



watersheds
program

treeline

partnering for climate adapted forests

November 2024

Photo Credit: Lower Columbia Estuary Partnership

Treeline is an information and storytelling hub for Pacific Northwest restoration practitioners, nursery partners and researchers who work for or represent Tribes, Indigenous groups, non-profits, agencies, landowners, businesses and more.

The Workforce & Training Issue

This issue of Treeline explores different strategies that coalitions, NGOs, agencies, universities, businesses and more are taking to develop a workforce that will implement the complex work needed to protect and restore ecosystems amid a changing climate and other pressures.

Missed the June Treeline Newsletter? Click [here](#) to learn about how our partners are adapting to climate change.

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

Models of Implementation Crews at Work in PNW Restoration

The work of ecological restoration cannot happen without competent, skilled workers at all levels of project planning, implementation, and follow up. Across the Pacific Northwest and beyond, practitioners in this field utilize a variety of different crews and staffing strategies to accomplish their aims. Here, we describe a few implementation and maintenance crew structures that groups around the region currently employ to restore ecosystems.

All information compiled in this article comes from program websites (linked below) and/or personal communications with program managers.

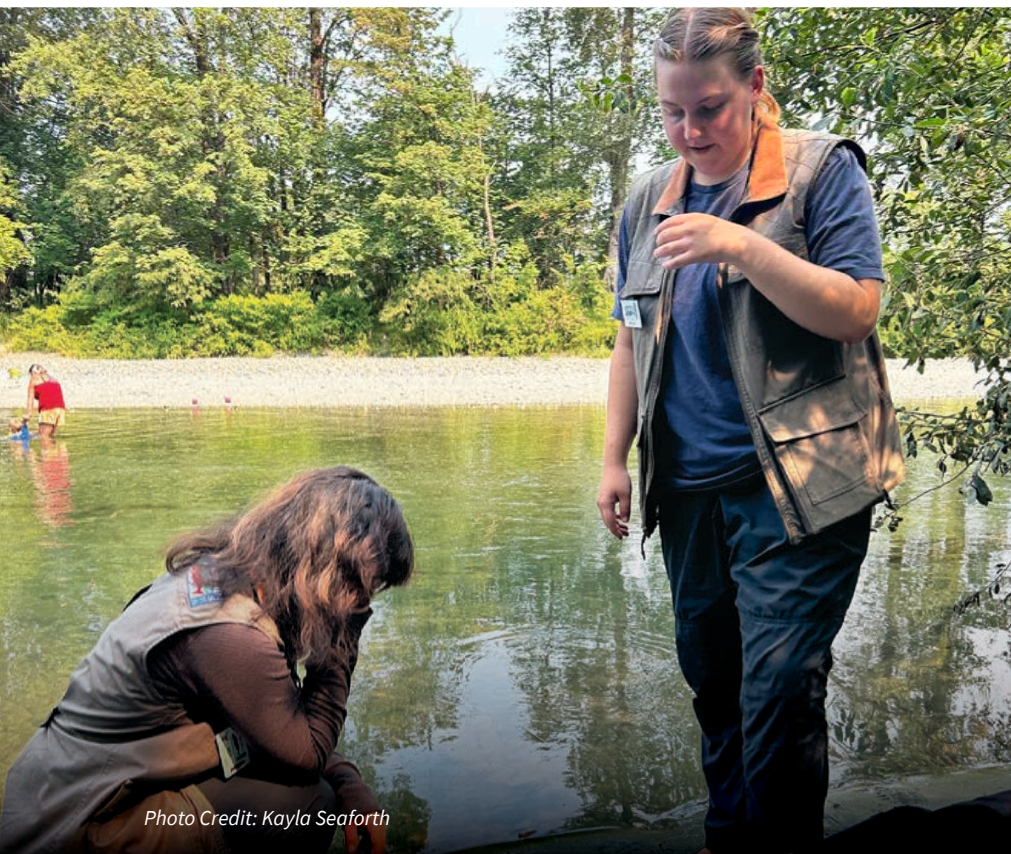


Photo Credit: Kayla Seaforth

The Conservation Corps Model

In this model, crews are contracted to work for a sponsor agency or organization for a dedicated period of time. These crews are often made up of young adults who are hired to build technical skills, and almost all of their time is spent doing field work. These crews are available to either be hosted by an organization or agency year round, or on a project specific basis, but are coordinated by a centralized (often state government) agency.

The examples below are meant to illustrate different ways a conservation corps can take shape, and are not exhaustive of the conservation corps programs at work in the Pacific Northwest. Other programs include [EarthCorps](#), [Northwest Youth Corps](#), [Dirt Corps](#), and more.

Washington Conservation Corps

PROGRAM GOAL

Washington Conservation Corps is an AmeriCorps program that supports young adults and military veterans as they jumpstart their careers in the environmental field.

CREW SIZE & STRUCTURE

- 5 AmeriCorps members and 1 WA Ecology staff supervisor
- Crews can be sponsored by a single partner for the full 11 month term or can serve with multiple sponsors on a week-by-week basis
- Crews are coordinated by the Washington Department of Ecology

FUNDING STRUCTURE

- Cost-share model*
- Full-time crews: 75% partner 25% WCC
- Spike crews: 75% partner 25% WCC + per diem and housing

**Environmental Justice projects are not subject to cost-share requirements. The Climate Commitment Act (CCA) funds EJ, living allowance increases and affinity group spikes, among other things*

CREW RESOURCES

1 truck, hand and power tools, 120 hours of training in field and leadership skills per crew member each year

LENGTH OF CREW MEMBER TERM

- 11, 9, and 3 month positions; crew contracts with permanent sponsors can last up to 11 months and be renewed annually
- Smallest requestable time is 1 week
- Crews operate on 4 day x 10 hour per week, or occasionally an 8 day x 10 hour “spike schedule”. The crew year runs from October - September, annually.

CREW MEMBER DEMOGRAPHICS

18-25 years old and/or military veterans

PROJECT TYPES

- Instream large woody debris placement, bank stabilization, or fish-barrier removal project field support
- Livestock exclusionary fence construction
- Manual and chemical invasive-species suppression and removal
- Native species installation and maintenance
- Trail, boardwalk, bridge, and infrastructure improvements, such as campgrounds and picnic shelters
- Wetland creation or restoration
- Wildlife structure installation
- Wildland fire mitigation, including thinning and fuels reduction

EQUITY BENEFITS

Beginning in 2022, Environmental Justice crew time became available to eligible organizations with no cost-share requirement. During the 2022-23 service term, crews completed 97 projects for 14 partners through this program, which provides no cost-share time to 501(c)(3) nonprofits and governmental organizations, including tribal governments. State and federal agencies are not eligible. Eligible projects must be habitat restoration or trail projects that positively impact vulnerable communities and take place in areas with disproportionate environmental burdens, in rural counties, or economically distressed counties.

MEMBER BENEFITS

In an 11 month term, members receive 3, 40 hour training blocks plus on the job training, college credits, health insurance, GED reimbursement, an education award following their service term, and mental health, food, and child care assistance.

Members are issued a living stipend of \$2,882/month. Members living in high cost of living counties receive an elevated living stipend of \$3,136/month

GEOGRAPHIC REACH

Washington State

PROGRAM SIZE

2024-25 service year:

- 272 members
- 100 project sponsors
- 52 field crews
- 12 individual placement positions

APPLICATION WINDOW FOR PROJECT SPONSORS

Requests for crew time open the winter prior to the beginning of the crew year (i.e. if crew time is desired between October '25 & September '26, submit application in Winter '24/'25)

Washington Service Programs and the Climate Commitment Act

Green service AmeriCorps programs like the Washington Conservation Corps (WCC), EarthCorps, CivicSpark, and the Student Conservation Association, got a recent boost thanks to the Washington Climate Corps Network (WCCN). WCCN was formed during the 2023 legislative session to distribute funds from Climate Commitment Act derived revenues to existing climate related workforce development programs, with an emphasis on supporting projects that address climate change and seek to minimize harm in overburdened communities throughout the state. The Climate Commitment Act authorized Washington's new "cap-and-invest" program, which places a declining cap on the state's largest polluters, and requires them to purchase allowances

for each metric ton of their air pollution. The first auction was held in February 2023, and many programs including the WCCN have benefitted from auction revenues since.

The WCC has utilized this funding to increase member stipends, expand the number of environmental justice projects they complete at no cost to the sponsor organization, and build opportunities for peer support among members who are neurodivergent, have or currently serve in the military, and who belong to the BIPOC and LGBTQIA+ communities.

In 2023, the legislature approved \$7.545 to support the WCCN. More than half of this comes from the Climate Commitment Account, and the rest was provided as match from the federal AmeriCorps program. In addition to

the funding provided to WCCN, the legislature has appropriated over \$2.1 Billion of CCA revenue in things like energy efficient equipment rebates, home weatherization, projects that seek to reduce health disparities, tribal capacity grants, projects to improve air quality in overburdened communities, utility bill assistance, projects that seek to reduce greenhouse gas emissions in overburdened communities, and improvements to urban tree canopy cover. For information on the impact of the CCA on northwest tribes, see this [article](#) from Northwest Indian Fisheries Commission Chairman, Ed Johnstone.

This year, a ballot initiative to repeal the Climate Commitment Act was defeated. This is good news for the WCCN and the many other important projects and programs that the Climate Commitment Act supports.



Photo Credit: Kayla Seaforth

Oregon Conservation Corps

PROGRAM GOAL

1. Reducing the risk of wildfire
2. Assisting in the creation of Fire-Adapted communities
3. Engaging young adults in workforce training

CREW SIZE & ORGANIZATIONAL STRUCTURE

Funding is coordinated by the Higher Education Coordinating Commission of Oregon. The Office of Workforce investments manages requests for applications and determines awards – however, the grantees/partners do all of the hiring and training of staff as well as the management, and implementation of on the ground work. Each partners' structure may look slightly different from the next.

Most crews have a general 4:1 youth participant to adult staff ratio, and many organizations run more than one crew at a time.

Funding Structure Oregon Conservation Corps is primarily funded by State dollars determined in Legislative sessions and supplemented by private donations & fundraising. OCC does not currently have “continuous service level” funding, which means that it is reconsidered each biennium during the long legislative session. This year, OCC funding was not included in the HECC's Agency Request Budget, so IF OCC gets funded it will be because Legislators or the Governor seek to include its funding in the upcoming budget for 2025-2027.

OCC grant awards average around \$1 million dollars per grantee currently, to be spent over 2 years.

CREW RESOURCES

Grants can fund purchase of tools and large equipment, staff time and training, as well wrap around support services for participants. This is flexible, and determined by grant applicants.

LENGTH OF CREW MEMBER TERM

Some programs operate in conjunction with national AmeriCorps grants and have more traditional 12-18 week models of service. Other programs will keep their participants on as long as needed to support their career advancement. For some people, this process is 6 months, for others it may be over a year. OCC as a program tries to be flexible to accommodate a wide range of needs.

CREW MEMBER DEMOGRAPHICS

16-26 years old

PROJECT TYPES

- Fuels reduction
- Defensible space creation around structures and critical infrastructure
- Prescribed burns
- Community education/outreach

EQUITY BENEFITS

The request for applications calls on potential grantees/partners to refer to HECC's Equity Lens as they consider their work. Many grantees/partners are already in positions where they are community hubs or otherwise serving people in their communities. Grantees/partners consider equity as they try to narrow down requests for treatment.

MEMBER BENEFITS

Minimum wage or higher, some receive AmeriCorps education awards, opportunities to receive certificates related to first aid, chainsaw operation, wildland firefighting, incident management and more.

GEOGRAPHIC REACH

Oregon, treatments are limited to areas within the Wildland Urban Interface

PROGRAM SIZE

In the inaugural year, over 500 young adults participated in OCC, and over 200 additional jobs were supported with OCC funding.

APPLICATION WINDOW FOR PROJECT SPONSORS

The upcoming application window will likely open November 2024-February 2024



"I know way more now than I ever thought I would about fire ecology and how to adapt to new things—it was like a light switch, almost—learning how to adapt to new places and experiences. It has opened my eyes to so many more positions in the workforce."

—Alex, Lomakatsi Crew Member, funded by OCC



"After getting this job, I've been able to get on my feet, get everything stabilized in my life, and go to college."

—Rosie, member of crew funded by OCC



"Homeowners are really receptive. They're happy to see us working and making their land more fire-wise."

—Ethan, member of crew funded by OCC

The Paired Education-Field Work Model

This model pairs the technical skills one may gain on a conservation corps-type crew with formal education, often in the form of a certificate through a partner college or university. In this model, participants balance time between field work and class time. All of the programs highlighted below have been developed in the last 1-4 years as a response to the need for well trained workers in the field of ecological restoration, beyond the entry level, and new programs in other watersheds are being developed to meet local needs every year.

New Program Underway: Tribal Stewards Program

With funding from NOAA, and in partnership with five tribes, the Washington State Board for Community and Technical Colleges (SBCTC) will administer a program to provide culturally relevant workforce training for tribal students. In a press release, SBCTC said “The Tribal Stewards Program will involve training faculty to better serve Tribal students, integrating Tribal natural-resource knowledge into college workforce programs, and recruiting and supporting more Tribal students. The programs will be available both on campuses and Tribal lands, creating opportunities for Tribal students to enter natural resource careers and serve Tribal communities.”

Six colleges will partner with five tribes to develop programming:

- Peninsula College with the Makah Tribe.
- Grays Harbor College with the Quinault Indian Nation.
- Green River College with the Muckleshoot Indian Tribe.
- South Puget Sound Community College with the Squaxin Island Tribe.
- Spokane Community College and Wenatchee Valley College with the Colville Confederated Tribes.

Additional collaborating organizations include employers, The Evergreen State College, the NOAA-affiliated University of Washington Climate Impacts Group, and the Office of the Washington State Climatologist.



Photo Credit: Island Conservation Corps

Islands Conservation Corps

PROGRAM GOAL

The Islands Conservation Corps combines academic coursework and hands-on ecological restoration to cultivate the next generation of land stewardship professionals that understand the history and modernity of conservation from the ground up.

CREW/COHORT SIZE & STRUCTURE

A crew of 9 first year members, led by 5 second year members and one field supervisor. Crew members work an average of 30 hours a week in the field and take classes on Friday and evenings.

FUNDING STRUCTURE

Cost-share with project sponsors, grant funded projects, Americorps, tuition assistance through Western Washington University.

CREW RESOURCES

Transportation to project sites, hand and power tools, chainsaw training

LENGTH OF CREW MEMBER TERM

10 months, September - July annually

CREW MEMBER DEMOGRAPHICS

Under 36 years old

PROJECT TYPES

- Riparian and upland planting
- Fuels reduction
- Defensible space creation around structures
- Noxious weed removal
- Trail building
- Fence building
- Ecological management planning

EQUITY BENEFITS

\$700/ month equity enhancement per month for members who made less than \$30,000 the year before.

MEMBER BENEFITS

Monthly stipend of \$1600, plus \$400 in rental assistance, healthcare, and education award

Ecological Restoration Certificate with credits that can be used toward B.A. or M.A. at Western Washington University

GEOGRAPHIC REACH

San Juan County

PROGRAM SIZE

15 field crew members

APPLICATION WINDOW FOR PROJECT SPONSORS

April - June annually

Restoration For All Pilot Program

Edmonds College, Latino Educational Training Institute (LETI), and Snohomish Conservation District

PROGRAM GOAL

Restoration for All at Edmonds College is a technical workforce certificate program focusing on the Latinx community; certificate support is provided by the Latino Educational Training Institute. The program is designed for participants to gain the training needed for a habitat restoration-based career, in addition to advancing the knowledge base of individuals who already have experience in landscaping, horticulture, and construction by educating them on restoration practices. The Latino Educational Training Institute (LETI) and Snohomish Conservation District are also involved in the pilot phase of this program.

CREW/COHORT SIZE & STRUCTURE

- Class (Human Ecology 201/202/203): Up to 22 students each quarter. Each quarter offers all three course levels as a mixed class.
- Paid internship: one quarter-long internship for 2 – 4 interns is offered per year in the fall quarter. The internship is currently offered as a 30 hour per week, 10 week internship. One crew lead position (seasonal position) and up to 4 interns per internship. Interns operate as a field crew to maximize efficiency with Spanish – English translation and intern learning objectives.

Interns are employed by LETI and hosted with the Snohomish Conservation District. Snohomish Conservation District is currently the only organization sponsoring an internship with the current NOAA funding; it is possible that the program will be able to offer interns to other partners as part of the 3-year pilot program, but as of fall 2024, the partners are working to pilot the internship at Snohomish CD before expanding.

FUNDING STRUCTURE

The three-year pilot program is currently funded by a NOAA Coastal Habitat Resilience Grant for Underserved Communities (2023 – 2026).

INTERNSHIP CREW RESOURCES

Interns will be paid a stipend that is set to a competitive wage for the restoration labor market (field technician). Interns will receive field gear that remains with them post-separation to address one of the barriers to entry into this field (work boots, work clothing including pants, shirts, hats, rain gear). Interns will also receive some coaching for job seeking and applications and will have the opportunity to network with potential future employers through project site tours and a possible employer panel.

LENGTH OF CREW MEMBER TERM

The 10-week internship aligns with the Edmonds College fall quarter for each academic year.

CREW MEMBER DEMOGRAPHICS

None to provide at this time.

PROJECT TYPES

Riparian and wetland habitat restoration (planting, maintenance, vegetation monitoring); beaver coexistence; exposure to fish passage construction and public works construction habitat restoration projects;

EQUITY BENEFITS

The internship is structured to address some of the known barriers to entry for Latinx community members to enter the workforce including competitive stipends and field gear. The pilot internship is also focused on uncovering and identifying solutions to other known and unknown barriers that prevent Latinx individuals from entering the habitat restoration workforce. LETI provides strong support to the students in developing application materials, understanding and obtaining work authorization documents, and address other barriers.

MEMBER BENEFITS

Paid internship 2024 internship pay: stipend that provides \$20.00 per hour; crew lead paid \$27.69 – \$29.70 per hour.

GEOGRAPHIC REACH

Snohomish County, Washington

PROGRAM SIZE

- Class: 22 students per quarter
- Internship: one crew lead and 2 – 4 interns per quarter when the internship is offered

APPLICATION WINDOW FOR PROJECT SPONSORS

N/A



Photo Credit: Eric Nelson

NSEA and Western Washington University Certificate Program

PROGRAM GOAL

Students engage in courses to learn the current environmental issues in fisheries habitat and research while also participating in hands-on practicum work through paid internships with the Nooksack Salmon Enhancement Association (NSEA).

CREW/COHORT SIZE & STRUCTURE

There are two certificate options Salmon Enhancement: Community Education Certificate and Salmon Enhancement: Habitat Restoration Certificate which have different course requirements. We hire one cohort of students pursuing both certificate types based on need for the summer/fall program seasons.

FUNDING STRUCTURE

Students are responsible for all tuition costs associated with certificate. Internship hours with NSEA are paid minimum wage with funding provided by federal state and local grants.

CREW RESOURCES

Interns are provided with training, tools, supplies, and PPE to carry out work assignments.

LENGTH OF INTERN TERM

8 credits, or approximately 240 hours of work. This can be done as a summer quarter intensive or spread out across summer and fall quarters. Coursework is done concurrently with internship and 15-19 credits are needed to earn the certificate.

PROJECT TYPES

- River user education and outreach
- Water quality sampling
- Trash cleanup
- Volunteer work party leadership
- Youth salmon education

EQUITY BENEFITS

Certificate programs have been developed with Career Connect Washington's equity principles in mind, and seek to expand career training opportunities to historically underrepresented students.

MEMBER BENEFITS

Paid intern hours, hands on learning opportunities

GEOGRAPHIC REACH

Whatcom County

PROGRAM SIZE

Spring - Fall 2024: 5 students

APPLICATION WINDOW FOR PROJECT SPONSORS

N/A: all work is intended to serve NSEA habitat restoration and community outreach programs



"I took a water quality class last quarter at Western so measuring all this water quality data has helped me solidify everything I've learned, and [I'm learning] how to apply it to habitat for salmon. Doing outreach in general has given me a lot more confidence in talking to the public, and having conversations about salmon."

- Maddie W. NSEA Summer/Fall Intern



"Outreach is mostly about building long lasting relationships, so that people trust you and can continue to engage in conversation about what matters to them. Maybe [they] don't care about salmon, but [they] care about [other elements of the river], and they're all interconnected."

- Mer P. NSEA Summer/Fall Intern



"One thing that I think is really valuable is how the certificate program connects real world environmental work with academic courses. We have a lot of students that come through our internship program, and they realize how difficult it can be to explain some of those hard science concepts that tell you there's a problem or that describe some environmental issue, to the general public who hasn't received that same education."

- Sarah B. NSEA Stewardship Program Manager



"I think that this program is really good for finding ways to engage with people in a way that's meaningful for them, especially with how diverse our audience is. As these interns continue on into the fall, they'll work very closely with fourth graders, which lets them connect with a younger audience whose perspectives of the world are forming. That's another way we teach about watersheds and start instilling those values of stewardship and environmental protection early and building that place based connection."

- Avery G. NSEA Stewardship Coordinator

The Staff Crew Model

When an organization commits to hosting a staff crew, the crew members are hired directly by the organization on a part or full time, and temporary or year round basis, depending on the needs and resources of the organization. This model tends to allow for more institutional knowledge transfer, and can offer better job support for crew members like higher pay, benefits, and opportunities for advancement. This model also tends to be much harder to fund because of the project specific nature of restoration work.

In addition to the programs below, we have featured other staff crews in previous issues of treeline. Find articles about the Olympic Peninsula based [10,000 Years Institute crew](#), [Lomakatsi Restoration Project](#), and more on our [website](#).



Photo Credit: Kayla Seaforth

Mason Conservation District

PROGRAM GOAL

Provide year-round labor to complete riparian habitat restoration, enhancement, and maintenance projects for the Conservation District

CREW SIZE & STRUCTURE

5 - 10 crew members supported by 1.5 FTE to coordinate

FUNDING STRUCTURE

Funded by multiple grants including: Washington Conservation Commission, Salmon Recovery Funding Board/Puget Sound Acquisition and Restoration, Washington Department of Agriculture, Conservation Reserve Enhancement Program, Floodplains by Design, and occasional interlocal agreements / contracted work.

CREW RESOURCES

Brushcutters, backpack sprayers, planting shovels, vehicle, ORV, small non-motorized watercraft, hand tools, PPE, wheelbarrows, planting bags

LENGTH OF CREW MEMBER TERM

Full-time, year-round (not term limited)

EQUITY BENEFITS

Annual boot and clothing stipends are offered to MCD employees.

MEMBER BENEFITS

Full time position, benefits (sick leave, vacation, healthcare, PERS retirement), opportunities for training and career growth

GEOGRAPHIC REACH

Mason County – unless contracted by another district to conduct work in their jurisdiction.

PROGRAM SIZE

1 crew; size fluctuates depending on available funding ~ \$1million annually



Photo Credit: Latino Educational Training Institute (LETI)

The Contract Crew Model

In this model, the crews are managed by independent businesses and hired by project sponsors on a project to project basis. These crews often require little training or oversight by the watershed group compared to other models, because the business takes on the responsibility for training and managing their employees and providing transportation and equipment. For this reason, crews may be more costly on a per-person hour

basis, but typically provide high quality, reliable work that can be lower cost at the project level. While several restoration contractors serve the PNW, responses to our inquiries were limited owing to the busy summer and fall seasons, so information is limited to the contractor highlighted below. For more on an Oregon based contractor, check out our previous feature on [R. Franco Restoration](#).

Northwest Habitat Management

MISSION STATEMENT

Northwest Habitat Management works with landowners to restore and maintain native habitat throughout the North Puget Sound region.

CREW SIZE & STRUCTURE

5-8 member crew, including crew lead & owner operator

FUNDING STRUCTURE

Fee for service model

CREW RESOURCES

Transportation to/from sites, tools, herbicide & licensed applicators, crew management and training, equipment rentals, personalized PPE, GPS and mapping

LENGTH OF CREW MEMBER TERM

- Full-time, year-round (not term limited)
- Mix of seasonal and year round employees and part and full time schedules, partnerships with other contractors

PROJECT TYPES

Riparian planting, weed control, herbicide application, site prep and maintenance, weed management plans, management plans tailored to conservation plans, thinning, adaptive and experimental management practices

CREW MEMBER BENEFITS

Bonus and pay bump for herbicide applicators license, regular raises

GEOGRAPHIC REACH

Snohomish, Skagit, San Juan, Kitsap and Whatcom counties

PROGRAM SIZE

One 5 - 8 person crew

LEAD TIME NEEDED TO HIRE CREW

Dependent on type of project and time of year



Photo Credit: Island Conservation Corps

Program Highlight: Oregon Conservation Corps

By Kayla Seaforth, BEF

The Oregon Conservation Corps funding program was created through Senate Bill 762 in response to the 2020 fires that burned over 1 million acres, destroyed 4000 homes, and cost the state \$84 million, according to the Oregon Department of Forestry. Now, four years removed from this devastating wildfire season, the program's funding is under threat.

In a model that relies on the expertise and priorities of implementation organizations, the Oregon Conservation Corps (OCC) has been a huge boost to fire resilience work in Oregon since its inaugural year in 2022. OCC is operated by the Higher Education Coordinating Commission of Oregon (HECC) as a grant program that organizations can apply to for funding for fire resilience and job training activities. Funding allows these Tribal organizations, non-profits, and agencies to hire and train crews, purchase tools and equipment, and provide wrap-around support services to crew members. All of this supports the broader goal of increasing fire resilience among Oregon communities, while providing valuable job training skills to youth, defined by this program as ages 16 to 26.

"I have more stability, I have my own place now and consistent checks help a lot with that," one participant said. "I became more responsible after I got on the crew."

– Youth participant, enrolled citizen of The Klamath Tribes

While this program has not been around long, it has already made a large impact on the communities it supports. The partners who employ crews supported by OCC prioritize work in areas that will improve resilience among elders, individuals with disabilities, veterans, and other vulnerable populations. Crew members are often members of vulnerable populations as well, and this work provides valuable income and training. Members have reported experiencing economic hardship, skills gaps for employment, and academic gaps for employment. In addition to these more common barriers, 17% of participants self-report living with disabilities, 13% self-report experiences with the justice system, 11% self-reported as identifying as LGBTQIA2S+, and another 11% self-reported barriers related to being unhoused. These barriers are intersectional and complex, and the support that the participants need and receive is highly individualized. OCC provides more than just job training, it can also serve as a community for youth, and a resource for support services.

"It's amazing to see. Yes, it is jobs for these kids, but it is also peace of mind for the people who live here."

– Robert Swan, Community Services Consortium Program Coordinator

Because OCC is run as a grant program, it allows things like crew structure, training opportunities, and work plans to be driven by the needs and priorities of the organizations that implement projects.



Photo Credit: Central Oregon Wildfire Workforce Partnership

2023-24 Program Achievements



3820+ acres
treated across 235 sites

360
homes and businesses impacted

51
Oregon zip codes served

10.5 acres
treated per day

264
program participants

Example Crew Models:

LOMAKATSI RESTORATION PROJECT:

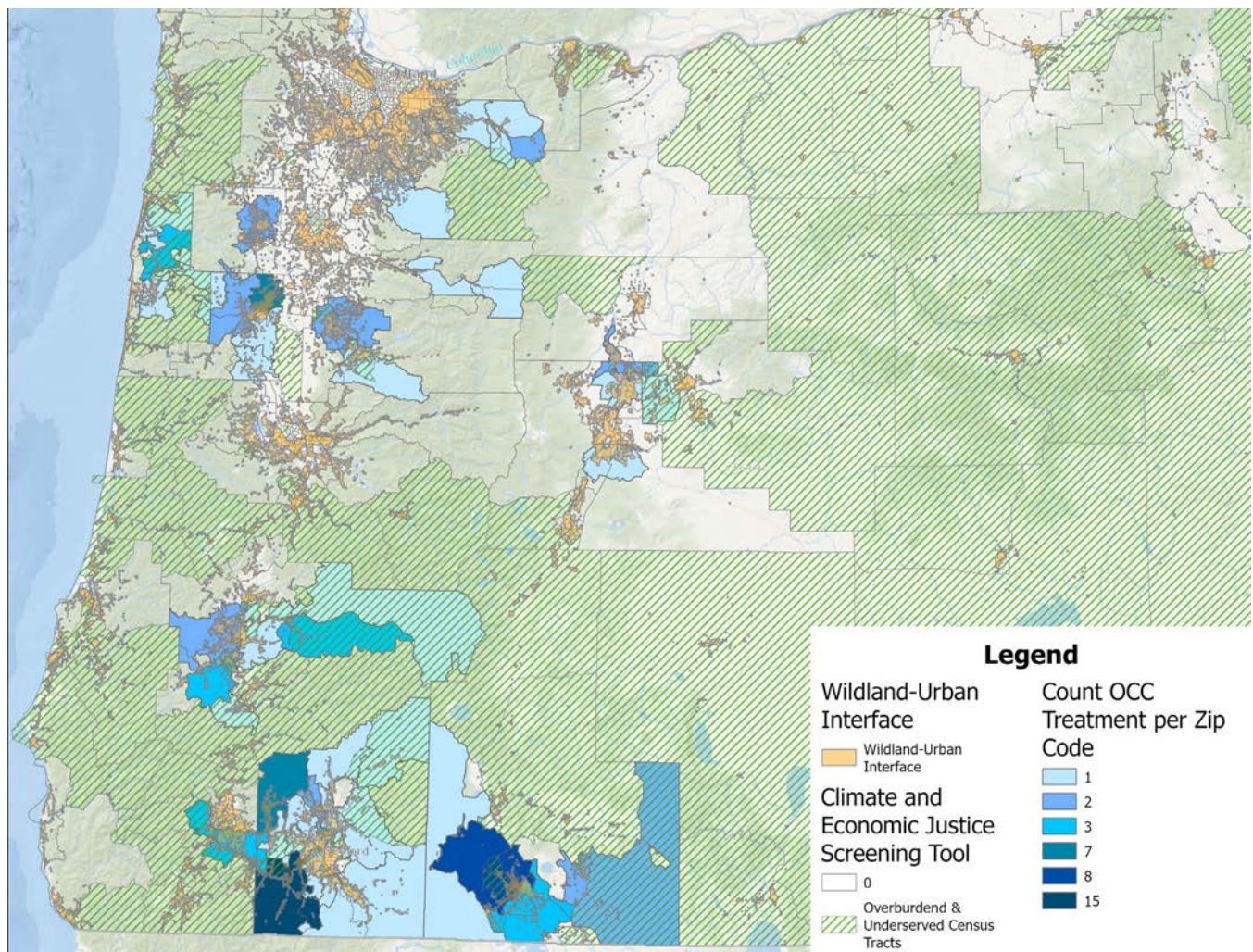
Lomakatsi has two specific crew types funded through Oregon Conservation Corps. One inter-tribal crew and one Rogue Valley crew. These crew also work on mutual projects. Youth participants are local, they may participate in the program for 1+ years, and they do large scale treatments to protect infrastructure and create community resource buffers. 22 youth were employed in the last year, average age 23. Work occurred at 64 sites, completing over 3300 acres of treatments. To read more about the work Lomakatsi has achieved through their Youth Ecological Forestry Training Program, click [here](#).

COMMUNITY SERVICES CONSORTIUM:

CSC has a number of crews. These participants are local and have independent housing and can serve for over a year or more. CSC work focuses primarily on HIZ (Home Ignition Zone) treatments. They also do projects with local land trusts and other agencies. 21 youth were employed in the last year, average age 18. Crews worked at 60 sites, completing over 130 footprint acres of treatments.

CENTRAL OREGON INTERGOVERNMENTAL COUNCIL (COIC)/HEART OF OREGON CORPS (HOC):

COIC/HOC operate rotating crew-based models, often taking youth participants on strike crews (providing housing/away from their home-base). Their crews serve 18-week periods. Many of HOC crew members are co-enrolled in AmeriCorps to receive additional benefits and increase collective impact. Most treatments focus on HIZ, with some strategic treatment lines to buffer communities. 155 youth were employed in the last year, average age 19. Crews worked at 27 sites, completing 121 acres of treatments.



Treatments carried out by Oregon Conservation Corps funded crews over the last year, represented at the zip code level and compared to Oregon's wildland urban interface area and census tracts determined to be overburdened or underserved by the Federal Council on Environmental Quality, who publishes the Climate and Economic Justice Screening Tool data.

“Funding through OCC has allowed our program to address a critical need in Central Oregon to reduce the risk of wildfire in communities across the region. The program has also increased opportunities for young people in our program to gain valuable technical skills, make a tangible impact on their communities and learn more about fire and forestry related careers. The funding has also provided the opportunity for HOC and COIC to pool resources and expand training opportunities that have not previously been possible, as well as building a strong relationship with the Oregon Department of Forestry.”

- Adult Staff

Funding for OCC was initially appropriated by the legislature in 2021 and renewed 2023, but with a new biennium on the horizon, the path to funding the next two years of programming is highly uncertain. As a program nested within the Higher Education Coordinating Commission of Oregon, the OCC relies on inclusion in the agency’s budget to be fully funded each biennium, a standard process for state agencies. Due to budget constraints from the Governor’s office, HECC did not include OCC in its budget request,

leaving the future of the program in the hands of individual legislators or the governor, who can request that it be funded in later budget review sessions.

“I know way more now than I ever thought I would about fire ecology and how to adapt to new things—it was like a light switch, almost—learning how to adapt to new places and experiences,” a participant said. “It has opened my eyes to so many more positions in the workforce.”

- Youth participant

OCC funding is supplemented by **private donations**, but it is not enough to sustain their impactful work. Program staff are seeking additional agreements with federal agencies to provide continuous funding, however this is in no way guaranteed.

The current situation the OCC is facing is all too common in workforce programs. A disaster or other highly impactful event happens, prompting ‘bold’ and ‘swift’ action. Promises are made to change systems, but once the memory of the event fades, funding evaporates and the system returns to its pre-disaster norm. Climate change is affecting our

communities and ecosystems in so many ways, and short term infusions of funding do not sustain needed changes over time. Ongoing support for programs like the OCC allows them to grow and respond to evolving needs, build trust with communities, and achieve impressive outcomes.

“This program was an answer to our prayers. My husband was diagnosed with terminal cancer and given a year to live. We were so glad to have this program help us with our property. I especially enjoyed the young people who were working so hard. This was giving them some much-valued work experience. It certainly helped us out and made us feel safer. It will also help our community get things under control in our area. We are very grateful.”

- Karen Shannon, Deschutes County

Massive Federal cuts **announced in October 2024** will eliminate Forest Service seasonal staff, reducing capacity to provide essential conservation and biodiversity work. This reduction underscores the critical need for stable, long term funding of local and state crews.

Actions to Support the OCC:

- 1 Call upon Oregon legislators and Governor Kotek to fund the OCC program budget
- 2 Make a **donation** to directly support the OCC
- 3 Share this article with your network to spread awareness
- 4 **Endorse the Corps** to help tell the story of this program

Photo Credit: Central Oregon
Wildfire Workforce Partnership

Prescribed Burn Association Movement in California

Interview with Lenya Quinn-Davidson, Fire Advisor and the Director of UCANR's Fire Network

Interviewer: Jean-Paul Zagarola, BEF

J.P.: Can you tell us about the University of California Agriculture and Natural Resources (UCANR) Fire Network? What is your background and role; and, what brought you there?

LENYA: I've been with UCANR for 12 years, and for most of that time I was a fire advisor based on the north coast of California. I was California's only fire advisor then, which may seem surprising given how much fire we have down here. We have a lot of other people in our system who work on fire related issues either tangentially, or as a bigger part of their program including forest advisors, livestock advisors, public health people,

people across a wide range of expertise and disciplines. But, we didn't have a program that was explicitly focused on fire. Eventually, we received funding from the state of California to build out a statewide fire program within UCANR, and I was asked to direct it. We currently have six fire advisors, including a new advisor here in Humboldt County who is filling my previous position. We also have various other staff and faculty on campus and people who are engaged in this work. You can think of the UCANR Fire Network as our statewide fire extension program. It's meant to inspire and empower people through a combination of research, education

and outreach, policy work, training, and capacity building. We're one of the only entities in California that does all of those things. There are a lot of groups that do fire restoration work, or fire policy or research, but we span that whole spectrum of activities.

J.P.: I imagine you've seen a lot of growth, and there's been a lot of attention put on your program and your role in the last few years.

LENYA: Absolutely. I've worked on fire in California for a little more than 15 years. And for a long time, it wasn't that sexy of a topic. I was always passionate



Honeydew VFD. Photo Credit: Lenya Quinn Davidson

about prescribed fire and restoration of fire as a process, and have been pushing for policy change and capacity building. The people who are involved in prescribed fire work are very passionate and very committed but there wasn't a lot of attention given to that more broadly. I'd say about five years ago, around 2017/2018, things really started changing in California, when we had the wine country fires, the Thomas Fire, Camp Fire, Carr Fire and then later, the Dixie Fire. We've seen so many bad fire seasons that these topics became of more interest and importance to the broader California public. That's when we started seeing legislators wanting to get more involved in advancing this work. The community of practice around prescribed fire really grew at that time, and so have other aspects of fire resilience, like the built environment and home hardening. Those are all issues that our fire network addresses in some way and has expertise in, but my personal passion is around prescribed fire. This space has really exploded in the last five years.

J.P.: The program spans various aspects of wildfire resilience, can you speak a little bit more on the prescribed fire portion, and your experience supporting Prescribed Burn Associations (PBAs)?

LENYA: Prescribed fire is the aspect of this work that I've been most engaged with over the last 15 years. I started out working on this really seriously when I was in grad school at Humboldt State, where I focused on barriers to prescribed fire. I surveyed folks across northern California, trying to identify the top barriers [to prescribed fire], and trying to understand why we weren't doing more of this work. That flowed naturally into the formation of the Northern California Prescribed Fire Council, which I co-founded with Morgan Varner, Will Harling and others in 2009, to start breaking down some of those barriers in California. At that time, it was the first prescribed fire council in the Western US. When the council formed, it really was a foreign concept but what we found was a whole community of practitioners, researchers and regulators who were

very passionate about prescribed fire. The Northern California Prescribed Fire Council gave them a space to convene and to build community. At the time, prescribed fire was being used at a very low level and mostly by federal agencies—the National Park Service, the Forest Service, Fish and Wildlife Service, and to a much smaller extent, some CAL FIRE people, tribes, and some timber companies. The tribal side of prescribed fire was limited at that time, because they had been kept from using fire for so long. I noticed that over the years there was a whole sector of the community who weren't being served by the prescribed fire conversations that were happening, and as an extension person here in the north coast, a lot of my clientele—private landowners, ranchers, Tribal folks—were wondering how to use more prescribed fire, because they understood the value of it, they wanted it. For many of these communities, CAL FIRE was the only pathway to prescribed fire on private land. CAL FIRE had their own program for implementing burns, but it was limited. So, I started exploring



Photo Credit: Jeff Gersh

other opportunities for prescribed fire on private lands and that's how we ended up bringing the PBA model to California.

In 2017, my colleagues and I went out to the Great Plains to try to understand how other places were doing this. In the Great Plains, they're burning hundreds of thousands of acres a year on private land, not with fire professionals, but with community members and landowners. We spent a week in 2017, burning with a couple of PBAs in Nebraska, and decided that we needed to do this in California. We formed the Humboldt County Prescribed Burn Association and started burning on ranches here in Humboldt County, staffed entirely with community members, landowners, volunteer fire departments, and the momentum was pretty incredible. People were hungry for it. People in other parts of California were asking questions like, "What are you doing? Is that legal? Are we allowed to do that?" So, I started working with a lawyer to understand the legality of community based burning. There were some real

questions about permits, seasonality, CAL FIRE's role, CEQA (California Environmental Quality Act) and all of these different things. We launched a public campaign to clarify the legal structure and permitting for prescribed fire and to tell people, "yeah, you have the right to do this in California." It's in state statute that landowners can use prescribed fire on their properties. Over the course of two years I think we did maybe 25 workshops around California, some with demonstration burns. It was almost like a road show inspiring people and opening their minds to new ways of thinking about the work. It was community organizing, really, and it was very successful. Six years later there are 24 prescribed burn associations around the state of California. Not all of them have that name, some of them have different names, like the Plumas Underburn Cooperative, or the Southern Sierra Burn Cooperative, but they're all prescribed burns associations, and they all really came from that time of pushing the boundaries and inspiring people to think differently.

J.P.: How has the relationship been with CAL FIRE as you developed the PBAs?

LENYA: It's been mixed. I think part of the reason that this was able to happen in Humboldt County was because we were able to innovate the approach with a really supportive CAL FIRE unit in the north coast. When we came back from Nebraska in 2017, we already had good relationships and history in my county. I had been working on prescribed fire for a decade at that time, and I had hosted the first TREX in California in this region. There was a lot of support here at the local level. Oh, they were nervous, especially when we did our first PBA style burn in Humboldt in late June for invasive grass control with people in blue jeans and cowboy boots and ball caps, and CAL FIRE's, like, "really?" But it was so successful, safe, and it all went really beautifully. That relationship has only continued to improve and grow and it's been great here at the local level.

At the state level, there have been a lot of hiccups, and especially as some groups in different parts of the state



Photo Credit: Lenya-Quinn Davidson

tried to stand up their own PBAs, CAL FIRE units are not always so receptive. Some units were very resistant and didn't believe that this should be legal even where we did workshops to talk about laws and regulations pertaining to prescribed fire. There were a lot of questions, I think, because they weren't used to permitting private landowners to do burning. However, just because you've never done it doesn't mean it's not allowed.

There was a lot of unexplored potential that we tapped into and it was not without tension and controversy. But the nice thing is, we've gotten to this point where the relationship is really good, and CAL FIRE's current director is very supportive and thoughtful, and a great collaborator. I really like Chief Joe Taylor. I think change is happening and leading to a cultural shift within CAL FIRE.

J.P.: I imagine there's got to be quite a bit of hesitation for an agency that's been working on suppression for so many years. Then, opening up prescribed fire to the community. I'm sure that must have been met with shock in some cases?

LENYA: It definitely was. I think for CAL FIRE folks, their primary interactions with fire are scary. They're putting it out, protecting communities, and they're afraid of people making mistakes that they are going to be responsible for cleaning up. We've now had years of proof of concept and CAL FIRE has come to recognize that people do take a lot of care in this work and that maybe prescribed fire is not that scary. It's not the same as a big wildfire. A lot of CAL FIRE folks don't have a lot of experience with prescribed fire, so their perspectives are coming from the Dixie Fire or from the Carr Fire where they were watching whole communities burn. I understand their trauma and their fear, but that's part of the shift. We're not talking about fire suppression, we're talking about restoring fire, and not being afraid of it. And we're getting there. It's a slow, but steady process.

J.P.: Having successful projects to be able to showcase must be key in that transition. You had mentioned that timber companies were using prescribed fire, could you tell me a little bit about that?

LENYA: When we first formed the Northern California Prescribed Fire Council, we wanted to include timber companies in that conversation. It's not that they were doing a lot of broadcast burning, but timber companies have a history of doing a lot of pile burning, slash burning, and even unit prep burning getting ready to replant. So, fire had long been a tool that timber companies had used, but liability concerns and all the same issues we all deal with [with prescribed fire] had increasingly limited their use of fire. So when we formed the Northern California Prescribed Fire Council, we were thinking of it more holistically and really wanting to invite different kinds of stakeholders. Some of the timber companies are very interested in starting to use fire again. Some of them want to use broadcast burning for ecological reasons like maintaining oak woodlands. We have some pretty progressive timber companies in our area, but I think throughout the state, there's some interest in pile or slash burning. We've always tried to engage timber companies and have the policy solutions that we design also encompass and benefit them, because I think we could all benefit from using more fire.

J.P.: There's clear overlap and incentives to reduce fuels and reduce risks to their marketable timber. I think it's great that they're being included in that conversation and they obviously have a vested interest to participate.

You've written a lot about the barriers to this work. Could you talk about some of the other challenges that you've dealt with in facilitating community based burning?

LENYA: Like you said, this is something I've thought and written about extensively and the barriers have changed over time. Our understanding of them has changed, and as we get deeper into this work, new barriers reveal themselves. I feel like we're at a place where we should stop focusing so much on barriers and think more about where things are really working and what's making that happen. One of the big things that we've worked on in recent years is liability concerns. Most of the liability barrier is really a perception issue, it's about perceived

risk more than actual risk. We know that prescribed burns rarely escape control and even when they do, they most often don't cause any kind of damage. It's an interesting conundrum that there's so much focus on liability when it's really probably not our biggest problem. But that said, perception is reality. We've spent so much time addressing it and we've made huge strides. We changed the liability standard in California through a bill in 2021, and just this last year we rolled out a \$20 million prescribed fire claims fund, which is like a state backed insurance fund for prescribed fire. In both of those cases, we've been able to hold space for cultural practitioners in the same way that we do for federal and state qualified burn bosses. We've been very careful to not create any more bureaucratic hurdles for our Indigenous partners in working on these beneficial fire issues. I'm really proud of our efforts on the liability issue.

J.P.: You mentioned looking at some of the successes. Can you talk a little bit about some of those?

LENYA: I think the Prescribed Burn Association movement in California is so cool and fascinating and really, really promising. There are a lot of different ways each community that has a PBA has taken its own shape and flavor based on who the local community members are and what their priorities are. For example, when I did my research back in 2008 the top barrier to prescribed fire that I published was narrow burn windows. Well, if you start looking at the Prescribed Burn Association model, you start to see that a narrow burn window isn't necessarily the barrier, because you've activated a whole network of community members who are available year round to help with burning. Here in Humboldt County, we have 200 people who are part of our PBA and I could send out an email today and round up 20 to 30 people to burn with me on Sunday. So we, as PBAs, are able to take advantage of pretty much any burn window that presents itself and we don't have people who are on holiday, or people who are in training, or people who are in meetings all day or people who are out on a wildfire. The PBA model is premised on the idea that it's local people living in a place

who know their place and can jump on opportunities as they emerge. [pull quote or bold] Of course, not everyone's going to be available but you have this broad network, whereas a lot of agency burn programs have a handful of people who can do burning and if those folks are out, it's not going to happen. For the Forest Service or for CAL FIRE, narrow burn windows are a big deal because they have to plan well in advance to be able to send a crew out on a prescribed fire, and PBAs are much more nimble. Let's stop talking about those barriers, they're not really useful anymore. I'd say "a narrow burn window, who cares!" What are the ways we can increase our opportunity space? So yeah, the local community based models are really where it's at.

J.P.: That's a sign of a successful researcher/practitioner that says scrap everything I said a couple years ago and focus on this now.

What is your experience working with tribes facilitating cultural burning, and how do PBAs interact with cultural burning and tribes?

LENYA: My personal work with tribes has mostly been in the policy space and a lot of the policy work that I do has been in direct partnership, especially with the Karuk Tribe, but also with some other Tribal partners. We have a regular policy workgroup where we meet often and work together to author bills. We've done so much policy work. All of that liability work has come to be in collaboration with Tribal partners. I have also collaborated on training, like when we hosted the first TREX in California in 2013, in partnership with the Mid-Klamath Watershed Council and the Karuk Tribe. In subsequent years, I've partnered with others like folks from the Yurok Tribe's Cultural Fire Management Council. I'm really lucky here in the North Coast, because we have so many wonderful tribal partners with active burning programs, and we've done quite a bit either together or in parallel.

The PBAs are kind of different depending on where they are. Some are very influenced by Indigenous Knowledge and partnership. The Sierra-Sequoia Burn Cooperative, for example, has a focus on cultural burning and on

Indigenous Stewardship. I also consider the Cultural Fire Management Council (CFMC) a part of our PBA network, given their focus on local (and sometimes family-focused) burning. PBAs are all about local people being able to burn, and so the degree of tribal involvement depends on where you are and who lives there and what tribes are in the area. The Lake County Prescribed Burn Association has a lot of tribal involvement and is led in large part by tribal partners. Here in Humboldt County, we have so many different groups burning—the CFMC, the Karuk Tribe, and the Wailaki people. I see us all pursuing parallel efforts to get as much fire on the ground as possible. I partnered in 2022 with the Karuk Tribe on hosting an Indigenous women's Prescribed Fire Training Exchange, because I am also the program director for the WTREX programs. Tribal involvement in PBAs is kind of across the board and it varies depending on the landscape and the people.

J.P.: Do you have any perspective to share on the opportunities or barriers to promoting this kind of work in Oregon and Washington? Do you look at Oregon and say, "wow, you've got a lot of work to do, and you're going to have to take care of all these things first, before you prepare?

LENYA: I see a lot of opportunities. I feel like Washington and Oregon are always just a short step behind California. For example, California and Washington passed a bill to develop state certified burn boss programs in 2018. We started rolling out our burn boss program, and then they started rolling out theirs. They seem to be learning and watching California to see what works, and then Oregon's kind of right behind that. So, I think that 5-10 years from now, we'll probably all be on the same page. California, for whatever reason, is always just a little bit more in the "trying things out" space. We started the Prescribed Fire Council, and then brought TREX out, and then brought PBAs. We're seeing all of that spill out into Oregon and Washington. So I feel very hopeful and I think there are a lot of similarities. Of course, there are unique differences as well, but nothing that can't be overcome. I think that most of the great work we all do we borrow from other places. I mean we started the Northern California Prescribed Fire Council because we were influenced by Florida, and we were inspired by Nebraska for the PBAs. We shouldn't be too proud to borrow models from other places. We're not that unique. Also, some of the things we think are so challenging about California are actually advantages in some ways, like the perception that our



Photo Credit: Kayla Seaforth

topography is too steep. When you're burning, topography is a leverage point. It's another thing that gives you some control on the fire line, allows you to manage fire behavior and spread. We can reframe the way we think about things and sometimes barriers become opportunities.

J.P.: What does the future look like, where do the opportunities lie, and who would you like to be working with more to push work forward?

LENYA: I hope that in the future fire is in the toolbox of anyone who needs or wants it. And that someone can step outside on a winter morning and feel those leaves crunch under their feet and think “today's a good burn day, I'm gonna burn and not feel completely overwhelmed or confused about how to do that.” [pull quote or bold] We're close to that in a lot of places and that's changed just in a short period of time, just in five years. It's been a remarkable shift.

I also really would like the movement to engage with youth more. We need to be bringing more kids into this work and getting them excited about it. And

then also, different kinds of people. Our WTREX program is focused on diversity and fire, and how we make space for people who have not been represented historically. I really want to see more people of color, more tribal folks, we need everyone involved in this work. I'm trying to create space for all those different kinds of people, whether it's a rancher in a rural area, or a young transgender person, or a couple of five year olds who want to learn more. Why not make space for everyone?

J.P.: After having a recent conversation with Chris Adlam (Oregon State University Extension Regional Fire Specialist), it sounds like you all are conducting a round of surveys for PBAs, and possibly producing a report in the near future? Is there any information you can share about that report?

LENYA: We just completed a national survey of Prescribed Burn Associations. We had somewhere around 80 Prescribed Burn Association leaders from around the country respond to our survey. We're trying to understand the mechanics of PBAs—how they're run, how they're organized, how they started,

what's working, and what they need. The group who administered the survey are all extension people, so we have an interest in how we can better serve these groups and build their capacity. We haven't finished analyzing the results of the survey, but we're hoping to make some kind of briefing papers related to Prescribed Burn Associations so that new landscapes that are looking to start one don't have to start from scratch. Also, we want to help in describing what PBAs are and what they do, especially for an agency and regulator audience, where we can say, PBAs are actually burning hundreds of 1000s of acres. Like these are not cute, it is a real solution, and a real part of the future. That will be unfolding and we will be dealing with all of the analysis and writing over the next six months to a year, but I think we'll have a lot of interesting products from that for different audiences.

J.P.: That's great. There are only two official Prescribed Burn Association currently in Oregon and three in Washington so I think this work will be of high interest to many fire practitioners across the Pacific Northwest interested in community based prescribed fire.



Lenya Quinn-Davidson is the Fire Network Director for the University of California Agriculture and Natural Resources, where she leads a statewide team working on various facets of fire resiliency, from wildland fire management and the built environment to workforce development and community capacity. Over the last 15 years, Lenya's work has focused in large part on the human connection with fire, and increasing the resiliency of California's landscapes and communities. Lenya has worked at various scales, including locally with private landowners and community members; at the state level, where she collaborates on policy, research, and training; and nationally/internationally, through her leadership on the Women-in-Fire Training Exchange (WTREX) Program. Lenya is passionate about using fire to inspire and empower people, from ranchers and scientists to agency leaders and young women, and everyone in between.

Native Seed Knowledge Exchange in Seattle

What does it take to collect and distribute native seeds for restoration? In early September, the recently formed Puget Sound Seed Partnership, an offshoot of the Pacific Northwest focused Forest Adaptation Network, brought together area plant and restoration professionals with experienced native seed collectors to dig into this question and more.

The day began with an introduction from the event's organizer, Rolf Gersonde

of Seattle Public Utilities (SPU), who shared the Seed Partnership's vision of supporting the local native seed economy through knowledge exchanges like this one. SPU, like many in the restoration space, recognizes that the supply of native seeds, and the pool of qualified seed collectors is not sufficient to meet current needs for native plant propagation in the Pacific Northwest. For more information on this, check out this [webinar](#) previously hosted by treeline, as well as several [articles](#) on the topic.

In recognition of this gap in the seed industry, Seattle Public Utilities funded the workshop, plus participation stipends for individuals who are underrepresented in the industry. The funding came from an impact investment fund that is used to strategically invest in private sector green business opportunities and jobs that help the utility more sustainably manage waste and water in Seattle. "We're very thoughtful about 'spreading the wealth' and opportunity to small



Photo Credit: Kayla Seaforth

businesses and people who have been historically under-represented in these industries,” shared fund manager Kahreen Tebeau.

The workshop’s technical content was delivered by Emily Wittkop, owner of Jonny Native Seed, and Alex Slakie, owner of Flora Northwest. Combined, these two brought decades of experience collecting native seeds and other plant materials to the workshop participants. They sought to drive home three tenants of high quality seed collection:

1. Seed quality over quantity
2. Proper drying and cleaning
3. Adequate labeling and storage

Throughout their presentations, they emphasized the importance of developing deep knowledge of the plants and the ecosystems they are a part of. “One of the best things you can do to get to know plants is spend time and build a relationship with them,” said Alex.

Both collectors have learned their trade through mentorship and a lot of trial and error, they shared with a laugh. Native seed production sits in an interesting space, where effective collection and processing techniques have been developed for some species, especially those with high commercial value, but for many others that are important ecologically and culturally, the methods remain low tech, and few industry standards are widely available. Instead of being disseminated by trade groups or other formal assemblies, knowledge of seed collection practices is largely held by individuals, businesses, and organizations and passed from person to person over time.

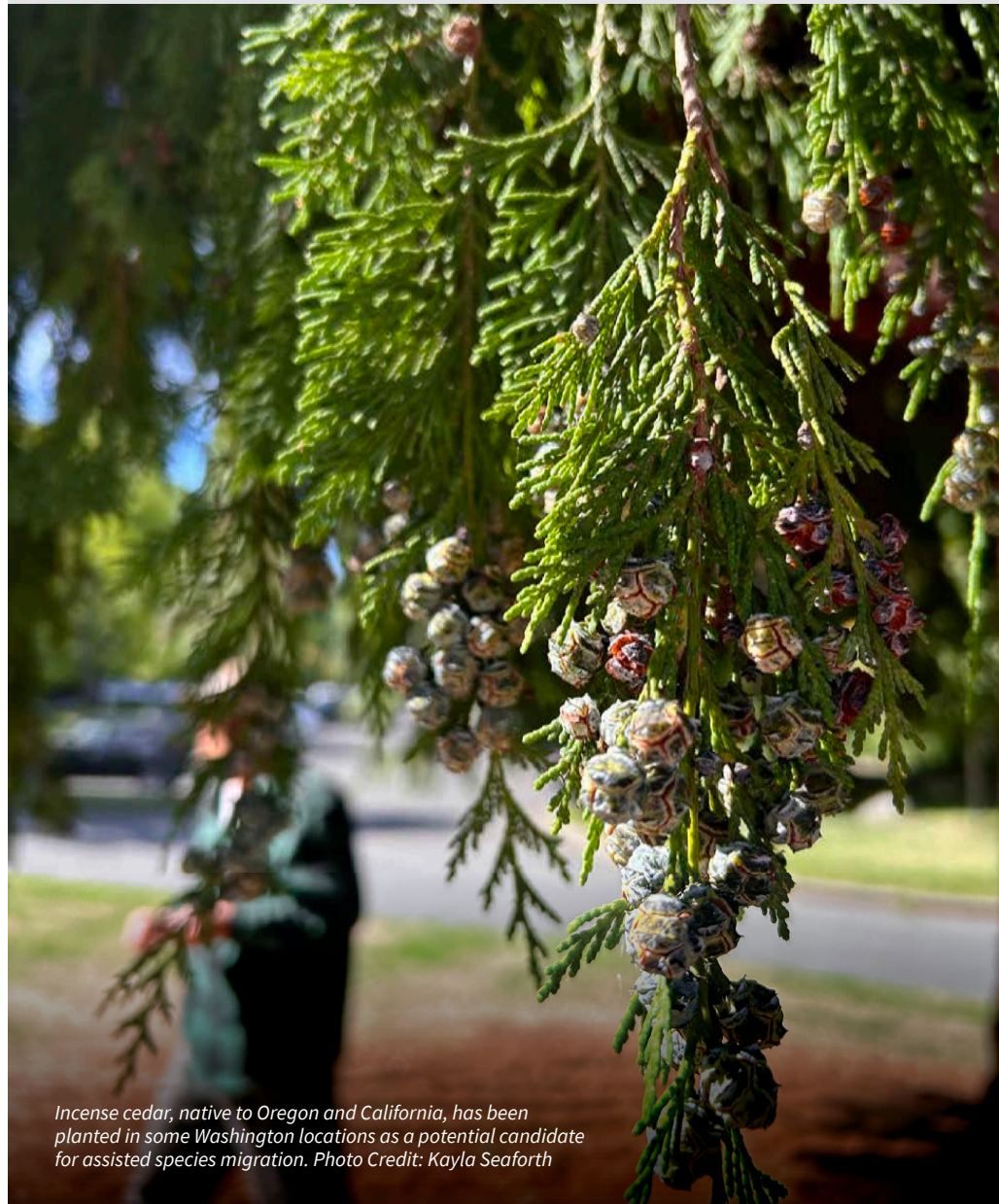
In this tradition of knowledge exchange, Emily and Alex shared the ins and outs of their trade. They presented on how to assess populations for potential collections, quirks of collecting different kinds of seeds, obtaining site access permissions, site scouting, the difference between collecting locally and potentially future adapted plant materials, and more.

The second part of the workshop took participants outside to examine different seeds in Discovery Park in

Puget Sound Seed Partnership and the Forest Adaptation Network

The Puget Sound Seed Partnership (PSSP) vision is to increase the availability and affordability of genetically diverse and ecologically appropriate native plant materials for use in the greater Puget Sound Region, to support the local native seed marketplace, and to support ecological restoration and reforestation. The PSSP was envisioned as a collaborative effort of entities to improve the availability of seed and plant material to its partners for reforestation and ecological restoration of native ecosystems in the larger Puget Sound Region.

The challenges of seed supply in North America and the Pacific Northwest for restoration and reforestation have been recently highlighted and emphasized by the partners of the Forest Adaptation Network. This collaborative partnership between reforestation and restoration practitioners, seed supply businesses, and plant material nurseries was formed as a means to address these challenges.



Incense cedar, native to Oregon and California, has been planted in some Washington locations as a potential candidate for assisted species migration. Photo Credit: Kayla Seaforth

Seattle. Emily and Alex encouraged the group to pluck rose hips, maple samaras, fringe cup seeds, snowberries and more to illustrate how to quickly assess whether seed is ripe, likely to be viable, or obviously damaged by pests or other developmental issues. Workshop participants enthusiastically inspected seeds, asked technical questions, and a few even brought out their own hand lenses and field microscopes to take a closer look.

Those who attended the workshop also brought their own knowledge and experience to the group, and were happy to share what they knew about different aspects of plant materials collection. For example, the manager of the City of Seattle's Jefferson Greenhouse shared how their program collects and propagates native ferns through spore germination for restoration plantings. Another participant from the Snoqualmie Tribe shared how some tools used for berry collection

can permanently damage plants and encouraged collectors to use other methods, and prioritize respect for the plants and the tribes that rely on them for food and medicine.

The day wrapped up with a demonstration of how to clean and process the seeds the group collected. Alex and Emily showed off their trusty Dybvig seed cleaner, a device that uses water and agitation to separate seeds from their fruit, creating a slurry of seeds that are then dried and screened further to remove non-seed material. They also gave a tutorial on how to winnow seeds, a low tech process that uses a fan and a series of containers to clean seed further. Participants also got to work with mining screens and a wooden device called a seed boat or de-awner, which can be useful for removing grass awns or separating seeds from hard pods.

The atmosphere throughout the day was convivial; a small part of the native plant

community coming together to dive into the wild forest that is native seed collection, turning over leaves and logs and discovering all kinds of delightful connections in the process. The Puget Sound Seed Partnership intends to host more workshops on seed collection in the future. Participants and facilitators both acknowledged that the material covered was highly distilled, and further learning opportunities could facilitate a greater depth of knowledge, reach more people, and deepen community and connection among those who work with native plants.

Interested in Joining the Puget Sound Seed Partnership or Participating in Future Workshops?

Contact Rolf Gersonde at Rolf.Gersonde@seattle.gov to receive updates.

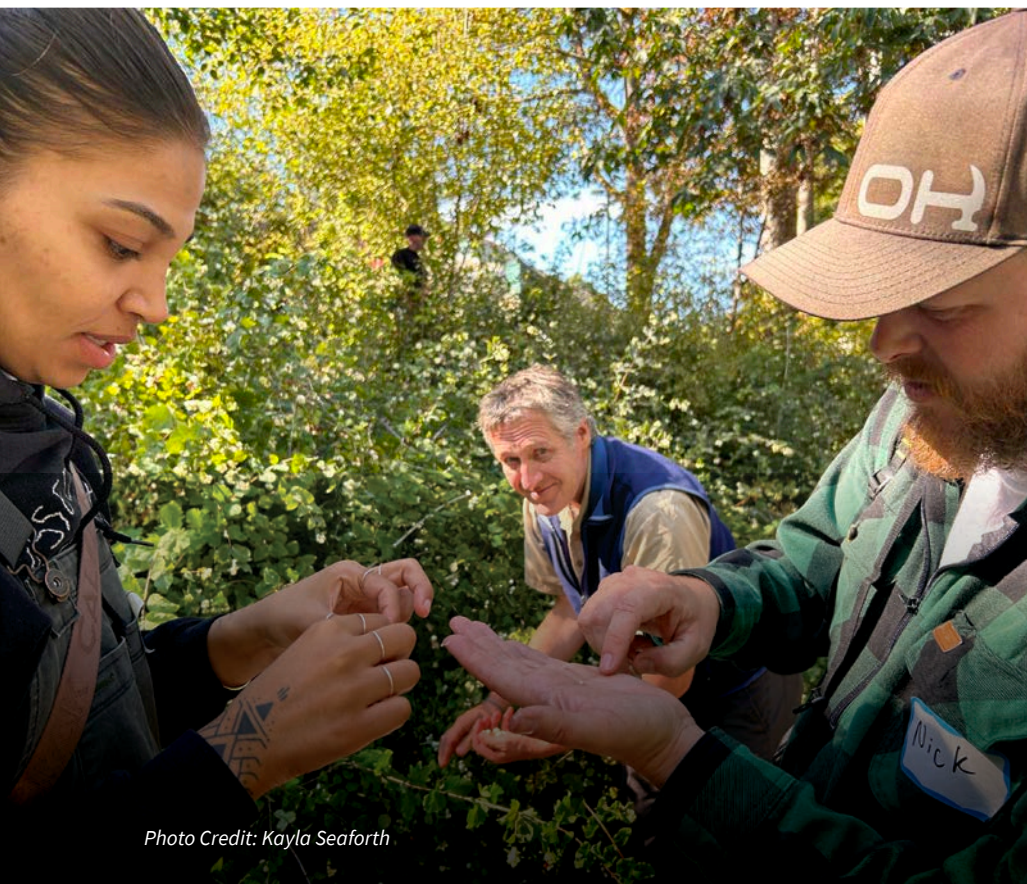


Photo Credit: Kayla Seaforth



Photo Credit: Kayla Seaforth

AI-generated Climate Models: Bridging Practical, Material and Value-based Challenges for Ecological Restoration Application

By Hannah Buehler & Kas Guillozet

Restoration practitioners work across multiple time frames, restoring past ecological functions, improving present conditions, and anticipating the long-term impacts of climate change and extreme weather events on projects and communities. As Artificial Intelligence (AI) is increasingly integrated into predictive climate modeling, it may offer significant benefits to practitioners as they grapple with questions regarding how today's projects might withstand a volatile climatic future. However, AI's powerful predictive advantages

come with both practical and value-based challenges to consider when incorporating AI climate predictions into on-the-ground work.

The Role of AI in Climate Prediction

AI models have revolutionized climate science by enabling more accurate and precise predictions to be made regarding future climate conditions. These models can aggregate and analyze vast amounts of data from diverse sources, such as

satellite imagery, weather stations, and historical climate records. By identifying new connections between various datasets and synthesizing volumes of information far beyond what humans are able to do through traditional computing, AI models can predict future climate patterns and natural disasters with accuracy and consistency that was previously unattainable.

Artificial Intelligence (AI)

Artificial Intelligence has existed since the late 1950s. Today, AI is rapidly improving thanks to increased amounts of data being collected through sensors, satellites and the internet. AI is capable of finding patterns that humans cannot in order to make more effective and accurate predictions (Cho 2018).

Artificial intelligence (AI) is **technology that enables computers and digital devices to learn, read, write, create and analyze** (IBM 2024).

Photo Credit: Lower Columbia Estuary Partnership

As predictive climate models become increasingly utilized by climate scientists and restoration practitioners, AI's predictive role in ecological restoration may expand. For restoration practitioners, these advanced predictive tools can meaningfully guide their efforts in ecosystem restoration and disaster preparedness. The ability to more accurately anticipate droughts, floods, and other major climatic events can significantly enhance the efficiency and effectiveness of restoration projects. For example, AI has helped researchers to accurately identify 89 to 99 percent of weather fronts, tropical cyclones and atmospheric rivers (Cho 2018). In the short term, improved AI-powered weather forecasts help predict extreme weather and keep communities safe. In the long term, AI-generated climate predictions may become even more crucial for planning and implementing restoration practices that continue to work for ecology and community long into the future.

AI tools can more accurately predict future climate and ecological conditions

of landscapes being restored, thereby reducing the risk of project failure due to unforeseen climate and ecological changes. This predictive capability could provide restoration planners with insights into the characteristics of plants that can endure increasingly stressful climate conditions, enabling them to select species more likely to thrive in future environments rather than those suited only to historical or current conditions. For example, future AI models could analyze historical and predicted soil moisture levels, temperature fluctuations, and precipitation patterns alongside information on temperature related plant dormancy requirements, flowering and seed formation patterns and the life cycles and climate tolerances of pollinators, pathogens and pests to inform conversations regarding resilient plant species for a given area.

AI may be productively applied as an information input that triangulates on the ground observations and helps entities direct limited resources and capacity to specific locations within

large landscapes. For example, AI can model the spread of invasive species, predicting their potential impact on native ecosystems and helping practitioners implement targeted early detection and rapid response interventions to control or eradicate them. Furthermore, AI-powered tools can simulate various restoration scenarios, allowing practitioners to evaluate different approaches and select the most effective strategies for long-term sustainability. By integrating these predictive insights, restoration projects can be more adaptive and resilient in the face of a changing climate.

The predictability offered by advanced AI climate models can not only enhance the technical aspects of restoration projects but may also benefit the mental health of restoration workers and their teams. While these AI models can't tell the future, they can arm restoration workers and their teams with cutting edge insights into future climatic conditions. While some may argue that looking at models predicting severe future climate conditions could negatively impact



Photo Credit: Lower Columbia Estuary Partnership

mental health, the empowerment and proactive planning facilitated by these predictions may also ultimately provide a greater sense of preparedness, mitigating anxiety and fostering resilience among individuals and teams.

Advanced models can also support public awareness, decisionmaker and private sector buy-in to ecological restoration investments by presenting more refined future scenarios of extreme weather events, fire risk, flood risk, and species declines with and without conservation, restoration and stewardship investments.

AI tools can predict future climate and ecological conditions of landscapes being restored with potential implications for planning, community engagement, communications, project design, monitoring, and more. Additional work is needed to consider implications for how AI generated information can be most responsibly used and with consideration for potential risks, liabilities and other complex issues with attention to audience and purpose. For example, construction design standards and regulatory mapping can require the use of specific information and data sets to communicate risk. Sharing multiple, different potential future scenarios or conditions, particularly from the same entity, can introduce confusion and may not always be helpful.

AI-generated information may also have unintended impacts on property values, insurance eligibility and rates, and more. While AI is likely already applied in the development of many existing models, different levels of social trust can be placed in different institutions who release or endorse models, and entities will want to be cognizant of unintended endorsements they may make in sharing or socializing new AI generated models. For example, information on fire risk shared by a state forestry agency will likely have a different reach, credibility and weight assigned to it than those applied by for-profit online realty services.

AI-generated models can provide predictability around what challenges conservation and restoration sites may face in the future, and bolster confidence

that restoration plans will succeed in the long term, and help identify needed next steps to increase resilience. This predictability may reduce some of the anxiety around the uncertainty about future climate conditions, enabling teams to feel more confident in their planning and decision-making processes. With the ability to anticipate and prepare for potential challenges such as droughts, floods, and other extreme weather events, practitioners may be better equipped to develop proactive strategies, fostering a sense of accomplishment, purpose and empowerment. Having tools to more effectively get ahead of and effectively manage these challenges may reduce workplace stress and improve overall mental well-being of individuals and teams. Models could also help build compelling cases for investment and policy improvements.

Practical Challenges in Implementation

While AI models offer significant benefits for predicting future climate conditions and aiding restoration efforts, there are several practical implementation challenges of note:

1. **Data accessibility and quality:** The accuracy of AI models heavily depends on the quality and quantity of the data they analyze. Inconsistencies among data sources, scales, and collection methods can lead to inaccuracies in predictions, undermining the reliability of AI-driven insights.
2. **Technical expertise required to utilize AI models effectively:** The complexity of these models demands a certain level of technical knowledge to interpret and apply the predictions with an understanding of model gaps, limitations and weaknesses. Models can become detached from their creators and associated metadata, making it laborious or impossible to trace data inputs. Users may lack the necessary training or resources to fully leverage these AI tools, creating a gap between the potential of AI technology and its credible applicability.
3. **New frontiers of big data and resilience thinking:** Challenges in assessing progress towards or away

from ecosystem recovery goals are numerous and include:

- Information gaps on gains as well as losses (status and trend data),
- shifting baselines and trajectories of degradation and restoration through time at species and process-based scales,
- feedback loops among biotic and abiotic systems in conversation with built systems.

The volume of data, assumptions and variables is overwhelming from technological as well as cognitive perspectives. AI may present novel ways of overcoming current challenges in modeling complex systems. This in turn will require new thought paradigms and cognitive tools and frameworks for risk management, resilience planning and decision making.

4. **The accessibility of AI requires new ways to address risk and uncertainty:** This may portend a future society with an ever-growing reliance upon big data, or we may see fissures in this reliance and a re-emergence of practices and values based upon collective values, intuitive and/or intergenerational knowledge systems. Perhaps more likely, we will see spectrums of these in conversation, conflict and collaboration.
5. **Cost and resource constraints:** Developing and maintaining AI models is resource-intensive, requiring substantial freshwater, energy and human resource investments.¹ For many organizations involved in ecological restoration, especially nonprofits and community organizations, the costs associated with managing AI technology to ensure reliability can be prohibitive. The energy and water intensiveness of AI processing may also run counter to the objectives of ecological restoration practitioners, and it is unclear whether these costs can be mitigated.

¹ <https://www.forbes.com/sites/cindygordon/2024/02/25/ai-is-accelerating-the-loss-of-our-scarcest-natural-resource-water/>

Value-Based Challenges

In addition to the material challenges, values-based challenges must be considered as well. Values about nature are diverse, and perceptions of the value of nature vary greatly amongst individuals, even within a community that holds similar values. Just as climate conditions will change over time so will values in relation to nature, and these shifts can be much harder to predict. AI could provide planners and communities with new ways of modeling ecological changes as well as changing human values, which could raise new questions, insights, and challenges.

Community engagement is another vital component of successful restoration practices. While AI provides valuable technical insights, these must be balanced with field verification, local knowledge and traditional practices. Engaging communities in the interpretation and application of AI models could foster more sustainable and accepted restoration efforts.

Identifying consensus based pathways for managing limited resources that support different and sometimes competing objectives in the present

is already a challenge, doing so while potentially anticipating community needs and values decades in the future introduces new complexities. AI may in time provide resources to support new understandings and ways of thinking about the human dimensions of integrated, long term planning, growth and natural resource stewardship.

AI in Integrated Practice

Training and resources to support restoration practitioners in utilizing AI technologies will allow these experts to shape application of AI models. Establishing collaborative efforts between restoration organizations and academic institutions, governmental agencies, and the private sector could bring crucial perspectives and insight into this emerging field. Partnerships with organizations specializing in AI and climate science can support co-generation of tools that will be useful in applied contexts, facilitating the exchange of best practices and innovations. Additionally, developing and adhering to ethical frameworks for AI use in climate prediction is vital to ensure responsible and equitable application, including transparent data

practices, community consent, and mechanisms for addressing biases that exist in the data.

The integration of AI into ecological restoration presents both significant opportunities and challenges. While AI's advanced predictive capabilities can greatly enhance restoration implementation and elevate broader public and decisionmaker understanding of and value for restorations. The path forward, if thoughtfully charted, could involve an integrated approach that combines technological advancements with a deep understanding of ecological and social complexities, hopefully leading to more informed and impactful restoration practices.

Citations

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Photo Credit: Jeff Gersh



Lessons Learned From the Willamette Model Watershed Partnership

Between 2009 and 2019, the Willamette River Initiative's Model Watershed Program with funding from Meyer Memorial Trust (MMT) set out to accelerate the pace and scale of restoration in the Willamette Valley by investing in Watershed Council capacity. In Oregon, Watershed Councils are small, community based organizations that advance on the ground habitat restoration to support clean water and healthy habitats for people and nature.

The willingness of MMT to invest funds over a ten year period, coupled with the enthusiasm and commitment of riparian practitioners led to a unique and highly successful systems approach to restoration that continues today. We can draw several lessons from this approach that may be instructive for other groups looking for ways to scale riparian restoration and protection, which are explored below.

See a detailed report on the achievements of the Willamette Model Watershed Partnership [here](#).

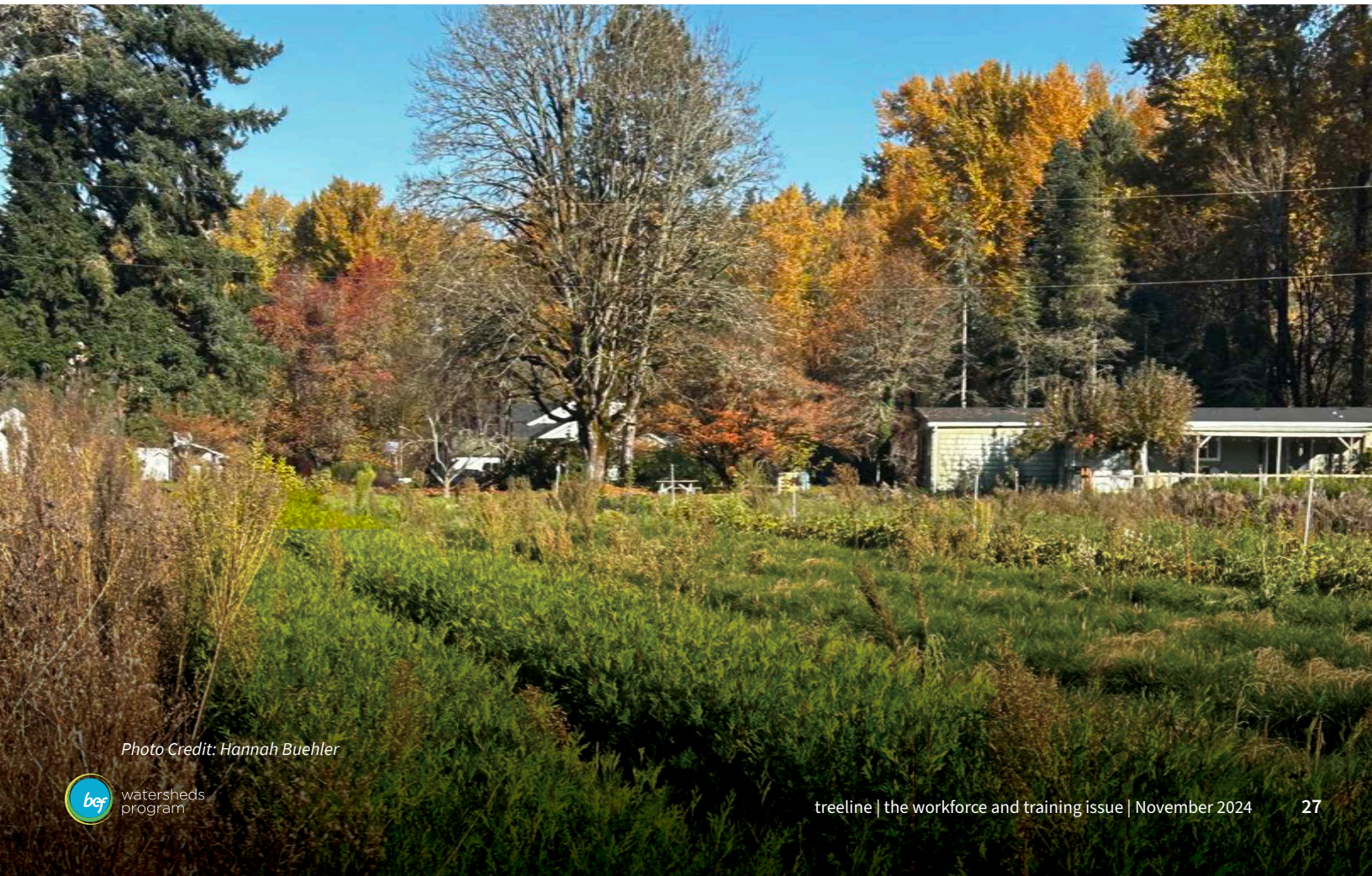


Photo Credit: Hannah Buehler

1. Relationships and Trust Are Key

Relationships with landowners, funders, contractors, community members and peers are the glue that holds the restoration system together, and these take time and energy to develop and nurture. In a funding environment that celebrates metrics like acres restored and trees planted, it can be very difficult to fund the slow and hard to measure work of building relationships. When funders trust that practitioners know how to best advance their work and include things like landowner outreach in funding agreements, and will follow through on commitments, then real progress can be made. Some landowners need a lot of time, resources, and conversations to agree to host a project, but the rewards for sustained engagement can be larger or more complex projects, more community support, a greater sense of connection, and more.

One real time response to the plant shortage driven by the increase in work by Model Watershed partners was the development of the **Collaborative Grow program** in 2011. Through this program, Bonneville Environmental Foundation holds contract growing agreements with a network of Oregon nurseries, and acts as a centralized ordering hub for organizations that implement restoration projects that can provide additional services such as allocating plants when projects experience disruptions, spreading the impacts of unanticipated shortages, tracking issues with particular species etc. The contracts with nurseries provide order estimates three years ahead of time to inform seed collection and nursery bed layout. Regions have unique needs and resources and this may not be a replicable model for other locations.

2. A Rapid Increase in Restoration Will Strain Existing Supply Chains

The work of restoration is supported by a network of implementation contractors, nurseries, seed collectors, restoration crews, planning and outreach staff and more. Organizations and businesses adjust to supply and demand trends, but managing change can take time, and can be difficult without long term assurance of stable funding.

The infusion of dollars into the system in the Willamette led to a scramble for tools to manage information, willing landowners, staff, plants, vehicles, tools, crews, and more to meet the demand. Knowing that this ripple effect is coming may help organizations prepare, but private businesses typically need secured orders or contracts to comfortably increase staff or production.

3. Flexible Funding Can Lead to Systems That Sustain

The ten year investment in the Willamette River Watershed by MMT was unique in the world of restoration. Many restoration funds are awarded on a project by project basis, and require leveraged funding to support project development, partnership building, outreach and long term follow up. As mentioned above, the work of cultivating relationships with private landowners to host projects is both necessary and time consuming. Project based grants are also often dispersed over a limited time horizon, most of the time shorter than the 5-10 years it takes to plan, prepare, implement, and maintain riparian projects.

With the funding from MMT, Watershed Council staff were able to engage meaningfully and consistently with landowners, conduct project prep and maintenance, build coalitions of stakeholder groups, fund time to write additional grants, engage the community, and more. By funding the programmatic work that is vital to sustaining habitat restoration and protection, Watershed Councils have been able to effectively scale their work and move forward meaningful ecological and social gains.



Photo Credit: Hannah Buehler

Achievements of the 10 Year Willamette Model Watersheds Partnership



815 acres
over 52 river miles of riparian planting

640 acres
of wetland and floodplains restored, delivering benefits totalling over \$5M

86
fish passage barriers removed, allowing access to 140+ miles of stream

300 acres
of upland prairie and oak woodlands restored

4M trees
and shrubs planted by 20+ partner organizations

6 nurseries
contracted to supply 45 native woody species

905
landowners engaged resulting in access and project agreements

3250
Restoration advanced over 3250 total acres

2775
youth and 1982 adults engaged in field education and events

“If we can’t play the long-game, we can’t get complex projects with multiple landowners done.”

- Clinton Begley, former Executive Director of the Long Tom Watershed Council

4. Emphasize Quality Over Quantity

When the opportunity to participate in the Model Watershed Partnership arose, some partner Councils tried to spread the funding from MMT and other grant programs as far as they could by implementing more low cost projects, instead of investing in the full costs associated with designing, implementing and maintaining projects. They engaged volunteers to plant trees and relied on landowners to conduct maintenance to stretch grant dollars. Holly Purpura, Executive Director of Marys River Watershed Council shared “the push to spread the funding as thin as possible to fund more work on the ground has created numerous difficulties for the Council that have lingered long after this push shifted. The Council is still working to catch up with the backlog of projects.”

The inclination to spread funding further over the landscape can also be pushed by funders explicitly or implicitly through things like scoring criteria, reporting metrics, and the types of projects that are celebrated as examples. Riparian restoration is a professional practice that is informed by traditional knowledge, science, and peer learning. By trying to achieve more with less, we run the risk of undervaluing the people who make up this system, and perpetuating patterns that lead to burnout.



Doug fir plugs at Kintigh Mountain Farm.
Photo Credit: Hannah Buehler

The Situation with Suksdorf's Hawthorn

By George L. Kral

Up until twenty years ago, there were probably more Suksdorf's hawthorn (black hawthorn, or *Crataegus gaylussacia*) in the Willamette Valley than anywhere else on Earth. This unassuming small tree is a workhorse here, filling in hedgerows, streambanks and the margins of woodlands. In spring, our native hawthorn produces masses of white, insect-pollinated flowers. Its prolific, reliable crops of jet-black fruit ripen in late summer and fall to a sweet-starchy pulp that is a staple for flocks of songbirds. Dense thickets of these spiny little trees provide cover and structure for all manner of wildlife.

But now, in the heart of the Willamette Valley, most of the Suksdorf's hawthorn are dead or dying, and the pattern of decline is rapidly spreading to the margins of the valley and into the foothills. It was clear something was going on with these trees by 2008, and it became so extreme along the I-5 corridor between Canby and Salem that I called up Alan Kanaskie, Forest Pathologist at ODF, to see if he knew

anything about it. "Yeah, I have noticed they aren't looking good," he said. When I asked if anyone else had brought this to his attention, he replied "Nope." I sent a number of samples, first to Alan, then again later to the pathology lab at Oregon State. The diagnoses—stress pathogens and symptoms typical of environmentally driven decline.

As far as I am aware, this has been the only investigation into a tree decline that has claimed at this point hundreds of thousands or perhaps millions of hawthorn, within direct daily view of Salem. To this day, there has been no mention in the press or government publications of the mass death of native hawthorn in the Willamette Valley. Apparently nobody loves, or even notices, these poor little trees dying by the tens of thousands along Oregon's highways and byways. This is a situation that needs to change. We all need to notice when something as profound as massive die-offs of important species occur. Once we notice, and then realize that we are the cause of these events,

perhaps we will speak up and make changing our behaviors a priority.

In the case of widespread tree declines in this state, there are two major causes—climate change and introduced insects and diseases. While we spend energy and air-time anxiously debating who will be the next US president—an outcome over which Oregonians have essentially zero influence—we do have the ability to begin changing the behaviors and social structures that are killing our forests and compromising the natural systems that support us. Rejecting foreign products that bring pests and diseases here, rebuilding our economy around local ag and industry and reducing our use of fossil fuels all have the potential to change the long-term trajectory of our local ecosystems and to promote local prosperity. Let's focus our public discourse on making these positive changes.

Oh...also...please plant hawthorns. They, and the birds, bees and other wildlife that depend on them, need our help now.



Photo Credit: George L. Kral



Photo Credit: : George L. Kral



News & Publications

Planting Long-Lived Trees in a Warming Climate: Theory Shows the Importance of Stage-Dependent Climatic Tolerance

A Erlichman, L Sandell, SP Otto, SN Aitken, O Ronce - Evolutionary Applications, 2024

Read the article [here](#).

Case Study on Future Fire Size and Burn Severity

UW Northwest Climate Science Center

Read the case study [here](#).

The Gnawing Question of Saltwater Beavers

Ben Goldfarb, Hakai Magazine

Read the article [here](#).

Blending Indigenous and Western Science: Quantifying Cultural Burning Impacts in Karuk Aboriginal Territory

Skye M. Greenler, Frank K. Lake, William Tripp, Kathy McCovey, Analisa Tripp, Leaf G. Hillman, Christopher J. Dunn, Susan J. Prichard, Paul F. Hessburg, Will Harling, John D. Bailey

Read the article [here](#).

Climate Change is Already Reshaping PNW Shorelines and Tribal Nations Are Showing How to Adapt

Isabella Breda, The Seattle Times

Read the article [here](#).

To Prepare for the Climate of Tomorrow, Foresters Are Branching Out

Syris Valentine, Grist

Read the article [here](#).

Events & Opportunities

Yale Forest Forum: Conserving Old Growth and Mature Forests

August 29 - December 5

Monthly virtual speaker series exploring different elements of protecting and restoring mature and old growth forests. Learn more and register [here](#).

Our Willamette River: Science in Service of Policy, Management and Restoration

November 12 - 13 | Oregon State University

Register [here](#).

Open Redcedar Adaptation Network

The project is designed as an open demonstration where communities can participate in the stewardship, monitoring, and comparison of redcedar trees grown from two seed sources. Learn more [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 treeline@b-e-f.org.

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