



# NORTHWEST FIRE SCIENCE CONSORTIUM

## ACTIVITY IMPACT STATEMENTS

### Key fire science topics that NWFSC contributed to this year

The Northwest Fire Science Consortium (NWFSC) contributed to *all* the listed fire science topics during FY24. New journal articles and reports on each topic that were published throughout the year were added to our research database and highlighted in our monthly newsletter. Topics that were a key focus of a NWFSC-led deliverable (e.g., a research brief, synthesis, webinar, or workshop) during FY24 are noted in bold.

- |                               |  |  |  |
|-------------------------------|--|--|--|
| 1. Wildlife                   | <b>6. Postfire recovery and management</b> | <b>11. Smoke, air quality, and health</b>              | <b>14. Social science and human dimensions</b> |
| 2. Invasive plant species     | <b>7. Fire behavior</b>                    | <b>12. Wildland urban interface and infrastructure</b> | <b>15. Indigenous knowledge</b>                |
| <b>3. Vegetation</b>          | <b>8. Fire regimes</b>                     | 13. Firefighter safety and incident management         | <b>16. Economic impacts</b>                    |
| 4. Soil                       | <b>9. Fuels management</b>                 |  |  |
| <b>5. Watershed processes</b> | <b>10. Prescribed fire</b>                 |  |  |

## 1 ADAPTING NWFSC FOUNDATIONS

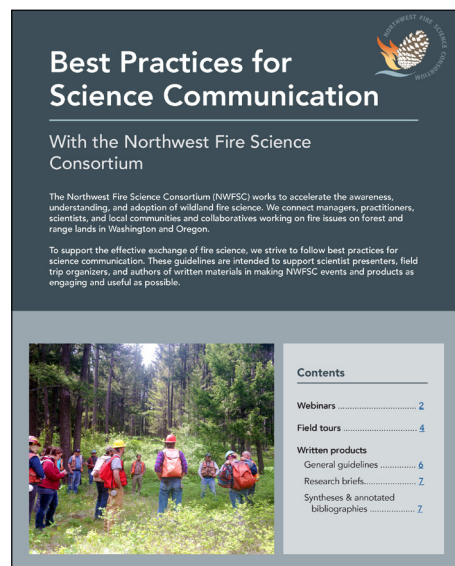
**Key fire science topics:** *Indigenous knowledge; Social science and human dimensions, Fuels management*  
**Societal Impacts:** *Connectivity, Conceptual, Capacity-building*

The Consortium’s FY24-25 plan of work outlined efforts to adapt the NWFSC to a new fire science and management environment, which required adjusting governance and core platforms to further enhance our ability to share knowledge and build relationships. We focused efforts in 2 key areas: 1) governance and outreach, 2) Tribal engagement.

### New governance and outreach approaches

Our new governance approach emphasizes inclusive opportunities for our operations team, steering committee, and partner sensing group to provide input on our mission, decision process, and operation frameworks. This required an iterative process with the various governance teams to develop and approve a new [NWFSC Operating Guidelines and Governance Charter](#), which we adopted in early 2024. We also focused on improving our processes for delivering activities and outputs to support the science application capacity of managers and scientists. We researched, synthesized recommendations, and drew on our own experiences and lessons learned to compile and publish a “[Best Practices for Science Communication](#)” guide that we share broadly with partners and presenters to plan efforts (e.g., webinar and workshop presentations, outlining field tour objectives, preparing research summaries).

We also endeavored to establish new outreach pathways and audiences. We continued to consult with neighboring fire science exchanges and other boundary spanning science organizations to share insights around needs assessment and evaluations; and identified and discussed collective needs and strengths that transcend regions through peer learning during FSEN monthly calls, annual gatherings, and national events where multiple exchanges were featured. For example, the NWFSC led both a Special Session and a Fire Circle in December 2023 at the 10th International Fire Ecology and Management Congress that brought together multiple exchanges and FSEN organizers from JFSP to present on the FSEN and facilitate discussion with diverse attendees around needs and opportunities for ongoing work. We have



Cover of NWFSC’s Best Practices for Science Communication guidebook.

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also presented at neighboring exchange's management calls on overlapping areas of focus and engaged in larger co-led ongoing efforts with others. For example, the NWFSC is co-leading the Fire and Traditional Ecological Knowledge newsletter with the Northern Rockies Fire Science Network. This includes bringing on an Indigenous undergraduate student from Oregon State University to bring their knowledge and experience to the newsletter.

Finally, new outreach approaches also relied on strategies to rejuvenate our core dissemination venues to continue growing our audience in ways that are both broad and welcoming to all new parties:

- Our modernized and reorganized website went live on October 1, 2023 and has had 74k visits from over 30k unique individuals in the past 12 months. This is a significant increase in traffic.
- We redesigned our newsletter to better match our updated website and continued to feature new fire science research, events, and news alongside our own outputs as we completed them. Our newsletter listserv grew by 370 new participants over the last year, meaning that >19% of our 1907 listserv participants joined in FY24.
- We expanded our participation in an array of in-person events that ranged from smaller invited gatherings to large public social and learning events. Some of these were core to our topical work bundles and are outlined in greater detail below (e.g., the Work of Wildfire Field Workshop, the Bend Prescribed Fire Tabletop Exercise). Others offered novel venues to meet many new people and discuss NWFSC more broadly (e.g., we engaged with well over 400 people between two events: a tabling event with Pacific Power employees to discuss wildfire preparation and a table at the Oregon Museum of Science and Industry's [OMSI After Dark](#) event that had over 1,500 attendees).

### Listening and learning with Tribal Nations, Indigenous peoples, and the BIA

In FY24 we focused particularly on establishing relationships and mutual understanding through introductions, presentations at meetings, and mutual co-led efforts with managers from the Northwest's federally recognized Tribes and rights-holder organizations, and Indigenous scientists. Each gathering and engagement effort was different in nature, scale, and participants. In FY24, we engaged in listening/learning with Tribal managers and practitioners at:

1. Inter-Tribal Ecosystem Restoration Tribal Summit in Sunriver, OR (November 2023)
2. BIA NW Fire Management Officers spring meeting in Airway Heights, WA (April 2024)
3. Intertribal Timber Council Annual Symposium in Cherokee, NC (May 2024)
4. BIA fuels monitoring group for the NW, virtual, co-presentation and discussion with the Northern Rockies Fire Science Network and Monique Wynecoop (September 2024)

We continue to learn and partner with Monique Wynecoop, who became a member of our steering committee. In addition to working on specific projects with her, we conducted a sensing interview as part of our needs assessment efforts. Our ongoing attention to Tribal engagement will continue to require time, attention to cross-cultural learning, and a dedicated focus on being responsive to the engagement needs of new partners. Not all Tribal Nations and Indigenous peoples have the same experiences or express the same needs and interests. We consolidated some common themes learned from these efforts in the last year to help guide our ongoing engagement:

- Many Indigenous peoples and Tribal Nations have received requests with non-Indigenous people and organizations trying to learn more about their needs and how they could work with them. This leads to a lot of time and knowledge being requested from Tribal Nations and practitioners, often without follow up.
- There are a growing number of Tribal liaison or other types of positions intended to build connections between non-Indigenous agencies and organizations, and Tribal Nations. This has resulted in less people being available to join the workforce of some Tribes themselves, which is difficult when those Tribal Nations may be having difficulty in funding, recruiting, and retaining staff.
- Tribal Nations that have experienced many large wildfires may be working to implement post-fire monitoring and long-term planning to make their forests more resilient, but it is hard to find funding and capacity to implement those activities. Direct resources for Tribal monitoring related to wildfire, particularly postfire effects, are very limited.
- The capacity to engage on wildland fire topics varies greatly across Tribal Nations. Some have fire management programs, and others such as smaller or coastal Tribal Nations, do not. There is a need for resources to support some Tribal Nations in developing programs to monitor and respond to wildfire, drought, and other climate impacts—while also navigating how to support Indigenous knowledge sovereignty and intergenerational knowledge exchange. Most Tribal Nations also do not have air quality programs.
- Activities involving Tribal Nations and Indigenous peoples should be led by them. Entities like the FSEs can be supporting partners and lend capacity if invited and on their Indigenous partners' terms.
- Funding may often be needed to support Tribal Nations and Indigenous peoples in participating in collaborative processes, assessments, studies, etc.

- Any program that engages Tribal Nations and Indigenous peoples should focus on long-term relationships and consistent communication, rather than single events or requests.
- Some Tribal Nations may be interested in working together on events or resources that offer tangible skill building and training.

Although our ongoing engagement will continue to take time and attention over the long-term, we have seen growing interest in our work among our Tribal and Indigenous partners. For example, of the 369 new enrollees to our listserv in FY24, 46 (12.5%) were Tribal or BIA affiliated. 39 of the 83 total Tribal-affiliated listserv participants (47%) and 7 of 18 BIA participants (39%) joined the listserv in FY24.

### Connecting short- and long-term objectives:

The activities and impacts described above contribute to diverse outcomes across all scales in our [logic model](#). They contribute most prominently to:

- **Short-term outcomes #4** (Increased awareness of the NWFSC), and **#5** (Increased coordination of existing science delivery institutions through the NWFSC).
- **Medium-term outcomes #6** (Increased familiarity, collaboration and co-learning among managers, practitioners, and scientists, **#7** (Increased engagement among Tribal managers and scientists around fire science needs), and **#14** (Diverse representation and inclusion of underrepresented groups in NWFSC activities and outputs).
- **Long-term outcomes #16** (Increase in cross-boundary, science-informed management and partnerships) and **#18** (Mutual inclusion and respect for Indigenous knowledge and rights in research and management efforts).

## 2 ENHANCING RESILIENCE AFTER FIRE

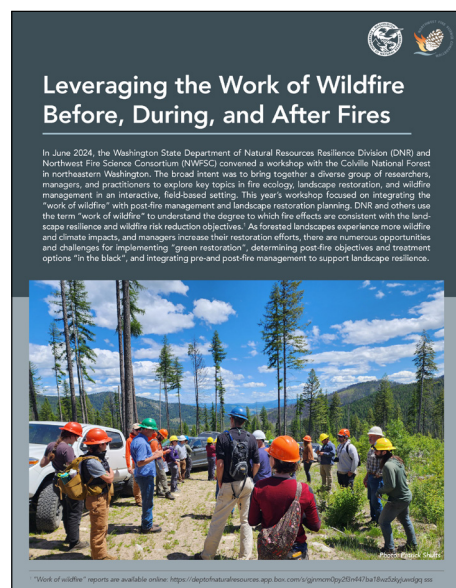
**Key fire science topics:** *Postfire recovery and management; vegetation, fuels management; fire behavior; fire regimes; social science and human dimensions*

**Societal Impacts:** *Connectivity, Conceptual, Capacity-building, Instrumental*

Resilience-enhancing strategies are more often thought of in the context of managing “in the green” or before wildfire occurs. However, postfire treatments also afford opportunities to develop long-term resilience. In addition, Oregon experienced its worst wildfire season in terms of acres burned (nearly 2 million). This year we conducted outreach activities focused on connecting land managers with researchers and new science to integrate landscape resilience in postfire management; and for rapid response following the fire season.

### Work of Wildfire Field Workshop

The “work of wildfire” is a term used to describe fire effects that can contribute to land management goals of reducing wildfire risk and enhancing resilience. Conceptually this involves integrating pre- and post-fire management before, during, and after wildfire to meet landscape scale objectives of wildfire resilience. Despite growing interest, there are limited resources available to engage land managers and support incorporation of these concepts into their management. To address this resource gap, we partnered with the WA Department of Natural Resources and managers from the Colville National Forest (CNF) to develop a two-day interactive, field-based workshop in June of 2024. The goals of this workshop were to 1) connect and build relationships among scientists and managers, 2) observe recently burned areas to discuss post-fire management barriers and approaches for quantifying and leveraging beneficial fire, and 3) identify strategies, research and resource needs, and policy changes for integrating the work of wildfire into pre-fire restoration treatments. We structured the workshop as a retreat to support formal field-based learning from land managers from the CNF and emphasize the importance of informal discussion between attendees, speakers, and workshop leaders. It was attended by over 40 land managers and researchers representing USFS, state agencies, universities, tribes, and NGOs from the region.



Cover of Work of Wildfire post-workshop report.

Attendees camped at Curlew Lake State Park and carpooled to multiple recently burned sites in the CNF over a two-day period. The sites demonstrated a diversity of wildfire severity, pre-fire management, and post-fire treatments. At each site managers from the CNF described the work that had been done pre- and post-fire, challenges and successes, and the effects of wildfire on their management. That information was supplemented by DNR researchers who were partnering with the CNF to study those impacts. We then facilitated a discussion with attendees to identify strategies for applying pre and post-fire management with the work of wildfire in mind, as well as potential barriers and challenges. Each night at camp, attendees gathered for informal campfire discussions. The second night included a needs identification activity where attendees were given notecards and asked to write 1-3 research, management, or policy needs they believe would support leveraging the work of wildfire in land management if addressed. We recorded recurring themes and needs identified in the discussions and activities and published them in a [post-workshop report](#) along with key recommendations to meet those needs.

Feedback from the workshop was overwhelmingly positive both formally through post-workshop survey responses and informally via discussions with attendees. Most expressed a desire for similar workshops to take place annually or bi-annually. All the attendees said the workshop was beneficial to their work, with 96% reporting it was “very” beneficial. We asked for and received additional feedback on how to design future workshops to better suit attendee needs and received several helpful comments.

## Revive the Future Webinar Series

To further develop the connection between wildfire science and land management, we developed a five-part postfire webinar series in October and November of 2024. This was coordinated in partnership with the Washington Department of Natural Resources Post-Fire Recovery Program. The goal of this series was to connect land managers with postfire science and resources in the wake of the 2024 wildfire season by showcasing examples of science application in postfire settings and highlighting partner resources and research.

The series featured new science in a variety of postfire topics, including debris flows, community recovery, restoration infrastructure, reforestation, and recreation. Topics were partially informed by needs identified in the Work of Wildfire Workshop. Each session featured a scientist and practitioner working in that field to demonstrate science application. These were one-hour sessions which included time for Q&A with speakers.

Consortium team members and partners advertised the series through multiple channels in both Oregon and Washington. The webinars were well attended, with over 600 people attending across the five sessions, and an additional 733 views of the recordings on the Northwest Fire Science Consortium Youtube channel as of November 14th, 2025 (8 days after the final webinar). Based on post-webinar survey results, across all 5 surveys more than 90% of attendees said that the information shared was useful, and nearly 2/3 of respondents said they would use what they learned in their work.

### Connecting short- and long-term objectives:

The activities and impacts described above contribute to diverse outcomes across all scales in our [logic model](#). They contribute most prominently to:

- **Short-term outcomes #1** (Enhanced awareness and understanding of new research findings for reducing the occurrence of catastrophic wildfire and wildfire risk), **#2** (Increased awareness of locally relevant methods to prioritize active wildland fire and fuel management, and determine most effective treatments; and **#4** (Increased awareness of the NWFSC).
- **Medium-term outcomes #6** (Increased familiarity, collaboration and co-learning among managers, practitioners, and scientists), **#7** (Increased engagement among Tribal managers and scientists around fire science needs), **#8** (Increase in requests for NWFSC assistance and expertise), and **#13** (Application of information and knowledge from NWFSC outputs)
- **Long-term outcomes #16** and **#19** (Increase in cross-boundary, science-informed management, and partnerships; Improved landscape resilience to disturbance).



Flyer for the 'Revive the Future' webinar series.



**Key fire science topics:** *Smoke, air quality, and health; Prescribed fire; Fuels management; Social science and human dimensions*

**Societal Impacts:** *Connectivity, Conceptual, Capacity-building, Instrumental*

Growing smoke impacts in the PNW are driving investments and innovations in research and mitigation resources. Smoke management for prescribed fire remains a key issue for managers and regulatory agencies. Smoke from catastrophic wildfires affects many communities and populations at increased risk from smoke. We have engaged with federal, state, and local agencies, as well as community-based partners and researchers to identify ways to improve communication, outreach, and engagement around smoke and air quality, in response to practitioners' needs, questions, and concerns. Key activities included: (1) in-person, two-day tabletop exercise in Bend, Oregon; (2) facilitation and engagement with Smoke Ready Communities group; (3) a peer-reviewed literature review on public opinion on prescribed fire; (4) a peer-reviewed literature review on air quality and smoke communication; and (5) planning for co-design of an upcoming virtual workshop focusing on public health and equity in wildland fire air quality.

### Tabletop exercise: Bend, OR

In partnership with federal and state agencies (U.S. Forest Service, U.S. Environmental Protection Agency, Oregon Department of Environmental Quality, Oregon Department of Forestry), and local organizations (Deschutes County Public Health, Deschutes County Commissioner, Deschutes Forest Collaborative Project), a two-day tabletop exercise was held in Bend, Oregon with 40 attendees. This exercise focused on smoke management of prescribed fire operations, its health impacts, and the need for collaborative strategies to manage smoke-related public health risks.

**Outcomes:** The exercise led to the development of a comprehensive report, including an executive summary, which helped to clarify roles and responsibilities, identify gaps in preparedness, and set the stage for the West Bend Prescribed Fire Pilot Project.

### Smoke Ready Communities (SRC)

Smoke Ready Communities (SRC) is an Oregon statewide community of practice and network of practitioners, educators, and researchers, who engage in information sharing and learning at the intersection of public health, environmental quality, and smoke from wildfire / prescribed fire, heat, and other related effects. Each meeting has ~15-20 attendees with an email listserv ~60. In this shared space, participants brainstorm potential points of collaboration to address practitioners' needs and questions through research and extension. Through our ongoing facilitation SRC, we conducted a focus group (~15-20 attendees) to better understand practitioners' needs related to messaging and communications around smoke and air quality. The group identified the need for literature reviews on prescribed fire and air quality communication that identify enhanced strategies for communicating smoke exposure risks to vulnerable populations. The feedback from the focus group helped inform the development of the science syntheses.

### Public Opinion on Prescribed Fire Literature Review / Science Synthesis

We conducted a literature review on prescribed fire focusing on public opinion, attitudes, and concerns, with an emphasis on research conducted in the Pacific Northwest. The review identified widespread support for prescribed fire, yet highlighted concerns such as smoke impacts, fire escape risks, and effects on recreational activities.

- **Process:** The review engaged subject matter experts, including the Wildland Fire Leadership Council (WFLC), public health practitioners through the Smoke Ready Communities group (~15-20 attendees & email listserv ~60), academics noted for their research on these topics, and more extensive engagement with U.S. EPA subject matter experts (~5-7 individuals). Feedback from the multiple sessions where we have presented this information (Wildland Fire Leadership Council (WFLC) (~100 attendees, online & in-person), West Bend After Action Review discussions, and planning for an upcoming workshop) have been positive and engaged, affirming the need for this type of synthesized information.
- **Progress to date:** Through our review of the literature, we considered implications for communicating about prescribed fire and associated smoke by drawing on existing promising practices and new insights drawn from the literature. We include information on the state of current research and future directions for research and practice. This document is in final edits, with layout and design anticipated in late November.

# Smoke & Air Quality Communications Literature Review / Science Synthesis

We are conducting a peer-reviewed literature review (science synthesis) focused on smoke and air quality communication.

- **Process:** We developed a protocol for this literature review using inclusion and exclusion criteria during: (1) title and abstract screening and (2) full text review. Using Covidence software, we reviewed around 6600 articles. Throughout, we have engaged with subject matter experts, including Wildland Fire Leadership Council (WFLC) (~100 attendees, online & in-person) and public health practitioners through the Smoke Ready Communities group (~15-20 attendees & email listserv ~60), to obtain feedback and input on types of content, themes, and questions around smoke messaging and related topics. Feedback has been positive and engaged, affirming the need for this type of synthesized information.
- **Progress to date:** Our synthesis will focus on the state of science in air quality communication research, identifying promising practices, and areas for future research. We included smoke, regardless of source, as air quality communicators and public health experts emphasize the need to focus on exposure reduction in risk communication practices. In other words, "there is no such thing as good smoke." We are currently at the extraction phase of this literature review, which will be complete in the first half of 2025.

## Equity Workshop planning: "Considering Public Health & Equity: Wildland Fire Air Quality"

In FY24 we spent time developing partnerships to plan content for a virtual workshop around wildland fire air quality, equity, and public health. We co-lead this effort with input from nine different partners, including federal and state agencies (U.S. Forest Service; U.S. EPA; WA Dept. of Natural Resources, WA Dept. of Ecology, WA Dept. of Health; Oregon Health Authority), OSU Extension Services, community-based organizations, and local government. Although this workshop will occur in FY25, we did much of the planning for this session in FY24, including creating a resource guide to share with partners and their audiences during the workshop that highlights toolkits, websites, upcoming events, and resources for working towards community smoke readiness.

### Connecting short- and long-term objectives:

Our work to date in this bundle meets our objectives for this program of work, including:

- State, federal and local land management and public health agencies are able to both identify key challenges for communicating wildfire smoke preparedness, and interpret opportunities for improvement in air quality communication within their own agency.
- Applied researchers are able to examine areas of research where additional research on related topics would be warranted.
- The NWFSC is able to relate findings from this bundle to considerations for future research development.
- The release of the science synthesis documents will further support federal and local land management and public health agencies in assembling synthesized findings for their own work agendas, and in identifying areas where potential policy or practice changes might be warranted.

The activities and impacts described above contribute to diverse outcomes across all scales in our [logic model](#). They contribute most prominently to:

- **Short-term outcomes #3 and #4** (Enhanced awareness and understanding of concepts related to equity and environmental justice; Increased awareness of the NWFSC (particularly for local and public health partners)).
- **Medium-term outcomes #6** (Increased familiarity, collaboration and co-learning among managers, practitioners, and scientists), #9 (Increased science communication skills and science delivery approaches for scientists, researchers, and knowledge generators), #10 (Use of new communication strategies informed by social science to address local & regional fire issues), and #11 (Managers increasingly address equity and environmental justice in planning fuels treatments & recovery approaches).
- **Long-term outcome #20** (Improved safety, health, and resilience of NW communities).

The screenshot shows a webpage titled "RESOURCES FOR WORKING TOWARDS A WHOLE COMMUNITY APPROACH TO BEING SMOKE READY". The page is dated November 12-14, 2024, and is for a virtual workshop. It is organized into several sections:   
- **Toolkits:** Lists resources like "OHA Crisis & Emergency Risk Communication Toolkits", "EPA Fact Sheet - Protect Yourself from Smoke & Extreme Heat", "Key Oregon Green", "DEM Oregon Wildfire Response and Recovery", and "OR DED Protect Yourself & Your Family - Clean-up after Wildfire".   
- **Upcoming events:** Lists "Governor's Occupational Safety & Health (GOSH) Biennial Conference" and "Annual OHA & Oregon DED's Annual Smoke Protocol Update Call".   
- **Recent events with resources:** Lists "Annual OHA Summer Hazards Call" and "Annual EPA Smoke Management in the Northwest Hybrid Conference".   
- **Websites:** Lists "Oregon Smoke Blog", "Washington Smoke Blog", "EPA AirNow Fire & Smoke Map", and "CDC Wildfire Smoke Page".   
- **Footer:** Includes a note: "Note: \* indicates materials are translated in other languages".

Resource guide for working towards a Whole Community Approach to Being smoke Ready