

Northern Region
Burned Area Emergency Response (BAER)
 Post-Fire BAER Assessment



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SUNRISE POST-FIRE BAER ASSESSMENT REPORT SUMMARY



FS-2500-8 Burned-Area Report: Watershed Analysis, Condition, and Response

The [Sunrise Fire](#) was ignited by lightning on July 16, 2017 and is located on the [Lolo National Forest](#) (NF), 11 miles southeast of Superior, Montana. Driven by steep terrain, high temperatures, low relative humidity, pre-fire tree mortality, and gusty winds, the fire spread. As of September 6, 2017, the fire burned 24,103 acres on Forest Service System (NFS) land, 2 acres on state land, and 1,138 acres on private land. The fire burned in the Trout Creek, Verde Creek, Sunrise Creek, Meadow Creek, and Quartz Creek drainages. These drainages are tributary to the Clark Fork River.

The burned area was assessed by a BAER team comprised of Forest Service scientists and specialists. The BAER team evaluated the burned watersheds to identify post-fire threats to critical BAER values, values that include human life and safety, property, and critical natural and cultural resources on National Forest System lands. Post-fire conditions increase risks of threats, such as flooding, accelerated erosion and increased sediment delivery, rock fall, hazard trees and noxious weed spread.

The BAER assessment team's analysis of the burned area and recommended emergency treatments are documented in a Forest Service (FS) Burned-Area 2500-8 Report. This report was submitted to the Northern Region (Region 1) Regional Forester by the Forest Supervisor for the Lolo NF for review and funding. The following is a summary of the BAER team's burned area analysis and report for the Sunrise Fire:

Post-fire Conditions

Soil burn severity is the fundamental indicator used to evaluate post-fire conditions. The soil burn severity categories reflect changes in soil properties from pre- to post-fire and are a key element used to identify post-fire threats. The distribution of unburned, low, moderate, and high soil burn severity

levels become a baseline for resource specialists to monitor changes in soil-hydrologic function and vegetative response as the burned watersheds recover.

High and moderate soil burn severity categories have evidence of severe soil heating and the consumption of organic material; the soil seedbank and water infiltration characteristics are reduced. Natural recovery is slower where little or no vegetative ground cover remains, with increased surface water runoff resulting in increased soil erosion. Areas of moderate soil burn severity have viable roots and some soil cover, but may still be vulnerable to erosion on steep slopes. The low to very low soil burn severity areas still have good surface soil structure, intact fine roots and organic matter, and should recover more quickly once revegetation begins and soil cover is re-established.

- There are about 13,914 (32%) unburned acres, 10,137 (23%) acres of low soil burn severity, 13,487 (31%) acres of moderate soil burn severity and 6,507 (14%) acres of high soil burn severity.
- 5 drainages were analyzed and modeled to compare pre-fire conditions to post-fire predicted response as a function of soil burn severity: Lower Trout Creek, Meadow Creek-Clark Fork, Quartz Creek, Second Creek-Clark Fork and Upper Trout Creek. Within these drainages there are 13 miles of perennial stream and 42 miles of intermittent streams.
- There are 97 miles of NFS roads and no NFS trails within the assessment area.
- Post-fire, there are 14,037 acres with high hazard ratings for soil erosion, 11,539 acres with moderate ratings for soil erosion, and 940 acres with low hazard ratings for soil erosion. Elevated soil erosion hazard is only applicable for the first few years following the Sunrise Fire until revegetation occurs to stabilize the slopes.
- There are approximately 225 acres of water repellent (hydrophobic) soils. Hydrophobic soil conditions are common within moderate and high burn severity areas.

Identified Values-at-Risk, Threats, and Emergency Conditions

Summer thunderstorms have the greatest likelihood of generating large runoff and soil erosion events. If large summer thunderstorms occur, the primary values-at-risk within the burned area are human life and safety, transportation infrastructure (roads and trails), soil productivity, water quality, bull trout habitat, and native vegetation communities. The primary threats caused by the fire include 1) increased runoff, which is expected to intensify the first 2-3 years following the fire until the burned watersheds recover, and 2) accelerated hillslope erosion as a result of increased runoff and decreased infiltration rates. High intensity, short duration rainfall may result in valley bottom flooding and localized debris flows. Additional threats originating from the destabilized hillslopes throughout the burned area include falling trees and rolling rocks.

Emergency post-fire conditions for the Sunrise Fire were identified by the BAER team for the following on-forest values-at-risk:

- **Human Life and Safety:** There are potential risks to the safety of forest recreating visitors and FS employees entering the burned area, and residents of private lands within and adjacent to the burned area. Generally, increased risk occurs within or directly downslope from high and moderate soil burn severity areas. Potential threats exist along roads and recreation areas. Risks for the general public to be impacted are from rolling rocks, flash flooding, debris flows, rolling and falling rocks, falling trees, and loss of ingress/egress access. Locations with increased risk include road

systems within the Meadow, Sunrise Creek, Verde and Trout Creek drainages. Trout Creek Campground is at a low risk.

- **Property:** There are potential risk NFS roads, road prisms, and associated infrastructure. There is a potential for failure to road drainage due to increased post-fire flows and thus potential for erosion of road surface and sediment delivery to streams. The potential threats are from increased runoff, increased overland flow, movement of sediment, accelerated hillslope erosion, and debris flows downslope into roadway drainage features such as roadside ditches, culvert inlets, roadway dips and run-outs. Once these drainage features become impacted and overwhelmed by the increased runoff, their function fails allowing uncontrolled water to divert, resulting in major damage to the invested road improvements, loss of road function, and loss of access along some road segments. FS roads within high and moderate burn severity areas are concerns for these risks.
- **Natural Resources:** There is a low risk to the bull trout, an Endangered Species Act (ESA)-listed species and its designated critical habitat in the Trout Creek drainage. The risk assessment is based on the low percentage of total acreage burned within the Trout Creek watershed and only 4% of the watershed burned at a high burn severity. Core spawning and rearing habitat is threatened by the potential for increased sediment delivery from burned slopes. The risk is considered low because of the associated intact vegetation between the burned area and the stream channel which acts as a buffer for sediment delivery.

The risk to native plant communities was analyzed in the context of threats associated with noxious weed spread into the burned area. The level of risk is associated with moderate and high soil burn severity areas having increased susceptibility for potential noxious weed spread. Roughly 11,671 acres within the Sunrise Fire burned area are at high risk from weed infestation.

Generally, there is a high risk to soil productivity and hydrologic function associated with known post-fire watershed threats including accelerated hillslope and sheet erosion, rilling, gullyng, and increased overland flows in the moderate and high burn severity areas. However, analysis of existing soil conditions and land types within the Sunrise Fire burned area suggest that while these areas have an elevated erosion hazard, the potential for erosion events will be localized and will not result in a long-term degradation of soils. While these impacts are significant in the short-term, natural soil recovery is considered the best treatment, and the risk to soil productivity is low. As the forest floor recovery occurs, the risks to soil productivity and hydrologic function will diminish.

- **Cultural/Heritage Resources:** A very low risk is anticipated to critical cultural and heritage resources within the Sunrise burn perimeter, based on the unlikely potential for increased overland water flows, deposition, and erosion from upslope burned areas.

Emergency Stabilization Treatments

Treatment Objectives

The BAER assessment team's emergency stabilization objectives for the burned areas are to protect, mitigate and reduce the potential for identified post-fire threats, including increased surface water runoff and soil erosion/sediment yield, for:

1. Human life, safety, and property within and downstream of the burned area;
2. Forest Service infrastructure and investments such as roads and trails;
3. Critical natural and cultural resources; and
4. Native and naturalized plant communities from new noxious weed infestations.

The following post-fire emergency stabilization measures and treatments have been approved:

- Install burned area warning and area closure signs to caution forest visitors traveling and recreating within the burned area.
- Storm-proof and stabilize approximately 60 miles of NFS transportation roads and stream crossings with improved water drainage structures and features to prevent damage resulting from post-fire watershed conditions such as soil erosion, storm water runoff, and public safety hazards to improve the safety of forest visitors and employees. Conduct storm patrol monitoring to ensure road treatments are functioning as intended.
- Continue to communicate risks to the public, landowners, emergency services, community groups, and cooperating agencies.
- Continue to work and coordinate with interagency cooperators, partners, and affected parties and stakeholders.
- Assist cooperators, including local, county, state, and federal agencies with the interpretation of BAER assessment findings to identify potential post-fire impacts to communities and private land owners, domestic and agricultural water supplies, and public utilities (such as power lines, state roads, county roads, and other infrastructure).
- Conduct early detection surveys and rapid response eradication with herbicide application on noxious weeds along areas disturbed by fire suppression activities, equipment concentration points, high and moderate soil burn severity areas near these fire suppression disturbed areas such as fire lines and roadsides, and other high priority areas, to reduce the potential for impaired vegetative recovery, and the introduction and spread of invasive weeds. The total treatment area is approximately 786 acres.
- Cultural resource concerns will be evaluated at a later time within the burned area to determine if future management actions are required.

SPECIAL NOTE: *Everyone near and downstream from the burned areas should remain alert and stay updated on weather conditions that may result in heavy rains over the burn scars. Flash flooding may occur quickly during heavy rain events. BAER actions are intended to reduce, but cannot eliminate risks. Current weather and emergency notifications can be found at the **National Weather Service** (www.weather.gov/mso/) website.*

Northern Region 2017 Post-Fire BAER Assessment information is available at
<https://inciweb.nwcg.gov/incident/5627/>.

