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Build Back Better: Water, Oceans, and Wildlife

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Mr. Chairman and Members of the Subcommittee:

Thank you for the opportunity to speak before you today about how we can increase the resilience of our communities and watersheds to climate change, support economic recovery, especially for rural areas, and advance environmental justice.

I am a research professor and senior policy advisor at the Ecosystem Workforce Program (EWP) at the University of Oregon. The EWP is a joint program of the University of Oregon and Oregon State University. This unique partnership allows Oregon's two leading research universities to contribute to natural resource governance that fosters prosperity and promotes community and landscape resilience. EWP was founded at the University of Oregon in 1994 to support the development of a high-skill, high-wage ecosystem management industry in the Pacific Northwest. Over the intervening quarter century, we have undertaken numerous studies to understand the restoration sector and how federal policy can support small businesses and workers conducting these activities. In addition to my role as a research professor, I am the interim vice president for research and innovation at the University of Oregon. However, today, I am speaking in my role as a faculty member rather than as an officer of the university.

I want to suggest that the restoration and maintenance of our nation's watersheds can contribute to increased climate resilience of our working forests, range, and agricultural lands and fisheries in the face of increasing temperatures, wildfire, drought, and flooding. In addition, by focusing on these efforts now, we can foster economic recovery for workers and businesses that have been particularly hard hit by the economic impacts of COVID-19 by providing thousands of well-paying jobs.

Building Resilience to Climate Change through Watershed Restoration

Watersheds connect rivers, streams, and coastlines with the surrounding forests, range, and agricultural lands and the built environment. Over 80 percent of drinking water comes from forested lands and 20 percent of the nation's drinking water originates on land managed by the US Forest Service.[1] It is increasingly urgent that we accelerate the pace of restoration because healthy watersheds increase biodiversity, provide high quality drinking water, reduce pollution; strengthen tribal, commercial, and sport fisheries; and sustain working agriculture, range, and forest lands.

Increasing drought, declining snowpack, and increasing impacts from hurricanes and other storms are all putting considerable stress on communities and the ecosystems upon which

they depend. In the American West, some of the most urgent watershed issues are related to the growing amount of historically uncharacteristic wildfire. In 2020 alone, Oregon lost 4,000 homes and 9 lives in wildfires.[2] Since 2017 in California, 170 people have lost their lives, 41,000 structures burned in fires that have covered over 7 million acres (an area roughly the size of Massachusetts).[3] Along with substantial smoke impacts, this new kind of wildfire is increasingly affecting waterways and transportation corridors with post-fire mudslides that send sediment and debris into rivers, threatening drinking water and fish habitat, and disrupting transportation corridors. The most striking recent example of this is the collapse of Highway 1 in California at Rat Creek near Big Sur this winter after the Dolan Fire, which began in August 2020.[4] Scientific consensus points to all of these trends accelerating and expanding through this century without aggressive intervention across scales.

Watershed restoration is a broad group of activities that seek to improve ecological function and reduce risk from natural hazards to communities. And, while we call these 'restoration' activities, these projects are increasingly developed with an eye on the future rather than the past. They include forest thinning and prescribed fire to reduce wildfire hazard, restore forests, protect drinking water infrastructure, and improve wildlife habitat; rangeland restoration; road improvements to reduce sediment runoff and mudslide risk; retrofitting or removal of outmoded dams, culvert replacement, and other activities to improve fish passage; irrigation and other improvements to increase water efficiencies; stream-side tree planting to reduce stream temperatures; recontouring streams to reconnect side channels and restore natural flows to increase fish habitat and reduce flooding; removal of invasive species; changing agriculture practices to reduce run off; and urban stormwater management. Projects can range in complexity from streamside plantings that can be accomplished by volunteers in a single weekend to major dam removal projects that may take decades to align all of the necessary agreements and hundreds of millions dollars to execute (e.g., Iron Gate and three other dams on the Klamath River, near the California-Oregon border).

Substantial investments in watershed restoration are needed to keep pace with the growing challenges. Some estimates are that public, private, and tribal forest lands may require an additional $50-$60 billion over the next decade to conduct targed fuels reduction treatments to protect communities from wildfire. On national forests in Oregon in 2019, there were approximately 2.2 million acres of non-commercial thinning and prescribed fire projects that were NEPA-ready and only lacked funding to execute. The estimated costs of completing these treatments was approximately $390 million.[5] Although watershed restoration cost estimates are hard to come by, in 2018, the Department of Interior estimated that it had $16 billion of deferred maintenance backlog (primarily roads, trails, buildings, and toilets).[6] Similarly, the U.S. Forest Service in 2019 estimated that their backlog was $5.2 billion.[7] These are likely significant underestimates of needed investments, especially in the area of roads. These numbers do not include stream restoration needs, which are not considered deferred maintenance. Major basin-wide or dam removal projects may run hundreds of millions of dollars.[8] Substantial investments are also needed to address vulnerability to drinking water supplies from extreme wildfire, flooding, and related natural hazards. For example, Denver Water has expanded their original Forests to Faucets program with the U.S. Forest Service to now include the Colorado State Forest Service and the Natural Resources Conservation Service in a five-year, $33 million effort to restore more than 40,000 acres of priority areas on state, federal, and private lands.[9]

Creating Economic Opportunity by Increasing Climate Resilience

Watersheds typically include many jurisdictions, making collaboration across land ownerships and among tribal, federal, state, and local governments key to the successful development and execution of restoration projects. The restoration sector, which develops, funds, and executes these restoration projects, is multifaceted and includes a myriad of agencies, landowners and land managers, numerous types of non-profit organizations, and small businesses. Community-based organizations such as watershed councils, soil and water conservation districts, land trusts, and other conservation organizations often play a convening role. They bring together multiple stakeholders, especially willing landowners and multiple state and federal agencies to build agreement, develop and design projects, and seek funding from multiple sources for their implementation. In some cases, these organizations also run workforce training programs along with contracting small companies to execute the work. Depending on the specifics of the project, other participants often include tribes, irrigation districts, water and power utilities, and local governments.

One of the great success stories of this collaborative, multi-stakeholder approach to watershed restoration has occurred in Oregon over the past three decades. Almost 30 years ago, faced with the specter of multiple listings of salmon species as threatened under the Endangered Species Act, the State of Oregon created the Oregon Watershed Enhancement Board (OWEB).[10] Using dedicated lottery revenue, OWEB funds self-organized watershed councils to bring together willing local landowners, federal and state agencies, tribes and many other stakeholders develop, implement, and monitor projects to enhance salmon habitat. Since that time, dozens of watershed councils in every corner of the state, working with partners, have removed fish passage barriers, reduced sediment inputs and improved thousands upon thousands of miles of salmon habitat. With these state funds, they have leveraged millions of federal dollars as well, from sources such as NOAA's Pacific Coast Fisheries Fund, the U.S. Forest Service, and the Bureau of Land Management. Over time, these projects have become increasingly sophisticated and coordinated to support basin wide salmon recovery.

Watershed councils and their partners execute these projects primarily using in-house crews, local contractors, and volunteers, creating local economic activity through their execution. Our research has found that these projects create 15-24 jobs in Oregon per $1 million invested, depending on the type of work involved.[11]

As watershed restoration has become more common over time, small businesses and trained workers have emerged across the country that perform this work. This is a diverse sector primarily composed of small businesses that can be grouped into three broad categories – labor-intensive (e.g., hand thinning, manual tree planting, noxious weed abatement), equipment-intensive (e.g., heavy equipment operation such as instream activities, dam retrofits, road work, mechanical thinning), and technical (e.g., project design, engineering, surveys, monitoring, prescribed fire). Although skill sets are similar to other non-restoration activities, all of this work requires specialized training and experience to perform high quality work.[12] Companies in this sector are also well positioned to participate in emergency response and recovery from events such as wildfire, floods, landslides, and storms.

Using funding from diverse sources such as NOAA's Pacific Coastal Fisheries Fund, Bonneville Power, and USDA Natural Resource Conservation Service, partners in Lemhi and Custer Counties, Idaho have developed numerous watershed and fish recovery efforts in

partnership with ranchers. Over time, a handful of local contractors have built viable businesses around this restoration work. When projects involved skills not available locally, project partners required that outside contractors mentor local contractors in order to expand local capacity over time. In addition, partners have integrated a youth training program that introduces young adults to restoration-related career pathways.[13]

Because this work is seasonal, businesses and workers in these sectors often perform a variety of work for a range of customers, and may move in and out of the restoration sector over the course of the year. In the West, we see equipment-intensive contractors frequently moving between restoration work and other heavy equipment work (e.g. construction, wildfire response) in the area near where they live for multiple government, private, and non-profit customers. By contrast, the labor-intensive contractors are more likely to work primarily for one or two federal or state land management agencies, with their crews traveling long distances (across multiple states) and moving between activities like fire suppression crew work, thinning, and tree planting.

Challenges and Opportunities

Complex organizational and regulatory environment

Conducting watershed restoration is not exclusively a technical task, and often requires building broad and complex agreements among many stakeholders. There can be numerous challenges driven by multiple landownerships, complex regulatory environments, and multiple government agencies with a stake in outcomes. Tribal treaty rights, key federal laws such as the Endangered Species Act, Clean Water Act, Federal Energy Regulatory Commission dam licensing requirements, state law, and market drivers such as demand for certified green power create an incentive structure for these projects. But the specifics of project development and execution requires significant local-level collaboration to bring willing partners to the table, build agreement, navigate the regulatory environment, and identify multiple sources of funding. Progress on restoration in places as far ranging as the Everglades, Chesapeake Bay, the Salmon River in Idaho, and the Colorado Front Range have depended on extensive engagement of multiple government and nong-governmental partners and dozens of funding sources. In New Mexico, collaborative forest restoration is returning forest health and resilience to wildfire. Restoration in the Santa Fe watershed, particularly through prescribed fire, protected the city's water supply, a ski area, and Tesuque Pueblo's tribal lands from severe wildfire.[14]

One key ingredient is support for local-level collaborative capacity. Programs such as the Oregon Watershed Enhancement Board's watershed council support grants, and the US Forest Service's Collaborative Capacity and Land Stewardship Program have made small but critical investments in this area.

In addition to local-scale collaboration, there can be challenges that require partnership and collaboration at higher organizational scales to solve complex problems.[15] In California, the Governor's Forest Management Task Force has driven cooperators from across sectors to develop new strategies yielding an ambitious "shared stewardship agreement," committing the state and federal government and their cooperators to restore a million acres of forests and woodlands per year over the coming decades.[16] The Oregon Watershed Enhancement Board has developed a Focused Investment Partnerships program in order to make multi-year investments in priority restoration issues at a basin-wide scale, with the tackling complex issues with enough investment to make a real difference ecologically.[17]

Shortage of trained workers and entrepreneurial business skills.

As we build out major new climate initiatives, we will need to be attentive to developing the workforce and supply chains to match these efforts. Small businesses, especially those located in rural areas, can struggle to find qualified workers to perform higher skill jobs, such as heavy equipment operators that are skilled to work instream, burn bosses and other crew members to support prescribed fire, and engineers to design projects. Given the breadth of this sector, training needs vary considerably from on-the-job training and apprenticeships to college certificates and degrees. The traditions of JobCorps, AmericaCorps, YouthCorps, and community colleges are strong building blocks for a training approach to meet contemporary demands, and all are trying to adapt and innovate their programs to meet the needs of the moment.

Given the seasonal nature of the work, it is vital that workers are trained to do multiple types of activities. There are a number of local training programs that focus on recruiting rural residents, including Anglo-American, Native American, and Latino youth, to build a cross trained workforce, so that they can work over longer periods as the seasons change as well as be available for emergency response and recovery. The seasonal nature of restoration work is a significant barrier to building careers that can support families and communities and, more generally, the workforce we need to respond to wildfire and climate threats. Increased support for the community-based organizations that stitch multiple seasonal jobs together with training to offer viable careers could help the restoration sector expand as an economic engine.

For example, the Karuk Tribe in Northern California has been steadily building a diversified natural resources program focused on restoring their traditional salmon fishery and restoring fire to their ancestral lands, almost all of which is now National Forest System lands. Working through the Bureau of Indian Affairs, their fire crews participate in emergency wildfire response both locally and regionally, and focus on fuels reduction, prescribed fire and supporting cultural burning during the remainder of the year. Recently, they have begun training and mentoring other regional tribes to grow their workforce capacity to serve as stewards of their homelands.

The Forest Stewards Guild, based in Santa Fe New Mexico, has focused its training programs on forest restoration and prescribed fire to increase the local resources for both fire suppression and forest restoration efforts.[18] By working with federal, tribal, state, and local partners, young adults are gaining practical experience, firefighting qualifications, community college credits, and, in many cases, long-term jobs. The Guild's program builds on over two decades of success engaging youth in wildfire prevention and preparation work and is expanding into post-fire tree planting. Many local programs, however, are challenged to support the full range of technical skills involved in watershed stewardship (e.g., heavy equipment operator training, engineering, burn boss qualifications) and would benefit from partnerships with JobCorps or other programs to broaden the training that they can provide rural workers. In addition, many programs struggle each year to piece funding together and would benefit from consistent, multi-year support.

With the decline of rural natural resource and manufacturing jobs in many rural communities, there can be a shortage of entrepreneurial and business skill sets. Business assistance programs are often not well matched to the needs of the restoration sector, especially in remote rural communities. Some programs are primarily located in urban areas with limited

outreach to rural businesses, other programs are targeted primarily at landowners, other programs have funding criteria that include job creation metrics that do not work for low population areas.

Lack of diversity and unsafe working conditions in some segments of the sector.

In many parts of the United States the restoration workforce is multi-ethnic, including a large number of Latino, yet women tend to be underrepresented in many parts of the sector. Although women often play leadership roles in community-based organizations and watershed councils and the federal workforce has diversified significantly over time, some segments of this workforce continue to be male dominated and, in some cases, harassment of women is common. For example, over the last few years, there have been a number of news articles about the unwelcoming and unsafe environment of wildland firefighting.[19] Programs such as Women-in-Fire Prescribed Fire Training Exchange (WTREX), which is designed to bring groups of women to build skills in conducting prescribed fire, not only build technical and leadership skills, but also can create a sense of community and safety that appears to help women stay in fire careers.[20] The National Prescribed Fire Act of 2020, first introduced in the Senate during the last session, has a number of other provisions to support the growth of women in leadership roles.

In addition, among the labor-intensive segment of this sector, there is a long history of significant challenges with job quality including dangerous working conditions, lack of access to medical treatment when injured, wages theft and other exploitation, and inadequate training.[21] There are some programs such as Lomakatsi Restoration Project's Promotora program, which provides workers with information about safety and worker rights.[22] However, given the remote nature of the work, labor law enforcement can be challenging and workers are often too vulnerable to report problems. Due program structure, guest (H2B) workers are particularly vulnerable to wage exploitation and mistreatment. This exploitative environment can also lower wages and increase vulnerability for citizens and legal permanent residents, as well as workers with more precarious immigration status.

Unequal impacts of climate change

As climate change is contributing to increasingly intensive wildfire, flooding, storm events, sea level rise and coastal inundation, we are seeing rural and coastal communities facing increased vulnerability to these events. In many parts of the country, farmers, ranchers, fishers, and forest landowners' livelihoods are increasingly at risk due to their dependence on weather for their wellbeing. Physical vulnerability to these kinds of events– being in harm's way – is only one driver of risk, however. Social inequalities lead to some groups to be more susceptible to hazards and less able to adapt to these risks.[23] Factors that drive social vulnerability include demographic characters (e.g., poverty, race and ethnicity, medical conditions, age, mobility).[24] However, communities, particularly rural communities, can ameliorate social vulnerability by building strong collaborative capacities, social relationships, experience working together, and habits of learning and change. Fortunately, collaborative processes of developing watershed restoration projects can contribute to this "adaptive capacity."

Take for example, the Middle Fork of the Willamette River in Oregon, a watershed with substantial national forest land, and small communities with deep commitment to place but challenged by pockets of substantial poverty. The community collaboratives that had come together around forest and watershed restoration proved to be building blocks for broader problem solving. In the wake of a severe winter storm and then wildfire smoke events, they added to their focus community preparation for wildfire and other natural hazards, including

coordinating and enhancing social service delivery. Now, they are planning not only watershed restoration and wildfire hazard reductions projects, but also working together to reduce risk and be better prepared as a community for the next fire or storm.

Recommendations

1. As part of a stimulus package, invest in activities on federal, tribal, and private lands that: (a) increase ecological and community resilience to climate change and natural hazard events including wildfire; (b) strengthen the viability of working lands, waterways, fisheries, and renewable power generation while improving ecological function; (c) reduce greenhouse gas emissions and increase carbon sequestration; and (d) address deferred maintenance backlogs on federally managed lands and facilities.
2. Ensure that federally-funded restoration projects are forward looking and designed with climate change in mind.
3. Create grants programs and other mechanisms that support community-based organizations that bring together diverse stakeholders to build agreement, organize the necessary resources to execute the restoration projects as well as support the collaborative capacity to increase community climate resilience.
4. Foster an all-of-government approach that brings together the resource management, regulatory, labor, and business assistance agencies to deliberately and simultaneously create ecological and economic benefits from restoration efforts for communities.
5. Invest in modernized workforce training that covers the broad range of restoration activities that require a wide variety of skill sets, from labor intensive to heavy equipment to biological science, civil engineering, and management skills that are specific to restoration. Focus on building a cross trained workforce that allows people to work across multiple seasons and prepares them to perform restoration activities and pivot to emergency response, when necessary.
6. Focus on job quality by supporting worker safety programs and labor law enforcement. In addition, implement immigration reform that creates pathways to citizenship for DACA recipients and other long term residents and through reforms to the H2B program to reduce worker exploitation and improve job quality.
7. Invest in strategies to create career pathways and leadership opportunities for a diversity of Americans in restoration and recovery, including women.
8. Support rural entrepreneurship and small business ownership through programs that are structured and targeted to support rural-, minority-, and women-owned businesses.
9. Invest in cutting edge social scientific research in addition to biophysical science and technology. There is considerable need to expand understanding of effective governance, social networks, effective decision support, community economic impacts, and other social dimensions of creating climate resilience. Sea Grant, the National Estuary Research Reserve system, the Joint Fire Science Program, U.S. Forest Service Research and Development, and the USGS Water Science Center are a few examples of strong programs that could expand to include more interdisciplinary and social scientific research.

Endnotes

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