Nature Trails

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Soil: What It Is and How It Works!

James Cassidy

Instructor, Department of Crop and Soil Science, Oregon State University, Corvallis, Oregon

Friday, 16 January 2015, 7:30pm, Room 100
Willamette Hall, UO Campus

James Cassidy grew up in Minneapolis, Minnesota, where in his own words he was "a D-plus student in high school. I did a different kind of high school, the school of rock-n-roll and metal." He played banjo and bass in heavy metal bands, but eventually became a full-time bassist in Information Society, a synthpop-freestyle band in the 1980's. After 10 years of recording and touring, he quit the music business when he was 30 years old. In her article about Cassidy that appeared in OSU's student newspaper *The Daily Barometer* in May 2014, Dacotah-Victoria Splichalova penned a great line: "After the rock, came the dirt."

When you think about it, that's how it works, right? Rocks get worn down into dirt. But how Cassidy got dirty deserves a bit more scrutiny. After bailing out of music he set about figuring out what to do with himself. He had always liked the outdoors and, in his words, "intuited that the truth was to be found in nature …" so he started thinking about forestry or fisheries work. He had visited the Pacific Northwest years earlier and had loved it, so he ended up taking the fisheries technology program at Mt. Hood Community College in Gresham, Oregon. Because of his abject mediocrity in high school he was pretty intimidated and so took it seriously, which seemed to work fine since he came out with straight A's. After the fisheries tech degree he continued at Mt. Hood CC and then transferred to Oregon State University as a junior and finished his B.S. in fisheries science.

While working on his B.S. he had his epiphany. I'll let him describe it. "While doing independent research standing by the stream one day (in the pouring rain!) it dawned on me that most of the rain wasn't falling in the creek and, though I had undoubtedly read it in a book, I realized that all that water was passing through the soil and that is what determined the quality of the water (duh!). That's when I realized IT'S ALL ABOUT SOIL!!! Our

external metabolism! The giver of ALL!!! WE ARE SOIL!!! Etc."

And so it was that the rock began to be converted to dirt. Cassidy became a graduate student in OSU's Department of Crop and Soil Science, obtained his M.S., and got a job in the OSU soil physics laboratory. Then he was given the opportunity to give a lecture in an introductory soils course. He said, "I remember being nervous before my first lecture and then all of the sudden I realized, I was in front of an audience and I was relaxed and totally comfortable. My rock-n-roll years and the skills I learned there, something I thought I had put behind me and mourned the loss of, were suddenly front and center! But this time I wasn't just selling a new record, I was describing the truth that IS SOIL!!!"

Cassidy has now been an Instructor of Soil Science at OSU for over 10 years. His introductory class has over 200 students each term. Cassidy is also the faculty advisor for the Organic Growers Club - OSU's student farm. The student farm project has over 300 student volunteers on its listserv and continues to grow. The farm cultivates over 50 different fruit and vegetable crops and is just beginning its 15th season. In Cassidy's words, the project is "wildly popular."

Cassidy is passionate about soil and is popular with students because of his dynamic speaking style. A teaching assistant for Cassidy told Splichalova, the reporter for *f*, that Cassidy's passion for soils coupled with his teaching skill means that in every term he gets another 200 or so converts to "his cult of soils."

Here are a few comments about him from Rate My Professors:

- Phenomenal instructor! Keeps class engaged, so the time flies by! I enjoyed it so much that when my boyfriend came to visit, I dragged him to one of my lectures and he LOVED it!
- Cassidy is by far the best teacher I have ever had. I am an economics major and took this class as a bac core and LOVED it. Cassidy made every lecture very interesting.
- Probably the best teacher at OSU maybe even the best teacher in Oregon as well. This guy is a phenomenal teacher and is great at making any topic interesting. Take one of his classes even if your major has nothing to do with soils.
- James Cassidy has it all: goggle-eyed wonder for soils, extensive knowledge of its workings and relevance in the world, great teaching skills to convey this all memorably and fascinatingly, and the star power to make it exhilarating and magical. Take any class with Cassidy and be delighted, astounded and ready to change the world for the better.

Cassidy rejoined Information Society in 2006. He says "The best thing I ever did was quit the band. The second best thing I ever did was join the band. The third best thing I ever did was join again!" They now do 5-20 concerts a year, and as one of the other founders of the band, Paul Robb, told Splichalova, Cassidy cannot stop talking about soil. "He's insufferable. Every time we go out on the road with the band now, it basically becomes an extended soil lecture."

I asked Cassidy for a brief summary of his talk, and this is what he gave me: "This is what the talk is about: Soil! – What It Is & How It Works [that's the title] ... It's ALL about soil! Most people only have a vague idea of what soil is and how it works. You will learn more than you ever thought possible from this lecture. The reason you are alive, what nutrients are, how soil stores water and nutrients. The fundamentals that ALL humans on the planet Earth should know!" A little vague, I will admit, but do you detect enthusiasm? How can you not be curious enough to come listen to perhaps the best teacher in Oregon expound about dirt? You'll be hearing the only faculty member in the entire state who has played Radio City Music Hall in 2014. Be there, and remember, no dessert after dinner that night – there will be cookies. John Carter

Meditations on Rain by Tom A. Titus

Darkness at 4:30 feels like inclement weather—there is a small adrenaline-inducing oppressiveness to it. As blackness folded over us one December evening, Kim and I did something unusual, at least for us: we saw a movie. This wasn't some warmed over Netflix CD that had been sitting under the television for six months; we saw the new flick *Interstellar* at the local Imax theater. Imagine stepping from drippy real-world dimness into a cave of booming wrap-around sound and monstrous visual sensation, where humanity is ravaged by violent dust storms in an ecological desert of corn and riding roaring rockets in a desperate search for another planet to colonize. Wow. Afterward we emerged into a gentle, soothing rain. No blowing clouds of dust, no thundering engines, no intergalactic crises … just a peaceful womb of pattering wetness. Since our movie adventure the rain has rarely stopped, including those two magnificent days of warm precipitation that traveled to us through a trough emanating from the southeastern Pacific. I love being connected to the south Pacific by a belt of rain thousands of miles long.

Recently my bond to rain has delaminated just a little. We installed new super-duper energy-efficient windows with an added layer of soundproofing that helps shut out annoying suburban sounds like cat fights, chirring raccoons who are digging up my garden at 3 a.m., and nonstop barking by neurotic untended dogs. The house stays warmer, and this technology-enabled boundary of peacefulness probably helps me sleep. But I can't hear the rain. I can't lie in bed imagining I'm listening to every drop that ever fell or is falling or will fall on our well-watered planet. I miss that. So on rainy nights I sometimes leave the window open, make my peace with the unfettered BTUs disappearing into the darkness, and allow the symphony of rain to settle deep into my chest.

Maintaining my bond to rain sometimes requires breaking out of my soundproof cell in the suburbosphere for a midwinter sleepover at the cabin on upper Smith River. This isn't very convenient. My excuse for going is a small fruit orchard that needs pruning. The only heat in the place is from a leaky woodstove that won't hold a fire. My pretense is that by spending the night I can get an early start in the morning. I rarely start early. There is only oatmeal and coffee with evaporated milk for breakfast. I could take other food, but I rarely do that either. In reality, my trips to the cabin are just a recipe for reckless indulgence in rain. Because unlike my techno-sealed glass in town, the cabin windows are so drafty that panes occasionally lose their grip and fall to the ground. The roof is metal and completely un-insulated. So when night storms pummel the house, the barriers between me and the music of rain are minimal. Lying awake listening makes me happy.

On a good rain-soaked morning in the Coast Range, battleship clouds run aground on the hills to the southwest, tearing open their hulls, spilling their payload of precipitation. After breakfast I put on a leaky camouflage raincoat and an old pair of green nylon bib rain pants with a tear in the leg that has been patched with a piece of duct tape. Then I putter around pruning or shaping the garden-to-be or sawing up a pile of firewood. My rain clothes help, but in the end I get wet. Really wet.

Toward the end of the winter-shortened day I'll wander off to pick a few hedgehog mushrooms. Getting to the small remaining patch of old-growth forest requires that I walk through a very young

clearcut where the rain pours down unimpeded. My boots squish rhythmically in red goo, and there are often muddy deer prints indicating a visit the previous night to the meadow below. Inside the forest the big trees are doing their job. They intercept the downpour, and the hurried descent of water becomes more measured, sliding off the canopy, forming crystalline drops at the end of each deep green conifer needle that fall to the forest floor with a muffled plop.

By 3:30 the subdued light under the big firs dims rapidly, and the growing gloom triggers that primal urge to find a safe roost for the night. I hope everyone has been in a place where they can feel this. Traipsing my sodden self back to the cabin, I'll hunt up some dry clothes and a beer. Then I'll sit in the shelter of the front porch where I can watch and listen and smell the onset of rainy nightfall. Darkness is very dark. It is also very quiet. There are no car horns or catfights, only the drumming of rain on the tin porch roof and occasionally the snort of an indignant doe beneath the apple tree on the knoll. Some evenings, going home is hard.

In winter everyone who lives in this moss-ridden fungus-infested place should complain publicly and vociferously about the rain. I mean this. It will help in ways that you may not have considered. Your complaining will be an affirmation to those who live here and really do hate the constant drizzle that they need to pack up their soggy tents and leave. You will discourage people from coming who imagine this must be paradise but who have not fully assessed the oppressive wetness of our winters. Your whining might give voice to those internal gremlins that begin to nibble away at your late winter soul, those times when it seems like the rain has been falling for years and only a thin umbrella of sanity remains. A window might open into the gray, allowing the little monsters to fly away. All told, your grouchy disposition will ensure that we remain a community of rain lovers.

So go ahead and gripe. But you can't mean it, not really. Because somewhere in the depths of your spirit you know the truth: that in this interminable disheartening winter drizzle rests the splendor of our place. Rain is the dominant force behind the creeks that cut the canyons that are blanketed by an infinitude of greens. It is the watery adhesive that draws us together, even when sometimes this seems like shared suffering. If we are to become this place, then we must become the rain.

Complexity by Reida Kimmel

Several years ago Bill Ripple from OSU gave ENHS a talk about his research on wolf predation, elk browsing, and willow growth in the riparian areas of northern Yellowstone National Park. His conclusion has been hailed as proof that the reintroduction of wolves has had trophic effects throughout the ecosystem, because the wolves keep the previously rather sedentary elk moving, and as they are not able to graze the willows and other shrubs to stubble, vegetation in riparian areas recovers to healthy levels. Also, it should be noted, the elk population has declined by seventy percent since the wolves' return. Ripple's research was meticulous and very important, especially to conservationists, but new research shows that the story is far more complex than originally reported.

Bill Ripple's work showed how dramatically riparian vegetation rebounded when wolves controlled the elk. But his studies concerned the larger streams and riparian areas in northern Yellowstone. David Cooper, N. Thomason Hobbs, Evan Wolf, and Kristen Marshall, all from Colorado State University, have several publications, dating from 2007 and 2013, studying the smaller streams in the area, which have not recovered, asking why can't the wolves work their magic on these small water courses? What parts of the puzzle are missing? First they looked at willow trees, living and dead, young and old, established in the period from 1917 to 1999, the period when there were no wolves in Yellowstone. They found that in recent times, since the 1950s, there have been far fewer young willows along the smaller streams than are necessary to maintain a thriving population. In the early years of the twentieth century willows could establish more broadly in riparian zones, far from actual streambeds, on the alluvial sediments created by the presence of numerous beaver dams. In the early 1920s there were more than two hundred beaver dams on the streams near the Yellowstone River. There is a cycle to the lives of beavers and their dams. The rodents build dams with trees in the vicinity of the dam they are building. Their nourishment comes from the bark of the trees they collect. When the dam is completed, the water rises and the silt in the beaver pond enriches the soil. Eventually the good big edible trees are all gone and the beavers move on. The willows and shrubs grow back, thriving in the soil of the former beaver pond. The dam deteriorates, but some years later, beavers return to the site and start the cycle all over. With the extirpation of wolves early in

the twentieth century, elk populations grew to unhealthy levels in the Park, and all the willows were grazed constantly. They could not recover. The big trees beavers needed were gone. Beavers did not return. The dams disappeared forever and the natural forces of erosion caused streambeds to deepen. The water rushed by. Riparian zones narrowed. Surviving vegetation was stunted not just by grazing but also from drought.

Believing that the beavers were another key component in restoring vegetation in the Elk Creek area of northern Yellowstone, and probably in damaged riparian areas throughout the Park's ecosystem, the Colorado State researchers designed an elegant ten year long experiment. They created four types of study places on Elk Creek and similar creeks, where there were wolves but no willow recovery. One study plot type had a dammed stream, but the surrounding area was not fenced. Another had neither fence nor dam. The third type had the vegetation protected, but no dam. Finally the fourth had a dam and a fence. Only in the fourth plot type did vegetation recover. Elsewhere it remained meager, due either to poor dry soil or grazing or both. The conclusion is clear. The ecosystem needs beavers to build dams that build soil and raise the water table so streamside willow and aspen, and all the plants and animals they feed and shelter, can prosper. Beavers are necessary, just like wolves, if the greater Yellowstone ecosystem is to recover to the 'norm' of 1900.

Photo by Dennis Austen

Well Go Beavers! But is it possible to return the beavers and their dams? It is a question we should consider carefully because the decline and extirpation of beavers throughout the West had very detrimental effects. Our own Eastern Oregon was once a much better watered area with beaver ponds and tree-shaded streams that ran in shallow beds. The fur trade wiped out the beavers in the very early days. The ranchers, farmers and loggers moved into an already damaged ecosystem. What will it take to change stream hydrology and allow vegetation to recover on a grand scale in Yellowstone and the West? Some like the Park's own beaver biologist Doug Smith talk about creeks that can never recover. However we know from Ripple's work that larger streams can recover and that beavers are returning. OSU hydrologist Robert Betschta thinks that in another fifteen years there will be far more beavers and dams. We just have not given the 'experiment' in wolf recovery and elk decline enough time. Perhaps in Yellowstone and certainly in other parts of the West, we should give nature a bit of a boost. There should be a lot more protection of riparian areas from grazing by livestock than there is at present. Then incentives like cash grants or buyouts could encourage ranchers and farmers to protect their streams and to build small dams to conserve water, thereby raising the water table and encouraging riparian recovery. Like everything in nature, wolves, beavers, elk, and willows are tied in a tight circle of cause and effect. When we unwittingly break off even one component, the circle is indeed broken – perhaps, but not necessarily, forever. The more we learn about how things work, the less likely we will be to repeat our mistakes. Sometimes, knowing a bit more about the natural order, we can even make a few repairs.

Thanks to *High Country News*, 8 December 2014 for introducing me to this important new chapter in the elk-wolf-willow story.

If you have had trouble finding parking before our meetings, there is a sparsely used parking lot nearby. Turn north (toward the river) at the intersection of Franklin and Onyx and go about a block. It'll be on your left.

Events of Interest in the Community

Lane County Audubon Society

You can access the current issue of *The Quail*, LCAS's excellent newsletter, from their website: http://www.laneaudubon.org/. A summary of their upcoming monthly meeting can be found there, as well as many other interesting avian tidbits. **See the February issue of *The Quail* for a summary of the recent Lane County Christmas Bird Count.**

Saturday, 17 January, 8am. Third Saturday Bird Walk. Go to the LCAS website for details.
Tuesday, 27 January, 7:30pm. Birding Cuba with Rick Ahrens. The island nation of Cuba is fascinating, both culturally and ecologically. For the last 50 years, it has been protected from the tsunami of US tourism by an embargo. Only recently opened to American birders, Cuba is an essential stopover or wintering habitat for almost 300 migratory species from North America. It is home to 28 endemic species, including the world's smallest bird, the Bee Hummingbird. Join local naturalist Rick Ahrens for an inside look at this birding paradise. 1645 High Street.

Mt. Pisgah Arboretum

Saturday, 10 January 10am-12pm. New Years Hike. Start out strong with your New Year's Resolutions to exercise and get outside more! Come hike up to the top of Mt. Pisgah and learn about the history of the Arboretum and the Howard Buford Recreation Area along the way. This is a little less than a two-mile hike with a 1050' elevation gain and an option to extend the hike another mile. Bring water and an optional snack. Rain or shine. Meet at the Arboretum Visitor Center. $5, Members FREE.
Saturday, 17 January, 10am-12pm. Life Among the Mosses. This is our annual celebration of the little folks of the plant world. Botanist David Wagner will tell moss stories and weave lichen yarns to help us understand the elfin world of mosses, liverworts, and lichens. Rain or shine. Meet at the Arboretum Visitor Center. $5, Members FREE.
Sunday, 25 January 25, 12-4pm. Basket Weaving with Donna Crispin. EPUD community room. Local natural fiber weaver Donna Crispin will show you how to put yellow flag iris to good use! After discussing how to gather and prepare this plant for making cordage, Donna will guide you in the creation of your own small basket. $30 members plus $8 material fee, $35 non-members plus $8 material fee. All materials included. Pre-registration required. To register call 541-747-3817.

Friends of Buford Park and Mt. Pisgah

Monday Morning Regulars. 9am-noon. Monday Morning Regulars work on habitat restoration projects wherever they are most needed each week. Their work includes working in the native plant nursery as well as planting native species and removing invasive species around Buford Park. Contact volunteer@bufordpark.org for more information.
Tuesdays and Thursdays, 9am-12pm. Nursery Work. Join us for a morning or full day of planting seedlings, preparing and caring for beds, and otherwise helping out on the many tasks needed to propagate the native plant material we use for restoration projects. The nursery is a fun and beautiful place to relax and to get some fresh air and activity. Meet and work at the Native Plant Nursery at Buford Park. Enter Buford Park from Seavey Loop Road. Turn LEFT after crossing the bridge and drive 1/4 mile to the nursery.

Nearby Nature Go to http://www.nearbynature.org/events for information on NN activities, or call 541-687-9699.

January-February No School Days! Modeled after our summer daycamps, these one-day programs are offered during many scheduled 4J school district No School Days. They take place at Alton Baker Park from 8:30 am-3 pm, for kids aged 6-9 years old. No School Day Programs happen mostly outdoors, but we also have an indoor space (our yurt) for inclement weather. Each program includes tons of fun games, crafts, hiking, stories, and outdoor exploration. Class size is limited to a maximum of 12 kids. Programs cost $40 for members and $45 for non-members. For registration materials, go to the NN website.
Monday, 19 January, 8:30am-3pm. Nature's Busy Builders. Enjoy a building adventure in nature nearby. Make a bird nest and your own fairy fort or gnome home in the forest. Go on an animal homes scavenger hunt.
Saturday, 24 January, 1-3 pm. Rodent Roadshow Nature Quest. Learn all about the fascinating lives of moles, beavers, and other rodents on a family-paced walk in Alton Baker Park. Check out real animal pelts with naturalist Dave Walp. Meet in the Learnscape. Members FREE, non-members $2/person or $5/family. Pre-registration required: 541-687-9699.
Friday, 30 January, 8:30 am-3pm. Rah! Rah! Rot! Fungus, bacteria, insects - oh my, the FBI! Discover and uncover the forest's mighty recyclers. Watch worms at work, make art from nature's leftovers, and go on a scavenger hunt for the fungus among us.
Saturday, 7 February, 10 am-noon. Pruning 101 Workshop. Learn the basics of fruit tree pruning with Master Gardener Pruning Specialists Tom Bettman and Peter Thurston. Meet in the Nearby Nature Learnscape. To pre-register or for more information: info@nearbynature.org or 541-687-9699.

Native Plant Society of Oregon, Emerald Chapter

Thursday, 15 January, 7 pm. Rock Stars of the Western Cascades. Tanya Harvey will show photos of rock-loving plants that grow in Oregon's Western Cascades. She will talk about the different types of rocky habitats, where they can be found, and share some good locations to look for them. Location: Conference Room at Lane County Mental Health. For more information call Kim at 541-726-8057.

North American Butterfly Association, Eugene–Springfield Chapter

Monday, 9 February, 7pm Friends and Food 7:30 pm Presentation. Butterflies and More: A Year in the Life of a Self-employed Entomologist. Dana Ross is a Corvallis entomologist and lifelong butterfly enthusiast. He's been studying Oregon insects - butterflies and moths in particular - since his arrival in 1981. He works with endangered butterflies such as Fender's Blue, Taylor's Checkerspot, and Leona's Little Blue. Dana will tell us about his recent and upcoming insect work with butterflies, moths, and other insects. In addition to sites in the Willamette Valley, Dana will also talk about his studies in Klamath Marsh National Wildlife Refuge, Sand Creek, Oregon Caves National Monument, and Crater Lake National Park. At the Eugene Garden Club, 1645 High St. Free.

The University of Oregon's Museum of Natural and Cultural History

Exhibit Hours: Tuesday through Sunday, 11am-5pm

Current Exhibits

- Explore Oregon: 300 million years of Northwest natural history.
- Site Seeing: Snapshots of Historical Archaeology in Oregon.
- Oregon - Where Past is Present. 15,000 years of Northwest cultural history and 200 million years of geology.
- Highlights of the Jensen Arctic Collection.

Enhance your visit to the Museum of Natural and Cultural History with a guided exhibit talk. Talks are given daily at 2pm and are included with the price of admission.

Ideas on Tap. First Wednesday of the Month, 7-9pm at Sam Bond's Brewing Co., 540 E. 8th Ave. Quench your thirst - for beer and for knowledge - at **Ideas on Tap.** Enjoy local craft beers and thought-provoking discussions about science, ecology, history, and more. **Wednesday, 4 February. Carnival! Revolution or Repression?** Delve into the history of Carnival with UO anthropologist **Philip Scher**. Explore the festival's masquerade traditions and its modern expressions in the Caribbean and other parts of the world. Admission is free, food and drink available for purchase.

WREN (Willamette Resources and Educational Network)

Go to http://wewwild.blogspot.com for January and February events.

Tuesday, 13 January, 9-10:30am. Wetland Wander at Swallow Pond. This is a special "Lichen Walk with Daphne Stone". WREN Wanders are casual walks through various West Eugene Wetlands sites each second Tuesday of every month. These exciting opportunities provide observation, education and inspiration in our surrounding natural spaces. WREN staff and volunteers will guide this walk. Participants are asked to park heading south on Bailey Hill Rd, between 7th and 11th, Eugene, OR 97402 Participants should bring water and wear waterproof shoes or muck boots. WREN will provide binoculars. For more information: info@wewetlands.org or 541-338-7047. FREE!

Habitat Restoration Work Party in Alton Baker Park

ENHS is pairing with Nearby Nature for a work party in Alton Baker Park on **Sunday, 18 January, 10am-1pm**. Meet at the Park Host Residence (Nearby Nature Headquarters) at 622 Day Island Road. It is just past the ABP community gardens and across the road from the dog run area. Dress for the weather: long sleeves and long pants for blackberry vine protection, heavy shoes for mud, and raingear if needed. Bring a water bottle and your favorite work gloves and pruners if desired. However, Nearby Nature will provide gloves and necessary tools for our tasks. We may be digging and planting as well as extracting invasives like blackberry and ivy. Our work parties usually end with gathering at the North Bank for lunch and socializing.

Contact: David Wagner, 541-344-3327 davidwagner@mac.com

ENHS welcomes new members! To join, fill out the form below. Membership payments allow us to give modest honoraria to our speakers, as well as to pay for the publication and mailing of *Nature Trails*. Our web address: http://biology.uoregon.edu/enhs

MEMBERSHIP FORM

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

The following information is voluntary, but appreciated:
Would you like to: __lead field trips __teach informal classes __work on committees __
What would you like to hear a talk on? _____
Do you have special experience in natural history: _____

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ENHS Schedule of Speakers and Topics for 2014-2015

16 Jan. 2015	– James Cassidy	– Soil: What It Is and How It Works!
20 Feb. 2015	– Shelly Miller	– Native Freshwater Mussels in the Pacific Northwest
20 Mar. 2015	– Paul Engelmeyer	– Conservation Strategies: Seabirds and Forage Fish
17 April 2015	– Marli Miller	– Roadside Geology of Oregon: Some Highlights
15 May 2015	– Pat Ormsbee	– Wings in the Night: A Glimpse into the Mysterious World of Bats