The Sharpshooter

Oregon Society of Soil Scientists Quarterly Newsletter Spring, 2020

We are entering uncertain times and day-to-day our personal, educational, and work situations are in flux. I hope everyone is able to maintain a positive outlook, some connection during this time of social isolation, and cherish our friends and colleagues despite our physical distancing.

I want to thank all the attendees at the Winter Meeting for being flexible and understanding of the schedule changes. The Winter Meeting Committee spent numerous hours finding and organizing the speakers and our venue. Schedules do not always match reality but overall from my perspective it was an informative and interesting two days.

Look at this great paleosol exposure! Any idea where this soil profile is located and what might have contributed to it characteristics? Hint, it is in Oregon.

We have our Summer Tour scheduled for Central Oregon with our base camp at Newberry National Volcanic Monument. We have a intriguing and full itinerary for two full days, I guarantee you will see some soils and soil profiles that are unique. I also wanted to announce that we will have both new and vintage swag at the Summer Tour and the closest to guess the correct amount of lbs. per acre in the O Horizon sampled from the forest at Silver Falls Conference Center will get first pick of any item from our swag collection. Relatedly, for those of you looking to deepen your appreciation of the O horizon, take an hour and have a look at this 2014 SSSA lecture: https://scisoc.confex.com/scisoc/2014am/videogateway.cgi/id/22561?recordingid=22561

I am looking forward to being creative and flexible during the next year as we fit and adjust our aspirations to the realities imposed by the pandemic.

I want to end by wishing everyone good health and new discoveries in the coming year. - Bruce Moffat, OSSS President

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From the Editor

Hello all, and welcome to another edition of OSSS's Sharpshooter; it's been a long time coming.

I want to start off by thanking those who provided material for this quarter's edition. In this edition we have a great piece on biochar, some BLM updates, a recap of the winter meeting for those who weren't there, and some soils news from around the state.

If you are wondering about the Summer Tour to Newberry Crater, the board is currently moving forward as though it will be happening. However, while we may be planning for the best, we are assuming the worst given how the pandemic has played out and the uncertainty that abounds. Keep an eye out as for more news as we get closer to August.

Working closely with the submissions and the authors, gently editing and compiling them into this issue, helped escape the reactionary cycle which had become my day-to-day as a result of a news-saturated miasma permeating daily life. I think this was a good thing, because in the end, stepping back has allowed me to re-evaluate some of my beliefs about being well-informed and it has brought into focus the foundations of the interconnected web in which we find ourselves.

It's safe to say it's anyone's guess where this will lead or what events it'll catalyze along the way. For me, the pandemic painfully illustrates how biology and evolution do not recognize borders or the undergirding of a nation; that it is naïve to continue pushing a flawed economic philosophy which is unreconcilable with the ecological machinations of the planet.

Vance Almquist,
Editor-in-Chief

Cohesionless sand grains being eroded and carried away by a small stream on the beach.
Photo by V.W.A.

Treasurer's Report

Summary of current Fiscal Year, FY19: 7/1/19 – 6/30/20 as of 3/26/20
Summer Tour 2019, Brookings had income of $2,031 from registrations (25 regular, 3 discount) - online fees; expenses of $1,116 campsites and $801 food for a net of $114.
Winter Meeting 2020, Silver Falls had income of $9,331 from registrations (21 regular, 13 discount, 17 student) - online fees; expenses of $10,923 lodging & food, $225 movie license, $200 poster prizes for a net loss of -$2,017. We have received 28 professional membership and 5 student membership dues since January, 2020 for an income of $1,550 - $54.20 online fees. We have 24 lifetime members. Other income is $200 for Sharpshooter ads. Other expenses are insurance for $275, State annual reporting fees for $70, Website plugins for $228, postage and PO Box rental for $128 and $137 travel reimbursement for the Coos Bay "Pub Talk". We have **$12,448** in the bank. We plan to award a $1,000 scholarship this year and $1,000 donation to the Soil Judging Team.

—Pam Keller, OSSS Treasurer

Soil Stories from Around the State

Spring Soil Judging

By Will Austin

We held a contest on March 4, 2020. I had 4 soil judgers attending their first ever timed contest. They all did well with the morphology section. We will need to spend time on taxonomy and interpretations as I have only worked with them on visual and tactile skills. The timed aspect of judging is stressful to most participants. So I discussed contest time management to the judgers and explained that if, in a contest, you are given 6 horizons to judge with an initial 5 minute time in the pit you can effectively get the samples you need from the 6 horizons. This is how you proceed: 1.) You know 2 horizons for certain; the top horizon and the bottom horizon.; and 2.) You actually have a very good idea about the second horizon, it is directly below #1 and is usually easily discernible from the granular, dark, etc. top horizon. So even before you have you have extracted soil material from the pit wall you are pretty certain of #1, #2, and #6. Now, only 3 more horizons to go. In the third horizon is an artifact placed there by the official judges. Now you know the approximate location of the third horizon, therefore you now have 4 horizons identified. Your only real unknowns are the 4th and 5th horizons. Now grab all soil material from #1, #2, #3, and #6, set them aside and sort out 4 and 5. Most importantly, do not get bogged down with the 'master horizon or subordinate' designations that will come later. Get your soil samples, go sit down, and work on color, texture, etc. The fear of the 5 minute pit sampling time apparently disappeared. The first group of two students were in and out of the pit in 3 minutes, and the second group of two were done in 2 ½ minutes. This for me is a complete success for the day. Good job to the OSU Soil Judgers.

Introducing the wonder of rocks

By Greta Krost

On March 13th, The day before the Oregon schools were shut down due to COVID-19 mitigations, I was able to give my 5th annual rock talk to 4th grade classes. My talk includes a power point promoting public lands and the Every Kid Outdoors program, geology maps, the 3 rock types, rock cycle, geologic time, and rock ID tips. I try to keep my talk short, so I can maximize the time the kids spend with the rock ID lesson. I encourage the kids to describe the rocks (use scientific observation). It has taken me 5 years to build my collection, but I now have 30 samples, so each kid gets a rock and then they pass it to their neighbor. My samples are simple and I built my collection using common sedimentary rocks on the Oregon coast and from other places I have visited. I also asked other geologists to send me rocks from where they work (and also tell me what it is). Rocks in their environment can seem kind of boring, until you partner them up with a rocks formed in a different environment. This year, I added a painted rock, in hopes to show kids that if you paint the rock then you can't tell what type of rock it is. However, for some kids, the painted rock was their favorite.

Teaching is outside of my comfort zone, but I keep going back to the school, because I want to introduce students to the science of geology and hopefully have a potential Jr. geologist recruit. Each year I fine tune my talk and the lessons contained in it which helps me to be more relaxed and to feel excited as the school year approaches. Another key to my success, is that a retired BLM engineer helps me every year with the classes—they carry my rocks, and I must say that as a geologist, if feels good to have an engineer carrying my rocks samples for a change.

Upcoming BLM Biochar Study

The Bureau of Land Management (BLM) in Western Oregon is conducting a study to evaluate the use of biochar as a soil amendment BLM scientists say that "this project is designed to measure changes in soil and forest productivity in response to different ground-based timber harvest machinery. Soil nutrients, including carbon storage, soil microbial community composition, and other macronutrients will be assessed as surrogates for soil productivity. Furthermore, the effects of biochar placement on soil productivity will be measured. Soil samples will be collected from commercial timber sales in each of the western Oregon BLM Districts. The collection and assessment of soil samples would be conducted by an independent lab and partners. For more information about this project contact Jennifer Puttere, jputtere@blm.gov or Amy Meredith, ameredit@blm.gov

Aquatic Working Group Meets in Bend

Submitted by Mike Brown and Marissa Theve

In early March, Oregon and Washington BLM soils specialists gathered in Bend, Oregon to discuss current issues that they manage on BLM administered lands. They discussed emerging technologies such as tethered assist harvesting/ yarding and biochar/ biomass their potential effects to soils. Jim Archuleta, from Forest Service Region 6, led a discussion on the development and use of biochar to improve soil productivity. Cory Owens, NRCS State Soils Scientist provided a soils survey status update. Kurt Moffitt, Redmond MLRA Soil Survey Office Leader, led a field session southwest of Prineville to help bring a field context to the data interpretations that BLM staff use daily. The group looked at the severe differences aspect can have on otherwise similar soils including organic matter, fragment, and clay content which in turn changes the water holding capacity and even the land's resilience against invasive species. They discussed the challenges in using order three mapping to help inform land management decision and reiterated the importance of going on -site and digging a pit!

Meeting attendees gathered around a soil pit in the hills outside of Prineville. Photo Courtesy of Ron McCormick

In Western Oregon, the BLM soils staff will gather again in the coming months to have more focused discussions on improving the designs of timber harvest activities and evaluating those effects to soils resources.

And that is all we have on new stories from around the state. If you have a soil-related story you would like to share, please email the Vance Almquist, Editor of the Sharpshooter.

Perspectives on the 2020 Winter Meeting

Submitted by Mark Keller and James Cassidy

Mark Keller speaking

The location, in the beautiful forest of Silver Falls State Park, was fantastic! We had the four lodges, closest to the dining and meeting hall, assigned to our group. All were comfortable, amenable to socializing, and convenient. The buffet meals were very good. The weather cooperated except for occasional rain, and even snow!

Gentle snow can be seen falling on the dining hall at Silver Falls State Park during the OSSS winter meeting. Photo Credit: V.W.A

Dr. Scott Burns divided his talk into 1) The geology of Silver Falls State Park. It is a layer cake of basalt flows, most of these from Columbia River Basalts. There are 14 waterfalls within the Park, in an amazingly small area. Of particular interest, he talked about the Vantage soil seen behind North Falls. Named for the exposure near Vantage (WA), it is an interbed deposited 13 million years ago in a tropical climate. And 2) How Jory became the State Soil. Scott shared the language of the 2011 resolution that designated Jory. It had to pass muster on sustaining agriculture, food production, and benefiting future generations—wine, wine, and wine! It was further whereas'd to be unique, easily distinguishable, and providing color and texture to the landscape—red, red, red. But it also had to be representative of the whole State! Well, Jory soil is mapped extensively in Western Oregon, but not in Eastern Oregon. Scott got around this by tying it all back to the Columbia River basalts which are parent material for Jory and also many soils in the east! (I used to say we had the Jory soil bedrock phase –that's an inside joke for soil correlators)

Dr. David Lewis told of the indigenous peoples of Western Oregon. There were numerous tribes in the area, all with their own distinguishing unique and sustainable lifestyles. The trading network among the tribes was continent wide.

David Rand presented the turnover rates of O horizons. The different plant communities and the different climate factors give rise to different decomposition characteristics. Shredders (millipedes, beetles) predominate in early decomposition, creating fine enough material for fungi and bacteria.

Park Ranger Matt Palmquist gave a talk on the history of the State Park. Silver Falls was a candidate for the newly formed National Parks System, 1916. However, it had been recently logged which disqualified it from consideration. Through persistent efforts this unique area was added to the Oregon State Parks system in 1933. Matt shared some amazing stories of early efforts to commercialize the popularity of the site, such as sending cars, and even a man in a boat, over South Falls.

There were two sessions of "Lightning Talks", short, hectic and eclectic. All were interesting, but I remember in particular Scott Goode's description of his process for rapid biogeneration of lignite (worms, lots of worms) and Chris Gebauer and Katie Chambers soil temperature regime "catena" demo with audience participation (think tall for high, short for low, elevation).

The poster session showed the various interests of OSU soils researchers. Congratulations were in order for all the students. First prize was awarded to Ashley Waggoner.

Saturday evening featured a movie. The documentary portrayed an outdoor/nature artist's life. It was intentionally slow, analogous to the careful, thoughtful works by the artist. The photography was stunning, and the music fitting. It was the kind of film that stays with you.

A highlight for me was taking the short walk with a group to see the Vantage Soil (interbed?) behind North Falls. Were the roots fossilized? Were they current? Was it a soil or a sedimentary geologic deposit? The discussions raged on without a final consensus. The other tourists were confused (bemused?) by our group's rapt attention to the cave back and basalt overhang rather than the waterfall itself!

James Cassidy speaking

I have to admit writing this message about our winter meeting seems a life-time ago - so much has changed in the last 4 weeks and I really should be working on my hands-on farming and gardening class which now needs to be converted to a remotely taught course…I am thankful for the distraction. But just for the moment, allow us all to escape into the recent past when we last gathering together and exchanging ideas was a part of our normal existence - what a society is really all about.

After a nice breakfast at the lodge we coordinated our transportation (more or less…) and headed to the south falls at Silver Falls State Park where we were all amazed by the incredible vault of basalt that formed as soils trapped between basalt flows eroded out by the flow of the stream leaving and enormous volume of the rock above unsupported.

The remaining rock formed a supported arched dome. Anyway, that's how I interpreted what I was looking at (and after having been schooled the previous day by Dr. Scott Burns). Aside from this incredible basalt feature, what caused the greatest interest was the band of highly compressed soil underlying the basalt the base of which formed a slope on which the walking path was constructed. Castings of trees in the basalt were visible as empty shafts running upwards above us lending more evidence that yes, this was a soil surface buried in a basaltflow. Closer examination showed looser soil material at this interface and even closer examination showed what appeared to be roots! Fossil? Preserved wood? Millions of years old? Lots of great discussion and wonderment followed. It was so fun looking at our group all looking at the rock and soil with our backs to the falls while all other visitors were taking in the beauty of the falling water. We are a strange breed.

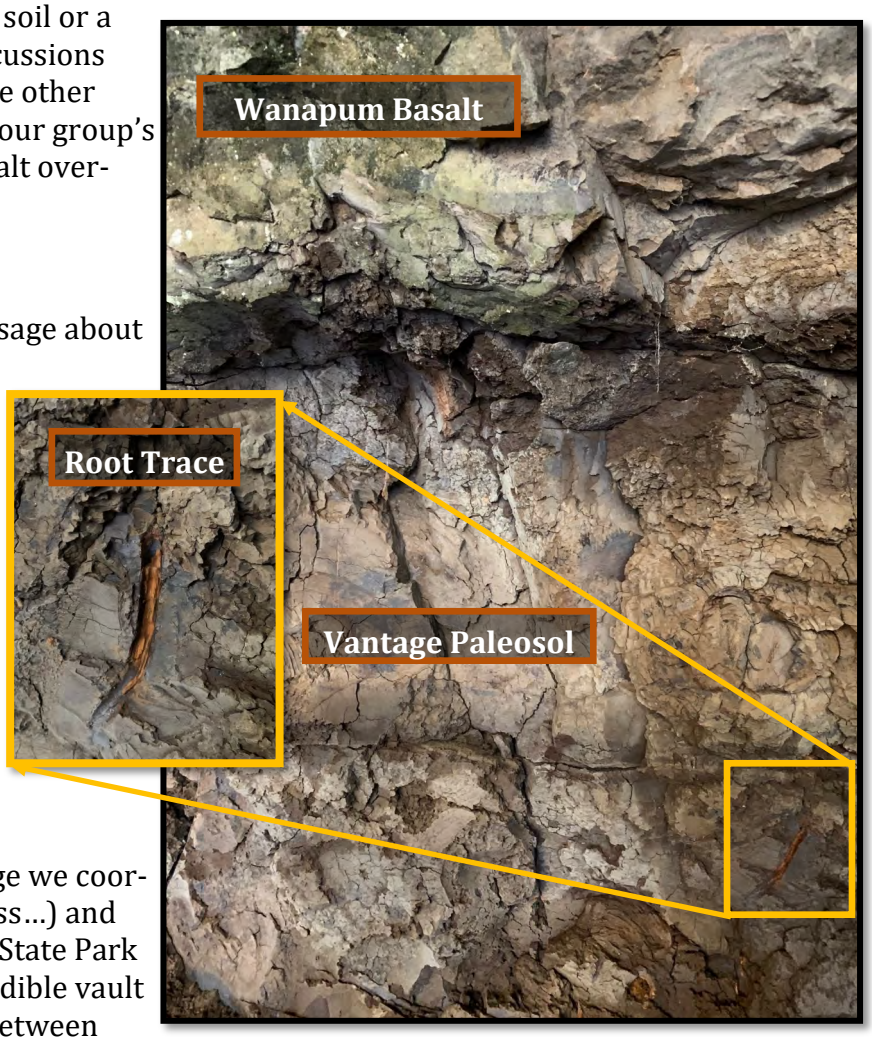

Photo of the contact between the Wanapum basalt (Miocene) and the underlying strata, known as the Vantage Horizon and thought to be a paleosol. Root casts and traces (inset) are found in the vantage horizon, often in proximity to root casts in the basalt ceiling . Photo credit: V.W.A

Our amazing day together continued as we loaded up and motored on to making new friends

in the Christmas Tree farming business. We went to Silver Bells Christmas Tree Farm where we met up with Casey Grogan and Jan Hupp of Drakes Crossing Nursery. We all gathered in a sunny spot of an open bay of one of the storage barns and had our box lunches and after a brief welcoming and introduction by Casey, engaged in a very lively conversation about soil nutrient management and other issues (soil related and otherwise) of concern in the Christmas Tree business. I really think we have something to offer this industry. They shared with us their recent soils analysis and we were impressed with high levels of OM they have been working on maintaining but really felt that there might be some cost savings moving forward if they pulled back on their recommended nutrient application rates (especially for P) that they were getting from their crop advisors. Former OSSS President Teresa Matteson and myself suggested looking into some trials trying different management regimes and employing mycorrhizae. Both Casey and Jan were all ears and I think Teressa is following up with them. Please contact her if you are interested in helping.

We then went on to view a series of soil pits that our hosts dig for us (one of which was dig on-the-spot with a LARGE backhoe just laying around!). One of the pits dug the previous day had filled up with water overnight - a big surprise to Casey and Jan and gave them lots to think about as we tried to explain how landscape position was responsible for subsurface flow over the underlying bedrock. Casey said to me "I never would have considered it had I not dug this pit for your group, its changing the way I'm thinking about managing this field." Wow, the unexpected result is where real learning happens. Our freshly minted OSSS President Bruce Moffatt jumped into the pits and lead with great style (look at that yellow jacket!) sending samples up for study, inviting others down in the pit and helped manage so much discussion and side conversations – thanks Bruce, you are we are looking forward to you leadership.

And Sage Reuter was the star student for sure, she was in on it all, in every pit! One of the sweetest moments of all was the pride on dear old dad's (Ron Reuter) face and the big hug and kiss between the two – I really am choked up just thinking of it as I write. Thanks to all who participated, we had beautiful weather, made new friends who love soil, and made for a colorful group photo!

OSSS, you put the society in soil science - Bravo!

Attendees gather around a freshly excavated soil pit at the Silver Bells Christmas Tree Farm. OSSS president Bruce Moffatt can be seen preparing the pit face for all to gaze upon, meanwhile James Cassidy is still in awe of the excavator. Photo Credit: VWA

What should Oregonians know about biochar?

Submitted by Claire Phillips

Individual with a sample of biochar in the palm of their hand. Credit: Oregon Dept. of Forestry; Wikimedia Commons

You've likely heard about it, seen it at plant nurseries, or perhaps an enthusiast has even asked you to taste it. It is charcoal with a fancy name, and its popularity is still gaining. Some growers swear by it, but some soil scientists roll their eyes. Some say it sequesters carbon, others say we should feed it to cattle for animal health. While much remains unknown, one thing is for sure; if you are a soil scientist someone is bound to ask you about biochar. Since 2015 I have been working on team research at the USDA-ARS evaluating many aspects of biochar impacts, so I will try to answer some common questions.

Can we create terra preta in Oregon?

Biochar is a product with a great origin story, much like the Macintosh computer and GoreTex. Descriptions of man-made Amazonian dark-earth soils, or *terra preta de índio*, have captivated scientists and laymen alike, spurring widespread research and popular interest. In comparison to unimproved tropical soils, terra preta soils have higher levels of plant-available phosphorus, calcium, sulfur and organic matter, and do not become depleted after multiple years of farming. The key to creating terra preta was the indigenous practice of slash-and-char (rather than slash-and-burn) agriculture, which allowed biomass to smolder and form persistent charcoal. Cornell professor Johannes Lehman is largely responsible for bringing terra preta to the attention of the world, and making compelling arguments for how to apply the lessons of terra preta to improve soils elsewhere. Biochar really represents a hypothesis—that we can create more fertile soils by adding charcoal—which is now being tested around the world.

In the explosion of biochar research over the last 15 years, answers to this hypothesis have been mixed. In a recent meta-analysis, Jeffery et al. [1] found that most improvements in crop yields have been found in the tropics, where soils typically have low pH, low fertility, and low rates of soil inputs. Arable temperate soils with high fertility and adequate pH have had on average no improvement in crop yields. Their study also showed that biochar's ability to stimulate yield correlates especially well with soil pH, which is consistent with the experiments our team has conducted.

Biochar tends to be alkaline, and many biochars increase soil pH when applied at a sufficient dosage. In experiments with 11 different PNW soils, we have observed biochar increasing plant growth only in soils with pH low enough to be injurious to plant growth [2, 3], and not in soils with other growth-limiting factors, even when we experimented with large quantities and different kinds of biochar. So this work suggests

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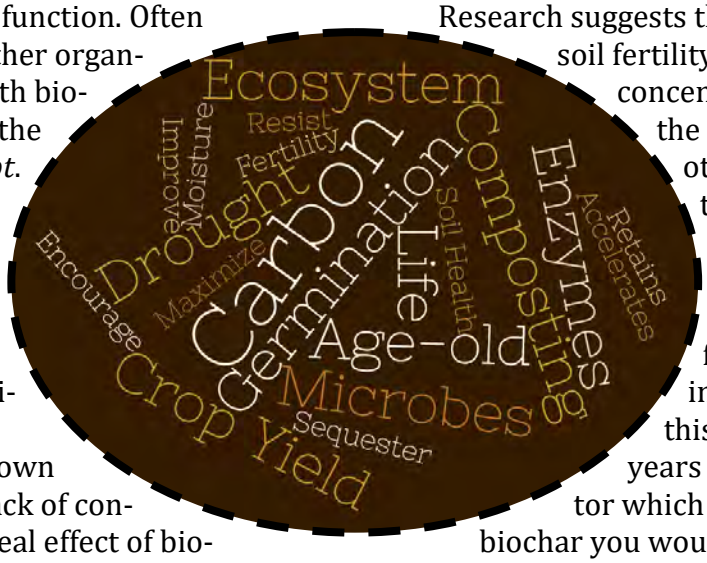
that the liming effect of amending soil with raw (i.e. un-amended, un-aged) biochar can be pretty important.

But many plants grown in the PNW need acidic soils. For his PhD at Oregon State, Bryan Sales studied whether biochar was a useful amendment for blueberries, an acid-loving plant. He found that additions of biochar did increase plant growth, both in pot and field experiments, and that biochar increased mycorrhizal colonization of *roots [4]. So clearly, biochar can also improve soils in ways that are not related to liming.*

Learning from citizen scientists

In the PNW we have many gardeners and small farmers who have been enthusiastic early-adopters of biochar, and report substantial improvements in their soil function. Often these folks are adding other organic amendments along with biochar and are embracing the whole soil-health *concept*. For instance, they may be incorporating manure for fertility, and adding readily available carbon sources like molasses to enhance biological activity.



In some home-grown experiments there is a lack of controls needed to see the real effect of biochar. But on the other hand, these enthusiasts have shown me the wrong-headedness of using biochar alone to try and accomplish what indigenous Amazonians created. It makes sense to use biochar as a component of holistic soil management to give it the best chance of improving soil.

There are several good reasons to add other sources of organic matter along with biochar, including the fact that intense microbial activity is likely to accelerate the weathering of biochar. It appears that many of the properties of charcoal associated with improved fertility in terra preta soils came with time and weathering. Freshly-created biochar is largely chemically inert due to an abundance of aromatic functional groups. But both natural and artificial weathering treatments (including chemical treatments using acids and oxidizers) add functional groups (e.g. carboxylic) that create surface charge, increase cation-exchange capacity, and also increase anion bioavailability [5].

If weathering and time are important ingredients to create terra preta, then it is probably too soon to know how agricultural soils in Oregon could benefit from long-term biochar additions. For large-acreage field crops, adding large quantities of organic matter, including biochar, is often cost prohibitive. Therefore, the terra preta experiment is likely to continue playing out in smaller-acreage and higher-value crops, and in small farms and gardens, where citizen scientists may have the first look at how it turns out.

What does biochar do for soil fertility?

Research suggests that biochar impacts on soil fertility are proportional to concentrations of nutrients in the biochar itself [3, 6]. In other words, if you want to figure out how biochar will improve your soil fertility, you can treat biochar like any fertilizer by characterizing its composition. Using this principle, a couple of years ago we made a calculator which estimates how much biochar you would need to add to meet the nutrient recommendations OSU makes for different crops. (You can find this at http://pnwbiochar.org/tools.) The nutrient content of most biochars is low, but depends on the feedstock they are made from (e.g. wood versus manure).

A lot of research, including work our team has done, suggests that you should not expect biochar to provide bonus nutrient-retention above and beyond its own nutrient content. Charcoal pieces from terra preta have very high cation-exchange capacity, which does increase nutrient retention. However, many fresh biochars have cation-exchange capacities that are similar to or less than soil itself [7]. Also, be aware that just like any high-carbon soil amendment, biochar can

immobilize soil nitrogen [8], so it is a sound recommendation to provide additional nitrogen when amending with biochar.

What about biochar's ability to support microbial activity? Biochar is very high in carbon relative to other nutrients (e.g high C:N ratio), and the carbon it contains is very aromatic, which makes it a poor microbial food source. However, ARS experiments done by Dr. Kristin Trippe show that biochar can impact microbial abundance, for instance by supporting higher abundance fungi relative to bacteria [2]. And for some plants, like blueberries, increasing the abundance of mycorrhizal fungi improves plant nutrient acquisition.

Does biochar improve soil moisture?

Over the last few years our team has spent significant time investigating if biochar improves soil moisture. The literature suggests that the hydraulic benefits of biochar are quite variable, are most pronounced in sandy soils that have excessive drainage, and occur most often at high biochar concentrations [9, 10]. Based on the five Oregon soils we have worked extensively with (ranging in texture from silt loam to loamy sand), disappointingly, we have only found very small improvements in plant-available water storage [11, 12]. We have only observed consistent increases in soil water content near-saturation, though because this water is generally not part of the plant water budget, it likely won't help to conserve water resources.

Does biochar sequester soil carbon?

On the other hand, here is something a bit more positive: biochar may provide meaningful carbon sequestration [13]. One of the challenges of trying to store soil carbon in working lands is impermanence: years of gains from using cover crops and no-till can be wiped out by a bad drought, or by resuming tillage. But biochar is inherently different from uncharred organic matter because it has been thermochemically converted to a form that is very stable and resistant to microbial decay. And while there is an energy requirement to produce biochar, life-cycle analyses generally support the notion that biochar used as a soil amendment provides net carbon storage [14].

From a soil-health perspective, this chemically-stable biochar is not available to support microbial activity. But this is actually one of biochar's most important characteristics. With uncharred organic matter there is a dilemma: should we manage soils to hoard that carbon and allow it to build up, or should we use the carbon, and encourage the microbial activity that decomposes it [15]? But because biochar is persistent, it can accumulate and provide many of the ecosystem services that high levels of uncharred soil organic matter would provide—such as improved soil structure, water retention, and climate stabilization. And biochar carbon can persist while soil microbial activity simultaneously flourishes on uncharred organic matter.

Photo demonstrating how activated carbon can be used to remove pollutants, in this case a dye (right). Credit : Wikimedia Commons

What should biochar be used for in the PNW?

The high cost of biochar relative to its near-term benefits may make biochar difficult to integrate into field-crop agriculture. Other methods of regenerative farming may be more accessible to farmers looking to increase soil organic matter and improve soil health. Nevertheless, biochar does have many promising applications, particularly in environmental protection and restoration.

For instance, biochar appears to be very useful in strategies to reduce nitrogen pollution. Experiments that have added biochar to manure, municipal compost, landfill leachate, and to nitrogen-retention media, have all shown improvements in nitrogen retention, reduced leaching of nitrate,

and reduced gas emissions – all of which protect clean air and water. The high pore volume of biochar, its high C:N ratio, and its ability to facilitate the complete reduction of NO_3 to N_2, all appear to be factors in these improvements. In addition to nitrogen pollution, biochars have also proven very effective at retaining many organic pollutants, antibiotics, and heavy metals, and are thus being actively explored for remediation efforts in the PNW and beyond.

Ideally, the remediation uses for biochar could be paired with sustainable biochar production. In the PNW, many ecological restoration efforts entail removal of woody biomass, which could be used as biochar feedstock. For example, removal of Douglas fir to restore oak woodlands in the Willamette Valley, removal of Western juniper from sagebrush-steppe ecosystems, and thinning of managed forests on both sides of the Cascades, all produce low-value woody biomass. A number of environmental professionals in our region are exploring options for mobile biochar production, to try and produce a product of value, and with less smoke then the open burn piles typically used to treat woody biomass. However, these projects require capital investments, and the economic feasibility of producing biochar generally hinges on how far the material needs to be transported (often pretty far), and how much the biochar product can be sold for (often not enough).

So, while we aren't seeing a lot of these projects move into a commercial phase just yet, there is a lot of interest and creativity going into evaluating biochar for environmental restoration activities across the Pacific Northwest. And that's a good thing.

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Note: All photos were added by the editor, VWA.

Unexpectedly Moving

Submitted by Markus Kleber

Google says 'Art' is "*the expression or application of human creative skill and imagination, typically in a visual form such as painting or sculpture, producing works to be appreciated primarily for their beauty or emotional power".*

Treefall by Andy Goldsworthy. Photo Credit: Akos Kokai ; Wikimedia Commons

To me, the beauty and emotional power is the important element in this definition. We have all walked past paintings, sculptures or fancy buildings that left us untouched, despite the fact they were designated and often very expensive pieces of 'Art'. So my very personal view of art is that of an experience that finds a way into the deeper layers of the mind to release thoughts, ideas and emotions I am most often not entirely prepared to process.
As a result of such exposure, established truths and firm convictions are questioned, inconveniently including such that are part of me defining myself. The experience is both exhilarating and frightening, as it opens new doors as much as it reveals obsolete convictions. To me, exposure to a true piece of art involves a moment of taking a new look at some inner workings of the mind and feeling a resulting urge to move in a new direction.

During our winter meeting, James made a big fuss of showing this film about an artist doing environmental art and land art. It was planned as an after hours event in the evening and I have to confess when the moment came around I was not really in a mood to attend, having settled next to a fireplace with a cold beer (Thank you, Alan!) after a long day of listening to talks and presentations. Eventually I was dragged away from the fireplace and pulled across the lawn to watch Andy Goldsworthy trudging through a hedge, oblivious to, or uninterested in the perfectly functional sidewalk next to it. The crazy thing is, I found this silly only for the length of about three seconds time.

Instead, in what seemed to be an instant, I was captivated, pinned to my chair and registering a massive intrusion of powerful images into my mind. The images were of a kind I had never seen before, and many of them penetrated deep, down to the brain stem. The project that touched me most was the fallen tree that was used again and again, over many years, as some sort of perpetually transforming background for renewed artistic appreciation. The crazy thing about this was that, despite the complete lack of openly expressed theme or program, all those subsequent morphings of the tree made total sense - yet how can a picture, a photograph, an image ever "make sense" ?

A scene from *Leaning into the Wind* wherein Goldsworthy uses his mouth to forcibly eject flower petals which he has gathered .

I did not sleep much that night and awoke the following morning to a world that seemed different than the day before. And not because there had been a bit of snow.

MaK

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