



FUSEE Fire Reports

Providing information and analysis on critical wildland fire issues

KEY POINTS

- Fireline construction kills and removes vegetation; displaces, compacts, and erodes soil; silts streams and degrades water quality.
- Firelines in roadless areas create longterm visual scars, and provide access for illegal off-road vehicles.
- Dozerlines are poorly engineered and are more damaging to soils and streams than logging roads.
- Firelines used to contain prescribed fires are less damaging than firelines used for suppressing wildfires.

Trench Warfare Tactics: Fireline Construction

Constructing a fire containment line or “fireline” involves removing all live vegetation and dead fuel to create a relatively narrow strip of bare mineral soil which cannot ignite or burn. The tools involved in fireline construction range from handtools like shovels, pulaskis, and rakes; heavy equipment like bulldozers, graders and plows; to certain explosives like “blastercord.” Handlines cut fairly narrow strips while dozerlines create wide barren strips at least twelve feet wide (the average width of a dozer blade), but are often wider as dozers make several passes.



Hotshot firefighters cutting fireline on the Biscuit Fire.

Creating firelines by handcrews or heavy equipment results in a number of direct environmental impacts: it kills and removes vegetation; displaces, compacts, and erodes soil; and degrades water quality. Handlines that are carved into steep slopes or run straight downslope can initiate gully erosion that transports soil directly into streams, causing siltation and sedimentation. Dozerlines can vastly increase the adverse impacts on vegetation, soil, and streams. Berm lines caused by dozer blades can alter hydrological flows and induce water channeling that accelerates erosional downcutting, and despite post-fire rehabilitation efforts, this soil and vegetation damage can be long-lasting.[1]

When dozerlines are cut into roadless areas they create long-term visual scars that can ruin the wilderness experience of roadless area recreationists. Firelines can also create human access for unauthorized use by Off-Highway Vehicles (OHVs). Although the amount of fireline constructed may appear to be insignificant compared to the total acreage of a large wildfire, the site-specific impacts may be highly significant. This is especially true for interior-dwelling wildlife species sensitive to fragmentation and edge effects.

On the Biscuit Fire approximately 405 miles of fireline were constructed, with about half of that constructed by dozers and the rest by handtools or explosives.[2] Many firelines utilized existing roads, trails, or even old firelines from the 1987 Silver Fire.

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Fireline construction unavoidably displaces soil and makes it vulnerable to erosion, but on the Biscuit Fire they were constructed through highly erosive slopes comprised of serpentine soils. These sensitive soils are fine-grained, especially prone to gully erosion, and are slow to revegetate.

Out of approximately 160 miles of dozerlines affecting nearly 350 acres, at least nine miles of dozerlines were constructed within 174 feet (a single tree's length) of fish-bearing streams, and involved 196 stream crossings.[3] These dozerlines dumped sediment directly into streams, and the affected riparian zones will be barren of vegetation for some time, causing ongoing degradation of water quality and fish habitat. Over 57 linear miles of dozerline from 18 to 40 feet wide were also carved into highly erosive serpentine soils, impacting at least 124 acres from nine watersheds within the burn perimeter.[4]

The longlasting destructive impacts of logging roads on water quality and fish habitat are well documented, but the impacts of dozerlines are arguably worse. Roads are engineered and constructed with at least some attempt to inhibit erosion, but dozerlines are quickly carved into the landscape under a state of emergency crisis management with little foresight or planning. As a testament to the enduring impacts of dozerlines, firelines constructed during the 1987 Silver Fire were still fully evident and easy to locate during Biscuit Fire suppression operations, and those carved into serpentine soils had not successfully revegetated after 15 years time.

Firelines are necessary for suppressing and managing wildland fires, but they should be carefully located and constructed to minimize damage to soils and vegetation. Ideally, prescribed fires should be privileged over wildfire suppression because it is safer, easier and more effective to contain prescribed fires burning under the best of conditions for controlling fire than it is to contain wildfires burning under the worst of conditions. Accordingly, the firelines needed for prescribed fires and wildland fire use are less damaging than those used for emergency wildfire suppression.

FUSEE supports a new, emerging paradigm that seeks to holistically manage wildland fire for social and ecological benefits instead of simply "fighting" it across the landscape. We seek to protect, restore, and maintain fire-adapted ecosystems, and enable fire management workers to perform their duties with the highest professional, ethical, and environmental standards. Our long-term goal is the creation of fire-adapted communities able to live safely and sustainably with fire-adapted ecosystems.

ENDNOTES

1. Benson, N.C., and L.L. Kurth. 1995. "Vegetation Establishment on Rehabilitated Bulldozer Lines After the 1988 Red Bench fire in Glacier National Park." In: Brown, J.K., Mutch, R.W., Spoon, C.W., and R.H. Wakimoto (tech. eds.). Proceedings of the Symposium on Fire in Wilderness and Park Management. INT-GTR-320. USDA Forest Service, Intermountain Research Station. Ogden, UT.
2. Biscuit Fact Sheet, www.biscuitfire.com
3. USDA Siskiyou National Forest. 2003. Biscuit Post-Fire Assessment, pg. 8.
4. USDA Siskiyou National Forest. 2003. Biscuit Post-Fire Assessment, pg. 67.
5. Quinn, B. 2002. "30-Mile Fire Front Menaces Southwest Oregon Towns." Portland Oregonian. (July 30)