The Bitterroot Valley Fires of 2000

Revisiting Experiences and Fire Effects 13 Years Later

NORTHERN ROCKIES FIRE SCIENCE NETWORK

Field Trip Summary 5 | May 2014

During the Fires of 2000 field trip, held as part of the May 2014 Large Wildland Fires Conference, researchers, managers, residents, and stakeholders shared their experiences around the unprecedented number and size of fires in the Bitterroot Valley in the summer of 2000. Topics discussed included fire history, fire behavior, firefighting, fire effects, and post-fire management.

Bitterroot Valley Fuel Landscape

On the bus ride to the Sapphire Mountains, Steve Arno, retired USFS Research Forester, provided the historical context around fire ecology in the Bitterroot Valley. Historically, the Valley's dry coniferous forests were dominated by large, widely-spaced ponderosa pine (*Pinus ponderosa)* trees on north and south slopes up to about 6,000 feet in elevation. Burning by Indians was common. Before the 1900s, forests burned an average of 10 times each century. Fire exclusion after this period resulted in dramatically altered fuel structure and increased fuel loads as Douglas-fir (*Pseudotsuga menziesii*) and grand fir (*Abies grandis*), restricted by frequent fire, established and grew within and among the ponderosa pine.

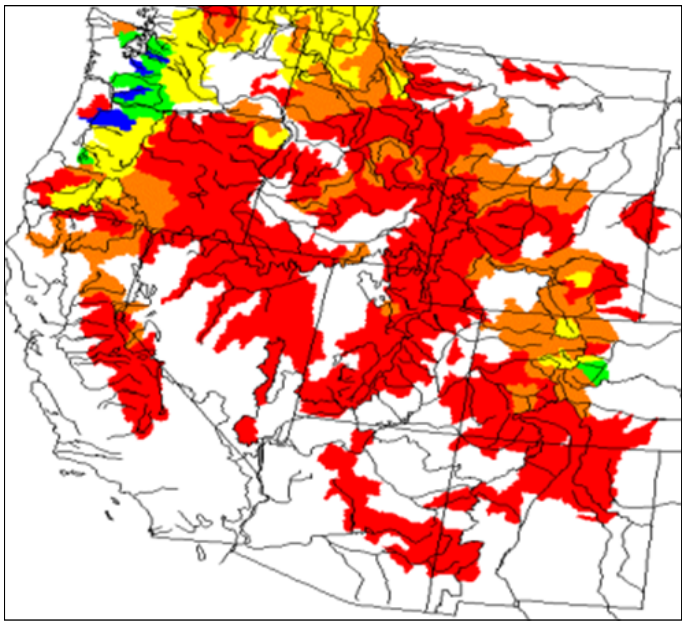

Figure 1. Snowpack in the western US as of May 1, 2000. (Percentage of normal—red: <70%, orange: 70-90%, yellow: 91 -110%, green and blue ≥110% . Map courtesy of USDA, NRCS.

Conditions in Summer 2000

Jacquie Parks, Fuels Specialist for the Bitterroot National Forest (BNF), described the exceptionally dry conditions in the Bitterroot Valley in 2000.

- Winter of 2000 delivered below average moisture.
- Low-elevation sites in the BNF lost snowpack in early February (Figure 1).
- Abundant grass growth followed spring pulses of precipitation.

By summer 2000, live fuel moistures on the BNF were as much as 75% below normal. Dry lightning strikes on July 31, 2000 started approximately 100 fires. High air temperatures, extremely dry fuels, and occasional high winds resulted in large and small fires converging into large fire complexes. By the end of the summer, 356,000 acres of forest in the Bitterroot Valley burned (Figure 2), and suppression efforts cost more than 85 million dollars.

Figure 2. Burned area in the Sapphire Mountains, Bitterroot National Forest near Darby, MT. Photo courtesy of Marjie Brown.

Post-Fire Rehabilitation

An extensive Burned Area Emergency Response (BAER) followed the Fires of 2000. Because of the thousands of acres burned, prioritization and organization of the rehabilitation projects was described by Marilyn Wildey, Hydrology Technician for the BNF, as a "logistical nightmare". The BAER teams worked with Incident Command Teams and fire crews in the area to coordinate rehabilitation.

The cost of BAER projects on the BNF totaled more than 8 million dollars.

Completed projects, included -

- Log or straw erosion barriers on > 4,500 acres.
- Aerial seed spread on 200 acres.
- Hazardous tree removal along roads covering more than 45 acres.
- Streambank stabilization along more than 300 feet of streams, and large woody debris placed in 4 miles of streams.
- Culverts installed at 316 locations; culverts removed and filled at 42 locations; 2.6 miles of ditches constructed; a flood warning system installed.
- One hundred miles of trails restored.

Burned Area Recovery Project

In 2001, the BNF proposed the Burned Area Recovery (BAR) Project, which included plans for watershed recovery and salvage logging in burned areas. Planning and development of the BAR Project took 13 months, and the BNF spent two months in negotiations with stakeholders opposed to the salvage logging part of the project. Marilyn Wildey, Hydrology Technician for the BNF, described the project.

Recovery activities that were eventually completed as part of the negotiated project, included -

- Planting 33,000 acres of conifers in upland sites, where seed sources were scarce, and planting conifers along 4.5 miles of riparian areas.
- Conducting Best Management Practices (BMP) water quality upgrades on 418 miles of roads.
- Decommissioning 46 miles of roads.
- Adding 16 miles of woody debris to streams.
- Replacing 22 culverts to allow for fish passage.
- Harvesting timber on 11,000 acres.

BAR Project – A Stakeholder View

Larry Campbell, member of the Friends of the Bitterroot, spoke about his organization's opposition to the salvage logging component of the BNF's Burned Area Recovery project. The BAR project originally proposed salvage logging 181 million board feet in the burned areas. Friends of the Bitterroot and other environmental groups sued the BNF, citing failures to comply with the National Environmental Policy Act.

The negotiated settlement agreement -

- Restricted logging in wilderness areas.
- Prohibited logging in the most sensitive fisheries.
- Earmarked 25 million dollars for non-logging restoration components of the project.

Safety/Homeowner Responsibilities

Figure 3. Burned home and property along North Rye Creek. Photo courtesy of Marjie Brown.

Despite firefighter's best efforts, 70 homes were lost during the Fires of 2000. At the stop along North Rye Creek Road, where several Bitterroot Valley residents' homes burned (Figure 3), Sonny Stiger, retired USFS Fire and Fuels Management Specialist, led a discussion about county legislation designed to improve wildland and rural firefighter safety. Stiger has been instrumental in developing and passing county resolutions in western Montana to -

- Prioritize fire protection services that will reduce threats to firefighter safety.
- Train all county fire staff in basic fire behavior.
- Prohibit homes in the wildland-urban interface from dictating fire suppression tactics, strategies, or fire line locations.
- Support fuel mitigation efforts that improve survivability of structures and improve firefighter safety.

Additional discussions with Steve Arno and Alan Tresemer, Captain of Painted Rocks Fire & Rescue Company, suggest that grassroots efforts to educate and persuade homeowners to use fire safe practices to protect fire suppression personnel can be successful.

Fire Effects on Watersheds

At the second stop along North Rye Creek Road, Ed Snook,

Hydrologist for the BNF, and Karen Riley, Geoscientist for the University of Montana and the Missoula Fire Sciences Laboratory, indicated that debris flows were most common on severely burned sites where a large proportion of the area's granitic soils were exposed.

> Debris flows are short-duration, episodic events, which move thousands of cubic meters of sediment and debris downhill during high-velocity rain events. Vegetation acts as a sponge for rain. Without the vegetative sponge, high-velocity surface flows with heavy precipitation are possible.

Although debris flows can be detrimental to watersheds in the short-term and they were responsible for some roadway washouts in the BNF, they are the major natural drivers of topography and contribute to the delivery of large rocks and woody debris to streams, which provide fish habitat.

Figure 4. Woody debris in North Rye Creek. Photo courtesy of NRFSN.

Fire Effects on Fish

At the final stop along North Rye Creek, Mike Jakober, Fish Biologist for the BNF, reported on native and nonnative fish populations in the early post-fire years (3-10 yrs). With well documented pre-fire fish data and more than 100 streams burned, the BNF presented an ideal opportunity to evaluate post-fire fish recovery.

University of Montana student, C.M. Sestrich, who conducted the fish recovery study, found -

- Stream temperatures were 4 to 11 degrees above normal in the early post-fire years.
- Native fish populations, westslope cutthroat trout (*Oncorhynchus clarkii lewisi*) and bull trout (*Salvelinus confluentus*), generally approached or exceeded their prefire abundance within three years of the fires.
- Populations of nonnative brook trout (*S. fontinalis*) were lower after the fire in most, but not all, burned streams.
- Nonnative trout were found for the first time in seven burned streams; however, abundance of the invaders was low, usually less than three individuals.

Additional Reading & Information

Barrett, S.W. and Arno, S.F. 1982. Indian fires as an ecological influence in the Northern Rockies. Journal of Forestry. 80: 647-651.

Mahlum, S.K., Eby, L.A., Young, M.K., Clancy, C.G., and Jakober, M. 2011. Effects of wildfire on stream temperatures in the Bitterroot River Basin, Montana. International Journal of Wildland Fire. 20:240-247.

Pinchot Institute for Conservation. 2004. Big fire lessons learned in the Bitterrroot Valley. Report prepared for the USDA Forest Service, Bitterroot National Forest. 31p.

Sestrich, C.M., McMahon, T.E., and Young, M.K. 2011. Influence of fire on native and nonnative salmonid populations and habitat in a western Montana basin. Transactions of the American Fisheries Society. 140: 136-146.

Field trip cadre – Steve Arno, Research Forester, USFS (retired); Sonny Stiger, Fire and Fuels Management Specialist, USFS (retired); Alan Tresemer, Captain, Painted Rocks Fire & Rescue Company; Larry Campbell, Friends of the Bitterroot; and Jacquie Parks, Fuels Specialist, Ed Snook, Hydrologist, Mike Jakober, Fish Biologist, and Marilyn Wildey, Hydrology Tech, USFS BNF, fs.usda.gov/bitterroot

Summary author - Corey L. Gucker, Northern Rockies Fire Science Network Coordinator, NRfirescience.org

The Northern Rockies Fire Science Network (NRFSN) aims to be 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.