Schneider Springs Fire Burned Area Summary

2500-8 Burned Area Report

Fire Background

A lightning storm blanketed the northern Cascade Mountain Range on the evening August 4 igniting a fire in the Schneider Springs area of the Naches Ranger District approximately 20 miles northwest of Naches, WA. The fire burned 113,689 acres, with 101,320 acres on NFS lands. The fire burned in mid-elevations short grass, low kinnikinic shrub communities of Douglas fir/ponderosa pine timbered landscape into upper elevations with closed canopy and heavy dead and down wood. Some timbered landscapes included the standing forest on talus slopes and some previously managed forest.

The fire is primarily located between WA State Hwy 410 and Hwy 12 in managed DNR, USFS System Lands including the William O'Douglas Wilderness. Over half of the fire area is within the 192,158-acre Rattlesnake Creek-Naches River Watershed; with the majority of the Lower, Little and Upper Rattlesnake Creeks and Nile Creek subwatersheds were burned. The Lower Bumping River and Dry Creek subwatersheds also had ~40% burned. The other drainages ranged between 1 and 20% burned.

Figure 1 Fire activity within the Schneider Springs Fire on the southside of FS Road 199 (8/29/21)

The Forest Service assembled a Burned Area Emergency Response (BAER) team on October 12, 2021. This team of experts in various natural resource disciplines began assessing the post-fire effects to critical values on Forest Service lands. The team developed a burn severity map to document the degree to which soil properties had changed within the burned area. Fire-damaged soils have low strength, high root mortality, and exhibit increased rates of water runoff and erosion. Using the severity map, BAER team members ran models to estimate changes in stream flows (hydrology) and debris flow (geology) potential. The modeled results were then used to determine where post-fire risks may threaten critical Forest Service values. Unacceptable risks were identified and recommendations to address the emergency are proposed. This document acts as a summary of the formal assessment and FS-2500-8, Burned Area Report.

Watershed Response

Soils

Soils within the Schneider Springs fire boundary are generally weakly developed, well drained, volcanic ash capped soils on steep (30-60%) to very steep (>60%) slopes. Field reconnaissance (figure 2) showed that areas with high soil burn severity (SBS) existed in areas where forest canopy was completely consumed. Areas of moderate SBS generally had some woody material left on the surface, complete or nearly complete litter and duff consumption, and browning needles in the canopy.

Field validation of SBS for the fire mapped out as High (17%), Moderate (19%), Low (35%), Rock/ Outcrop, Talus and Rubble Lands (10%), and Unburned (21%) (see Figure 7); the assessment identified areas of water repellant conditions in the moderate and high SBS.

Pre-fire conditions yielded little to no erosion from the forested areas. Where modeled average erosion rate for the entire burned area is 49 tons/acre producing approximately 3,346 yd^3/mi^2. Individual catchments within the fire were modeled with erosion rates ranging from 6 tons/acre to 117 tons/acre and sediment delivery was 436 yd^3/mi^2 to 8,008 yd^3/mi^2, respectively. Estimated erosion rates suggest that 56% of the fire is expected to exceed tolerable soil loss (TSL) thresholds and inputs to stream channels are likely to be significant. Exceeding TSL is very likely to result in a loss of productivity, which may hinder the natural recovery of native forest vegetation. Loss of soil productivity would be a long-term impact to soils in these areas. Additionally, the alteration of surface structure, exposure of bare soil at the surface, and strongly hydrophobic conditions within the soil profile will hinder the hydrologic function of the soil in the short term.

Geology

Much of the Pacific Northwest is geologically active with many steep slopes unstable and are prone to landslides and debris flows as a natural process pre-fire. The Schneider Springs Fire may speed up some of those natural processes in certain watershed areas as fire increases the potential for debris flows, partly due to the removal of ground cover vegetation.

The USGS-derived models estimate a moderate to high level of debris-flow hazard for most of the area burned by the Schneider Springs fire. When modeled against a 15 min / 40mm/hour storm (approximately 0.35” rain in 15 minutes), most large basins within the burned area have a high debris flow hazard rating and may experience debris flows (see Figure 8).

Figure 2 Ground observations of high, moderate and low burn severity conditions.

Hydrology

A lack of canopy cover and an abundance of water repellant conditions mean splash erosion will increase dramatically and limited areas of effective ground cover erosion and runoff will increase dramatically. Initial intense rainfall events will transport ash and initiate runoff that will mobilize

and transport bedload and debris disproportional to the amount of flow. Analysis of pre- and post-fire streamflow in several representative watersheds that drain into the Naches River show that small tributaries in the Lower Bumping River, Lower American River, Lost Creek, Nile Creek, Upper, Lower and Little Rattlesnake, Twenty-Five Mile Creek which would not have any projected flows from a 5 yr. / one hour rainfall event could produce flows that will measure in the 100's of cubic feet per second (cfs) (see map on page 8). Over time, as ground cover and canopy cover increase and water repellency decreases, runoff response and soil detachment and sediment transport will decrease. In areas that have reburned and are now classified as high burn severity, this process may take years.

Critical Values

The first critical value BAER teams assess is always human life and safety. As the team performed its risk assessment in context of physical assets on Forest Service lands, they were first assessed in terms of risk to human life and safety.

Roads and Bridges

The watersheds burned in the Schneider Springs Fire are predicted to exhibit varying degrees of response through increased runoff, and debris and sediment transport. This creates a future concern for roads, culverts (figure 3), bridges, and channels along the drainage paths of the burned watersheds in that they may be plugged, overtopped, or washed away more frequently than experienced under pre-fire conditions.

Forest system roads within the burn perimeter or connected to it are located on volcanic---------- ---------- sedimentary, Slopes range from moderately steep to very steep throughout the Schneider Springs Fire and corresponding drainages.

Figure 3 Engineers and hydrologists evaluate culverts like this one to evaluate its capacity to handle the predicted increased flows in Nile Creek.

Forest Service System Roads and drainage features downstream of moderately and high burned areas are at an elevated risk of increased flow and debris from flash flooding. Specific roads, their maintenance level (see link for definitions), https://www.fs.fed.us/eng/pubs/pdf/05771205.pdf and proposed treatments are listed below.

Road #	Proposed Treatment
1500 Bethel Ridge	warning signs, additional drainage dips, storm proofing, storm inspection and response, material removal
1506-Three Creeks	clean culvert/catch basin, additional drainage dips, storm inspection and response
1600-Nile Loop	warning signs, clean culvert/catch basin, berm removal, drainage dips, storm inspection and response

1605-Clover Way	Warning, signs, clean culvert/catch basin, drainage dips, storm inspection and response, riser pipes installed, check dam, material removal
1607-Lost Creek	Storm inspection and response
1611-Orr Creek	culvert/catch basin, drainage dips, storm inspection and response, riser pipes, material removal
1617-Orr Ridge	culvert/catch basin, drainage dips
1631-Thirsty Way	storm proofing, drainage dips
1671-Lost Basin	Storm inspection and response
1802-Chipmunk Way	Warning signs, drainage dips
1605227-Glass Ridge	culvert/catch basin, drainage dips, storm inspection and response, riser pipes
1617260-Orr Way	Armored water bars
1601-Nile	Storm inspection and response with heavy equipment to protect stream crossing, culvert reported as bridge (CRAB)
1644-Nile	Storm inspection and response with heavy equipment to protect arch culvert
1502-Rattlesnake Bridge	Storm inspection and response at with heavy equipment to protect bridge
1704, 174311, 1706, 1791366	Warning signs at fire boundary on NFS Lands

In addition to treatments at the specific roads listed above, the BAER team recommends general warning signs and communications to travelers on any USFS roads within or directly adjacent to the fire. The team recommends post-storm inspection and response using heavy equipment, if necessary.

Recreation

Most the recreation assets within the Schneider Springs burned area relate to trails, dispersed and developed campsites. The team identified 13 miles of trails within high or moderate burn severity and recommend storm-proofing as a potential treatment. Storm proofing involves cleaning or armoring existing drainage structures to remove accumulated sediment and add drainage structures to provide capacity for elevated post-fire runoff.

Figure 4 This burned sno-park trailhead sign is indicative of the passing fire.

In addition to trail-specific treatments, the BAER team recommends the removal of “danger trees” (fire-killed trees) in areas where crews will be working to implement identified treatments. The team also recommends the placement of warning signs at 156 trailheads, dispersed sites, campgrounds, wilderness sites and or logical ingress points to the burned area (figure 4). Finally,

the team also identified developed recreation sites below the fire in the Lower Bumping River that may be pumped, sanitized, wrapped, and sandbagged to reduce the possibility of contamination and discharge into Lower Bumping and the Naches River.

Botany

Invasive plants adversely affect native plant communities through direct competition for water and resources, allelopathy (suppression of growth of a native plant by release of a toxin from a nearby invasive plant), loss of growing space, changes in microhabitat, and direct suppression and mortality. Over time native plant diversity decreases as invasive plants expand, reducing habitat for native plant species and wildlife. Shifts from diverse native plant communities to non-native invasive plant dominance in dry habitats could alter future fire behavior, intensity, extent, and season of burning.

A check against USFS invasive plant databases, local district records, and the Yakima County Noxious Weed program indicate the following weeds are known to occur on our adjacent to the burned area: African wiregrass, Diffuse knapweed, Meadow knapweed, Tyrol knapweed, Spotted knapweed, Canada thistle, St. John's Wort, Bull thistle, Tansy ragwort, Dalmation toadflax, Oxeye daisy and Houndstongue.

Approximately 291 acres were disturbed by fire suppression activities including dozer line, drop points, staging areas and landings (figure 5) with interior areas being largely un-infested. In addition to causing an increase in weed invasion, the disturbances caused by dozer lines are expected to create accelerated erosion and soil compaction that may also inhibit the recovery of native plant populations.

The Forest recommends a treatment of Early Detection, Rapid Response (EDRR) to monitor for noxious weed infestation and expansion. In areas disturbed due to mechanical suppression activity and burned areas prone to new noxious weed infestations weed technicians will perform regular surveys and treat new infestations.

Figure 5 Dozer suppression lines are hot spots for invasive weeds.

Cultural Resources

While the initial focus of the BAER team was human life and safety, the team also recognizes that heritage resources are critical values. Any significant sites within the burned area will be evaluated as soon as possible by district staff to assess fire damage and new risks from the post-fire conditions.

Wildlife

Impacts to aquatic systems are directly related to the anticipated increases to runoff, erosion, and sedimentation in streams. Proposed treatments for road drainage will help to reduce those impacts to stream habitats. District fish biologists are reviewing the assessment and preparing emergency consultation documentation and coordinating with aquatic habitat restoration partners.

Non-Forest Service Values

Since fire effects know no administrative

boundaries, additional threats exist for assets not owned or managed by the Forest Service. This includes a state park, county roads, private property, etc., and the BAER team is already engaged with interagency partners to ensure that off-Forest values covered by other programs are addressed by the relevant responsible entities.

Conclusion

The BAER team has identified imminent threats to values at risk based on a rapid scientific and engineering assessment of the area burned by the Schneider Springs Fire. Despite taking significant precautions to minimize exposure to COVID-19, the assessment was conducted using the best available methods to analyze the potential for flooding and debris flows. The findings provide the information needed to prepare and protect against post-fire threats. The Forest Service will continue to provide information and participate in interagency efforts to address threats to public and private values at risk resulting from the Schneider Springs Fire.

Figure 6 Soil scientist evaluating water repellency on the Schneider Springs Fire.

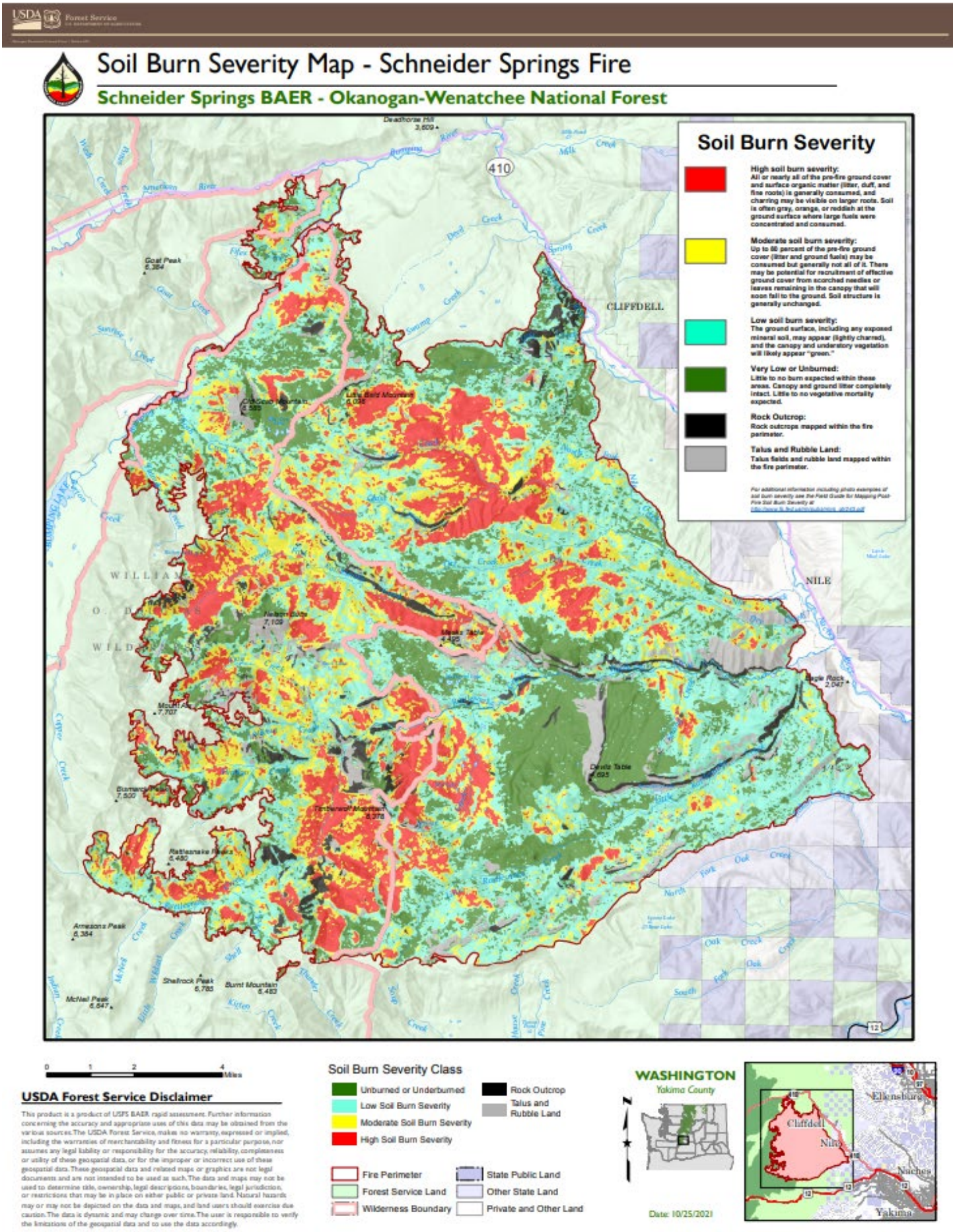


Figure 7 Burn severity map of the Schneider Springs Fire.

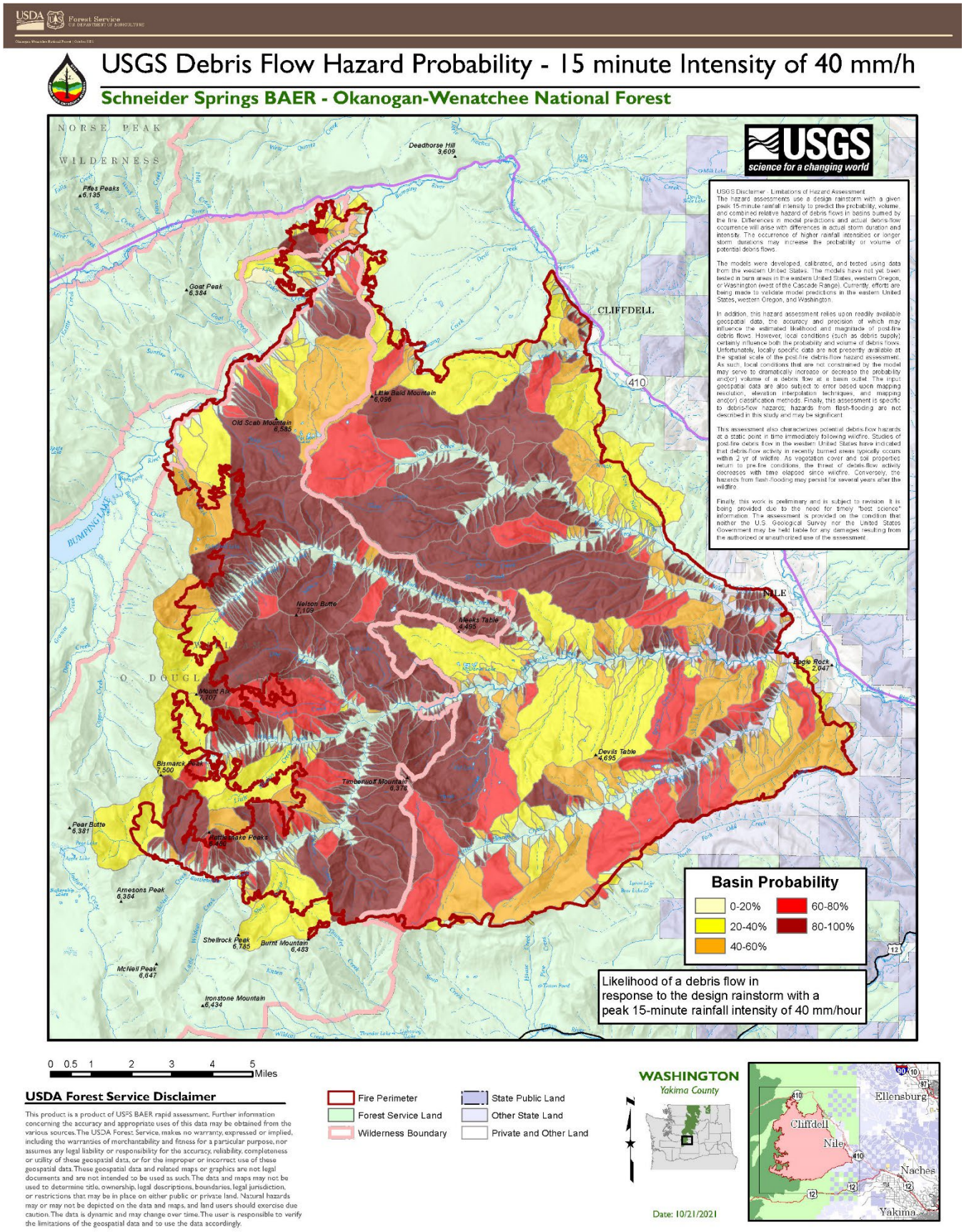
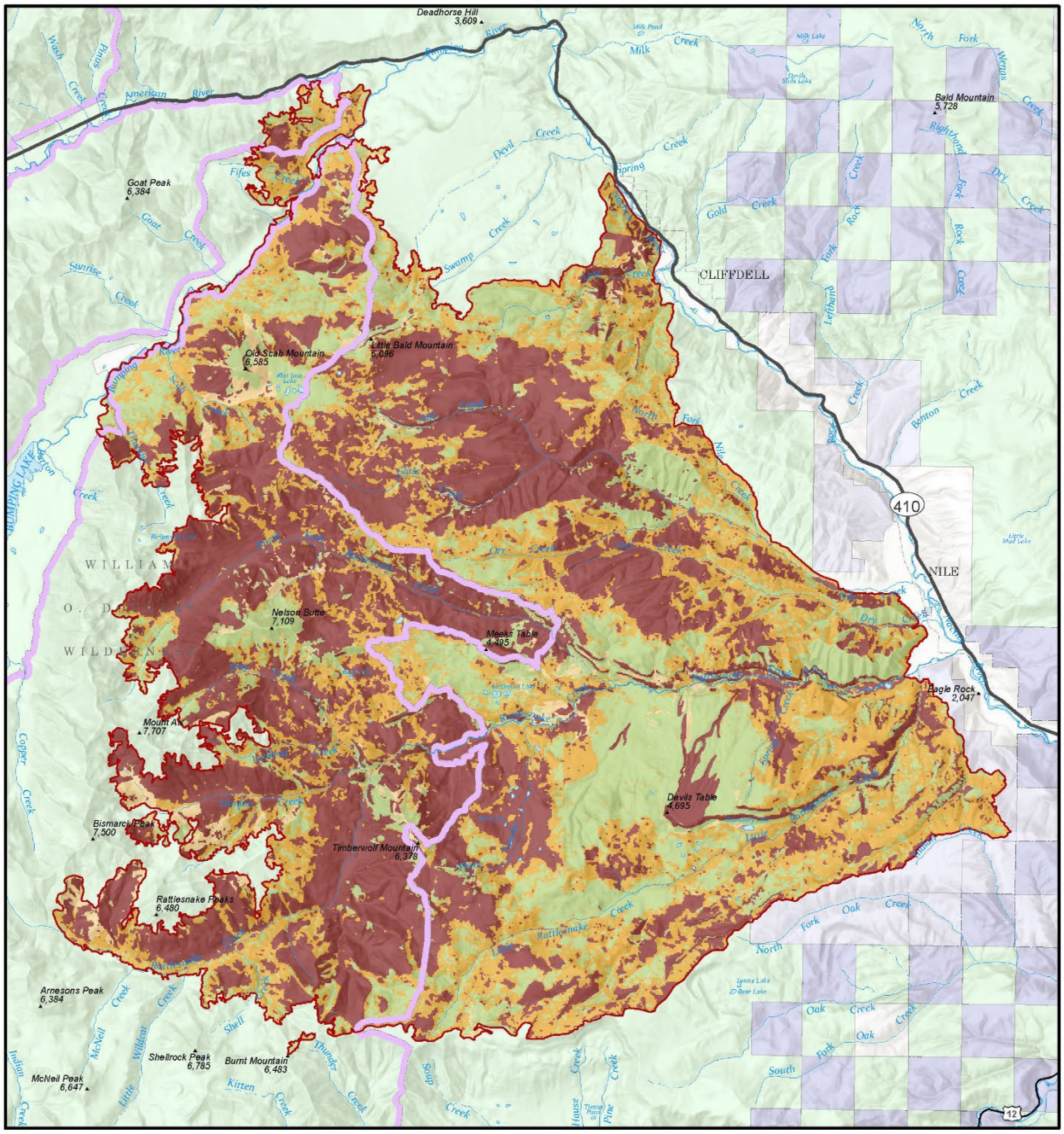


Figure 8 Debris flow hazards for the Schneider Springs Fire

Runoff Potential Map - Schneider Springs Fire

Schneider Springs BAER - Okanogan-Wenatchee National Forest



0 1 2 4 Miles

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Post-Fire Runoff Potential

- High
- Moderate
- Presumed Moderate
- Low

- Fire Perimeter
- Forest Service Land
- Wilderness
- State Public Land
- Other State Land
- Private and Other Land

WASHINGTON
Yakima County

Date: 10/21/2021

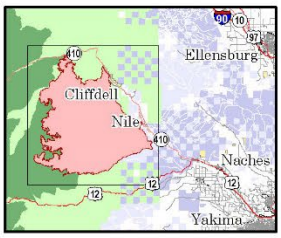

Figure 9 Post-fire modeled runoff potential.