Okanogan-Wenatchee National Forest

Central Washington 2014 Wildfires

Burned Area Emergency Response (BAER)

August 16, 2014

Mills Canyon Assessment Summary

The BAER team has completed its on-the-ground assessment of the 22,006-acre Mills Canyon Fire. Because the fire burned National Forest lands, along with other federal and non-federal lands, interdisciplinary and interagency coordination occurred throughout the process. The U.S. Geological Survey provided support through their landslide hazard program. landslides.usgs.gov/hazards/postfire_debrisflow/2014/20140708mills/

Technical reports have been submitted by BAER team specialists who are experienced in conducting rapid assessments and analyses. They focused on "values at risk" that could be affected by flash floods or other weather-related events. What follows is a summary of the team's reports.

VALUES AT RISK:

The Mill's Canyon Fire area values at risk include:

- capital investments in infrastructure, e.g. roads, culverts, and communication sites
- water quality and aquatic/riparian species, e.g. designated critical habitat for Columbia River steelhead, Upper Columbia spring Chinook salmon, and bull trout
- botanical protected species and the Thompson's Clover Research Natural Area, winter range, and soil productivity
- downstream properties, residences, and infrastructure

HUMAN LIFE/SAFETY and PROPERTY:

In valley bottom areas and in steep burned drainages throughout and downstream from burned areas, the team identified potential threats to life, safety, and property. Residents and other road users will be exposed to increased risk of flooding and debris flow. Houses and other structures, driveways, other private property, and Forest Service roads in valley bottoms adjacent to or in the flood-prone areas or near stream channels are at increased risk for flooding and debris flows. In several locations, roads intersect steep dissected canyons and are at increased risk of damage from debris flows.

ROADS:

The Mills Canyon Fire can be separated into two categories in its transportation system: a) maintenance "level 1" roads that run mid-slope off the main collector system and have been closed at the roads' entrances with physical barriers, and b) steep maintenance "level 2" roads that dissect the watersheds connecting the Mills Canyon and Dinkelman Canyon floodplains with the surrounding ridgelines or upper watershed features. Both

canyons have a history of debris flow or sediment movement caused by post-fire events and other naturally occurring events.

Field surveys have confirmed:

- the potential for overtopping of undersized culverts
- debris flows overtopping or partially washing out downstream road sections
- the potential for surface water to travel along a road prism, increasing sedimentation and "bulking" of road-generated surface flows
- sediment movement from the adjacent canyon side slopes can deposit debris within the road prism and fill drainage structures such as drain dips and sags. This can further damage road infrastructure and redirect run-off in less stable areas.

HYDROLOGY:
The BAER team expects that primary watershed responses of the Mills Canyon Fire area will include a) an initial flush of ash, b) rill and gully erosion in drainages and on steep slopes within the burned area, c) flash floods with increase peak flows, and d) sediment transport and deposition. The watershed responses will be dependent on the occurrence of storm and melt events, and will be greatest with initial storm events. The disturbances will become less evident as vegetation is reestablished, providing ground cover and increasing surface roughness. However, the nature of the watersheds within the burn area makes them susceptible to large runoff events.

FISHERIES:
The Entiat River and Roaring Creek currently support runs of Upper Columbia River summer steelhead (endangered), Upper Columbia River Spring Chinook salmon (endangered), Columbia River bull trout (threatened) and their designated Critical Habitat, as well as coho salmon, sockeye salmon, and Pacific lamprey.

Potential post-fire effects on the Entiat Watershed include increased water temperature, peak flows and channel scour, surface erosion and sediment delivery, and landslides and debris flows. These post-fire effects may threaten the survival of Endangered Species Act-listed fish eggs, fry, juveniles, and adults downstream of the fire. Effects may also alter habitat and channel conditions. Because of the proximity of steep drainages within the fire area (Mills Canyon, Dinkelman Canyon, Roaring Creek) the potential for detrimental impacts to listed fish habitat is high.

BOTANY:
Populations of two USFS Region 6 Sensitive plants (Thompson's clover and long-sepal globemallow), and one Survey and Manage plant (mountain ladies slipper, Cypripedium montanum) were burned by the Mills Canyon Fire.

Four noxious weeds are documented within the vicinity of the sensitive plant populations: Dalmatian toadflax (Wash. State Class B), spotted knapweed and diffuse knapweed (Wash. State Class B), and cheatgrass. Dalmatian toadflax spreads via seeds and rhizomes, and each plant may produce a half-million seeds. The seeds are small, about the size of poppy seeds, and are easily distributed through the air as the flower stem is blown in the wind. Diffuse and spotted knapweeds and cheatgrass spread via seeds that maintain viability for at least 10 years.

SOILS:
High soil burn severity in the burned area is evident on steep slopes that have lost nearly all canopy cover with ground cover consisting largely of rock fragments and sparse remnants of grass or small plants. These soil conditions result in increased magnitude and frequency of damaging debris flows.

Ardenmont soils have a high potential for damage by fire. There is a relatively high erosion factor (Kw) of 0.32 to 0.24. The forest floor is covered with a 3 cm layer of needles and twigs from Douglas-fir, grand fir, western larch, and ponderosa pine over many fine roots and fungal mycelia. Much of the Mills Canyon area has been previously burned – by the Dinkelman Fire in 1988 and the Swakane Fire in 2010. Post-fire events from both fires included substantial debris flows; there is a long history of jammer logging prior to the Dinkelman Fire. Much of the soil resource has already been subject to high erosion rates with the loss of its topsoil layer.

GEOLOGY:
Landslides have occurred in the past on steep slopes with Ardenmont soils; e.g. one on a north-facing slope south of Mills Canyon, and the other in the headwaters of Spencer Canyon. Basin and segment hazard and volume probabilities have been provided by the USGS Landslide Hazards Program:
landslides.usgs.gov/hazards/postfire_debrisflow/2014/20140708mills/

CULTURAL:
Discussions with the forest archaeologists indicate there are limited heritage resources within the fire perimeter; no emergency mitigation treatments are needed at this time.

Central Washington BAER Team information is available at inciweb.nwcg.gov/incident/4016/ and on the CentralWashingtonFireRecovery.info website.

Questions or comments can be directed to central.washington.baer.team@gmail.com or 509-433-7355.