

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



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CARIBOU POST-FIRE BAER ASSESSMENT REPORT SUMMARY



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

The [Caribou Fire](#) was ignited by lightning on August 11, 2017, and is located on the [Kootenai National Forest](#) (NF), approximately 21 miles northwest of Eureka, Montana. As of October 9, 2017, the Caribou Fire totaled 24,753 acres, with approximately 20,288 acres that burned on National Forest System (NFS) land, and also burned into Canada. The Caribou Fire area is dominated by mixed conifer forest with very minor inclusions of grasslands and shrublands. Dominant species in the mixed conifer component are western larch, subalpine fir, and Douglas-fir.

The burned areas were 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 NFS 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 Kootenai NF for review and funding.

The following is a summary of the BAER team's burned area assessment report for the Caribou Fire:

- 7 sub-watersheds were analyzed and modeled to compare pre-fire conditions to post-fire predicted response: Bloom Creek, Linklater Creek, Lake Koocanusa, Sink Creek, Young Creek, East Fork Yaak River, and Dodge Creek.
- There are 24.4 miles of perennial stream and 28.6 miles of intermittent/ephemeral streams.

- There are 97 miles of NFS roads, 82 miles of collector and arterial NFS roads, 16 miles of other roads, and 7 miles of NFS trails within the assessment area.
- There are 2,175 acres with very severe hazard ratings for soil erosion, 6,222 acres with severe ratings for soil erosion, 12,427 acres with moderate hazard ratings for soil erosion, and 390 acres with slight hazard ratings for soil erosion. Elevated soil erosion hazard is only applicable for the first few years following the Caribou Fire until revegetation occurs to stabilize the slopes.
- There are approximately 3,715 acres of water repellent (hydrophobic) soils. Hydrophobic soil conditions are common within moderate and high burn severity areas.
- There are about 5,326 (22%) unburned acres, 11,240 (45%) acres of low soil burn severity, 6,262 (25%) acres of moderate soil burn severity and 1,937 (8%) acres of high soil burn severity.

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.

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 Caribou 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 the 303, 470, and 7220 NFS roads, the Geneva Lake (#22), Young Creek (#58), Robinson Mountain (#59), Williams Creek (#73), and Dodge Summit (#325) NFS trails, and the Lake Geneva and

Moose Lake designated dispersed recreation sites. Young Creek will experience higher peak flows intensified by additions of large woody debris from the adjacent burned areas and potential sediment bulking.

- **Property:** There are potential high risk to NFS roads, trails, and associated infrastructure. There is a potential for failure to road and trail 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 and trails within high and moderate burn severity areas are concerns for these threats, especially along the Geneva Lake (#22), Young Creek (#58), Robinson Mountain (#59), and Dodge Summit (#325) trails.
- **Natural Resources:** The high risk to native plant communities was analyzed in the context of threats associated with noxious weed and invasive plant species 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 and invasive plant species spread. No emergency response treatment is recommended.

There is an intermediate risk for accelerated hillslope erosion and increased overland flows which may impact short-term hydrologic function. Emergency response is captured through road and trail treatments.

The fire is expected to impact soil quality by eroding exposed soil and nutrient-rich ash off-site. No emergency response treatment is recommended.

- **Cultural/Heritage Resources:** A low risk of damage is anticipated to critical cultural and heritage resources within the Caribou burn perimeter, based on the unlikely potential for increased overland water flows, deposition, and erosion from upslope burned areas. No emergency response treatment is recommended.

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, debris flows, and rock fall, 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 FS employees working, and forest visitors traveling and recreating within the burned area.

- Remove hazard trees within the high risk recreation sites, and along high risk NFS roads and NFS trails.
- Storm-proof and stabilize 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).

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/>.

