

Black Canyon Fire: BAER Briefing



November 16, 2015

Okanogan-Wenatchee National Forest
215 Melody Lane
Wenatchee WA 98801



Fire Background

The Black Canyon Fire started on August 14, 2015 and burned 88,974 acres in the central Washington watersheds of the Lower Methow River, Swamp Creek, Columbia River, and Lower Lake Chelan. Of the total fire area, 32,735 acres are National Forest System lands and 45,377 acres are privately owned. Of the burned area, the BAER team identified moderate or high burn severity on 23 percent of South Fork Gold Creek, 50 percent of the McFarland, 34 percent of Squaw Creek, 59 percent of Black Canyon, and 59 percent of Antoine Creek.

On October 15 the BAER team submitted a request for \$163,300 for risk-mitigation projects to improve road drainage, install Automated Local Evaluation in Real Time (ALERT) storm warning systems, initiate storm patrols, and install burned area hazard signs and gates.

Surface erosion and mass wasting are inherent hillslope processes, accelerated by disturbance such as wildfire or intense precipitation and runoff. Erosion becomes accelerated when effective ground cover and protective forest canopy have been removed, or when runoff is locally concentrated. Soils are then exposed to erosive forces that can result in rills and gullies causing an accelerated rate of surface erosion. Areas most prone to erosion are the steepest slopes, especially where soils are shallow and water-repellent, or in areas with a subsurface restrictive layer. Soils that have developed in volcanic ash and glacial till are easily detached, because of their low cohesiveness and structure, with relatively low volumes of organic carbon and moderately thin topsoil horizons.

Slopes in the area range from 30 to 90 percent. Nearly two-thirds of the acreage within the burn area includes slopes greater than 50 percent, and drainages are generally



narrow and confined. The steepest slopes are at high risk of debris flows. Areas most prone to debris flows are shallow-soil steep slopes in first- and second-order headwater drainages, including tributaries of the Methow River, but elevated risks are also likely in drainages with thicker deposits of unconsolidated ash and pumice-derived soils. The probability of debris flows is relative to hillslope steepness and landform morphology, upslope burned landforms, and notable precipitation. These effects can be exacerbated by removal of protective forest canopy and diminished root strength. Heavy precipitation and runoff can result from seasonal convective thunderstorms, but rapid snowmelt can also supply excessive moisture to susceptible slopes. Debris flows often occur in steep drainageways and channels where sediment is routed downslope.

Intense precipitation on moderate to severely burned headwater areas could trigger mass wasting, typically as a debris-laden flow or flood surge. Debris flows in steep basins can scour and mobilize large volumes of sediment, rock, and debris. Basins of particular concern include Antoine Creek, where the steep headwaters are severely burned. In downstream areas where the Antoine Creek valley gradient decreases and the bottom widens, the likelihood of debris-laden flows is reduced, but sediment-laden flood surges and/or hyperconcentrated flows could still occur. Similar circumstances and results are probable in South Fork Gold Creek, McFarland Creek, Squaw Creek, and Black Canyon Creek. Structures on alluvial fans or along streambanks and/or floodplains are at risk of damage from flooding and debris mobilized by flooding.

An emergency situation exists for all of the identified values at risk. Threats to the safety of the public and agency employees are posed by hazard trees along the groomed snowmobile routes and the Echo Ridge trail system, both within and near the fire perimeter.

The BAER team identified threats to human life and safety on National Forest System (NFS) roads. Hazards on roads in the burned area include:

- rock fall or trees blocking the roadway
- road ravel
- culverts blocked and overtopped (with or without embankment failure)
- debris-laden flows depositing on roadways
- flows removing portions of the road prism
- lost egress from NFS lands and private lands

Highway 153 generally parallels the burned area from north to south. Modeled post-fire watershed response indicates an order of magnitude increase in storm runoff and associated debris in many of the catchments adjacent to the highway.

Human life and safety at private homes and property in and adjacent to the burned area is at increased risk of flooding and debris-laden flows; residences adjacent to stream channels are at higher risk. Ad hoc water diversions were noted by the BAER team in several areas; these could be affected.

Burned trees adjacent to area trails are hazardous to anyone in the area, and debris-laden flows along trails could put recreational users at increased risk of hazards or cut off their escape routes.

Fish-bearing streams within or near the fire perimeter include the Methow River, South Fork Gold Creek, Rainy Creek, Black Canyon, lower McFarland, and lower Squaw Creek.

Post-fire effects to Black Canyon Creek, South Fork Gold Creek, and Squaw Creek include increased peak flows and channel scour in tributaries with moderate and high soil burn severity, and increased sediment delivery from surface erosion and debris flows within the fire perimeter and from roads and culverts that impinge on the floodplain.

These post-fire effects could threaten the survival of ESA-listed fish eggs, fry, juveniles, and adults downstream of the fire. Moderate to high soil burn severity occurred in tributaries of and adjacent to fish-bearing waters in Black Canyon Creek and South Fork Gold Creek, and to headwater tributaries of Squaw and McFarland creeks. The team identified the potential for surface sediment/ash and associated debris transported to and mobilized through these tributaries and into the lower Methow River.

Pulses of sediment from debris-laden flows, though often sudden and episodic, can have both positive and negative impacts on late summer and fall spawners such as spring and summer Chinook salmon and bull trout. Effects on the aquatic habitat would be short-term increases in turbidity and fine sediment, along with channel bank and bed scour. Conversely, deposits of large wood and gravel could beneficially increase stream habitat complexity.

Soil loss caused by post-wildfire erosion in some areas will result in a long-term loss of soil productivity. Natural recovery of ground cover vegetation is likely over the next 3-5 years, but in areas that were severely burned, pre-fire conditions may not be restored until a new forest stand is established.

The BAER team did not recommend emergency hillslope treatments to stabilize soils at high risk of accelerated erosion. Cost of treatments to increase effective ground cover on these sites would be very high for a relatively small area of the subwatershed (e.g. Black Canyon Creek), because helicopters would be required to transport and spread mulch materials for these sites. Such a project would be unreasonably expensive, considering the highly variable success rates of such hillslope treatments.

The team determined that priority treatments would be better focused on protecting roads and infrastructure; such projects have greater potential for success.

Planned Forest Service projects within the Black Canyon Fire area focus on the safety of persons traveling on roadways, within developed recreation sites, and along trails within and downstream of the burn area. Post-fire work will also include signage, temporary area closures, and installation of precipitation monitoring stations within the fire perimeter. Emergency treatment projects will also include working with agencies and organizations to provide early warning to residents and visitors about the changed conditions in the watersheds above homes and along the travel corridor.

The Forest Service is coordinating with county governments, the Natural Resources Conservation Service, and the National Weather Service to compile and distribute information about increased flood risks to those below the fire area, with additional information about the risks of traveling on county and forest roads within and downstream of the burn area. Post-fire work will also include signage, temporary area

closures, fire closure signs, and installation of precipitation monitoring stations and ALERT stations.

Other planned projects will ensure safe access and reduce road-related hazards. Some road work (such as pulling culverts and installing trash racks) will reduce the risk of runoff downstream of the fire and address safety issues where debris flows meet drainage structures. Many road and trail treatments are planned or already under way, and all risk-reduction activities will be monitored.

Questions?

Check for updates on the BAER team website at CentralWashingtonFireRecovery.info or call the Okanogan-Wenatchee National Forest headquarters office at 509-664-9200.