



NORTHWEST FIRE SCIENCE CONSORTIUM

*Annual Report
FY 2018
October 2017
to September
2018*

Northwest Fire Science Consortium is part of a national network of consortia established by the Joint Fire Science Program to accelerate the awareness, understanding, and adoption of wildland fire science information by federal, tribal, state, local, & private stakeholders in the PNW



The Northwest Fire Science Consortium's (NWFSC) Plan of Work (POW) for the three year funding cycle FY17, FY18, and FY19 was informed by our listserv subscribers, social media followers, and our Advisory Board. There were 50 respondents to a straw poll including 20 researcher/scientist, 19 manager/practitioner, and 11 other. In FY18 we continued to focus on the top ranked priority areas. This report will highlight the activities of the NWFSC during FY18 directed towards these areas.

PRIORITY AREAS

- 1 Smoke in Washington and Oregon: air quality and cross-boundary issues with prescribed fire
- 2 Post-fire management and restoration
- 3 Landscape level planning: collaborative natural resource management and coupled human and natural ecosystems
- 4 Managing fuels and fuel treatments in a changing climate

AWARENESS

The NWFSC provides a monthly online newsletter that is sent out to 858 listserv subscribers and disseminated to our Facebook and Twitter accounts. Subscribers to our listserv continues to grow each year. In FY17 there were 600 subscribers and in FY18 there were 858 – that's a 43% increase in subscribers! Engagement of our listserv subscribers also grows. FY18 engagement is higher than in FY17 with 39.9% open rate and 15.7 click rate, an increase of 8% and 17% respectively.

Our social media followers have also grown. Our Facebook followers increased from 614 to 720 and Twitter from 1824 to 2214. The Facebook post with the greatest number of people reached at 1850 is a JFSP Friday Flash News, [Spatiotemporal Evaluation of Fuel Treatment and Previous Wildfire Effects on Suppression Costs](#). The largest engagement, including post clicks and shares, came from the Facebook post on the [Fire Science Core Curriculum](#), an Oregon State University Extension publication written in partnership with the NWFSC. The largest engagement on Twitter came from another JFSP Friday Flash News, [Fires in the West may be changing the future of forests](#).

During FY18 we began a new partnership with the National Wildfire Coordinating Group (NWCG). The Fire Science Core Curriculum, mentioned above, will be used as a pilot that contributes to NWCG's Learning Management System (LMS). Users will have the opportunity to work through the Curriculum's Modules and get connected to similar resources within the LMS.

In FY18 we created a story map that included a project titled '[Individuals, Clumps, and Openings \(ICO\)](#).' In previous fiscal years, we sponsored a workshop, an Implementation Guide, and the development of an Android APP, and created a video around the ICO concept. The story map allowed us to creatively combine our products (i.e., guide, video, APP) and allowed us to deliver a more robust resource to our stakeholders.

Another way we try to bring awareness to fire science and management and connect stakeholders to resources is by providing information on completed and current projects via a 'project page' on the NWFSC website. These projects typically highlight JFSP funded projects. For example, [Co-Managing Risk or 'Parallel Play'? Examining Connectivity across Wildfire Risk Mitigation and Fire Response in the Intermountain West \(JFSP 17-1-06-6\)](#). A User can view this project page and learn about the research, objectives, key findings, etc. and get connected to the research team. The project page also allow for display of resources including Power-Points, videos, archived webinars, research briefs, working papers, and more.

The NWFSC also engages in informal briefings and personal interactions through meetings, workshops, and trainings to bring awareness not only to the Consortium but to regionally relevant fire science information and management. To that end, we were an exhibitor for two national conferences 1) Fire Ecology & Management Congress and 2) Fire Continuum Conference. At a local scale, we participated in two smoke management meetings. We also participated as panel members (Quack Chat Pub Talk), invited speakers (BIA NW Region Forestry/Fire Meeting), and facilitators (Fire Summit).

Cass Mosley, Management Team Member from the University of Oregon, has been working with legislators, University Deans, SAF Board Members, etc. to bring awareness to the Joint Fire Science Program and to the Fire Science Exchange Network.

UNDERSTANDING

As the NWFSC ages (est. 2012), we are beginning to see the completion of regionally relevant JFSP projects that we provided letters of support. As a result, the Consortium has come into the next level of engagement with researchers/scientists and managers. As such, our efforts have been focused on showcasing JFSP funded projects as they align with our priority areas. We accomplish this primarily through webinars and research briefs.

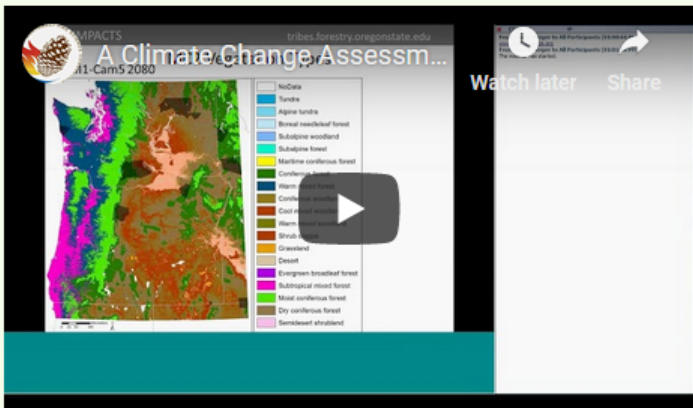
Webinars

The NWFSC hosted eight webinars during FY18, all of which are available on the NWFSC website under the '[archived webinars](#)' link under the 'resources' tab at the top menu. Compared to previous years, our webinar series have become very popular. The smoke tools webinar, for example, had over 140 registrants and 95 attendees.

- 1.) A climate change assessment of vegetation, fire, and ecosystem services for Tribal lands in the PNW (PA #3, #4) (*also a workshop*)

A Climate Change Assessment of Vegetation, Fire, and Ecosystem Services for Tribal lands in the PNW

Sponsored by Northwest Fire Science Consortium
Recorded December 19, 2017 - 10:00am
Presented by Michael Case



Dr. Michael Case, Research Scientist with the School of Environmental and Forest Sciences at the University of Washington presented, A Climate Change Assessment of Vegetation, Fire, and Ecosystem Services for Tribal lands in the Pacific Northwest.

Watch the video on our [YouTube Channel](#)

- 2.) Fire management of American Indian basket weaving plants in the Pacific Northwest (PA #3, #4) (*Georgia Hart and Tony Marks-Block both recipients of a GRIN Award*)

-Georgia Hart presented: The influence of fire regime and abiotic factors on the population dynamics and leaf qualities of a wild harvested understory herb, *Xerophyllum tenax* (Melanthiaceae)

-Tony Marks-Block presented: Recommendations for the biocultural conservation of beargrass, a fire-adapted, culturally-significant, understory herb

- 3.) Lessons from the Milli Fire (PA #4)
- 4.) Fuel treatment effectiveness in the southern Blue Mountains of Oregon (PA #4) (JFSP 14-1-01-2)
- 5.) Smoke tools and information for prescribed fire and wildfire (PA #1) - *"Filled gaps in my tech knowledge"* – Practitioner, Smoke Goose Consulting
- 6.) Scaling up Collaborative Restoration: What can be learned from participatory landscape simulation modeling? (PA #3)
- 7.) BehavePlus updates and changes (*in partnership with The Southwest Fire Science Consortium, Northern Rockies Fire Science Network, Southern Rockies Fire Science Network, California Fire Science Consortium, Great Basin Fire Science Exchange*)
- 8.) An outlook for the 2018 fire season in Oregon and Washington (*offered every year*)

Research Briefs

The NWFSC Research Briefs are exactly that – brief summaries of peer-reviewed literature that cover a variety of fire-related topics. Think of these Briefs as “CliffsNotes.” On the go managers have appreciated the upfront ‘Key Findings’ and ‘Management Implications.’

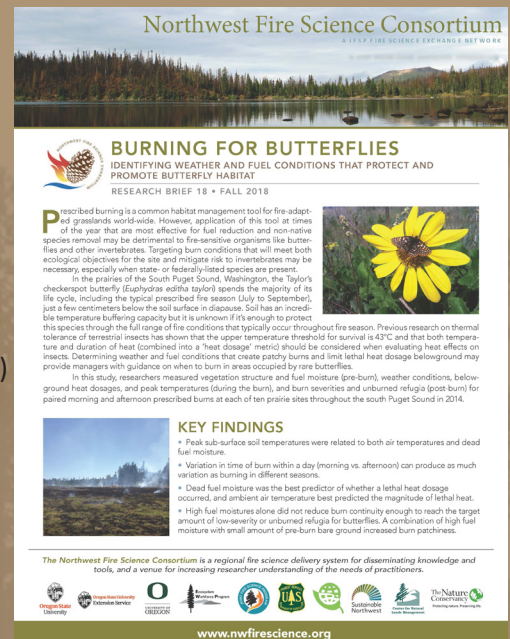
- 1.) NWFSC Research Brief #15: [Conflict around suppression: Drivers and Legacies \(PA #3\)](#)
- 2.) NWFSC Research Brief #16: [Rangeland Fire Protection Associations: Institutional and Social Dimensions of an Alternative Model of Wildfire Response \(PA #3\) \(JFSP 14-2-01-29\)](#)
- 3.) NWFSC Research Brief #17: [Ecological Reference Conditions: Perspectives in Collaborative Restoration of Dry Forest Landscapes \(PA #3\) \(JFSP 13-1-04-4\)](#)
- 4.) NWFSC Research Brief #18 - [Burning for Butterflies: Identifying Weather and Fuel Conditions that Protect and Promote Butterfly Habitat \(PA #4\)](#)

Fire Facts

The NWFSC Fire Facts are brief and to the point fact sheets that cover a variety of fire-related topics. These 5x7 Fire Facts are extremely popular. In addition to distributing Fire Facts at our own NWFSC events, others are starting to request the NWFSC Fire Facts for distribution at their events. For example, Fire Facts were requested for Representative Pam Marsh’s ‘Smoke and Fire Summit’ in southern Oregon this summer. The session addressed forest management, health impacts, economic consequences, and climate change. Over 400 people were in attendance at the Summit.

The focus of the FY18 series was around Fire Behavior and the components of the Fire Behavior triangle.

- 1.) [What is? Fire Behavior](#)
- 2.) [What is? Fuel](#)
- 3.) [What is? Topography](#)
- 4.) [What is? Weather](#)



What is? FIRE BEHAVIOR

Fire behavior is the way a fire acts - how and fuels ignite, flames develop, and fire spreads influenced by its interaction with fuel, weather topography.

The Fire Behavior Triangle is used to describe how a fire burns or how it behaves and includes three components: fuel, weather, and topography. Fuel is the only component that land owners and managers can influence.

The Fire Behavior Triangle is part of a series of Fire Facts that addresses Fire Behavior. For more in-depth information on Fuel, Weather, Topography, Types of Fire, and Fire Regime visit the [Northwest Fire Science Consortium website](#).

Fuels, weather, and topography

Fuels consist of dead woody and plant-based materials and live tree vegetation. Structures like homes are also considered fuel. Fuel characteristics include type, amount (loading), availability, and arrangement influence behavior.

Weather can influence how hot a fire burns (intensity), how much is killed (severity), and how long it grows (size) through wind, temperature, and relative humidity.

Topography can influence behavior through change in aspect, slope, and elevation across features of a landscape.

Types of fire

A wildfire fire can be defined by its surface, crown fire, or crown fire. The photograph (USFWS) shows a crown fire. A wildfire will generally exhibit all three fire types during the duration of the fire. The proportion of each type can vary greatly depending on fuel, weather conditions, and topography.

What is? FUEL

Any material that burns.

You cannot have a fire without fuel. Fuel feeds a fire by providing energy, and can be anything from live or dead plant materials to structures, like homes. Fuel is the only component of the **fire behavior triangle** that land owners and managers can influence.

Fire behavior is dependent on certain fuel characteristics - type, amount (loading), availability, and arrangement.

Fuel type

Wildland fuels are grouped into fuel types based on the primary fuel that carries the fire. These include grass, grass-shrub, shrub, timber, understory, timber litter, and slash-blowdown. Fuel types create different fire behavior. Grass fuels, for instance can catch and burn quickly through an area, while slash-blowdown may need more time to catch and burn. Fuels vary in type from one area of the country to another; within a state, and even within the same area.

Fuel amount (loading)

Fuel loading is simply the amount of fuel present in an area and is quantified in tons per acre. A grass fuel type would have a lower fuel amount than a slash-blowdown fuel type in most cases.

Fuel availability

Fuel availability refers to how ready a fuel is for burning. It is often related to fuel size, shape, and surface area to volume ratio. Fuels are characterized as 1-hour, 10-hour, 100-hour, or 1,000-hour based on how long it takes to change the moisture level within them, making them ready to burn. When they are dry enough to ignite, 1-hour and 10-hour fuels are largely responsible for ignition and initial fire spread. 1-hour fuels are 1/4-inch or less in diameter and are flaky, light vegetation (dead needles and grasses) that respond very quickly to changes in temperature and relative humidity. Larger fuels (>3-inches) have a lower surface to volume ratio and don't ignite as readily as smaller fuels, but once they do ignite they may burn for longer time periods.

What is? TOPOGRAPHY

The relief features or surface configuration of an area.

Topography's influence on fire behavior is more predictable than the other components in the **fire behavior triangle** - fuel and weather. Slope, aspect, elevation, and topographic features (e.g., canyons) can all influence a fire's rate of spread and other wildland fire behavior.

Slope

Slope is the amount or degree of incline of a hillside. Fire usually spreads faster uphill than downhill because fuels are more efficiently preheated by uphill spreading of heat and flames. The steeper the slope, the faster the fire can burn.

Aspect

Aspect is the direction a slope is facing. The aspect of the slope determines the amount of heating it gets from the sun. South and southwest slopes get more sunlight than north facing slopes. Because of sun exposure, S/SW slopes generally have higher temperatures, lower relative humidity, and drier fuels. These slopes tend to have less vegetation and typically smaller and sparser fuels. South/SW slopes usually are more likely to ignite and have increased fire behavior relative to N/NE slopes.

Elevation

Elevation is the height of the terrain above mean sea level. Elevation can influence fire behavior in several ways: the amount and timing of precipitation, heat, wind exposure, and context to the surrounding land. Fuels dry out earlier in the year at lower elevations where it's warmer than at higher elevations. At higher elevations, snow tends to linger which affects the moisture content of the fuels and hence, the start of the fire season. Higher elevations tend to have more lightning strikes.

What is? WEATHER

Weather describes short-term variations in the atmosphere from hot to cold, wet to dry, calm to stormy, clear to cloudy.

Weather is the most variable component in the **fire behavior triangle** and has a tremendous effect on fire behavior. Weather can influence how hot a fire burns, how much and what is killed, and how long it grows. Some fires can also create their own weather, under extreme fire behavior conditions.

The basic principles and concepts of fire weather as they relate to wildland fire behavior include: wind, air temperature and relative humidity, precipitation, and atmospheric stability.

Wind

Wind increases the supply of oxygen to the fire. Wind dries fuels, and also influences the direction and speed at which a fire spreads. Wind can carry embers ahead of the main fire causing new spot fires.

Air temperature and relative humidity

Rising temperatures result in higher heat and decreasing relative humidity and fuel moisture. Warm temperatures add to fuel drying, and when exposed to direct sunlight fuels can ignite more easily and quickly. Smaller fuels in particular, like dead needles and grasses, gain and lose moisture quickly with changes in temperature and relative humidity. Fluctuations in temperature and relative humidity in time and location impact how hot a fire is and how quickly it moves.

Precipitation

Precipitation influences the moisture content of fuels. A large amount of rainfall in a short time moves more quickly through an area and has less effect on fuel moisture than a lower amount over a longer time. Fuel size matters too - smaller fuels (dead needles and grasses) gain or lose moisture usually within one hour and are affected by precipitation more drastically than larger fuels like logs. Fuels that are wet are less likely to ignite and will burn slower, or will go out.

Atmospheric stability

A stable atmosphere is defined as an atmosphere that resists upward air motion. An unstable atmosphere can contribute to increased fire activity.

LEARNING

In FY18, the NWFSC provided support, both financial and in person hours, to a number of meetings (2), field tours (3), workshops (3), TREX trainings (2), summits (2), and conferences (1). Of note is the first ever combined WA and OR prescribed fire council meeting held this past winter in the Columbia Gorge (**PA #1, #4**). Together the group explored current issues and themes in prescribed fire and smoke management, shared learning, and connected across state lines.

Also of note is the one day workshop for Tribal members on Climate Change, Fire, & Tribal Lands held in Tacoma, WA (**PA #3, #4**). A focus of the workshop was to interactively identify relevant adaptation strategies and tactics. Ninety-four percent of participants surveyed (n=16) said they were very satisfied with the workshop.

Two field tours, two workshops, and the summit were focused on addressing the needs of the 35 Forest Collaboratives in Washington and Oregon, and were led by one of our long standing partners, Sustainable Northwest (**PA #2, #3**).

- WA Forest Collaboratives Summit (Ellensburg, WA. 56 people)
- PNW Forest Collaboratives Workshop (Hood River, OR. 127 people)
- Blues Coalition: Science, Management and the Art of Collaboration (Baker City, OR. 44 people)
- Colville National Forest Post-Fire Management and Collaboration Field Tour (Colville, WA. 28 people)
- Mount Hood National Forest Fuels Management Field Tour (Hood River, OR 22 people)

NWFSC continues to provide support to the Rural Voices for Conservation Coalition (RVCC) and their annual meeting. Our partner, the Ecosystem Workforce Program at the University of Oregon, sits on the RVCC board of directors (**PA #2, #3**).

The NWFSC collaborated with the College of Forestry and provided in person hours to the Fire Summit held in spring at the World Forestry Center, Portland, OR (**PA #1, #3, #4**). This event brought scientists, land managers, and forest policy experts together into working panels.

Specific recommendations from the Summit Panels included:

- 1.) Expand strategic use of commercial thinning, prescribed fires, and managed wildfire as forest management tools
- 2.) Improve coordination across jurisdictions and ownership boundaries
- 3.) Develop and implement cross-boundary “pre-fire response” plans and strategies
- 4.) Address inequities associated with liability for cross-boundary fires
- 5.) Invest in data mapping, risk assessment, and applied research that directly supports cross-boundary management and suppression

The Fire Summit Report can be viewed [HERE](#).

The NWFSC was a proud sponsor of the Ashland, OR and Bend, OR TREX trainings and provided scholarships for 16 attendees (**PA #1, #3, #4**).

“I was looking for ideas about how forests are likely to change and how to incorporate that info into adaptation planning. I will incorporate what I learned. Many good insights and ideas.”
-Tribal participant

“I was just awarded a scholarship to participate in the Central Oregon TREX, and I wanted to express my gratitude to all of you who made it possible. This will make it much easier for me to participate. I’ve been looking forward to the time that I could finally take this training. Thank you!”

-Bend TREX participant

LEARNING cont.

The NWFSC is in the process of conducting a Needs Assessment and has completed phone interviews with 20 key fire science users in WA and OR. Initial findings from the interviews highlight these common needs:

- 1.) There continues to be a need for more synthesis documents and project examples/summaries/case studies about all fire-related topics. There is specifically a need for more capacity to develop those syntheses and find ways to incorporate local and managerial experiences, knowledge, and other forms of anecdotal or unpublished insights into them along with implications associated with applying the findings to specific management issues or projects.
- 2.) Perhaps the most common need discussed in the interviews was for more information about fire histories and regimes in one's local area, what that information means for future fire potential, management, and impacts, and how to communicate those to the public to discuss fire's ecological and historical role and gain support for more active fuels and fire management.
- 3.) Research investigating the role of climate change in affecting future fire regimes and conditions is also of key importance. This is particularly relevant in areas that have not experienced significant amounts of fire but are seeing more of it lately (e.g., the west side of the Cascades, shrub-steppe ecosystems, and riparian areas).
- 4.) Another prominent need revealed in the interviews is for more fire-related social science. This generally focused on needing more research to help managers assess and incorporate local public and stakeholder values, norms, and attitudes into communication and management strategies and increase public trust, support, and collaboration throughout the planning and management processes. Research about evaluating and incorporating local knowledge and experiences with fire management is also needed, both to inform decision making using local knowledge and experience and to help managers communicate with the public when their decisions may vary from local experiences based on other inputs (e.g., scientific research or models guiding their decisions).

A survey will be disseminated this fall and will help inform the final Needs Assessment Report. The Report will be available in FY19.

PARTNERSHIPS

Collaborations and partnerships provide the foundation for the NWFSC's ability to do work and leverage resources.

Ongoing NWFSC partnerships include:

- The Nature Conservancy
- Fire Adapted Communities
- Fire Learning Network
- Oregon State University
- Oregon State University Extension
- Washington State University Extension
- Western Coordinating Committee for Extension
- The Center for Natural Lands Management
- US Forest Service Region 6
- PNW Research Station
- Pacific Wildland Fire Sciences Laboratory
- Sustainable Northwest
- University of Oregon
- Ecosystem Workforce Program
- PNW Research Station
- Pacific Wildland Fire Sciences Laboratory
- Sustainable Northwest
- University of Oregon
- Ecosystem Workforce Program
- As always, the NWFSC also partners with other Regional Fire Exchanges when it is appropriate and beneficial to do so.

Developing partnerships include:

- The National Wildfire Coordinating Group (NWCG),
- Western Region National Cohesive Wildland Fire Strategy group,
- Association of Natural Resources Extension Professionals (ANREP),
- Oregon Department of Forestry
- Washington Department of Natural Resources
- Confederated Tribes of the Warm Springs
- Colville Confederated Tribes



GOVERNANCE

Management Team

A new PI for the NWFSC has been selected! Julian (Morgan) Varner, Research Biological Scientist for the USDA Forest Service Research & Development, Pacific Wildland Fire Sciences Lab joined our team this fiscal year. There are no other changes to our Management Team.

Advisory Board

There have been a couple of changes to the advisory board and those include:

- Sue Phillips replaced Carrie Phillips and represents the USGS Forest and Rangeland Ecosystem Science Center
- Geoff Babb with BLM will no longer serve on the board. The BLM position is currently vacant.
- Cyndi Sidles with the USFWS will no longer serve on the board. The USFWS position is currently vacant.

Summary of JFSP funded projects addressed in FY 18

JFSP #14-1-01-2 - Outcomes Prioritization on Fuel Treatment Placement in Extreme Fire Weather in 3 CFLRP Landscapes

JFSP #17-1-06-6 - Co-managing risk or parallel play? examining connectivity across wildfire risk mitigation and fire response in the Intermountain West

JFSP #14-2-01-29 - Fire-Adapted Communities on the Range: Alternative Models of Wildfire Response

JFSP #13-1-04-4 - Monitoring Effectiveness of Forest Restoration Treatments: The Importance of Time and Space

