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Interested in submitting an article? Reach out to Kayla Seaforth kseaforth@b-e-f.org

Photo Credit: Friends of Tualatin River National Wildlife Refuge

Treeline aims to: Engage PNW restoration practitioners, nursery partners and researchers who work for or represent tribes, indigenous groups, non-profits, agencies, businesses and more. We gather, disseminate, and discuss information and knowledge across a broad region.

The Hope Issue

This issue of Treeline focuses on the stories and innovations that are bringing hope to federal, state and local agencies, tribes and NGOs.



Photo Credit: Jeff Gersh



Klamath Basin Revegetation

Interviews conducted by Kayla Seaforth, BEF

The November 2022 decision by the Federal Energy Regulatory Commission (FERC) to approve the removal of four dams on the Klamath River set a series of events in motion, which dozens of stakeholders have been preparing for over the course of the last two decades. Tribes that have stewarded the Klamath basin since time immemorial including the Yurok, Karuk, Klamath and Hoopa have led the fight for dam removal, and intend to be involved in the long term stewardship of the basin. The Yurok Tribe is the project lead for post-dam revegetation, with Joshua Chenoweth leading the project. Brook Thompson is a Yurok and Karuk tribal member and a restoration engineer for the Yurok Tribe. This interview took place in two parts, with Joshua first sharing details about the project, and Brook sharing her experience with the culturally significant species and landscape that the project seeks to restore.



Part I: Joshua Chenoweth

KAYLA: Tell me a little bit about your background and how you got involved with this project.

JOSHUA: I worked at Olympic National Park from 2001 until 2018, including my work on the Elwha dam project from 2007 to 2018, while also working on my Master of Science degree. My thesis specifically looked at revegetation of the reservoirs post-dam removal and the possibility of a seed bank germinating from the sediments. Elwha dam removal started in 2011 and our revegetation plan called for a seven year planting and seeding effort. During that project, the Klamath team came up to tour the Elwha and learn from it. The Yurok Tribe was represented by DJ Bandrowski, who approached me about coming down and doing this work, which I eventually did.

KS: How does the post dam landscape differ from other sorts of ecological restoration?

JC: Restoring a reservoir after drawdown is quite different as far as revegetation goes, compared to other kinds of



Elwha River floodplain through former Lake Aldwell lakebed. Photo Credit: Clallam Conservation District

projects. If you're restoring an old field that was left fallow, you've usually got a legacy of invasive species. There's a lot of history in the soil you have to deal with before you can convert it to something that you desire. What's nice about a dam removal project is it's a brand new landscape. It's not completely devoid of influences, though. Seeds from wetland species remain viable underwater and accumulate. Those species played an important role in the Elwha, dominating the understory vegetation for several years post-dam removal. In the case of the Klamath, any wetland species that do germinate in the uplands are unlikely to persist as long as they did on the Elwha because the summer environmental conditions are much more extreme.

Any vegetation that germinates from a seed bank will provide a boost to revegetation, even if the species are not suited to that habitat. Plants provide organic matter, the roots will begin the process of breaking up the sediments, paving the way for new species to establish.

KS: This project covers a vast and highly altered area. How do you conceptualize a revegetation project of this scale?

JC: The large scale adds complexity but the most important thing to do is to make sure you have enough materials to plant. How do you get the material? Where does it come from? How do you propagate it and get the volume you need? That's the first challenge. The second challenge is understanding the complexity of vegetation communities. Understanding the local vegetation and communities provides the basis for your plant palettes. The next step is to locate suitable seed sources for the selected vegetation and, over a period of several years, collect the seed. It is a long process. Producing material takes a minimum of five years for something of this scale. Seed collection and propagation for the Klamath started in 2018 and is expected to continue through at least 2025.

KS: Can you dig into that process of acquiring plant materials a little more?

JC: You cannot find 10s of thousands of pounds of suitable native seed commercially required to seed large

projects. Commercially available native seed can be hard to find and species diversity is limited. To meet this need, we employ seed increase or seed augmentation propagation, where seed is collected from wild sources in the watershed to ensure the genetics of the material are adapted to the project area. Since wild seed collection alone can never provide the amount needed, the seed is sent to specialized nurseries with agricultural fields designed to augment the seed. This process may be repeated over time, fields expanded as needed or new species added, until the volume needed is reached. For this project, we're looking at anywhere from 40,000 to as much as 80,000 pounds of seed, which, for the species we are producing, equates to roughly 19 billion pure live seeds. As you can imagine, no single facility could do that in a year or two, or even three. Instead, a project of this size requires multiple facilities over a period of several years to meet the need. From 2019 to 2020, this project contracted with three separate vendors in two different states to produce around 24,000 pounds of seed in harvest year 2020 alone. Production varies by year and can be adversely affected by climate and other factors. The seed produced by seed increase propagation will be used to direct sow into the reservoirs during and after reservoir drawdown.

Seed is also collected in the wild to produce trees and shrubs for planting into the reservoirs once they are drained. Trees and shrubs can be produced as container stock, like you find at your local nursery or as bare root plants, which is the most common plant material used for fruiting trees. Most of the production for the Klamath will be bare root because they tend to be more affordable and are light and easy to move around the landscape. Bare root production requires many years depending on the fruiting habits of each species. If seed is consistently available annually, it takes at least two years to produce a bare root plant. Some species do not produce significant seed in the wild every year. These are called masting species, which produce seed in cycles every two to three years. Sometimes species don't produce seed due to drought and heat or poor pollinator conditions. All of these factors complicate seed collection and for large projects that



*Plot surveys allow managers to quantify vegetation cover and other metrics.
Photo Credit: Joshua Chenoweth*

require large volumes of seed several years of collection is needed.

Plant propagation is more an art than a science and requires an adaptive management approach. A lot of important native species are not commonly propagated and require experimentation by nurseries. As a result, some species have failed to germinate or germination was spotty, and other situations where germination exceeded expectations, resulting in more plants than ordered! As you can imagine this can change our planting plans considerably.

KS: Does the revegetation plan take climate change into account with considerations for reduced snowpack/summer flow, species range expansion, assisted migration, or other adaptation strategies?

JC: There has been some discussion around assisted migration, but we are not going to do any of that. My answer to that question of "how do you deal with the fact that it's going to be basically hotter and drier?" is; introduce as many suitable native species as possible since climate change impacts are hard to predict for every species. Planting a wide diversity of species improves the odds that at least some of our planted species

will thrive in the changing conditions caused by climate change. For a dam removal project, climate change is not the only environmental challenge. Fine sediments that have accumulated in the reservoir over the last 80 years are a novel substrate for local flora, they are not well-developed soils typical to regional plant communities. In the Klamath, the reservoir sediments are predominantly silt and clay that are as deep as five feet in some locations. The substrate and the changing climate are both important considerations.

KS: On the soil side, are you doing any sort of amendments or mulching to increase nutrient availability?

JC: That's a tricky one, when you're talking about 2,000 acres. We have looked at whether we could cover the landscape in straw or mulch, and we are not taking any of that off the table, but it's not going to happen on the scale of 2,000 acres. Any soil manipulations, amendments, top dressings, will happen at a smaller scale in specific locations. Our approach to planting is going to be a high species diversity planted in what we're calling 'facilitation patches'. Facilitation is the idea that plants clustered close together facilitate survival in hot, dry environments. Humidity is higher in high density patches of plants, reducing water loss due to evapotranspiration which is greater in dry, windy, open areas. Clustering plants together increases humidity within the patch and minimizes wind effects.

Facilitation patches are going to vary in size; between a quarter of an acre and an acre. We are producing 300,000 plants, which is not a lot for 2,000 acres. By clustering our plantings in patches we not only increase survival rates but focus our resources in discrete locations that can be irrigated, intensively controlled for invasive species or provided soil amendments that could not be accomplished on the entire 2,000 acres. Patches will be positioned in high priority riparian habitats and tributary areas as well as upland areas, particularly oak woodlands. The entire 2,000 acres will be seeded at least once, but only facilitation patches will be planted with trees and shrubs.

As far as trying to determine species suited to the silt and clay substrate,

again, that's where introducing diversity is the best approach. Plant trials in the sediments often cannot accurately mimic the conditions in the field. On the Elwha dam removal project, several species that failed to grow in the sediment trials thrived in the sediments after dam removal. Sediments in containers or raised beds behave differently compared to landscape-scale substrates. Substrates confined to containers or raised beds heat and dry out at different rates and connectivity to water tables and soil biota, including fungal communities that are crucial to some species survival, are limited. Instead of plant trials, introducing diversity of species and monitoring plant performance after planting will provide us with information to adaptively manage the restoration project during the five year maintenance and monitoring period. This may include planting new species or re-focusing our plantings to species that are proven to thrive in the sediments.

KS: What are your strategies for invasive species control and project monitoring?

JC: Before the site is exposed by dam removal, the goal is to treat invasive exotic species close to the project area to minimize the abundance and potential seed dispersal after dam removal. Invasive species are abundant in the area and cannot be managed in the entire watershed; instead, we are creating a buffer along the shoreline. The buffer is 50-100 ft wide and located in grasslands and along riparian corridors that harbor the most abundant populations of high-priority invasive species. We started creating these buffers in 2021 by mowing invasive grasses. Mowing for 2-3 years will exhaust the seed bank and result in a decline in abundance for these species. We have found a reduction after only 1 year of over 70%. However, other invasive species in the grasslands, including yellow starthistle, are not controlled well by mowing, and in those cases we use a combination of grubbing the roots and targeted herbicide application. Once dam removal starts, we'll continue work within the buffers to prevent passive seed from invasive species entering the reservoirs. However, prevention is the best control and seeding native species has proven to minimize non-native

species abundance after dam removal. Our control efforts will shift over time from buffer areas to removing invasive species from the reservoirs.

The monitoring piece is also of critical importance. The monitoring plan is designed to provide managers with data to adaptively manage the project and monitor our successes or failures. Part of the permitting for this project required establishing 'success criteria'; metrics with quantifiable targets that must be met for the project to be considered successful.

The success criteria are going to measure four things; species richness, vegetation cover, invasive species abundance and woody stem densities in planted areas. These metrics will be surveyed in all vegetation types within the former reservoir footprints and will be compared to data from reference plots established in communities found in the surrounding area. A critical element in our monitoring will be areas left unplanted and unseeded. These control areas, up to 10% of the dewatered reservoirs, will also be monitored and compared to the seeded and planted areas. This will give us a chance to see how unmanaged areas respond, which will give us a true sense of how effective revegetation actions are. Control areas will be treated for invasive species.

KS: Can you speak to the various partnerships in place that are making this project possible?

JC: The Klamath dam removal is a complex partnership between many entities. The project owner is KRRC, which is Klamath River Renewal Corporation (KRRC). They are a nonprofit created exclusively for this project, run by a board with representatives from the state governments of California and Oregon, the Yurok Tribe, the Karuk Tribe, commercial fisheries organizations, and conservation organizations such as Trout Unlimited, a primary advocate for this project. The contract for dam removal is held by Kiewit Construction responsible for all the civil engineering, facility removal work, roads, etc. All restoration work including revegetation is a contract held by Resource Environmental Solutions (RES). RES has subcontracted revegetation work to the Yurok Tribe.



Part II: Brook Thompson

Brook's reflections in this interview are her own, they do not represent the views of her tribe, other members of her tribe or native people as a whole.

KAYLA: Dam removal represents a huge shift in the landscape of the river basin, from land underwater to a return of riparian and upland plant communities. What does that shift mean to you?

BROOK: When it comes to native plants and restoration, some of the things I care about as an Indigenous person are gathering and collecting to do traditional crafts and medicine, but a lot of times, there are also restrictions on where we're allowed to gather. Having these native plants in the area may be beneficial, but also a lot of native plants have evolved to have interaction with people and

Indigenous parties that actually helps them grow a certain way that becomes beneficial to us and them. A lot of basket gathering materials are that way. Over generations we helped train them to be ideal basket materials, but that also helps out the plant along the way. When it comes to native species, I also think of restoring our pollinators and helping with supporting the bee populations in the area. I think of the interconnectedness of restoring wildlife, like birds and smaller critters like moles and skunks and porcupines, and providing more food for them to forage. Restoring the landscape and encouraging native plant growth following dam removal is about giving not only the plants an extra chance, but all the animals that are connected to the plants an extra chance too, which will then help build a better ecosystem. It creates a positive feedback loop, in which all parts, including the Indigenous people, help each other.

We have what we call the "Yurok mindset" in our language, it gives plants the sense of being in personhood. That inherently comes with importance and respect. You're not just going to treat a plant like an object, which I feel has been the case for a lot of time in Western history, but as a being that deserves respect and communication, like you would with anyone else. It's like the golden rule, treat other people how you want to be treated, just applied the same to plants and animals.

Where I'm from, at the mouth of the Klamath River, there are theories around the salmon and the redwood trees where the large salmon that used to be there laid the groundwork for redwood trees to be able to grow in Northern California, they acted as a fertilizer. The water and the land are definitely connected to one another, they affect one another in the ecosystem. There are a lot of animals that interact in between the water and land that help make that connection. For example, when bears pull salmon out of the water, they leave the carcasses on land, which also helps build soil nutrients.

KS: Are there any plants that you're working with that you're excited about putting back on the landscape?

BT: We are replanting 103 species in this project, and a lot of these native plants aren't well studied because they don't have a lot of benefit commercially or maybe they're not fun to plant in the garden at home. Because of that, they're not as well studied as some other plants, even though traditionally, a lot of the tribal people would know these plants very well. Things like when they bloom, where they grow best, when they like to be picked, how much you can pick, etc. Having Indigenous people work on this project helps to reestablish that connection.

As far as specific plants, the serviceberry has been really fun because that's one



Iron Gate Reservoir. Photo Credit: Joshua Chenoweth



Removing invasive plants like the scotch thistle pictured here is hard work, but necessary to ensure successful revegetation.

of the plants that I've been picking and have gotten to know really well, it almost feels like a friend.

If you hired a crew that wasn't Indigenous for a job like this, you wouldn't get the same quality of work because a lot of the Indigenous people here enjoy spending their time trying to understand the plants. It's not just about the job and getting the paycheck at the end of the day. They're doing it for an almost spiritual connection. They're talking to the plants and letting them know what they're going to be used for. It's based on a deeper relationship and understanding than it might be if someone is more worried about getting a paycheck.

Other plants that are important to me are Oregon grape, which has medicinal properties. Elderberries are a super important medicinal one, too. A lot of the species we are planting are less basket weaving plants but more so medicinal plants. Chokecherries are great food too. Even things like Doug fir, the spring tips can be used in teas that have vitamins and can be essential for nutrition. We can't eat them, but I also like snowberries. I don't know coyote bush well, but I love the smell of it.

KS: What are your thoughts and hopes for long term stewardship of these ecosystems?

BT: For me, a really essential part is Land Back, which a lot of people assume means getting property title transferred to tribes, which is not necessarily what Land Back means. It more refers to the management style of the land. For example, before National Forests were established, a lot of us lived in those areas, until Teddy Roosevelt and some of the Sierra Club founders helped

pioneer the National Forest System. He disliked Native Americans specifically, and thought we were hurting the environment. This idea, which comes from colonization, that wilderness is pristine and untouched is not the truth. Because of that, we were taken off the land that we had been managing, and then we got larger fires, and a lot of plants struggled because of it. So, to me, if future restoration includes letting Indigenous peoples on these lands again, understanding that when we do things like gathering, because we have these Indigenous values and understanding of management, it's not the same as the Western sense where you're going to try to get everything you can and only care about yourself and not future generations. I'd like to see that care be put back in Indigenous hands, and us being allowed sovereignty over our decisions about how we take care of these landscapes that we had a relationship with.

I think long term management needs to seriously consider things like what happens with cows and wild horses, because they can be really destructive to native plants. A lot of cows free range in Oregon and California and they really like how the native plants taste, so they'll uproot all these native plants that then leave room for invasive species to spread in. That will be something that we need to take into consideration long term.

Indigenous management is not doing this for five years, and then moving onto the next project. You want to be multigenerational. I think you can only really expect that if you have Indigenous people who are invested in this area, versus someone who sees it as just a job. Projects can really be in flux with funding from year to year, and who is elected who might not have the complex historical understanding needed. It's really about trusting Indigenous people and giving us the access to manage our traditional homelands.

KS: Anything else you'd like to share?

BT: I'd like to stress the importance of hiring Indigenous peoples, and that skills aren't always going to be a certificate on a resume. Understanding that Indigenous values, knowledge and diverse backgrounds are really

important. And statistically having diverse backgrounds is also financially and creatively beneficial to everyone. But yet, when we apply to jobs as Indigenous people, so often despite having skills that we've learned through our traditions and our lived experience in these places, they'll just get looked over as not being as valid as other education or experiences. I don't think that helps anyone. Lived experience is important when applying these restoration techniques.

One other thing I would add is that with reestablishing the connection with these plants, and having more of Indigenous plants, one thing to consider is with Indigenous health, that a lot of us don't have the access to traditional medicines, adequate health care, or good and healthy foods. Helping restore these plants also helps to restore our health as Indigenous peoples. If we can gather more traditional medicines, having access to these plants that are super rich in vitamins that help supplement our diets will create healthier people overall.

Bios

Brook Thompson is a Yurok and Karuk Native American from Northern California. She is a Ph.D. student at the University of California Santa Cruz and works as a Restoration Engineer for the Yurok Tribe. Brook earned an M.S. at Stanford University in Environmental Engineering with a focus on Water Resources and Hydrology, and a B.S. in Civil Engineering, with a minor in Political Science from Portland State University's Honors College. Brook aims to bring together water rights and Native American knowledge through engineering, public policy, and social action.

Joshua Chenoweth's career in botany began in 2001 after leaving New York City and a career in television. In the ensuing 22 years, he worked on a variety of restoration projects from coastal wilderness and degraded subalpine campgrounds for Olympic National Park in Washington State to riparian and upland restoration projects on the Klamath, Trinity and Sacramento Rivers for the Yurok Tribe. He earned a Masters in Science degree in Restoration Ecology from the University of Washington in 2007.

Landowner Partnerships in Restoration Projects

Deep gratitude to all of the landowners and project sponsors that contributed to this article, and more importantly, improved habitat across the Pacific Northwest.

Picture this: a major river flows from its headwaters out to sea, fed by tributaries that deliver cold, clear, unpolluted water. Traveling down the river, you can't discern where one riverfront property ends and the next begins because the riparian zone is well connected and healthy. Salmon leap beneath you as they make the trip upriver to spawn and eagles lurk nearby, ready to feast on the wasted carcasses.

This scene exists in few places outside of mountainous tributary streams, too remote for development. However, work is underway to restore many watersheds to a state that is healthy enough to sustain the species that define our region, as well as support the agricultural systems vital to community health by supporting pollinators, stabilizing stream banks, filtering excess nutrients and pesticides, and promoting groundwater recharge.

This critical work depends upon willing landowners from all different backgrounds to make projects happen, and this requires trust. When it comes to sectioning off a part of their land for habitat restoration, some landowners have questions, needs and concerns. The stories below are from landowners who worked through their reservations and eventually came to host successful habitat restoration projects, with the support of local riparian enhancement groups.



Water Conflict Management Class field trip. Photo Credit: Marys River Watershed Council

LANDOWNER NAMES:
Chris and Julia Hickey

PROJECT SPONSOR:
Lower Columbia Estuary Partnership

RIVER/STREAM REACH:
Gibbons Creek, part of Steigerwald Reconnection Project



Tell us about the project that you hosted.

We granted an easement to Lower Columbia Estuary Partnership (LCEP) that allowed them to remove two bridges and a dam on the stretch of the creek that ran through our property. The crew also replaced one of the bridges. They also removed what some folks have called the largest bamboo forest in the Portland metro area and replaced it with native plants. We are also a part of the dike setback that happened; the former dike along the Columbia River was removed and the new dike now ends in our backyard. It's not that

noticeable but it did change the layout and feel of our property.

What were your initial reservations about hosting a restoration project on your land?

The head dam that previously existed allowed us to pull water to irrigate our property, so with the proposal to remove it we were worried that we wouldn't be able to irrigate things as we once had. We were also worried about losing the wind protection and privacy screening that the bamboo forest provided, as well as damage that might occur to the large trees and old growth rhododendrons on our property as the construction got underway.

What were the deciding factors that informed your participation or changed your mind?

LCEP purchased an easement, which allowed the project to take place while we retained ownership of the property. The easement doesn't allow the public to access our property, and it lets us stay here and enjoy the wildlife that we hope will come back to the area with access to better habitat. We were also very involved in planning which native plants would be installed so that we could preserve our view and still have a privacy and sound barrier.

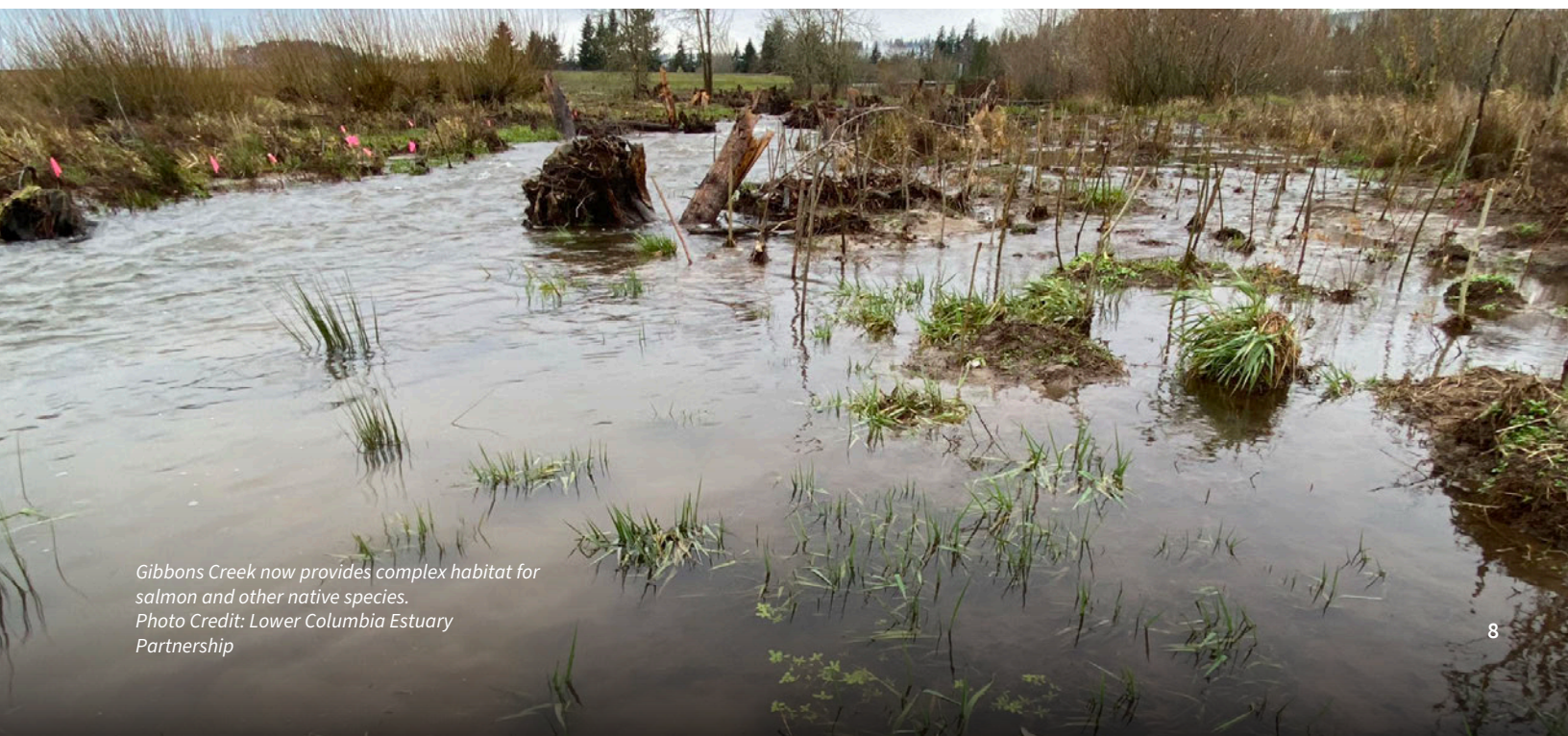
The crew was able to do all of their work without affecting a pond that we have on site, which was important to us. They also avoided damaging the large trees on our property, and even transplanted the 70 year old rhododendrons that are now thriving in their new spot.

How do you feel about the project now that it's been completed?

I feel lucky, I feel privileged. We went from having an out of control bamboo forest and a field and stream full of blackberries to a restored creek that's closer to its natural condition. It had been bulldozed into a channel, and now it's flowing freely. The beavers will come in and build dams, and I hope it will turn into something special. In the long run, I hope that anyone who lives here after us will enjoy seeing chinook and steelhead spawn in the creek rather than having the bamboo forest that was here before.

What advice do you have for other landowners who are on the fence about hosting a restoration project?

I would say document all of your concerns, and then allow the team to address them. The project managers were very receptive to all of the concerns that we have, so once we brought them up they addressed every one.



*Gibbons Creek now provides complex habitat for salmon and other native species.
Photo Credit: Lower Columbia Estuary Partnership*

LANDOWNER NAME:
Tisa Wecht, landowner

PROJECT SPONSOR:
Marys River Watershed Council

RIVER OR STREAM:
Shotpouch Creek



Tell us about the project that you hosted.

The Watershed Council reached out to us a number of years ago to have a meeting about potential projects. I was very hesitant because it sounded too good to be true. Eventually, we sorted things out and they did a project that included large wood placement in the creek, bank pull backs to naturalize the slope, a bridge replacement, native plantings, off channel livestock watering system installation, and livestock fencing installation. Altogether around 8 acres were planted. We have been so happy with the project, and have talked with lots of other landowners, youth, research groups, and so many other folks about

what worked well and what we might have done differently.

What were your initial reservations about hosting the project?

At first I was suspicious that this was a ploy to take the land, or restrict my use of it. We also had some pushback from livestock operators who leased the land. The project really seemed too good to be true, so I thought there had to be some kind of catch.

What were the deciding factors that informed your participation or changed your mind?

I talked a lot with the folks at Marys Watershed Council about how the stream was functioning, and how it was supposed to function. It was very incised, which was actually causing parts of the bank to fall off every year, and I was losing between 2 and 5 feet of pasture land every winter when it flooded. They provided me with so much great information and resources so I could understand how to utilize the natural floodplain.

The Watershed Council folks also let me tour past projects that they've done, which was helpful to see how it all

comes together. That experience also encouraged me to volunteer to be a showcase property for other landowners to come and see how projects actually look on the ground and speak candidly to them about what the process is like. I really like being able to do this because I have witnessed incredible changes to the water and I will always support it.

How do you feel about the project now that it's been completed?

We are very happy with the project. It has been great to see the wildlife come back to the creek; we have a resident kingfisher that didn't come around before, which tells me there are fish for them to eat. We've seen all kinds of wildlife that weren't there before: herons, raccoons, cutthroat trout in the creek.

What advice do you have for other landowners who are on the fence about hosting a restoration project?

I would advise landowners to attend the meetings and really listen to the people who will actually be doing the work, to walk the creek with the project managers and hear what it is they are thinking about. They can get into the specific concerns that you have and talk about how to address them in the project.

Bank Pull Back Progression. Photo Credit: Marys Watershed Council



LANDOWNER NAME:

Steve Van Grunsven, Farmer, Agronomist, and TSWCD Board Member

PROJECT SPONSOR:

Tualatin Soil and Water Conservation District

RIVER OR STREAM:

Dairy Creek



Tell us about the project that you hosted.

We partnered with Tualatin Soil and Water Conservation District (TSWCD) to host a 12 acre riparian enhancement project on our farm on Dairy Creek. We sectioned off areas of marginal farmland, primarily in frequently flooded areas to establish a buffer that varies from 50’ to 150’. The District considers it a 12 acre project, but I really think of it as only using up 3 or 4 acres of viable farmland since so much of it was in areas that we can’t use for perennial crops. The project also included an 8’ herbaceous pollinator plant buffer between the riparian area and the active farmland, which allows us to farm right up to the border of the project area without having to account for tree and

shrub roots, or deal with shading and debris that can come from trees.

What were your initial reservations about hosting the project?

Prior to me taking over the operation, my father-in-law operated the farm. He was also on the board of TSWCD, but during that time the economics didn’t pencil out — it would have been a financial loss to take these areas out of production and enroll them in a riparian protection or enhancement program. We also have some uncertainties of what the farm will look like in the future, so committing to any long term project carries some risk for us.

Through my work as an agronomist, I’ve talked with other farmers who are fairly hesitant to engage with government organizations because of the strings that are often attached to various funding sources. It’s also important to remember that farmers and habitat restoration folks may be operating under different definitions on a lot of the touch points in these projects. For example, the weeds that the TSWCD are concerned about in their project areas may be different from weeds that someone growing crops wants to keep out of their fields. If someone is growing a seed crop and 1% of that crop is contaminated, that’s a loss in value for that product. I brought a list of weeds to Mike, the project manager, and he shared concerns on

about half of the plants on that list. However, he heard me out and made considerations for the weeds that could affect our operation, that he otherwise wouldn’t have tried to control on the project site.

What were the deciding factors that informed your participation or changed your mind?

We’re lucky in the Tualatin Basin to have a well funded Soil and Water Conservation District. Thanks to a combination of state and federal dollars, as well as a large tax base, we are able to offer compensation for enrollment in projects that protect and enhance riparian areas. These payments allowed us to justify taking the areas we enrolled out of active production, while providing habitat benefits for fish, pollinators and other wildlife. Trust in staff at the district has also been a large motivating factor for me. I know they do good work, and are willing to hear out my concerns to design a project that works for everyone.

The TSWCD also offers contracts of different lengths, and I really appreciated that flexibility. It’s hard to say what farming here will look like in 30 years, so being able to re-evaluate things when our contract is up after 10 years gives us the ability to decide if it’s still the right program for us or consider changes that could be made.

How do you feel about the project now that it’s been completed?

I feel like it’s been working well. I have really great communication with staff at TSWCD and have appreciated their willingness to make the project work with my needs.

What advice do you have for other landowners who are on the fence about hosting a restoration project?

Communication is key. The Conservation District staff are interested in what is valuable to you as a landowner, and they’re willing to take your needs into account. They have their own goals related to watershed protection, but there is almost always a middle ground that can be found between the farmers and the district.



Herbaceous pollinator strips make good neighbors. Pictured is the strip of pollinator habitat that provides a flexible management areas between the riparian zone and Steve’s farm land. Photo Credit: Mike Conroy

Data Backed Engagement

Several local watershed restoration groups have sought to determine what motivates landowners to participate in restoration projects, and what barriers to participation exist. To do so, they have conducted interviews with landowners in their areas covering a range of topics to better understand attitudes toward riparian restoration. These factors vary significantly based on local conditions, politics and resources, and the studies discussed below were not designed in a way as to draw conclusions to the larger population, however they may provide a helpful starting point for other groups hoping to dig into more focused landowner engagement.

In the Tualatin Basin, the Tualatin Soil and Water Conservation District (TSWCD) commissioned a Program Opportunities Report, which was prepared by Stamberger Outreach Consulting. This place based survey of landowners with streamside property found that participants reported natural beauty and wildlife as the elements they valued most about their land, with privacy and historic connection to land also coming up as common values.

TSWCD also gathered responses from landowners who were currently enrolled in one or more of their riparian enhancement programs. The major incentives for participation in these programs were help from TSWCD with vegetation management, protecting

clean water, improving fish and wildlife habitat, and preserving natural resources for future generations. Landowners who had not participated in programs were also surveyed, and while the sample size was too small to draw representative conclusions, responses to barriers to participation may provide opportunities for further exploration. The top barriers this group cited were concerns about government rules and regulations, complicated paperwork and enrollment processes, and uncertainty about project effectiveness.

A similar report was commissioned by Skagit Conservation District in Washington, which was funded by the Department of Ecology and designed by Triangle Associates and Peak Sustainability Group. The goal of this study was to gather insight that would help design a pilot program for voluntary landowner restoration projects in which the needs and desires of landowners define the structure of the program. After reviewing relevant literature surrounding landowner engagement, the study leads pursued interviews using principles of community based social marketing to understand the underlying assumptions, perceptions, attitudes, preferences, motivations, and barriers that impact why people make the decisions and choices that they make. They targeted landowners or land workers associated with property on streams or tributaries to the Skagit River where summer water

temperatures reach levels that exceed what is hospitable to salmonids.

The report identified several common motivations for and barriers to participating in habitat enhancement projects. The top goal that participants cited was maintaining agricultural productivity on their land, followed by providing habitat for wildlife. Financial incentives to compensate for lost productivity or farm revenue was number one motivating factor for participation. Interviewees also stated they would be more likely to participate if funding or labor was available for project maintenance.

The barriers that respondents identified were fixed streamside vegetation widths they perceived to be inflexible in the programs currently available to them, complexity of enrollment processes, distrust or skepticism of government organizations, a feeling of a lack of autonomy over the land, and a lack of available funding for project maintenance.

Specific programs vary from watershed to watershed, and intersect with all kinds of political differences, economic disparities, cultural norms, historic relationship to land and more. By understanding the specific forces at work in any given place, and the common themes that cross boundaries, project proponents may be able to knit together the kind of habitat that is needed for an uncertain future.



Photo Credit: Marys River Watershed Council



Trauma Informed Approach Works to Build Bridges and Increase Safety

Interview between Monty Woods, Park Operations Manager at Portland Metro and Hannah Buehler, BEF Watersheds

HANNAH: Can you give a brief overview of your role and work at Metro?

MONTY: I'm a park operations manager, I work with the operations team within parks and nature at Metro. I work with a team of park rangers and park workers, and we try to create welcoming places for people to connect to nature close to home.

HB: How do you and your team use trauma informed approaches in your day to day operations?

MW: Over the last six or seven years since I learned about trauma informed care, it has taken a central role within the operations at Metro. Trauma informed approaches come into play in a lot of different areas, whether you're talking about our recruitment materials, our interview process, staff interactions, or the way staff interact with the public and provide customer service. I think trauma

informed care plays a very important role in all those activities.

HB: Can you give a few examples of what that type of trauma informed communication looks like at those different levels?

MW: In terms of recruitment, we recently started providing copies of the questions that we're going to ask in an interview setting 24 hours in advance. It provides our interview subjects a much better opportunity to prepare themselves and understand what we're looking for. We've gotten great feedback that providing questions ahead of time lowered the anxiety of the interview process and gave people a better opportunity to demonstrate who they are. With staff interactions, we've embraced a peer to peer support process as we review or follow up on serious incidents that occur. When we interact with the public, we're

training staff to use a trauma informed approach to increase the value in those interactions and better understand people's experiences. This allows us to better anticipate the emotional response that may occur when we enter into those interactions. Hopefully, we can avoid retraumatization by making our intentions clear early in the interaction.

HB: What does park rules enforcement look like for your team when using trauma informed approaches, both with unhoused community members and other folks using parks and natural areas?

MW: For us it's about making sure that we're establishing trust early on in the communication. Having an opportunity to connect personally is really important. Typically, we've always introduced ourselves at the beginning of engagement, but with a trauma informed approach, we may



Monty Woods

Park Operations Manager at Portland Metro

Monty Woods is a Park Operations Manager for Metro Parks and Nature whose focus is protecting clean water, restoring fish and wildlife habitat and connecting people with nature close to home. Monty enjoys working with the operations team at Metro to provide safe and valuable opportunities for visitors to enjoy the incredible natural and historical resources the Portland-Metro region has to offer. With over 20 years of experience supporting operations and maintenance in a park setting, Monty has worked to improve existing park facilities, plan new access, and to improve staff training and development. When he's not managing popular park destinations, Monty enjoys trail running, good books and music, and spending time with family. He currently lives in Corbett, Oregon with his wife, two kids, and two dogs.

ask a few other questions to determine what that individual's past experience has been either with uniformed law enforcement staff or park workers or park professionals in general, again, just to avoid retraumatization and to be able to anticipate the emotional response. We may say 'have you worked with a Metro park ranger before?' Or 'is there anything that I can do to make this process easier for you?' Especially if it's not necessarily clear what factors are of concern for the individual. We want to empower individuals to have a better understanding of our work and intentions through transparency and creating a connection from the

Many land and water stewards have the complex job of managing and improving habitat in areas where people are sheltering outside. Our friends at Johnson Creek Watershed Council recently published a statement sharing their position on sheltering in riparian areas, which you can view on their [website](#).

beginning. This establishes trust. Then we move to getting a collaborative conversation going, that'll get our staff where they need to be and inform individuals as to what our rules are, so they can make the best decision to succeed in that interaction.

HB: How have trauma informed approaches shifted outcomes that you see from rules enforcement and engagement with community members?

MW: It has made a profound impact when you deploy this method of communication. You can see that people are very responsive and receptive to staff making an effort to make a connection. I think, once they see that demonstrated from our team, there is this immediate trust component that's established. They may still not quite be sure what we're after, or where this conversation is going, but they do notice that we're coming at it from an angle where we're concerned about them personally and that we want to make sure that the outcome that we get to is the best it can be for both them and us, and that we want to have a collaborative conversation to reach that outcome. I think that approach, as opposed to the one sided communication often used in law enforcement, it's produced a much better outcome. People are generally much more responsive to our requests if they realize that we're looking out for their best interests too.

HB: Why do you think trauma informed care training is important for people who steward lands and waters?

MW: I think a trauma informed approach is important for anybody that wants to make a human connection, especially in the limited amount of time that natural resource professionals may have. In each unique interaction, taking a trauma informed approach gives you the best possible chance to succeed and have a positive outcome despite whatever challenges you're working through. Also, we care for these places because we all value our natural resources and our natural environment. Taking a trauma informed approach connects our efforts as natural resource professionals with those of anybody else that is out in a natural area, for whatever reason. It allows us to find common ground, and then move forward with whatever work we have



Photo Credit: Hood Canal Salmon Enhancement Group

to do. I think from a personal level, it's profoundly important to have that connection piece and to demonstrate a willingness to collaborate to create a safe place for people to interact.

HB: What are some small shifts on the intrapersonal or interpersonal level that people can start to implement to shift towards more trauma informed engagement and rules enforcement?

MW: I think trauma informed care is a wonderful approach, but I think initially, one thing anybody can do is bring self awareness into any situation. Recognize that on a human level, you're there as a representative of an agency or a business and that people you'll be engaging with may be in crisis, and could be working through really traumatic experiences. First and foremost, and this is not a little step, just recognizing the humanity in others and the human role that we all play in helping people to work through these difficult circumstances is a great starting point. Being aware of body language and being self aware of how you're approaching the situation is also important. Think about who you would want to talk to when you're having a really bad day. Are you being that person in your role at that time? Are you putting them in a situation where they feel cornered? Are they comfortable?

Are you checking in to begin the conversation to make sure they're in a state where they can understand why you're there? Being completely transparent so you're not leaving people wondering about your motivations or why you've been brought into the conversation can go a long way.

HB: On the organizational level, you mentioned shifts that you are making to policies, practices and procedures around workplace wellness, like in the hiring process. Are there other things that you all are changing at the organizational level to promote more trauma informed engagement as well?

MW: Over the last couple years, I've worked with a consultant, Shilo George, to look through our operations manuals and our rule enforcement manual in an effort to integrate more trauma informed language. In terms of rule enforcement we want these shifts to avoid the kind of a law enforcement-centric behavior and language that's present in a lot of those manuals currently. Those manual updates are being prioritized for this offseason, along with some other updates that need to happen to support our operation. Our intent is to get more trauma informed language front and center in the main resources that we use to guide operations and enforcement.

HB: Is there anything else you would want to share with the community about trauma informed care?

MW: I'd say keep it up, just keep learning and growing. I think it's great to see that we have some resource groups going now for natural resource professionals and other opportunities for us to get together and exchange information. I look forward to growing with everybody in the region as we continue to embrace this approach to our work.

Are you interested in working together with other land and water stewards to workshop strategies for trauma informed engagement with unhoused neighbors?

The Intertwine Alliance and BEF have partnered to host monthly peer support sessions to provide a space for natural resource professionals to connect with one another and co-create solutions for trauma informed engagement with houseless individuals. Contact Hannah Buehler at hbuehler@b-e-f.org to sign up or learn more.

Stories of Hope

For this hope themed edition of *Treeline*, we wanted to hear from our community about the things that have brought them hope in this time of uncertainty that we are collectively living through. The responses that we received were so full of light, connection, and yes, hope, and we are so excited to share them with you. If you missed this wave of submissions but would like to share a story with us, please reach out to Kayla at kseaforth@b-e-f.org

Brook Thompson, Restoration Engineer & Ph.D. Student, Yurok Tribe & UC Santa Cruz

When I started my civil engineering degree in 2014, there were no jobs for me at the Yurok Tribe where I am a

citizen. There were no other engineers I even knew existed who were Yurok. I was told that working on rivers as an engineer was unlikely and that I would most likely end up designing sewer pipelines or working in a wastewater

treatment plant if I wanted a graduate degree in environmental engineering and water resources. However, just this last year three engineers graduated including myself who now work for the fisheries department, and at least another who works in construction. Three of four of us are women which is very rare in engineering. I now have a job where I get to work to restore river and stream health on my traditional homelands, a goal I did not think was possible as a kid. It fills me with hope that there will be even more opportunity in the future for youth and women of color who want to contribute to the engineering field and work towards better habitats for all.

Christine Buhl, Forest Entomologist, Oregon Department of Forestry

If we can change our expectations of what the landscape looks like in terms of what tree species we expect to see and where, then we will fare better in adapting to this changing climate and even encourage a healthier and more resilient ecosystem by planting more sustainably rather than trying to force a system to fit into a macro and microclimate that has changed.

Three major pressures on our forest ecosystems are a changing climate that causes drought stress, unnaturally intensive wildfire, and opportunistic insect pest infestation. Luckily, we can use the silvicultural tools to prevent each of these scenarios if we target enhancement of the health of the tree and the stand. Healthy trees are resilient trees.



Photo Credit: Palouse Conservation District

**Bill Blake, Executive Director
Skagit Conservation District**

I started my first water quality sampling in 1988 with youthful enthusiasm to help keep our water clean and environment healthy. My role has grown from there over the years to guide staff in providing technical assistance to land managers from urban to rural in how they can reduce their impact on our natural resources. It has been frustrating at times, while also important to recognize we have come a long way instituting smart standards that give people something to strive for. Most rewarding the last couple of years is working and making friends with my Y and Z generation cohorts. They share that same youthful enthusiasm and motivation to take on the challenges ahead without pause, and do whatever it takes to assure we have healthy and abundant natural resources for future generations to live, work and play in the community they call home.

**Robyn Darbyshire, Regional
Silviculturist, Forest Service**

For me, it is the work that I do with new(er) employees — it is great to see the influx of new foresters and forestry technicians and the skills and ideas that they bring.

**Marc Gauthier, Forest
Practices Coordinator, Upper
Columbia United Tribes**

I am passing along a poem I wrote as part of the work I am doing for the “salmonids in your watershed” curriculum we are developing. This question made me immediately think about salmon:

Perseverance

*You are so strong, yet your days are not long,
Your minds seem simple, yet you overcome
every obstacle.
Birth, life, journey, struggle, home,
He makes it home,
She makes it home,
They dance the night away,
And do it over again the next day.
Ensuring, exhausting, creating,
Letting go,
Following the flow,
Downstream.
Laying the foundation for those yet to know,
Their role in the circle.
So much to learn from,
It's miraculous, what you have overcome!
You should be more revered,
You Persevered!*

**Adam Cares, Stevens County
VSP Coordinator**

Our local floodplain stakeholder group holds evening meetings in a musty gymnasium to discuss floodplain restoration projects. The group consists of hardworking people from our agricultural and tribal communities, and staff members who are decades deep in this work. It should be noted that this is not a group that is prone to false optimism. They are a practical bunch, thrifty with time and resources, ever wary of false promises and “flash in the pan” programs. But, these people are hopeful that they can improve the river and the landscape where they live. If they were not hopeful, they would not spend their evening in a musty gymnasium, month after month. I remain hopeful because they do.

**Lindsay McClary, Restoration
Ecologist, Confederated
Tribes of Grand Ronde**

I work on conservation, protection, and restoration of Tribal lands that were ceded to the federal government but recently re-acquired through a conservation program. It's fulfilling to make habitat improvements on lands with such historic connections to



Photo Credit: Clallam Conservation District

place and to return Tribal practices to landscapes which have been absent of indigenous influence for far too long. This coming fall, we have a cultural burn planned for one site that was historically maintained through Kalapuyan fire practices. I'm anxious to return traditional fire management to an oak landscape which depends upon it.

**Brandon McWilliams,
LEAD Co-Director, Western
Washington University**

In this field, it's the simple things that get me up in the morning. Kneeling in moist, fragrant soil, feeling it crumble between my fingers as I place a sapling in the ground; seeing the new buds pop as vibrant green awakes from the winter; the pleasant ache after a long day. These are the foundation. What keeps me going, though, is community. Recently, I have had the good fortune to work with a wide swath of people, from toddlers in rain suits to hardened weed warriors, with leathered hands and scars to prove it. Their energy is infectious. Seeing the way people show up to be in community with the land, but then find community in each other is wonderful. Hearing the

excited babble from a new volunteer, and knowing that they will be back, likely with a few friends in tow, reminds me that this work not only changes the physical landscape, but also changes the mental landscape of everyone involved. That excitement, that spark, and the warmth of a community that forms around doing simple acts is what gives me hope. I can't wait to see who I will meet next.

**Erin Halcomb, Stewardship
Coordinator**

Twenty years ago, as a young woman contractor with a saw and a drip torch I was met most often by a question like, "Do your parents know you're doing this?" I'd smile and say, "Yes." My joys today are in seeing so many women in the field — from laborers to top leadership — and in returning to sites where I once worked. In southern Oregon, I worked to thin fir trees from one property, intermittently, for many years. Later, when I had the opportunity to walk back through I traversed a slope full of leggy saplings; all natural regen, all with the soft, blue hue and the five-needled packets of a species that had been formally high-graded: Sugar pine.

**George Kral, PhD, Co-Owner,
Scholls Valley Native Nursery**

There is tremendous hope in diversity. In spite of everything we have done to tame and homogenize the life around us, diversity persists and will continue to persist. The solutions to most of our environmental problems are in this diversity of life forms and processes that are right in front of us. These have been hanging in, waiting for us to get our act together, to stop trying to be masters and start being partners.

**Toby Query, Natural Resource
Ecologist, City of Portland
Bureau of Environmental
Services**

I am hopeful in my work at Shwah kuk wetland which is a co-designed project between the City of Portland, the PSU Indigenous Nations Studies program, and Indigenous community members. "Healing the land, healing the people" (Judy Bluehorse Skelton) is possible with intention, time, flexibility, and humility rooted in land justice.



*Western red cedar seedlings.
Photo Credit: Clallam Conservation District*

Following Fire

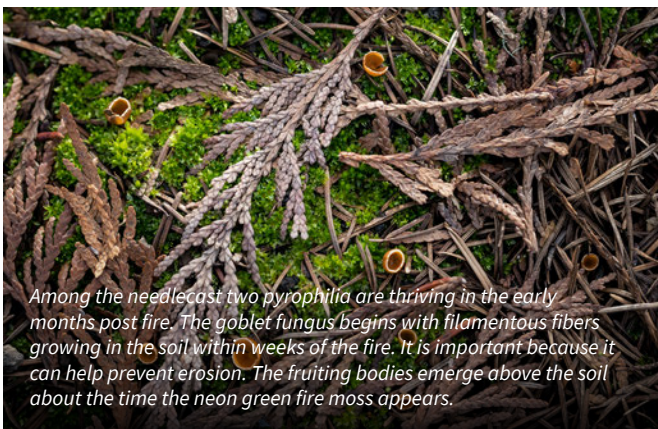
An interview with project founders David Paul Bayles and Fred Swanson, and BEF's Kayla Seaforth.

All photos by David Paul Bayles

Photographer David Paul Bayles and Ecologist Fred Swanson have taken a special interest in the post-fire landscape adjacent to the McKenzie River following the 2020 Holiday Farm Fire. Their project seeks to capture the resilience and resurgence of life in the forest after large scale disturbance.



Nine months post fire much of the landscape was filled with Fireweed growing to heights ranging from 4-7 feet tall.



Among the needlecast two pyrophilia are thriving in the early months post fire. The goblet fungus begins with filamentous fibers growing in the soil within weeks of the fire. It is important because it can help prevent erosion. The fruiting bodies emerge above the soil about the time the neon green fire moss appears.

Fire-loving plants called pyrophilia provide the first colorful signs of hope following a fire disturbance.

To see more images featured in this project, visit www.followingfire.com

KAYLA SEAFORTH: Could you tell me about each of your backgrounds and how you came together to work on this project?

DAVID PAUL BAYLES: I fell in love with photography after a class in community college, but the school that I wanted to go to was private and very expensive. I was looking for a way to earn tuition money that was also adventurous and different from anything I've ever done. I went to the Sierra Nevada mountains to visit my sister and mother and I met my sister's boyfriend. He was a third generation Norwegian American timber faller, and he got me a job. I loved the

work. That experience has led to a lifelong inquiry into our relationship to trees and forests.

FRED SWANSON: I was trained as a geologist and have worked at the H.J. Andrews Experimental Forest, which is property of US Forest Service, Pacific Northwest Research Station on the Willamette National Forest. We've had an ecosystem research program going on there with funding from the Forest Service and the National Science Foundation since I started working there in 1972, during a period of active logging on federal lands. I've long been interested in the arts and the

humanities, but not as a practitioner. I've also worked at Mount St. Helens. As a geologist I'm interested in physical processes that beat up the ecosystem: fire, floods, landslides and different types of volcanic eruptions. I've also long wanted to facilitate access for creative writers and artists, but didn't get around to it until the year 2000 at Mount St. Helens, which was 20 years after the eruption. That was a very exciting opportunity for me to go up there with the poet Gary Snyder, who had influenced my own thinking since I was an undergraduate. Beginning in 2002, I began interacting with Kathleen Dean Moore and others in the Spring

Introduction to Chronosequence

Repeated photography of the same scene over seasons and/or years has long been used by artists and scientists to document landscape change. This technique is especially relevant after major scene-changing events, such as wildfire, volcanic eruptions, and human land use activities. For this project, we selected 42 distinct photopoints that represent different forest conditions. During the first two years we photographed each photopoint 12 times in order to record the changing landscape following the fire.



This view is looking through a young riparian forest toward the McKenzie River flowing to the left. A logging camp occupied this site into the 1970s. The fire quickly burned down the valley, but left fire smoldering in the crotch of the large bigleaf maple tree, eventually causing collapse of three big stems — to the left and away and toward the camera.

Creek Project for Ideas, Nature and the Written Word, and we have facilitated more than 100 writer/artist residencies at Andrews Forest. This work with David has been the first time that I've actually participated in the creative process, not just facilitated it. It's been so much fun and so stimulating and interesting. I've been retired for 11 years so I can go out there freeform. I'm not trying to be a scientist, I'm just going out there to learn from the forest through repeated visits with David, who looks at it in different ways than I do. He looks at forms and colors and I look at geological and biological processes and history and think about the future. We've really resonated because we both love forests and share curiosities.

KS: That is a beautiful partnership. How did the idea for this project come about?

DPB: The first time I met Fred was when a group of writers and poets met at the H.J. Andrews for a long weekend. Later, there was an exhibition based on a scientist's work from the Andrews on rotting logs that I was asked to be part of. Fred was very involved in that exhibition, and so our relationship evolved through collaborative work on that project, as well as later through my residency at the H.J. Andrews Forest. So when the Holiday Farm Fire was raging, and we were all hunkered down in our individual spaces, Fred and I independently both started thinking about when we could get up there and

see the forest. We were both monitoring it since it was getting close to facilities at the Andrews. Later, Fred got access to properties nearby, through McKenzie River Trust, and from the very first day we were hooked.

FS: The key part of this is that David wanted to work in the forest; he'd done work in his logger days, some decades ago, down in the Sierras, and has continued to work in the forests since. His images have been used in scientific publications, by essayists, on the cover of scientific journals and more, because his images convey a sense of mystery and wonder and all the affective values of old forests. So, he did this work in the green forest, then bam, here comes a black forest. We wandered in that black forest, trying to sort out our emotions and the tension between the beauty we found and our sense of tragedy; more than 400 homes burned in the 173,000 acres of the Holiday Farm Fire that roared down the McKenzie River. David's earlier photo project *Old Growth Dialogue* revealed the green reference system for this work in the blackened forest.

DPB: One of the many things that I learned from Fred, that I think necessary for all of us in this period of time, is to shift our thinking about fire toward understanding that the forest is a lot more than what we think it is. So even that burned, skeletal state is a forest. And there is life happening there right after the embers go out, there's life in the soil that's preparing the way for the next iteration of that forest. It's not a dead forest and later a new forest, It's one continuous forest. That realization was groundbreaking for me.

On the drive up the canyon we saw all the burned, leveled homes, one right after the other. It was terrible, and when we got into what became our project site, I thought "this is really beautiful." Eventually, we had to reconcile what we drove past, the human loss and tragedy, with seeing this skeletal forest, where we're looking at the bones and physical structure, and they're elementally beautiful, and how to balance those two. We came to a realization that if we were going to make a project out of this, we were going to focus on the forest and not the broader human part of the story, that was for others to tell.

FS: Our overall objective is to try to help people, including ourselves, understand and appreciate forests better, get a stronger sense of their unbelievable resilience despite some of the batterings that they take, but also to raise concerns about the uncertainties of the future. Over my career, I've gone to many sites of forest disturbance; I got into Mount St. Helens on day 10 after the eruption, with a couple other scientists and we flew right in front of the volcano, and I realized later that I had seen life triggered by the eruption. On day ten! Spiderweb-like filaments of burn-site fungi had already ramified through these new deposits laid down during the eruption. To me, that was a profound learning experience. I've worked very closely with ecologists, principally Charlie Crisafulli, a Forest Service ecologist stationed at Mount St. Helens. The vitality of life has been a central theme for me throughout my career. I tend to feature the geophysical processes, but go to these places with people who are doing the ecology side. You have to bring both of those worldviews together on equal footing in order to do the best job you can in science. And now I realize that poetry and art and history and things of this nature should also be a part of the conversation.

KS: Where do you think the opportunities lie following ecological disturbance, especially as it relates to the work that you've been doing in a post-fire landscape?

DPB: Our project is very site specific. We're not stating that this is the way all forests respond. Part of that site specificity has to do with the human legacies on both project sites, one of which had been a logging camp from the early 30s through the 60s. It became the property of McKenzie River Trust, and there was all this underbrush that the fire burned away revealing all these pieces of metal: leftover car parts, washing machine parts, waffle irons, tea pots, and a dump pile of tin cans and glass bottles. Volunteers gathered the metal which was sent off to be recycled. In this way the fire helped McKenzie River Trust in their overall goal of wanting to allow this landscape to transform into something more natural. Fire actually might have helped accelerate that process. Part of that is the uncertain future, we don't know if it's going to be the kind of Pacific Northwest forest we've had for so long, it



Columbia lily.

may have some other species emerging 50 years, 20 years, 10 years from now. I suspect as we face climate change, we're going to need to do more of this kind of reclamation of land that has been altered by human activity, and let them become whatever natural landscapes they need to be. We need trees and forests in a whole different way than we have in the past.

FS: The details here are certainly not the story of all forests that have been burning so ferociously across the West. Because this is a wet area, the restorative and resilience properties of the forest are particularly strong. For example, some places where volcanoes erupted in the past, like east of Mount Mazama which erupted 7000 years ago, are still a desert, but in a place like Indonesia they go in and plant banana trees before the deposits have even cooled. In a tropical setting, life can really boom. We don't want to overreach in trying to draw general lessons from one specific case.

A key theme in this project is tensions; we felt a tension between the sense of loss of all these people who lost homes and businesses. But there was also this beauty, and how so much of the carbon capital, more than 95%, was retained on site, even despite us breathing it in smoke down here in the Willamette Valley. How much life had persevered, hidden underground, or under the bark, where it could sprout new stems and foliage. There were many biological legacies from the previous ecosystem that made it through the fire, and are now nurturing the next one that's coming on. So learning can be really motivated by seemingly contradictory or surprising circumstances. We're watching, we're listening, we're pondering, and we were able to bring more specialists out and have them tell us about the details of what's going on in the biological world of the fungi, the biology of plant life. We don't have good words for many of the impressions one can glean out there when you're patient, and repeatedly visit and take your time, and look and listen.

DPB: I've always been curious, and that comes to me visually. Through this project with Fred I've shared a level of sustained curiosity that has been like a joyful playground. To be out with this guy with this renowned career who knows

so much, and I can point to this little tiny thing that I'm curious about, and he gets down on his hands and knees. We get curious about it together without any sort of, "oh, yeah, I know all about that," or any hierarchy. It continues to be an incredible life experience for me, for which I'm so grateful.

KS: How do you think that human activity has affected the forest that you've been working in?

FS: One thing that we saw on all of those trips was an incredible amount of removal of trees that were considered dead or likely to die, that might pose hazards along the state highway. The forest also had a very patchy burn pattern, and there was a great deal of salvage logging on industrial lands. If the timber that burned was big enough and wasn't too burnt, it was logged and taken to the mill. We counted the number of loaded log trucks we saw coming down the highway to the mill in Springfield, and we'd see 42 or so loaded log trucks on a busy morning in that 30 mile drive. We aren't trying to do this work to tell people how they should manage their land, they make their decisions on the basis of their objectives and the conditions they have to deal with. But we do want to share a broader, more nuanced, hopeful story of the forest so they have those views in mind as they make decisions. There's a bunch of intensive industrial forestry going on up there. It was striking as we were there working along the river and highway, hearing this incredible burning of fossil fuels from the use of heavy equipment, helicopter logging, log trucks, all moving biocarbon down to the mill to move into the human use sector. There's a lot of carbon management going on.

DPB: I remember my last summer as a logger in the Sierra, just as I left the crew was heading to the Cherry Valley Burn Fire to log what was left standing. They talked about how important it was to get the logs and use them before they were wasted. It made total sense to me at the time, I didn't know anything else. Now I see the question is more nuanced than that. You burn a large amount of fossil fuels to haul those trees to the mill, cut them into boards, transport them to a lumber yard and then to the final project site. It isn't a one to one transfer, which is what I surmised from



A profusion of Fireweed seeds.

those early experiences. I never even considered the carbon burned to get the two by four to a site to build something with it, versus leaving that 95% of a forest that's left standing after a fire, slowly releasing carbon and adding nutrients to the soil over a long period of time. I think that's a really big question that we need to work at addressing better as we face climate change.

FS: The forests that we've been photographing are not old growth, but about 450 of the 173,000 acres of the Holiday Farm Fire burned into some of the experimental watersheds in the Andrews Forest, which we've been studying since as early as 1952, some of which is old growth. Those complex older stands with well distributed 500 year old trees seemed to fare better than the dense, young, monoculture plantations with more homogenous structure and closed canopies, which tended to burn more completely.

The burning in Andrews Forest occurred in three of our eight experimental

watersheds, but the forest is constantly being subjected to disturbances of many types — big wind storms, heavy snow events, and now fire. We didn't consider it a tragedy; it's an opportunity for study.

KS: Could you share how this project embodies hope for you?

FS: I have a couple hopes. I've been working since 2000 to bring artists, writers, scientists and others together to find new ways to learn and communicate. It has been a lot of fun. There's been a lot of interest in this project, as there has been in a lot of the other writing and artwork to come out of the Andrews efforts in conjunction with Spring Creek, which is covered in the [Long Term Ecological Reflections](#) program. This has been a hopeful sign to me that we can do new things, and the world finds interest in it. I've been amazed at how complicated and wonderful and interesting it all is. The resilience expressed by the forest following fire is certainly another reason to be hopeful.

DPB: I think about going back to those initial days and standing in that skeletal, blackened, charred forest. Fred has had so much experience with being in this otherworldly, gray landscape and then seeing life come out of it. I didn't know how life was going to come from this. Growing up in San Fernando Valley in a suburb outside of LA, the hills around the valley were chaparral, and every 10 years fire would come through in the fall and the next spring the landscape would green up as if nothing happened. That memory was in me somewhere, but still, I was not prepared for the vibrant neon green of the fire moss in this blackened landscape, the oxalis coming out. By mid summer of the next year, the fireweed was seven feet high and just everywhere; it's that profusion, where all that came from, the mystery of that, to me, represents so much hope. There is so much power in natural processes. Our mistake is not honoring that power enough. I think we need to do more of that to survive on this planet. I was working on our chronosequences the other day, tracking one particular photopoint. I saw the vegetation coming

up in the summer, and then going back down in the fall in the winter, and then coming up again, now through two cycles. It gave me this sense of the earth itself breathing, rising up, taking a big breath, and then going back down. It's not literal, but it was another way of experiencing the vibrance of the earth.

One last hopeful note has to do with the potential longevity of this project, and the potential it has for others to learn from through my archive at the Bancroft Library and the [archive at HJ Andrews](#). I've already had one photographer ask about taking on this project after I'm gone. No one human life can document a forest maturing. If you were to document the areas we've photographed until they reach maturity, it would take several human lifetimes. It's ongoing and to think that the work that Fred and I started here may present some learning opportunities, and may help in some ways is really exciting and hopeful.

Bios

FRED SWANSON: Fred Swanson has been studying and practicing geology and disturbance ecology since 1972, when he started with the US Forest Service's Pacific Northwest Research Station. Much of this work has taken place at the H.J. Andrews Experimental Forest in the Oregon Cascades, Mount St. Helens, and elsewhere in the Pacific Rim. Swanson has also been instrumental in the development and success of the Spring Creek Project for Nature, Ideas and the Written Word, as well as the Long Term Ecological Reflections Program, both of which seek to increase the scope of resonant science-arts inquiry in wildlands.

DAVID PAUL BAYLES: Photographer David Paul Bayles focuses on landscapes where the needs of forests and human pursuits often collide, sometimes coexist and on occasion find harmony. He currently lives and photographs in the Coast Range of Western Oregon. His photographs have been published in numerous magazines including Orion, Nature, Audubon, Outside, The L.A. Times Sunday Magazine and others. Public collections include The Portland Art Museum, Santa Barbara Art Museum, The Harry Ransom Center, Wildling Museum and others. To view more of David's work visit his main website davidpaulbayles.com.



Varileaf scorpionweed.

Conservation in the Face of Novel Pests and Pathogens

By Kayla Seaforth and Richard Sniezko

Pests and pathogens play an important role in natural selection but can also exact a toll on plant communities already strained by climate change and habitat fragmentation. With the arrival of emerald ash borer to Oregon, there is opportunity to examine how breeding efforts have helped develop more pest and pathogen-resilient genotypes. The genetic variation within a tree species is its key to evolving in the face of both biotic and abiotic threats or challenges. Even in the case of the threat of a non-native, invasive pest or pathogen this genetic variation may be key to assisting the recovery of a tree species. Selective plant breeding of this type has served society for thousands of years.

Port-Orford-Cedar

One story of successful genetic resistance breeding for forest trees comes from the USDA Forest Service's [Dorena Genetic Resource Center](#), where Port-Orford-cedar has been selected and bred to resist the non-native, invasive pathogen *Phytophthora lateralis* that threatens its existence in areas of northern California and southern Oregon. With resistant seed now available and in use by numerous groups if current efforts continue, Port-Orford-cedar may be the first tree species to be functionally restored after being considered threatened by such an impactful pathogen.

After discovering some genetic resistance to the pathogen in the late 1980s, scientists quickly got to work breeding resistant trees and had the first resistant seedlings available for field trials in just five years. The resistant stock from seed orchards has been planted out in many locations since then, and staff at the Dorena Resource Center are aiming to increase the level and frequency of resistance and expand the number of parent trees (to increase genetic diversity) present in seed orchards. This is promising news for getting additional resistant Port-Orford-cedar back on the landscape

and may provide a road map for quickly operationalizing the reintegration of genetically resistant stock back into reforestation and restoration efforts. Read more about the program to breed resistance Port-Orford-cedar [here](#).

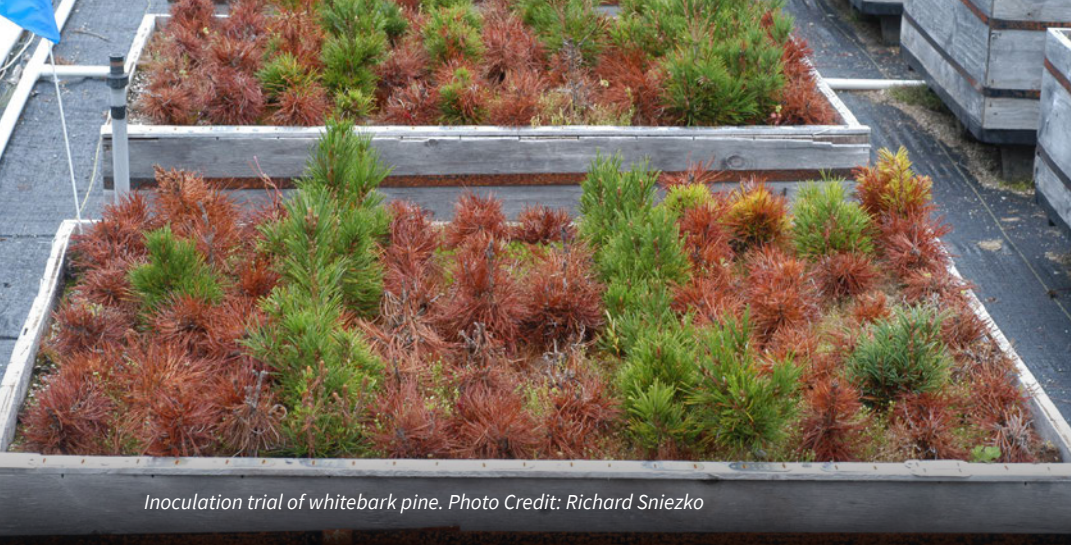
American Chestnut

The American Chestnut was almost entirely wiped out by the introduction of a devastating blight in the early 20th century. In 1983, [The American Chestnut Foundation \(TACF\)](#) was founded with the simple mission: "return the American chestnut to its historic range." The statement is simple, but the task is enormous. The efforts of TACF have brought together scientists to determine whether the blight resistance of the Chinese chestnut could be bred into the American chestnut, and backcrossed to American chestnut for a number of generations, so that eventually chestnuts nearly identical to those that covered the landscape of eastern North America before the blight arrived could coexist with the blight, thanks to the addition of resistance from the Chinese chestnut lineage. After several decades of working with breeding systems and extensive trial and error, TACF has bred trees that are likely resistant to the chestnut blight, and for the last 15 years have engaged groups across the American Southeast in



American chestnuts in experimental trials.

One major avenue for chestnut research and field trials has been mine site reclamation. These sites were formerly capped with non-contaminated soil and seeded with grasses (often non-native). Through many partnerships, these sites have been selected for planting trials of resistant American chestnuts, often with great results. Learn more about these efforts in [this story](#) by the New York Times.



Inoculation trial of whitebark pine. Photo Credit: Richard Sniezko

For more information on white pine blister rust and conservation efforts, including climate change considerations, this [article](#) by the USFS provides a great introduction and links for further reading.

field and silvicultural trials to work out the many details needed to return the chestnut to its historic range. A second group, lesser known, American Chestnut Cooperators Foundation (ACCF) has been working with the natural variation within American chestnut and their efforts are showing success, but as with most programs further breeding will be used to advance the level of resistance further.

Western White Pine

Another story of loss and restoration has taken place in the Western United States. Western white pines were a major element of the west's forests until the early 20th century when, in addition to overharvesting, pine-beetle outbreaks, and excessive fire suppression that led to limited regeneration opportunities, a non-native fungal pathogen that causes white pine blister rust disease was introduced to the landscape. All 5-needled pines are susceptible to the pathogen (there are nine species native to the U.S.), but the impact of western white pine susceptibility was especially profound because of the tree's formerly large presence across the landscapes of the west. This pathogen and resulting disease reduced the white pine population to less than 10% of its historic range, according to a [report](#) by the US Forest Service.

While the blister rust brought overwhelming loss to western forests, as with most diseases, some resistant individuals were able to persist. Using materials from these individuals, resistant pine trees have been the subject of [breeding programs](#) since the 1950s, with numerous field trials to confirm their ability to survive in the presence of the pathogen. While this program was eventually successful, it

may have been hampered somewhat by actions in the decades following the massive dieoff. Much of the unaffected white pine population was harvested to salvage what was left before it became infected with the rust. Looking back, many managers regret this decision, as it further reduced the available genepool for restoration efforts. The western white pine and Port-Orford-cedar are probably two of the top five examples in the world of successful disease resistance programs in forest trees to a non-native pathogen. A related five-needle pine species, whitebark pine, is now listed as threatened under ESA in the U.S., but the resistance breeding efforts and plans for a national restoration plan provide optimism for the future of this species.

Oregon Ash and Emerald Ash Borer

In 2022, the emerald ash borer (EAB), which has wiped out ash trees across much of the American east and midwest arrived in Forest Grove, Oregon, infesting the much beloved Oregon ash. This species has shown a high degree of mortality when exposed to EAB in first, early trials, and it is expected that much of the ash across Oregon, Washington and California will be killed over the next decades as the ash borer spreads. Scientists and managers have anticipated the arrival of EAB on the West Coast for several years, and response plans have been put into action.

Dr. Jennifer Koch and her team at the US Forest Service's [Northern Research Station](#) have been working hard to establish a genetic testing and breeding program for the eastern ash species that have been decimated by EAB already. Some genetic resistance has been observed, and work is ongoing to

breed subsequent generations from the resistant parent trees. Most of this work has focused on green ash, however work is underway to collect and test white ash, black ash, blue ash and pumpkin ash, and in the past year Dr. Sniezko has sent her seedlings of Oregon ash for the first resistance testing. So far 16 families of Oregon ash have been sent to the Ohio facility, where they will be grown for another year before undergoing an initial round of resistance testing. Learn more about these efforts in a 2022 American Forests story [here](#).

The [Dorena Genetic Resource Center](#) in Oregon and [WSU Puyallup's Research and Extension Center](#) in Washington have also set up a common garden trial to examine adaptive genetic variation. [Dr. Jill Hamilton](#) at Pennsylvania State University is also leading genomic screening of Oregon ash leaf materials to examine the pattern of genetic variation within and across conservation collections of the species, with hopes that this work will help with EAB-resistance breeding program development. Finally, a number of groups have contributed to conservation collections of Oregon ash seed over the last two years, with the most extensive collections to-date by Oregon Department of Forestry. Some of these seeds will be put into long term storage, while approximately one-third will be sent to Dorena to be a part of the center's "working collection."

Genetic resistant breeding specialists are hopeful that, like other species that have been severely impacted by novel pests and pathogens, the work to propagate and plant stock that is genetically resistant to EAB will spell hope for trees and ecosystems as the beetles become naturalized in North America.

Cause for Celebration

Stories of Good News From Around the Region and Beyond

Indigenous Environmental Justice and the California Indian Basketweavers' Association

The California Indian Basketweavers' Association (CIBA) embodies the Indigenous Environmental Justice paradigm in its work to expand access to gathering areas, revitalize cultural burning, and stop pesticide use. Read more about how they are making profound change [here](#).

Decades After Dam Removal, a Record Run of Salmon on Goldsborough Creek

The dam was removed in 2001 thanks to a partnership between the Squaxin Island Tribe, Simpson Timber Co. and local, state, and federal agencies. Learn more [here](#).

Herrings Are Swimming Back to the Salish Sea

Herring populations near the Squamish, BC shoreline rebound after being nearly wiped out in the 1970s, resulting in celebration by First Nations and other conservationists who have worked to improve habitat for these and other marine creatures. Learn more about the exciting return [here](#).

Fort Belknap Tribe Returns Small Predators to Their Lands, Hoping to Bring Balance Back to Ecosystem

The tribe and other wildlife groups recently released a cohort of endangered black-footed ferrets and swift foxes to their reservation lands in an attempt to recover the population. These small

mammals were previously extirpated from the tribe's land and beyond through a combination of habitat conversion, disease, and prairie dog poisoning campaigns. Learn more [here](#).

Port Townsend Recognizes the Rights of Endangered Southern Resident Killer Whales

In a first for U.S. city councils, Port Townsend recognized the legal rights of southern resident killer whales. Learn more about what this means for the endangered icons of the Salish Sea [here](#).

Lummi Tribe Brings Traditional Foods to the Community

In a project aimed at increasing the control tribes have over the foods they have access to, fisherman at the Lummi Tribe are bringing locally caught salmon, a staple of this and other Coast Salish Tribes' diets, to community members via a 638 Authority Demonstration Project. Learn more about this project [here](#).

Fish Passage, Post-Dam Removal Revival, Beavers and More

Northwest Treaty Tribes' Winter magazine is chock full of hopeful stories of projects moving forward and ecosystems recovering from past degradation. Download a digital copy [here](#).

Firmaggedon: Call For Submissions

A brief departure from themes of hope, as we turn our attention to a concerning trend in the region's forests.

Have you heard about the massive 2022 true-fir die off USFS has dubbed firmaggedon? Through a series of aerial surveys, researchers at the Forest Service have documented a record breaking amount of mortality among true firs in the genus *Abies* in Oregon, and a lesser, but still concerning dieback in Washington. Learn more about this story [here](#).

If you've experienced significant dieback of trees at project sites, we'd like to hear from you. We are committed to sharing ways in which large scale phenomena are affecting projects, and how folks are coping with the changes taking place in real time. If you have a story that you'd like to share please contact Kayla Seaforth at kseaforth@b-e-f.org.



Upcoming Events

WEBINARS:

Snow for Trees and Watersheds

Northwest Natural Resource Group is pursuing research on how forest management that favors extra snow retention may enhance resiliency in a changing climate. Watch their winter updates [Snow for Trees and Watersheds](#) to learn more.

What's Happening with Sudden Oak Death

April 11 & 18, 2023

Participants will learn what Sudden Oak Death is, how it spreads, symptoms to watch out for, the treatment approach, sampling and detection strategies, current research and citizen science opportunities. Register [here](#).

CONFERENCES:

Salmon Recovery Conference

April 18-19, 2023 — in person

Join us in Vancouver, WA at the Vancouver Convention Center for the ninth biennial salmon recovery conference. The conference will showcase salmon recovery projects, research, monitoring, and more. Register [here](#).

UW Botanical Gardens Ecological Restoration Symposium

April 11, 2023 — in person and virtual

This year's conference theme is "Beginning Again — Ecological Restoration from the Ground Up." Register [here](#).

JOB OPPORTUNITIES:

Pacific Northwest Project Manager at One Tree Planted

Learn more and apply [here](#).



watersheds
program

Do you have an idea for a future newsletter article or interview, or a suggestion for how we might improve? Please reach out to Kas Guillozet at kguillozet@b-e-f.org.

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