Integrated Fuel / Restoration Treatments

Field Tour at the Priest River Experimental Forest

NORTHERN ROCKIES FIRE SCIENCE NETWORK

Field Trip Summary 1 | June 2013

Terrie Jain, Russell Graham, Andrew Hudak, and Bill Elliot with the United States Forest Service's (USFS) Rocky Mountain Research Station, led a tour of fuel treatments in mostly moist mixed conifer forests in the Priest River Experimental Forest (PREF) near Priest River, Idaho. Site visits and discussions highlighted how multidisciplinary research can be used to develop and evaluate alternative restoration/fuel treatments that are ecologically sound, socially acceptable, and economically viable.

About Priest River Exprimental Forest

The PREF was one of the first sites set aside by the USFS for forest research. It was established in 1911 and, as legend has it, Bob Marshall established some of the first PREF study plots.

Figure 1. Jain describes some of the past research conducted on the PREF. Photo courtesy of the Northern Rockies Fire Science Network (NRFSN).

The PREF supports a diversity of forest types. Common conifer species include western redcedar (*Thuja plicata*), western hemlock (*Tsuga heterophylla*), grand fir (*Abies grandis*), Douglas-fir (*Pseudotsuga heterophylla*), and subalpine fir (*Abies lasiocarpa*). Extreme weather events, insect outbreaks, and diseases are the most frequent and persistent disturbances in these moist northern Idaho forests.

The PREF landscapes are a product of past legacies, including changing management and policy (e.g., fire exclusion) and disease and insect outbreaks. Moist conifer forests of northern Idaho fall into mixed-severity fire regimes; however, the interval between large and small fire events has increased with successful fire suppression. In the early 1900s, white pine blister rust (*Cronartium ribicola*) was introduced to western forests and resulted in heavy mortality of western white pine (*Pinus monticola*). These events resulted in the dominance of late-seral forests and the loss of forest openings and early-seral forests.

Experiments to Inform Management

Experimental forests are a place where researchers and managers can develop and test treatments that address forest management challenges. They also foster science partnerships and collaboration within and among agencies and local stakeholders.

Because PREF occurs within the National Forest system, all research and treatments must adhere to National Forest plans, regulations, and guidelines. For these reasons, experimental forests are ideal for developing long-term treatments and management approaches that are realistic while working within agency regulations and forest plans.

Figure 2. Forest site that was pile burned following tree harvest. Photo courtesy of NRFSN.

Managing for Resilience

Integrated forest restoration at PREF focuses on developing and maintaining disturbance-resilient forests, which have the capacity to recover naturally, even after severe fire, disease, or insect disturbances. Forests supporting a diversity of structures, successional stages, patch sizes, tree densities, tree sizes, and species compositions are generally thought to be the most resilient.

Development and maintenance of diversity requires the use of various treatments and management techniques across the landscape. Thus, researchers and managers at PREF used a variety of harvesting patterns to create canopy gaps and encourage growth of early seral forests while retaining some large, old trees.

Harvesting treatments included (Figure 2) -

- Harvesting trees in an irregular pattern to create a variety of canopy opening sizes and encourage regeneration of white pine
- Retaining various sized patches of multi-storied forest structure
- Protecting healthy old-growth trees

In harvested areas, additional treatments to create forest floor diversity included-

- Pile and slash burning or prescribed surface fires (Figure 3) to encourage growth of fire-adapted species
- Slash mastication to discourage shrub growth
- Planting western white pine, western larch (*Larix occidentalis*), ponderosa pine (*Pinus ponderosa*) in some large openings, and planting western redcedar beneath some canopies
- No post-harvest treatment

Years of PREF management have tested a number of fuel treatment methods and forest management concepts and informed the following lessons -

- Forest management and fuel treatments require patience. These forests developed over hundreds of years, and introducing rapid, aggressive treatments can produce unwanted mortality.
- Clearcutting and patterned silvicultural treatments used in the past do a poor job of mimicking forest structure that develops from natural processes. New silvicultural methods that create non-uniform forest patterns can be described to timber-marking crews and loggers and used in forest plans.
- Managing for forest resiliency is necessarily value-driven. A forest managed for fuel reduction so that the next fire burning through will not be severe enough to kill old, large trees may require a different management plan and treatment prescription than a forest being managed to support the greatest diversity of vegetation and wildlife.

Future Experimental Management

Long-term studies conducted at PREF inform the identification of conditions on the landscape that are disturbance resilient and those where a silvicultural manipulation might increase disturbance resilience. Such identification can inform treatment prioritization.

Figure 3. Forest canopy gap created by irregular harvest. Photo courtesy of NRFSN.

Additional Reading & Information

Jain, T.B., Battaglia, M.A., and Graham, R.T. 2014. Northern Rocky Mountain Experimental Forests: settings for science, management, and education alliances. Journal of Forestry. 112(5): 534-541.

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The Northern Rockies Fire Science Network (NRFSN) is a go-to resource for managers and scientists involved in fire and fuels management in the Northern Rockies. The NRFSN facilitates knowledge exchange by bringing people together to strengthen collaborations, synthesize science, and enhance science application around critical management issues.