussion of how we can use the fossil record of pinnipeds to promote their conservation in the face of environmental degradation and global climate change.”

We stand to benefit from Tate-Jones’s passions. She wants to hone her skills at making science accessible to the general public. That would be us. She is studying seals, sea lions, and walruses—fascinating animals—so learning more about them and how they achieved their present forms is bound to be interesting. Being practiced upon by someone with a strong desire to become an even more effective educator will only enhance the experience. She is enthusiastic, articulate, and knowledgeable. Please join the remote audience to hear Kellum Tate-Jones talk to us about “Pinniped Evolution” on Friday, 19 November 2021 at 7:30 p.m. The link is at the bottom of the cover page of this newsletter.

John Carter

Exploring Complexity By Evelyn Searle Hess

I'm slogging and slipping through ankle-deep gray mud, yanking on a rake clumped with the trailing black stems of pondweed. Late summer is a good season to thin this underwater jungle, as it should be mostly free of amphibian and invertebrate egg masses now. Across the pond, immense dark green leaves of pond lily stack layer upon layer. They could probably use some thinning too.

Suddenly a red-shafted flicker streaks toward my face, then veers away, white rump flashing, to hang in a nearby Douglas-fir. Watching the bird, I forget the job at hand and gaze around me.

Above the pond, too far away for my unaided eyes to identify, birds cavort around the broken top of a dead Douglas-fir. Off to its right, on the bank at the far end of the pond, silver backsides of fat cottonwood leaves flutter in the wind. Suddenly, right in front of me, a green darner—a big-headed dragonfly with green designs adorning its thorax and bright blue striping its abdomen—pauses in mid-air to check me out. A startled frog squawks and plops into the water from the bank where it had been sunning. Close to the frog's former perch, tracks of raccoon, adult deer and fawn, dog of some kind—wild or tame—and scattered bird prints decorate the mud.

Various species of willow edge the pond, and behind them rushes and ferns push through an underlayer of trailing dewberry, then young serviceberry, filbert, and occasional ash. Above those are seedling white oak, cascara, and fir. In all directions, species are dense and diverse, with a thick buzzing verdancy.

Hip deep in pond water, muddy and covered with duckweed, I stand enthralled. Everywhere I look, listen, and inhale is vibrant life. Here is clear testimony to the questionable relevance of the human hand in development and maintenance of natural places.

What seems a very short time ago, but was in fact more than thirty years ago, we had this pond dug. The huge machine and its attendant dump trucks made an enormous boomerang-shaped hole sixty feet wide and about 200 feet long, designed to hold about three and a half acre-feet of water. But initially it was a barren pit, easily mistakable for a bomb crater with an oversteep, high back bank.

Ignoring the reality of the scene before me, I retreated to my head and began making plant lists and dreaming exotic design elements—a central island, water lilies, an arched bridge.... But between the dreaming and the doing, life intervened.

Worried about the stability of the too-steep slope (*would the bank fail and take out the road above, a narrow shelf below yet another steep hill?*), I'd wake at night with nightmares of losing the road or of the pond not filling and leaving us with this barren hole. Or the pond filling well, our dam breaking, and all that water drowning traffic on the highway far below. And then I'd go back to my grand designs for the pond. I dreamed and worried, worried and dreamed.

Meanwhile, without any help from me, the hole filled with winter rainwater and its hillside runoff, birds and animals came, and air currents blew. With these came the rest: the willows, ashes, cottonwood, duckweed, pond lilies, and pondweed. Dragonflies, damselflies, and mayflies soon appeared along with salamanders and newts, flickers, kingfishers, waxwings, ducks, bats, and who knows how many visiting mammals. Now, in just these few decades, the pond looks ageless. In two or three times that many decades more, if left on its own, it will silt in, and eventually the firs and hardwoods will take over, changing from pond to meadow to woodland, depending on what the climate is up to by then.

It's true that I dream far bigger than I do—did then; do now. But it isn't just that I didn't get around to actualizing my plans. The point is, I could never have *dreamed* such complexity, such interconnections—ducks bringing duckweed on their feathers and viable pondweed seed in their guts, plants that make food for waterfowl as well as food and home for small aquatic creatures that are themselves food for others, or are the cleanup crew—filter feeders and decomposers, keeping the pond clean. It wouldn't have occurred to me that willow and ash seeds would blow in, their leaves essential food for numerous butterfly larvae, that cattails whose pollen provides protein for vertebrate and invertebrate creatures and whose colonies can house nests for birds would appear without my help. Beyond that are innumerable other networks that I have yet to discover: an incredibly complex, beautifully functioning system. The now thickly covered high bank is stable; the dam has never been threatened.

The human mind, cognitive scientists point out, tends toward simplicity, toward reductionism, focusing on an obvious part rather than on that part's connection to the whole. (What shall I plant? What shall I construct? What do I fix for dinner? How do I stay warm? How do I control an offending part?) From prehistoric time, our minds have sought certainty: patterns, predictability, avenues for control. Knowing the habits and hiding places of lions and tigers clearly helped our ancient ancestors survive

long enough to spawn the technological wizards that helped create the world as we now know it and to bring life to us. But perhaps it is those very characteristics that get us in trouble in this new world we have created.

Lately, I have been toying with that idea: the idea that health—personal, interpersonal, environmental—requires complexity and that most of the problems facing the planet and its inhabitants are caused by this very human tendency toward reductionism. H. L. Mencken famously said, “There is always an easy solution to every human problem—neat, plausible, and wrong.” But how do we seek complexity if we’re programmed to focus on the individual parts? Ecologist Steve Carpenter noted that ecology isn’t rocket science: “It’s more difficult.” We don’t have the time or mental capacity to be experts in all parts of an ecosystem or to understand how it all fits together, so of course, we specialize.

Which is what makes it so lovely that more and more people are tuning in to the fact of complexity and collaborating with others unlike themselves in viewpoint or specialty. Perhaps we could try to address societal and planet health by studying ecosystem science, trying to understand the connections and the role of diversity and complexity, and apply that systems thinking to human communities. How about having an ecologist on the city council, along with an engineer, a philosopher, and several people who grew up in underserved neighborhoods? Perhaps together, if all learned from each other and had our support, we could bring about a society as robust as this pond.

The pond is a daily surprise. Foreign. Beautifully complex. I absolutely don’t understand it. But I respect all of the parts as well as the delightful amalgam. And I feel—perhaps irrationally?—reasonably confident in the health of its future.

Out and About

By David Stone

The salmon are returning.

After years at sea, coho and Chinook salmon find their way home to their birth stream. You can see this fascinating event at Whittaker Creek Campground, about twelve miles east of Mapleton, just off Siuslaw River Road.

Head out in late November or December and find your way to the gravel beach, just upstream from the main campground loop. Watch the females dig a redd (nest) in the clean streambed gravel, where they will deposit thousands of eggs. Nearby, the males will compete to release a cloud of sperm and pass their genes on to the next generation.

Did you know? Salmon require cool water, provided by the shade of streamside old growth trees; not directly because of the water temperature, but because cold water holds the level of oxygen they require.



Chinook in Whittaker Creek. Photo by D. Stone

Leaf Abscission

By Howard Bonnett

Several years ago we experienced a long, hot, dry summer. Many Oregon bigleaf maples began losing their leaves early, in an unusual manner. The leaves were turning brown and then falling, bypassing the stage we all have grown to appreciate: the vibrant

golden displays these trees put on in a normal autumn. A tree near our house lost most of its leaves from the edges of its canopy. These leaves went directly from green to brown before falling prematurely, leaving only the leaves in more interior

portions of the canopy to turn yellow, later, in their usual manner and schedule.

Understanding the normal process by which deciduous trees drop their leaves could be helpful in interpreting this behavior. Leaf fall in deciduous trees is predominantly controlled by the tree's perception of day length; shorter days induce structural and biochemical changes in the tree's leaves. Temperature changes modulate the response to short days and can also modify levels and types of pigments (colored chemical compounds) displayed in fall leaves. Day length is measured by phytochrome, a pigment present in such small amounts as to be invisible in the leaf.

As the process of leaf fall begins, a thin layer of cells situated transversely at the base of the leaf's petiole ("stalk") begins to divide, producing a layer several cells thick all across the petiole's base, near where the leaf attaches to the stem. This layer of cells is called the abscission layer. In some temperate trees this layer actually forms as the leaf matures but remains inactive until fall. In the abscission layer, prior to leaf fall, chemicals that function to hold cells together are dissolved, and a waxy substance is produced to seal off the abscission site and minimize water evaporation from where the leaf was attached. Remarkably, the demonstration of life manifested by these cells in resuming division and synthesis of new proteins is a precursor to the death of the leaf.

The canopy of a deciduous tree represents a huge investment of compounds produced from photosynthesis. The tree recovers much of the energy stored in these compounds prior to leaf fall. The starch stored in the leaves is converted to sugars, which are transported back into twigs, branches, trunks, and roots. The magnesium in the chlorophyll is recovered to be used again next year. Leaf proteins are broken down into their constituent amino acids, which are transported into overwintering parts of the tree.

As their chlorophyll degrades, the leaves change color. Because the green color of the leaves actually results from a mixture of chlorophyll (green) and carotenoids (predominantly yellow), the leaves change from green to yellow as the chlorophyll degrades. This yellow carotenoid pigment has been there the whole life of the leaves, functioning to help chlorophyll collect light energy as well as to protect the chlorophyll. The yellow fall color we anticipate and love is not the result of production of new yellow pigments. Rather, it represents the photosynthetic pigments remaining after chlorophyll breakdown.



Bigleaf maple leaf. Image from web

Plants that gift us with red-colored fall leaves do so by synthesizing a group of red pigments called anthocyanins. Their mixture with the yellow carotenoid pigments results in hues varying from oranges to brilliant reds. What they are for has been an open question for a long time. There is an energy cost in their production, so it is certain that they don't show up just to delight us. They have some vital functions associated with alleviating stresses, and researchers are likely to uncover yet more reasons that plants go to the trouble to make them. Their production coincides with and may be part of the overall acclimation that temperate perennial plants undergo each fall so they can survive winter conditions. Anthocyanins are sequestered in a part of leaf cells from which they cannot be retrieved, so by the time a breeze or the weight of a wet leaf causes the leaf to fall it may still be red or yellow, and the energy it took to make and mobilize these colored compounds—anthocyanins and carotenoids—is lost to the tree. Of course, they will nourish soil microbes as the fallen leaves degrade naturally.

I believe the early drop of brown leaves from the perimeter canopy of our Oregon maples at the end of that long, hot, dry summer was the result of the trees not being able to provide sufficient water to those leaves farthest from the roots. Leaves in the interior of the canopy, closer to the roots, survive, to turn yellow in fall. The tree may not recover nutrients and minerals from those leaves dying from water stress. The scorch of many plants from this summer's record-breaking temperatures and the lost leaves of so many maple trees in late summer are stark warning signs that climate change is already wreaking havoc.

Events of Interest in the Community

McKenzie River Trust <https://mckenzieriver.org/events/#event-listings> (541) 345-2799

Second Saturday of the month, September through December. Living River Exploration Days at Green Island.

Take a walk near where the Willamette and McKenzie Rivers meet. Observe fifteen years of tree-planting work on Green Island, a habitat for beaver, river otter, and over 150 species of birds.

Because this property is a privately owned space in active conservation, there are a few things to know before you visit: No pets, please. There will be a port-a-potty available but no other facilities. Bring water with you. Bikes are great. The trails are a mix of loose gravel and dirt farm roads, so big tires are better. Please drive under 5 MPH past the houses on Green Island Rd. Gates will be closed at 3 p.m. Please practice COVID-19 safety during your visit. Mask up and maintain a safe physical distance from other visitors outside your group. This event is free and does not require registration.

Wednesdays, 17 and 24 November, 1 December, 9 to 11:30 a.m. Watershed Wednesdays. Join the fun at Green Island and help protect and care for this special area. Projects vary throughout the season but are always suitable for youth ages 13 and older. Youth under 16 should be accompanied by an adult. For a map go to <https://mckenzieriver.org/event/watershed-wednesdays-at-green-island-2/2021-10-13/>

Lane County Audubon Society <https://laneaudubon.org> or 541-485-BIRD

Tuesday, 23 November 7 p.m. Zoom only. The Bear Necessities. Ram Papich.

Mt. Pisgah Arboretum

For MPA activities go to <https://mountpisgaharboretum.com/festivals-events/> or call 541-747-3817

Sunday, 14 November, 8 to 11 a.m. Monthly Bird Walk. Join Julia Siporin for another monthly bird walk intended for people with all levels of birding experience. We'll use vocalizations, habitat, and behavior clues for identification of our winter and year-round residents. Come discover the Arboretum's avian diversity. Please bring binoculars. Rain or shine. Meet at the Education Building. Don't forget your parking pass. The fee is \$5 but free for Arboretum members. Preregistration and masks required. Limited to 10 attendees.

Wednesday, 1 December, 10 a.m. to noon. Hibernation & Migration Family Walk. Winter is on its way and all the animals at Mt. Pisgah are getting ready. Learn all the different tactics they use to survive the coming season. Preregistration and masks required. Max group size 15. **Free for Members and kids under 4.** Nonmembers, \$5. Don't forget your parking pass! Sign up here: <https://www.signupgenius.com/go/60B044EACAF2AA6F49-summer>

University of Oregon's Museum of Natural and Cultural History <https://mnch.uoregon.edu/museum-home>

Wednesday, 17 November, Little Wonders Museum Fun for Preschoolers. Available on our website beginning 19 November. Kits available for pickup starting Wednesday, 17 November. Learn and play from home—museum style!

Preschoolers and their adults can join us online for our popular Little Wonders program, featuring stories, hands-on activities, and more. This month is all about things with wings! From birds to bugs to bats, discover flying animals living all around us. Go to <https://mnch.uoregon.edu/events> or call 541-346-3024 for information about this and other events.

Native Plant Society of Oregon, Emerald Chapter <https://emerald.npsoregon.org/>

Saturday, 13 November, 10 a.m. to 12 p.m. Native Plant Ramble at Hendricks Park. Meet at the picnic shelter at the top of Summit Ave. The parking lot is south of the shelter across Floral Hill Drive. Native plant rambles are open to plant enthusiasts of all levels. The group "rambles" along the trail and discusses native plants they locate along the way. This trip will be limited to 10 participants. Sign up [here](#).

Monday, 15 November, 7 to 9 p.m. Fire and Weeds: A Growing Threat to Oregon's Native Plant Communities. The forests of the Inland Pacific Northwest have historically been resistant to grass invasions and their subsequent ecological impacts. However, a recent annual grass invader, *Ventenata dubia*, commonly known as ventenata, has rapidly spread throughout forest mosaic ecosystems of the inland northwest where it threatens to alter fuels and fire behavior. Our speaker, Claire Tortorelli, a National Science Foundation graduate research fellow at Oregon State University, will explore the factors that drive the ventenata invasion and examine how the invasion impacts native plant communities and fire. The location of this program will be announced at a later date but, considering COVID restrictions, may be offered virtually through a link to be provided.

Nearby Nature <https://www.nearbynature.org/> or 541-687-9699

None of NN's upcoming November events occur after *Nature Trails* comes out.

For information on their events, call 541 687-9699 or go to <https://www.nearbynature.org/events/>

Friends of Buford Park and Mt. Pisgah <https://www.bufordpark.org/> or 541-344-8450

Because people and nature need each other, the Park is OPEN during the coronavirus/COVID-19 pandemic. Please refer to [Lane County](#) for instructions about the park and updates.

ENHS welcomes new members! To join, fill out the form below. Membership payments allow us to give modest honoraria to our speakers and pay for the publication and mailing of *Nature Trails*. Our web address: <http://eugenenaturalhistorysociety.org/>

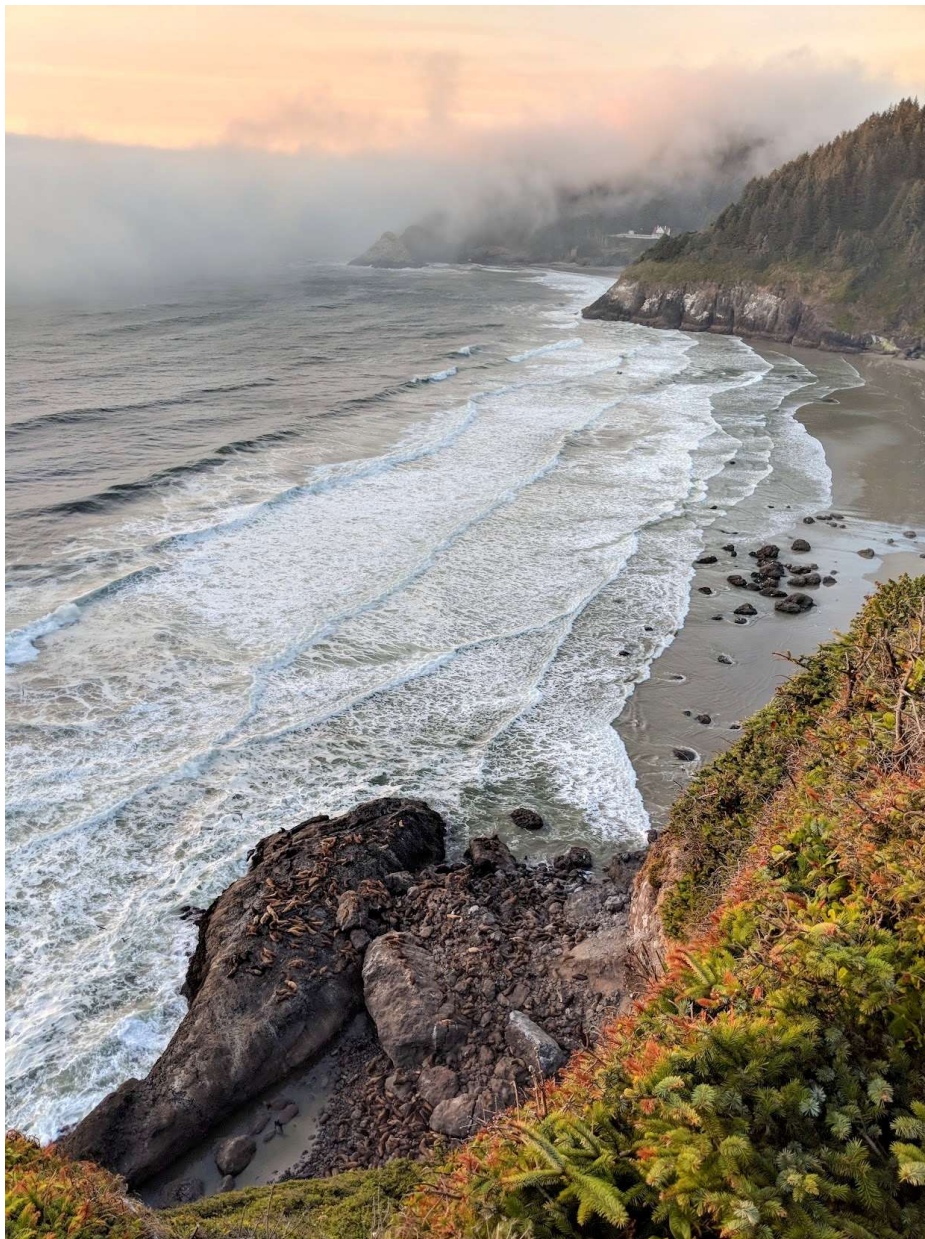
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I (we) prefer electronic copies of *NT* rather than paper copies. ___ Yes ___ No
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ANNUAL DUES: Family \$25.00
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Contribution _____

Annual dues for renewing members are payable in September. Memberships run from September to September. Generosity is encouraged and appreciated.

Make checks payable to:
Eugene Natural History Society
P.O. Box 5494, Eugene, OR 97405



Sea lions hauled out on rocks between Florence and Yachats, Oregon. Heceta Head Lighthouse in the distance.
Photo by K. Tate-Jones

Reminder. If you haven't renewed your membership, this will be your last issue of *Nature Trails*.

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2021-2022 Speakers and Topics

19 Nov.	Kellum Tate-Jones	Pinniped Evolution
10 Dec.	Paul Bannick	Snowy Owls (cosponsored with Lane County Audubon Society)
21 Jan.	Dana Lepofsky	Clam Beds and Traditional Ecological Management in Island Ecosystems
18 Feb.	Michael Nelson	Fire Ecology and Report Following the 2020 Fires
18 Mar.	Pat O'Grady	Archaeology
15 Apr.	Lauren Ponisio	Bees and Wildfire
20 May	Lauren Hallett	Siskiyou Plant Communities (cosponsored with the Emerald Chapter of the Native Plant Society of Oregon)



Waves at Yachats, on the Oregon coast. Photo by K. Tate-Jones when she was there with her middle-school camp.