Annual Report FY 2022

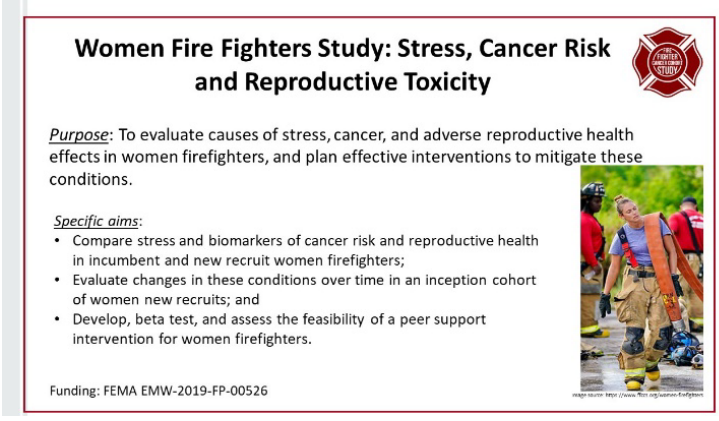
In FY2022, The Northern Rockies Fire Science Network grew to over 1500 members from federal, tribal, and state land management agencies, research institutions, private organizations, NGO's, and local governments. We engaged with our members through a variety of in-person and virtual activities, written products, newsletters, and online resources. In the sections below, we highlight three topic areas that were particularly fruitful for new science exchange in the Northern Rockies in FY22: firefighter health, prescribed fire, and post-fire vegetation management. We developed multiple activities or products around each of these topics, highlighting our strong relationships among researchers and managers. Impacts of these activities were increased by partnering with other exchanges, reaching out to new audiences, and developing new networks while planning these activities.

Firefighter Physical and Mental Health Webinar Series

Impacts: Conceptual, Capacity Building, Connectivity, Socio-environmental

Wildland firefighters experience a wide range of physical and mental health stressors while on the job that can lead to short and long-term health issues. Physical and mental health impacts are intermingled and may include prolonged smoke exposure, decreased reproductive health, sleep deprivation, and chronic injuries. Experiences of firefighters in dangerous situations can also lead to trauma, depression, and substance abuse. The schedule demands of being away from family for long periods and working long shifts under difficult conditions with others also creates challenges. The impacts of these health concerns on individuals, and the greater wildland firefighter profession, are receiving increased attention from government agencies, researchers, health professionals, and the wildland firefighter community.

In 2022, NRFSN partnered with the Northwest Fire Science Consortium, the Great Basin Fire Science Exchange, the Southern Rockies Fire Science Network, and the California Fire Science Consortium to host a 3-day webinar series titled: "Wildland Firefighter Health Series: Current Knowledge for Body, Mind, and Well-being." During this 3-day series of presentations and panel



discussions, professionals and agency leaders shared some of the current science, knowledge, and tools available to support wildland firefighter physical and mental health. The series aimed to bring the latest science to those working in fire management and/or wildland firefighting. This event was likely the NRFSN's most time-consuming, but rewarding, event of the past year. Additionally, the event provides a strong foundation for the NRFSN and other fire science exchanges to help JFSP's efforts to focus on this emerging area of interest.

This event was organized with agenda input provided by the USDA Forest Service's Innovation & Organizational Learning RD&A and Work Environment & Performance Office, and inspiration derived from the International Association of Wildland Fire's Workforce Resilience Ignite Talks.

Products: The recordings of the speakers from each day are available on our past-event webpage as is a list of resources recommended by the speakers. In addition, we created a Wildland Firefighter Health Hot Topic that includes a curated list of resources on the topic.

Attendance:
Day 1: 166; Day 2: 127; Day 3: 89
Most attendees were from the USFS, BLM, States, and University Faculty and Researchers, with additional attendance from the NPS, private associations, tribal nations, NGOs, FWS, and consultants.

Feedback: 92% said they will use the information from this webinar in their work. 82% said the material presented and discussed was very useful. Some of the survey comments included:

"Really great lineup! Very impressive. Looking forward to the next two days."

"Great 3 days of training/information. Enlightening and empowering. Thank you all."

"Speakers and participants were great and very respectful of each other in this space."

"Thank you for all of your commitment and hard work."

"Great sessions! Keep up the awesome work!"

Impacts cited in NRFSN Evaluation Survey: These statements were provided in response to a question about how NRFSN activities or products have been used by our members. These particular responses addressed the topics addressed in the webinar series.

"Information from publications used to frame discussion at incident management team meeting as it relates to the value of good sleep on assignments."

"The webinar I participated in (was a speaker) resulted in collaboration with several managers contacting me [about] additional training and information for their staff and crews thereby increasing their knowledge of fire science."

Research Need: NRFSN also submitted a research need to JFSP based on the responses to our post-event survey. The research need focused on questions around smoke exposure of

firefighters although we also recognize the need for further research on wildland firefighter mental health.

Logic Model Outcomes addressed: Fire managers and firefighters increase awareness of health and safety-related research (short-term); Fire managers access relevant science more easily, increase their knowledge of science, and share scientific products with colleagues (medium-term); Fire managers and firefighters regularly use health and safety-related science to inform decisions and actions (medium-term); Fire managers and firefighters work in a culture that rapidly assimilates the latest science on health and safety (long-term).

Prescribed Fire Treatments

Impacts: Instrumental, Conceptual, Capacity Building, Connectivity

Prescribed fire is always a leading topic of interest in the Northern Rockies, and identified as a national priority in the recent USGS Assessment of the JFSP Fire Science Exchange Network. We completed several products and activities related to this topic in the past year.

Field Trips: On June 16, 2022, we hosted two local field trips titled "Reintroducing fire in mixed and high-severity fire regimes: Prescribed fire planning, implementation and effects in lodgepole and subalpine forests." We invited prescribed fire experts from the Bureau of Land Management, the USDA Forest Service, the Montana Department of Natural Resources, and the University of Montana to share their knowledge on planning and implementing prescribed burns in lodgepole or subalpine forests with mixed- or high-severity regimes.

Over 30 attendees (local, state and federal land managers, researchers, and grad students) discussed the latest science and practices for working in these fuel types, both in the Wales Creek Wilderness Study Area east of Missoula, MT and in the Good Creek drainage on the Flathead National Forest north of Whitefish, MT.

Feedback from both trips was very positive:

"I appreciated the frank and lively discussion. These types of events have all kinds of added value."

"The variety in treatments. I was not expecting that. It was a great backdrop for conversation."

"I enjoyed discussing some of the challenges that were overcome to get to the burning . . . and applying them to my work."

"It was incredibly interesting and I learned a lot from having so many different perspectives presented and folks in attendance."

Story Maps: NRFSN has partnered with the team at the Interagency Fuels Treatment Decision Support System (IFTDSS) to develop two Story Maps, a new product type for NRFSN. IFTDSS is a web-based application designed to make fuels treatment planning and analysis more efficient and effective. The first story map is a "A Short Tour of the Interagency Fuel Treatment Decision Support System (IFTDSS)." The second story map will use an actual example from the National Park Service to plan a fuel treatment and complete a burn plan using IFTDSS.

Research Brief: We partnered with authors from the Fire Effects Information System to summarize their synthesis on prescribed fire and wildfire effects on several invasive plant species in the western U.S. The resulting research brief, *Fire ecology and management of spotted knapweed, diffuse knapweed, and yellow starthistle*, provides managers with important considerations when using prescribed fire in areas impacted by these invasive plants. This research brief was developed as the result of manager feedback that identified fire effects on invasive plants as an important research topic in the region.

Impacts cited in NRFSN Evaluation Survey: These statements were provided in response to a question about how NRFSN activities or products have been used by our members. These particular responses addressed fuels treatments.

"Information from webinars helped managers explain fire resiliency at a public meeting concerning a project proposal to lessen fire risk around a small mountain community."

"Fire managers access and use information and tools to communicate relevant fire science to public. Utilizing info during a public meeting and in NEPA specialist reports to articulate the benefits of prescribed fire and how these treatments modify fire behavior during a wildfire."

"I have seen a fuels specialist cite work distributed by the NRFSN during a collaborative field trip with outside partners and interested public, in the development phase of a NEPA project. He explained how the work applied to the project and why it was important to utilize fire as a tool for the project's successful implementation to meet desired outcomes."

"I have participated in the webinars to expand my knowledge of current fire science and fuels treatments so that I can adequately advise the field offices within my area on ways to best help private landowners reduce the risk of severe fire on their properties. Keeping up with the best and latest science on fuels treatments also helps to ensure that I'm giving good advice that leads to wise spending of tax payer dollars my agency distributes."

"I viewed multiple workshops, fuels and fire management related, as well as with modeling workshops. I am a Long-Term Fire Behavior Analyst on a Northern Rockies Incident Management Team and use the info gained from these workshops to help with my fire behavior predictions, fire effects, and communication to Agency Administrators, public and cooperators while managing wildfires. I am a District Fuels Specialist and use these webinars as a way to provide the latest, and best available science to IDT members, and I forward on webinars to other coworkers."

Logic Model Outcomes addressed: Fire managers have information and tools to communicate relevant fire science to public (short-term); Fire managers access relevant science more easily, increase their knowledge of science, and share scientific products with colleagues (medium-term); Fire managers use information and tools to communicate relevant fire science to public (medium-term); Fire managers integrate scientific information and tools into fire and fuels management (long-term); The science used in fire management decisions and actions is understood by the public (long-term).

Post-fire Vegetation Management

Impact: Instrumental, Conceptual, Capacity Building, Connectivity

Webinars: After our successful May 2021 Salvage Science Summit 1 webinar series, we again partnered with the Northwest Fire Science Consortium, the Southern Rockies Fire Science Network, and the USDA Forest Service Rocky Mountain Research Station to produce a second webinar series, Salvage Science Summit 2: Technology and Ecology. During this two-day event in December 2021, over 400 participants first viewed pre-recorded presentations then came together for virtual panel discussions. The presentations and recordings of the panel discussion are available on our past event webpage.

Hot Topic: In conjunction with the workshop, we updated our Post-fire Salvage Logging Hot Topic developed in partnership with the University of Idaho. This website curates the latest in publications, videos, and webinars on this topic.

Research Briefs: In the past year, NRFSN partnered on four Research Briefs that explore core aspects of post-fire vegetation recovery and management:

- **Seed Source**: In the research brief *Effects of seed source pattern on post-fire tree recovery*, author Jamie L. Peeler (University of Montana) describes how seed source pattern, scale, traits, and terrain interact to shape post-fire tree recovery. This information can help managers strategically delegate resources to burn sites not restocking naturally and ultimately support fire-resilient landscapes.
- **Microclimate**: In *Wildfire effects on microclimate conditions and tree regeneration in mixed conifer forests*, authors Kyra D. Wolf, Kimberley T. Davis and Philip E. Higuera (all University of Montana) explore how seedling-level microclimate factors impact forest regeneration. They also identify best practices for reforestation, and considerations for post-fire forest management that might help moderate microclimate extremes.
- **Invasive Species**: Non-native, invasive forbs can spread after fire, but fire is sometimes used to control them. In *Fire ecology and management of spotted knapweed, diffuse knapweed, and yellow starthistle,* author Robin J. Innes (Rocky Mountain Research Station) summarizes Fire Effects Information System species reviews regarding the biology and ecology of these species, how fire affects them, and how they respond to fire.

- **Repeated Fires (Reburns):** In subalpine forests, postfire tree recovery may be limited by climate conditions and fire return intervals that exceed the range of conditions under which these forests evolved. In *Short-interval high-severity reburns change the playing field for forest recovery*, authors Tyler Hoeker and Monica G. Turner (University of Wisconsin-Madison) discuss how species-level fire-adaptive traits, microclimate conditions, and fire interval can shape ecosystem responses to reburns.

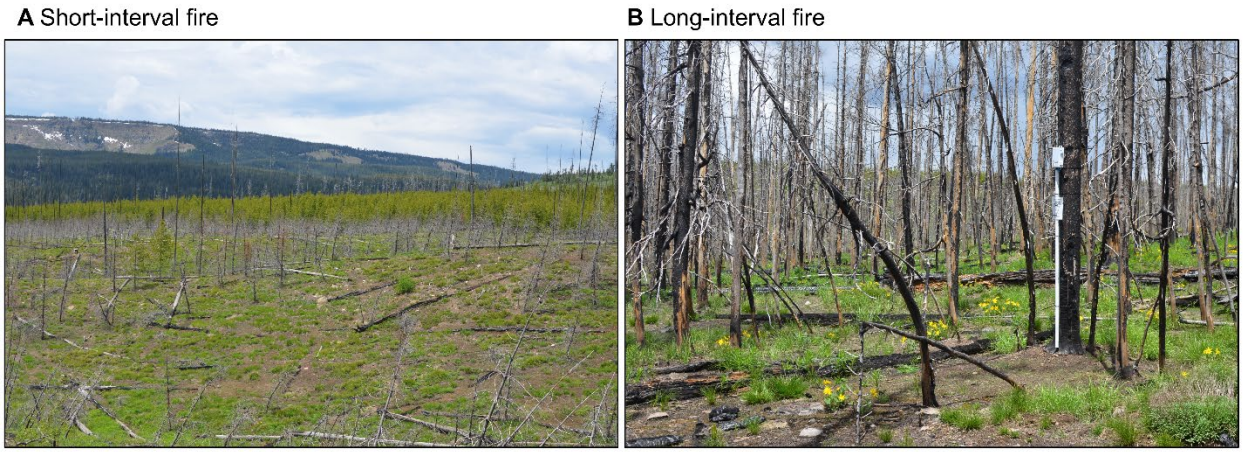


Figure 2 from *Short-interval high-severity reburns change the playing field for forest recovery.*

Statements provided in recent NRFSN Evaluation Survey: These statements were provided in response to a question about how NRFSN activities or products have been used by our members. These particular responses addressed post-fire management.

"The field-based workshop in Yellowstone after the Maple fire of 2016 there provided an excellent opportunity to connect with the preeminent researchers in the field of lodgepole pine resiliency and the impacts of a warming climate on future forest cover. These relationships are lasted and strengthened since then."

"Because of the workshops and field trips we have participated in we have a much stronger collaboration with researchers on what questions fire managers (we) have and how they (researchers) can help us answer them. We now speak frequently with researchers and work together to understand what ecosystem resilience in the GYA [Greater Yellowstone Area] means and how fire fits into it."

Logic Model Outcomes addressed: Scientists are more aware of fire managers' science and science delivery needs (short-term); Scientists and fire managers communicate more often about challenges and science to support them (medium-term); Fire managers and scientists collaborate to build ecosystem resilience and fire adapted communities that protect life and highly-valued resources and assets (long-term).