TWENTYFIVE MILE FIRE

Reports

Twentyfive Mile Fire Burned Area Summary
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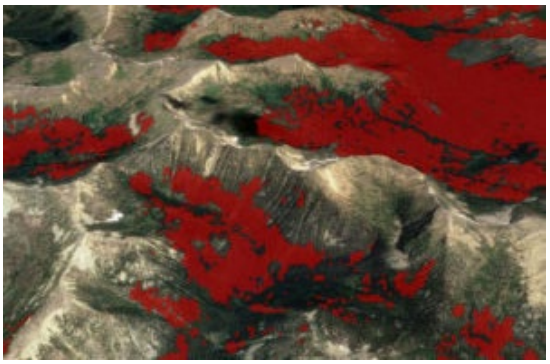
Wildfire-Associated Landslide Emergency Response Team Report
[11-page PDF]

Maps

Burn Severity Map

- **JPG** and **PDF** format
- A **KMZ** file is also available to view the map in greater detail in Google Earth (and many other mapping programs). Download the KMZ zip file, then double-click it to extract the KMZ file and save to your computer.

Open the Google Earth program. [If you donÕt already have Google Earth, you can download and install it for free **HERE.**] Drag the KMZ file onto the Google Earth program icon or main screen (or in Google Earth, click File, Import and select the KMZ file). After the KMZ file loads, you can zoom way in for more detail, change the angle of view, show or hide each burn severity level, and adjust transparency of levels. Click image below for an example screenshot from Google Earth, showing just high severity level.



More Information on **Burn Severity Levels**

Field Guide for Mapping Post-Fire Burn Severity

Runoff Potential Map

- **JPG** and **PDF** format
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ABOUT THIS SITE

The Okanogan-Wenatchee National Forest assembled a Burned Area Emergency Response (BAER) assessment team to analyze post-fire condition of burned watersheds and to plan emergency stabilization treatments for Central Washington wildfires.

PHOTO

Home page and banner photo: Cedar Creek Fire

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Twentyfive Mile Fire Burned Area Summary

2500-8 Burned Area Report

Fire Background

The Twentyfive Mile Fire was first reported on August 15, 2021, with the cause still under investigation. It is currently reported at 22,217 acres, almost all of which (79%) is within the 26,997-acre Twenty-Five Mile Creek Watershed which drains into Lake Chelan.

Figure 1 Fire activity within the Twentyfive Mile Fire.

The Forest Service assembled a Burned Area Emergency Response (BAER) team on September 16, 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 the relative risk to different critical values and inform recommendations to address risks that were determined to be an emergency. This document acts as a summary of the formal assessment and FS-2500-8, Burned Area Report.

Watershed Response

Soils

Soils within the Twentyfive Mile fire boundary are generally weakly developed, well drained, volcanic ash capped soils on steep (30-60%) to very steep (>60%) slopes. Prior wildfires in the area have resulted in coarse woody debris accumulating on the soil surface as well as dense regeneration of shrub cover in parts of the burned perimeter. Field reconnaissance (figure 2) showed that areas with high soil burn severity (SBS) existed in areas where forest canopy was completely consumed. High SBS was also documented in areas of reburn where the combination of surface coarse woody material and thick vegetative regeneration led to longer residency times and high temperatures. Areas of moderate SBS generally had some woody material left on the surface, complete or nearly complete litter consumption, and browning needles in the canopy. In areas moderate and high SBS water repellant conditions existed.

Mapped and validated SBS acres for the fire are High (21%), Moderate (32%), Low (39%), and Unburned (6%) (see map on page 6). Modeled average erosion rate for the entire burned area is 11 tons/acre producing approximately 883 yd^3/mi^2. When the individual catchments were modeled the erosion rate ranged from 9 tons/acre to 19 tons/acre

and sediment delivery was 719 yd^3/mi^2 to 1,544 yd^3/mi^2, respectively. Based on these estimated erosion rates, 53% of the fire is expected to exceed tolerable soil loss thresholds and inputs to stream channels are likely to be significant.

Figure 2 Scientists spent multiple days making ground observations about burn conditions.

Geology

Much of the Pacific Northwest is very geologically active and many steep slopes are prone to landslides and debris flows as a natural process. The Twentyfive Mile Fire may speed up some of those natural processes in certain watersheds. Fire increases the potential for debris flows, partly due to the removal of vegetation.

The USGS-derived models estimate a moderate to high level of debris-flow hazard for most of the area burned by the Twentyfive Mile fire. When modeled against a 15 min / 40mm/hour storm (approximately 0.4" rain in 15 minutes), most large basins within the burned area have a high debris flow hazard rating. Both North Fork and the main Twenty-Five Mile Creek should expect to experience debris flows (see map on page 7).

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 intensive rainfall events will transport ash and initiate runoff events that will mobilize and transport bedload and debris disproportional to the amount of flow. Tributaries to 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 Twentyfive Mile 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.

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

Forest system roads within the burn perimeter or connected to it are located on sedimentary, metamorphic, and igneous intrusive volcanic and high-grade metamorphic rocks heavily modified by glaciers that carved bedrock and deposited sediments in the area now occupied by Lake Chelan. Slopes range from moderately steep to very steep throughout the Twentyfive Mile Fire and corresponding drainages.

Potential critical values at risk addressed in this report include Forest Service System Roads and related drainage features.

Specific roads, their maintenance level (see https://www.fs.fed.us/eng/pubs/pdf/05771205.pdf for definitions), and proposed treatments are listed below.

Road #	Maint. Level	Proposed Treatment
5900	3	Dips, remove some berms, repair burned holes in road, storm inspection
5900125	3	Warning signs
5900124	2	Warning signs
5900128	1	None
5900220	1	None
5903	2	Dips, remove some berms, repair burned holes in road, storm inspection, armored dips at stream crossings
5903100	2	Armored dip at stream crossings, storm inspection
5905	2	Repair burned hole in road, remove culverts
8410	3	Storm inspection, clean inlets to restore capacity, remove some berms, and install gate
8410100	3	Warning signs, storm inspection
8410125	2	Temporary closure w/ existing gate

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.

There are two bridges identified that have an increased risk of damage from predicted flooding or debris flows: Ramona Bridge and the North Fork Twentyfive Mile Creek Culvert. The team recommends post-storm inspection and response using heavy equipment, if necessary.

Recreation

Most the recreation assets within the Twentyfive Mile burned area relate to trails. The team identified 6.2 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.

The team identified a total of 8 miles in or immediately adjacent or downstream of areas with high runoff potential. The team proposes trail drainage stabilization treatments, which include armoring and/or cleaning existing water control and adding additional drainage features to provide additional capacity for elevated sediment laden post-fire runoff.

Figure 4 This burned 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 13 trailheads or logical ingress points to the burned area (figure 4). Finally, the team also identified one burned-over vault toilet that will be pumped, sanitized, wrapped, and sandbagged to reduce the possibility of contamination and discharge into Twenty-Five Mile Creek.

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 Chelan County Noxious Weed program indicate the following weeds are known to occur on our adjacent to the burned area: Diffuse knapweed, Spotted knapweed, St. John's Wort, Bull thistle, Dalmation toadflax, and Tree of Heaven.

Infestations are primarily located on open and closed roads, old dozer lines, campgrounds, and trails through the burned area, with interior areas being largely un-infested. Additional infestations are known at the Twentyfive Mile Fire incident camp and helibase, at an old homestead upslope from the helibase, and off the 8410 and Lone Peak Roads.

Approximately 15 miles of dozer line (figure 5) and 7 miles of handline were constructed outside and within the burn perimeter. 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.

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

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 (approximately 88 acres) and burned areas prone to new noxious weed infestations (230 acres), weed technicians will perform regular surveys and treat new infestations.

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 Twentyfive Mile 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 Twentyfive Mile Fire.

Figure 6 Soil scientist evaluating water repellency on the Twentyfive Mile Fire.

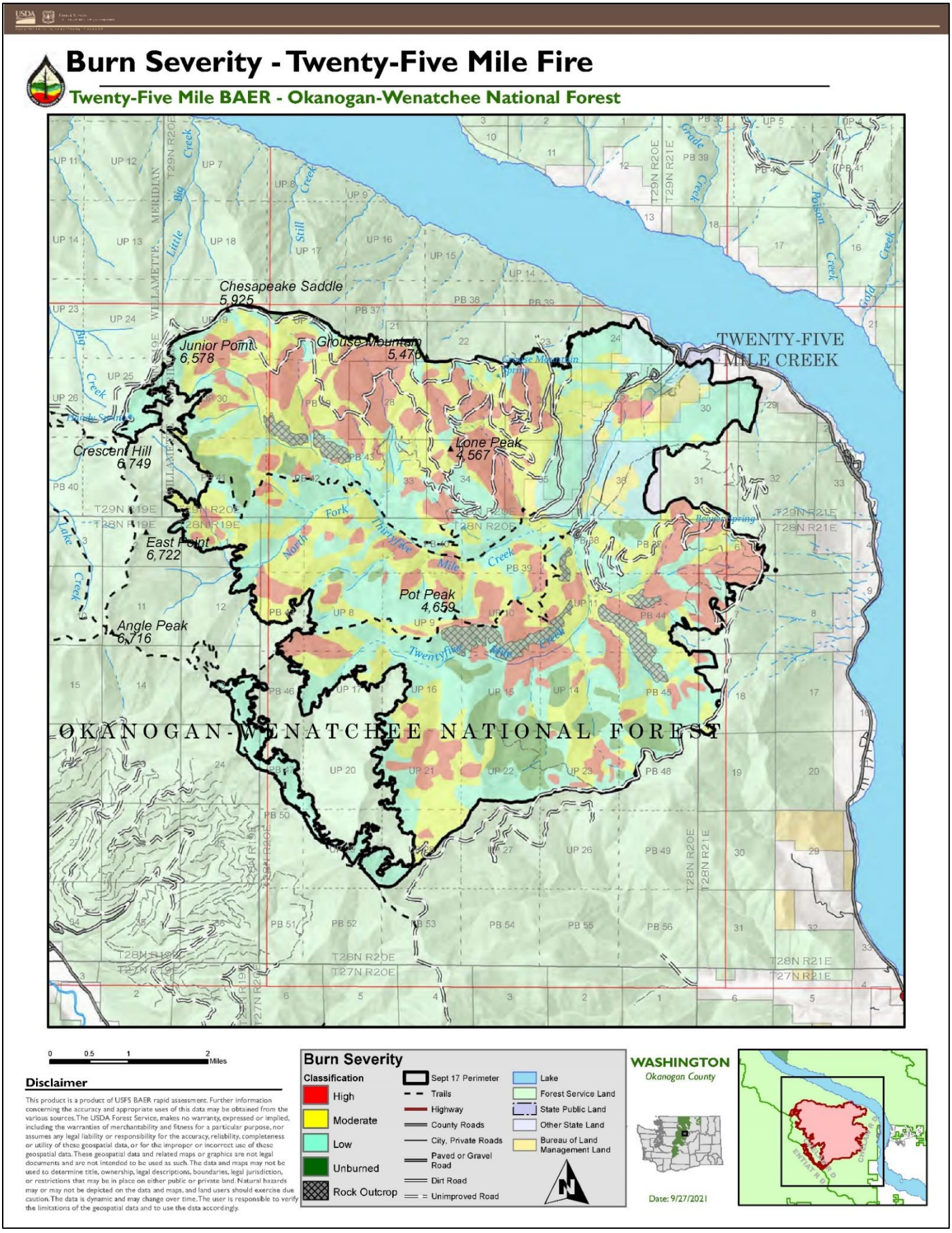

Figure 7 Burn severity map of the Twentyfive Mile Fire.

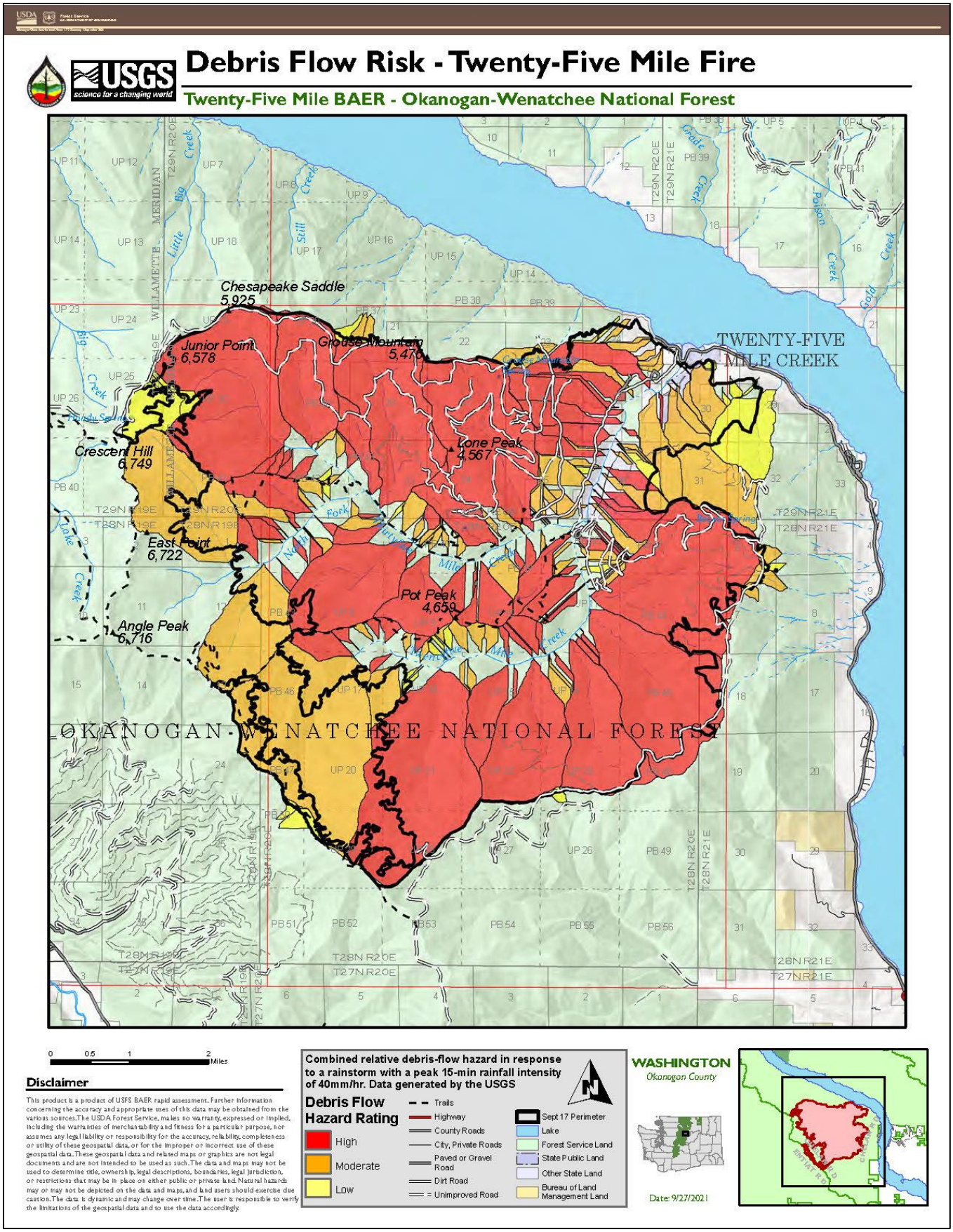

Figure 8 Debris flow hazards for the Twentyfive Mile Fire

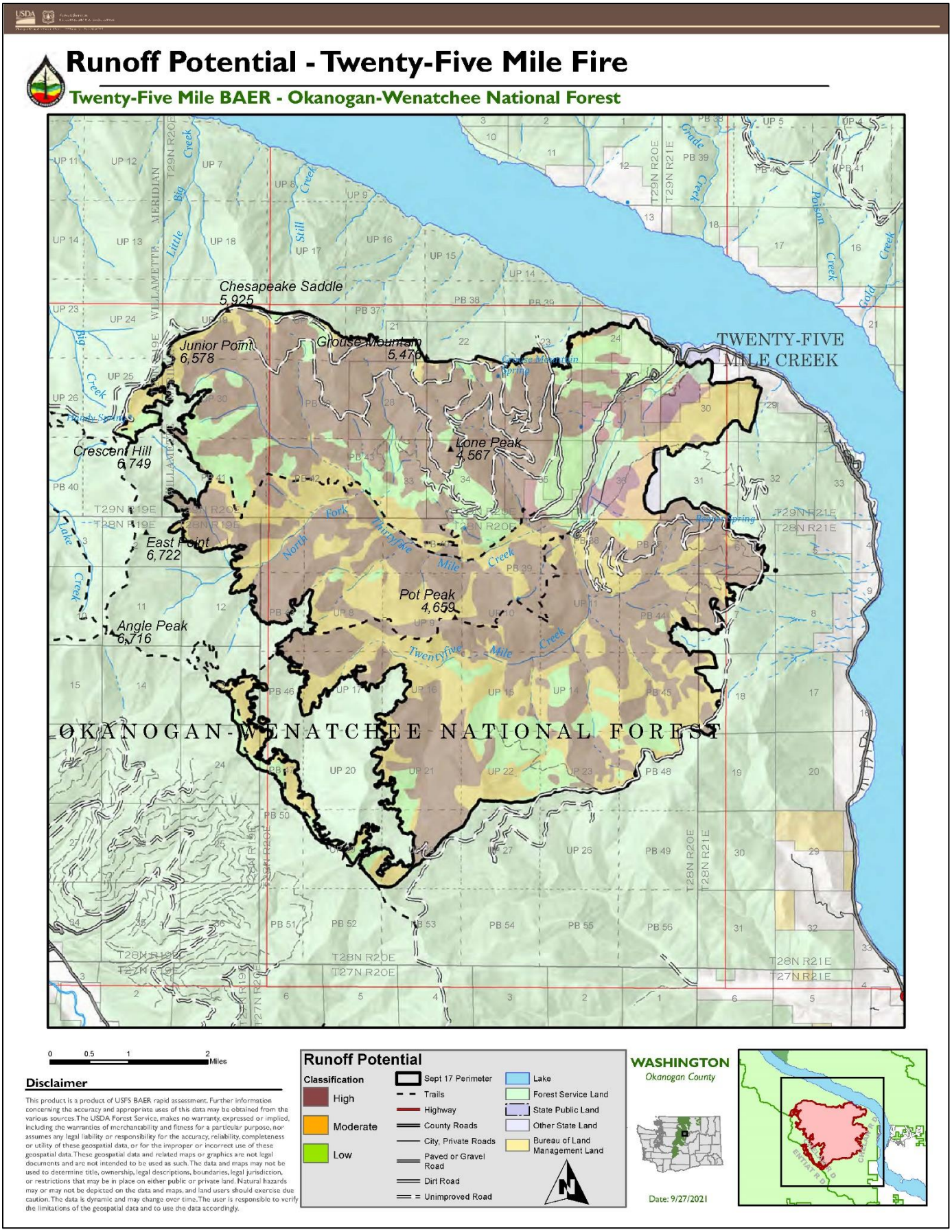

Figure 9 Post-fire modeled runoff potential.

NATURAL RESOURCES

WILDFIRE-ASSOCIATED LANDSLIDE EMERGENCY RESPONSE TEAM REPORT

Twentyfive Mile Fire

Chelan County, Washington

by Trevor A. Contreras and Katherine A. Mickelson

WASHINGTON
GEOLOGICAL SURVEY
WALERT Report
November 9, 2021

WASHINGTON STATE DEPARTMENT OF
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by Trevor A. Contreras[1] and Katherine A. Mickelson[1]

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INTRODUCTION

A limited Wildfire-Associated Landslide Emergency Response Team (WALERT) assessment was conducted to evaluate the potential risk posed by landslides and debris flows from a fire 12 miles northwest of Chelan, Washington. Wildfires can significantly change the hydrologic response of a watershed so that even modest rainstorms can produce dangerous flash floods and debris flows. On steep, rocky cliffs, rock fall can become a hazard after fires, as burnt trees cannot support rocks on a slope in the way that healthy trees can.

In coordination with the U.S. Forest Service (USFS), WALERT assessed areas downstream of slopes burned by wildfires to determine whether rock fall, debris flows, or flooding could impact roads, structures, and other areas where public safety is a concern. Further information about these hazards is provided in Appendix A.

WALERT looked for historical evidence of debris flows using field reconnaissance, lidar interpretation, Burned Area Reflectance Classification (BARC) maps, and orthoimagery. The USFS Burned Area Emergency Response (BAER) team finalized the soil burn severity map based on satellite data, which was provided to partners and will be posted online at: http://www.centralwashingtonfirerecovery.info/.

This report is primarily a qualitative assessment of post-wildfire landslide hazards based on our professional judgment and experience. The assessment was performed as part of emergency response with the intent to produce a rapid report for decision-makers, land managers, landowners, and other stakeholders. We focused on a limited area around Twentyfive Mile Creek near the state park campground, and residences along Shady Pass Road, outside of National Forest jurisdiction.

TWENTYFIVE MILE FIRE OVERVIEW

The Twentyfive Mile Fire was first reported on August 15, 2021, and the cause is still under investigation. As of October 5, the fire has burned 22,217 acres, mainly within the Twentyfive Mile Creek watershed, which drains into Lake Chelan. The fire burned primarily in short grass, timber, and brush (InciWeb, 2021).

The majority of the land that burned is on USFS land (93.5% of the total burned area). See Table 1 for land ownership information.

Table 1. Ownership distribution of burned area for Twentyfive Mile Fire

Land owner/manager	Acres	Percent of burned area
U.S. Forest Service (USFS)	20,684	93.5
Private ownership	651	3
WA State Dept. of Natural Resources (WADNR)	558	2.5
U.S. Dept. of Fish and Wildlife	201	0.9
Washington Dept. of Fish and Wildlife (WDFW)	24	0.1
Total	22,118[1]	100

[1] This value does not match the number of burned acres as reported by InciWeb. The reported burned acreage was 22,217. The acreage as reported here reflects a deviation of approximately 0.01%.

OBSERVATIONS AND INTERPRETATIONS

A very limited field assessment was performed on September 10 while mop-up operations were occurring. The work focused on areas where wildfire effects on watershed hydrology could put life and property at risk, specifically along Shady Pass Road, South Lakeshore Road, and at Twenty-Five Mile Creek State Park.

Satellite-derived data in the form of a calibrated Soil Burn Severity map was available for the Twentyfive Mile Fire and was provided by the USFS BAER team. They reviewed it for the federal lands and calibrated it for application throughout the burned area.

The Washington Geological Survey's Lidar Program was able to acquire preliminary lidar data for use in this post-fire assessment. These data assisted in visually estimating potential debris flow runout locations.

U.S. Geological Survey (USGS) post-fire debris flow hazard assessment

MODELING RESULTS

The USGS provided a debris flow assessment for the Twentyfive Mile Fire as requested by the USFS and based on the field-validated soil burn severity data provided by the USFS. The data can be viewed directly at their website (https://landslides.usgs.gov/hazards/postfire_debrisflow/detail.php?objectid=390).

There are various outputs and ways to view the data using the website. Here we'll discuss the combined relative debris flow hazard, which uses both probability and volume from the USGS model to provide three different hazard ratings: Low, Moderate, and High. We will focus on locations where public safety and infrastructure could be impacted.

INTERPRETATIONS

The USGS modeling suggests that there is Low, Moderate, and High debris flow hazard in drainages throughout the burned area. This is based on a modeled storm event with a peak rainfall intensity of approximately 0.25 inches of rain in a 15-minute period. USFS hydrologists suggest that a higher peak rainfall intensity of 0.4 inches in 15-minutes may be more appropriate for this area based on local climatic data. This greater rainfall intensity produces higher debris flow probabilities and may be more realistic when planning for intense rainfall events. However, we discuss the lower rainfall intensity here for consistency among other burned areas and for consistency with the default view of data on the USGS website.

We recognize that debris flow probabilities would be higher for higher storm intensities, and that this is especially probable for this area, so we encourage interested parties to consult the USFS BAER team debris flow hazard and runoff potential maps (U.S. Forest Service, 2021)(https://inciweb.nwcg.gov/photos/WAOWF/2021-09-16-1042-TwentyFive-Mile-BAER/related_files/pict20210908-182445-0.pdf) for additional information on debris flow modeling and flooding potential.

In the sections below we outline the various drainages where debris flows and flooding could impact the property and infrastructure that we reviewed during the limited reconnaissance field work. We didn't evaluate the area above the confluence of North Fork and the main stem of Twentyfive Mile Creek. This area is within the National Forest and was evaluated as part of the USFS BAER team evaluation. Additionally, below the confluence, the valley that Twentyfive Mile Creek flows in is relatively wide and flat, encouraging deposition of debris flow material. We do not expect debris flows triggered above the confluence to be directly transported downstream to the mouth of Twentyfive Mile Creek.

Twenty-Five Mile Creek State Park and South Lakeshore Road

We conducted a rapid visual assessment of Twenty-Five Mile Creek State Park. Of note were campsites along the creek on a lower terrace that are more prone to flooding than an upper terrace approximately 9 feet higher. The marina, docks, fuel tank, and store all exist on the distal edge of the fan, near Lake Chelan.

Boulders on the alluvial fan at the State Park suggest past debris flow activity. Based on a few old growth Douglas fir trees growing on an older debris flow deposit on the upstream portion of the park, the activity was likely over a hundred years ago.

We expect flooding, logs, and sediment would likely be the impact to the State Park and South Lakeshore Road during heavy precipitation events. Debris flows are not as likely here, though we do expect that debris flows could occur farther upstream in the watershed where drainages modeled with High and Moderate debris flow probability exit along steep and confined channels.

Debris flows need steep, confined channels to continue moving downstream. The channel upstream of South Lakeshore Road is broad and flat enough that most debris flows should attenuate and deposit larger boulders prior to

impacting the road and park. Much of the lower 2.5 miles of Twentyfive Mile Creek has a low gradient and is not confined below the confluence with the North Fork of Twentyfive Mile Creek.

The marina and fuel tank appear to be situated on the distal edge of the alluvial fan. Alluvial fans can be dynamic landforms during flooding events. While the marina store and fuel tank appear to be tucked away on the extreme east flank of the fan, approximately 300 feet from the current channel of the creek, wood debris and flood waters could impact the area during intense flooding events.

Shady Pass Road

Our rapid assessment relies on limited visual assessment of homes along Shady Pass Road. We reviewed the locations of homes to verify that they were not in channels that could transmit debris flows. While we did not observe homes in drainage channels, some outbuildings, driveways, and irrigation infrastructure may be vulnerable. Consulting the USGS debris flow modeling is advised to help assess site specific hazards (https://landslides.usgs.gov/hazards/postfire_debrisflow/detail.php?objectid=390).

The USGS debris flow model depicts drainages that cross Shady Pass Road as a combination of hazards, from Low to High. The two highest modeled drainages are near the 1500 and 1600 blocks of Shady Pass Road. Some homes may need assistance with minor flooding and sedimentation issues and some homeowners are currently working with Cascadia Conservation District to assess replanting and recovery efforts.

Homeowners have reported rocks impacting structures and landscaping equipment. Rock fall may be a hazard post-fire and in the coming years to homes and along roads as burned tree roots rot and lose their strength to hold rocks back.

RECOMMENDATIONS

Our assessment suggests that flash flooding, debris flows, and rock fall could impact the areas evaluated downstream of the burned area during intense rainstorms. According to previous reports from the USFS of post-fire flooding to nearby drainages (Safety Harbor and Big Creek), past floods have destroyed campgrounds and deposited logs and debris into Lake Chelan in 1972 and 2006. Based on previous flooding events in nearby drainages and calculations by the National Resource Conservation Service (NRCS) and the USFS BAER team, log jams could be a hazard during flooding events along the main channel of Twentyfive Mile Creek. Twenty-Five Mile Creek State Park may need additional review to better assess possible hazards to public safety and the environment.

Homeowners are encouraged to seek additional advice pertaining to future flooding, sedimentation, and debris flow impacts. Residents and visitors of the area should be informed of potential post-fire rock fall, flash flood, and debris flow hazards. If debris flows occur, they would make roads impassable. If you have questions or need additional assistance, please contact the authors of this report.

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LIMITATIONS

WALERT aims to quickly identify and assess geologic hazards associated with wildfires in order to inform decision making and to help focus the efforts of local officials and residents who may be impacted by post-wildfire hazards. Not all areas or hazards were evaluated. We encourage landowners, land managers, and those potentially at risk from post-wildfire hazards to consult qualified professionals for site-specific analysis of geological hazards and flood risk and prepare accordingly.

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We'd like to thank the USFS BAER team, NRCS, and the Cascadia Conservation District for their cooperation and for sharing data throughout the preliminary assessment process.

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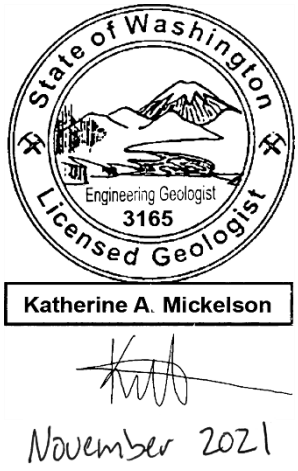

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APPENDIX A: GEOLOGICAL BACKGROUND

Hillslope processes

A variety of factors contribute to the probability of debris flows occurring in burned areas. These include hillslope gradient, channel convergence, availability of fine sediments, severity of hydrophobic (water repellant) soil conditions, burn severity, and the removal of a protective canopy and diminished root strength caused by fire.

Hydrophobic soil conditions in burned areas can increase water runoff potential on hillslopes during a storm by preventing water from infiltrating into the subsurface. Overland flow can result in rills and gullies that further channel water downhill.

When effective ground cover has been denuded after intense fire, soils are also exposed to erosive forces such as raindrop impact and wind. The steepest slopes are most prone to erosion, particularly where soils are shallow or where there is a restrictive subsurface layer such as bedrock. Soils that have developed in volcanic ash and glacial till are easily detachable, having low cohesion and structure, and contain relatively low amounts of organics, resulting in moderately thin topsoil horizons.

Flash floods and debris flows

Debris flows have a specific geologic definition that is often misused by the media, the public, and scientists. Most observed "debris flows" are actually sediment-laden flash floods known as hyperconcentrated flows (HCFs). In the following sections, we explain the differences between these two types of flows.

FLASH FLOODS

Flash floods, especially those that originate from recently burned areas, are often described as "debris flows" due to the sediment-laden water transporting woody and vegetative debris, trash, gravel, cobbles, and occasionally boulders. Though "debris flow" may be an observer's description of the event, a true debris flow has specific properties, behaviors, and characteristics that differentiate it from a flash flood. An HCF is the transition between a flash flood and a debris flow. One way geologists differentiate the three is by the percent of sediment (by volume) carried by the flowing water. A flood contains less than 5 percent sediment by volume, an HCF carries around 5 to 60 percent sediment by volume, and a debris flow exceeds 50 percent sediment by volume.

DEBRIS FLOWS

Debris flows are often described as having the appearance of flowing, wet concrete. These flows travel quickly in steep, convergent channels. A moving debris flow can be very loud because it can buoy cobbles, boulders, and debris to the front and sides of the flow. The sound is often compared to that of a freight train and may cause the ground to vibrate. In a post-fire situation, a debris flow may start as a flash flood surge that picks up sufficient sediment to transform into an HCF and, if soil and slope conditions are suitable, can transform into a debris flow.

Debris flow deposits tend to be distinct and include channel-adjacent levees of gravel, cobbles, and boulders. Channel-adjacent trees display upslope damage such as scarring on bark from rock or debris impact. Mud and gravel may be splashed onto trees and other channel-adjacent objects. Because of the ability of a debris flow to buoy these materials to the front of the moving mass, debris flows are extremely dangerous to public safety and infrastructure.

Alluvial fans

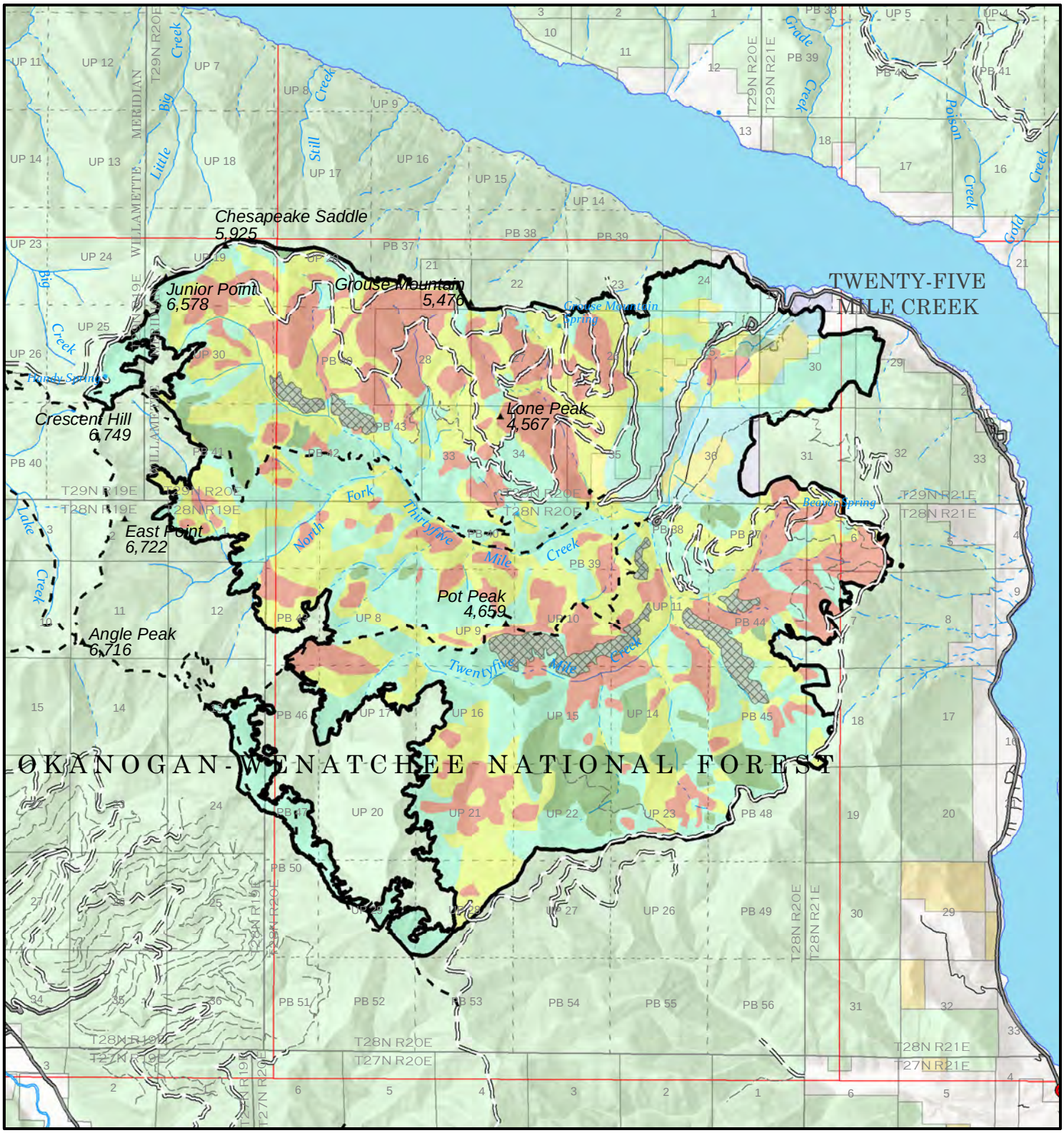
Alluvial fans are low-gradient, cone-shaped deposits that consist of sediment and debris. These features often accumulate immediately below a significant change in channel gradient and (or) valley confinement. This might occur at the mouth of a canyon or steep channel that drains from mountainous terrain and emerges onto a low gradient area such as a flood plain. Sediment on the alluvial fan is deposited by streams, floods, HCFs, and (or) debris flows and is typically sourced from a single channel.

Alluvial fans are attractive locations to build cabins and homes due to the slight elevation above the flood plain. However, alluvial fans are active depositional areas that accumulate sediment over time. The sediment can be deposited both slowly, such as during a spring melt when high streamflow transports and deposits fine sediment on the fan, or quickly, when a flash flood, HCF, or debris flow transports sediment and debris to the fan.

An information flyer about alluvial fan hazards is available on our website in both English (https://www.dnr.wa.gov/publications/ger_fs_alluvial_fans.pdf) and Spanish (https://www.dnr.wa.gov/publications/ger_fs_alluvial_fans_esp.pdf).

Burn Severity - Twenty-Five Mile Fire

Twenty-Five Mile BAER - Okanogan-Wenatchee National Forest



0 0.5 1 2 Miles

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Burn Severity

Classification

- High
- Moderate
- Low
- Unburned
- Rock Outcrop

- Sept 17 Perimeter
- Trails
- Highway
- County Roads
- City, Private Roads
- Paved or Gravel Road
- Dirt Road
- = Unimproved Road

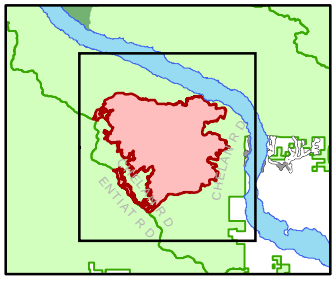
- Lake
- Forest Service Land
- State Public Land
- Other State Land
- Bureau of Land Management Land

N

WASHINGTON

Okanogan County

Date: 9/27/2021



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Okanogan-Wenatchee National Forest | FS Firenet | September 2021

Burn Severity - Twenty-Five Mile Fire

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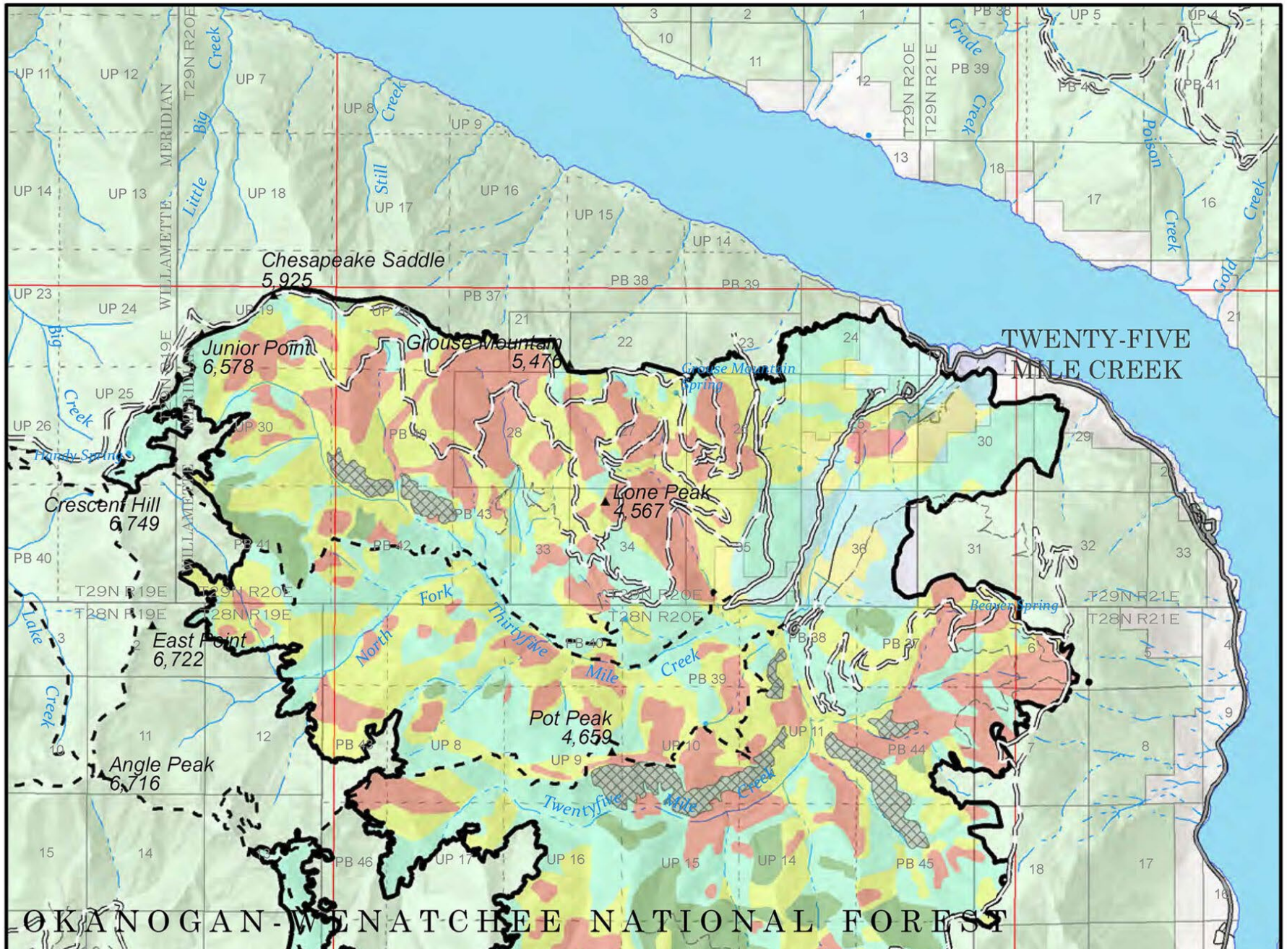

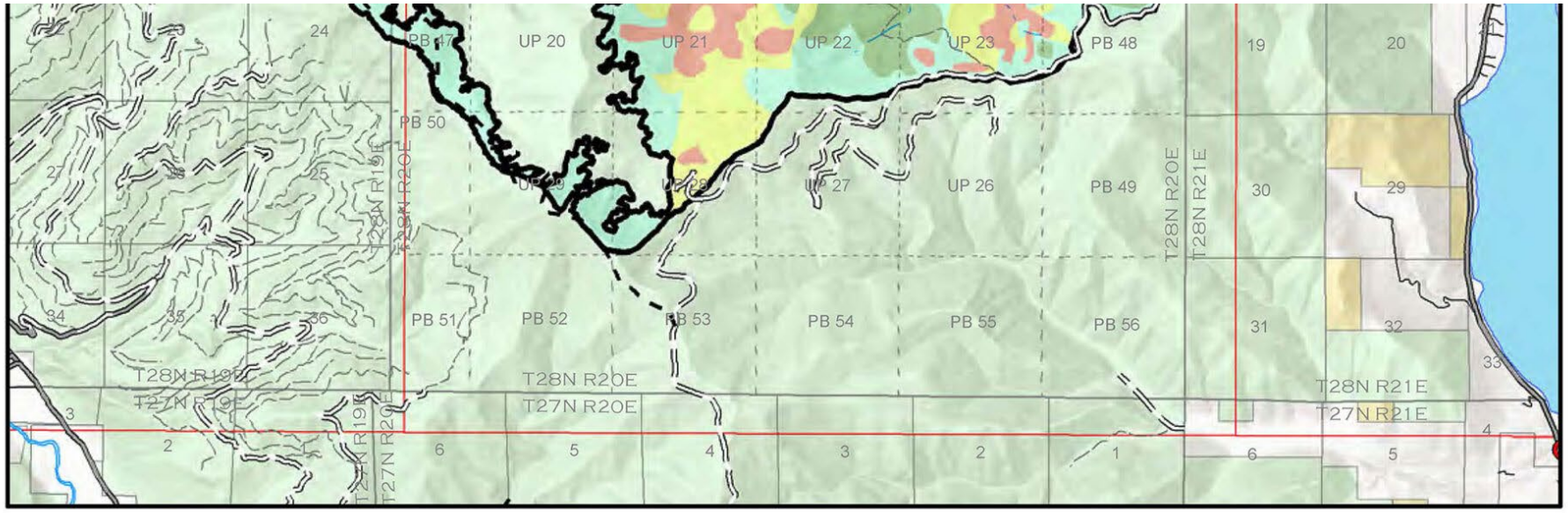

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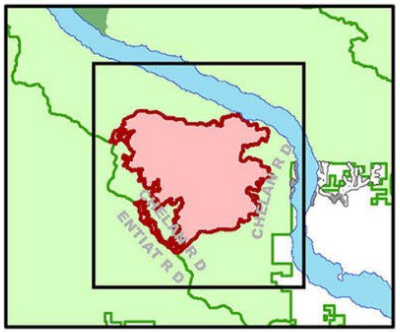
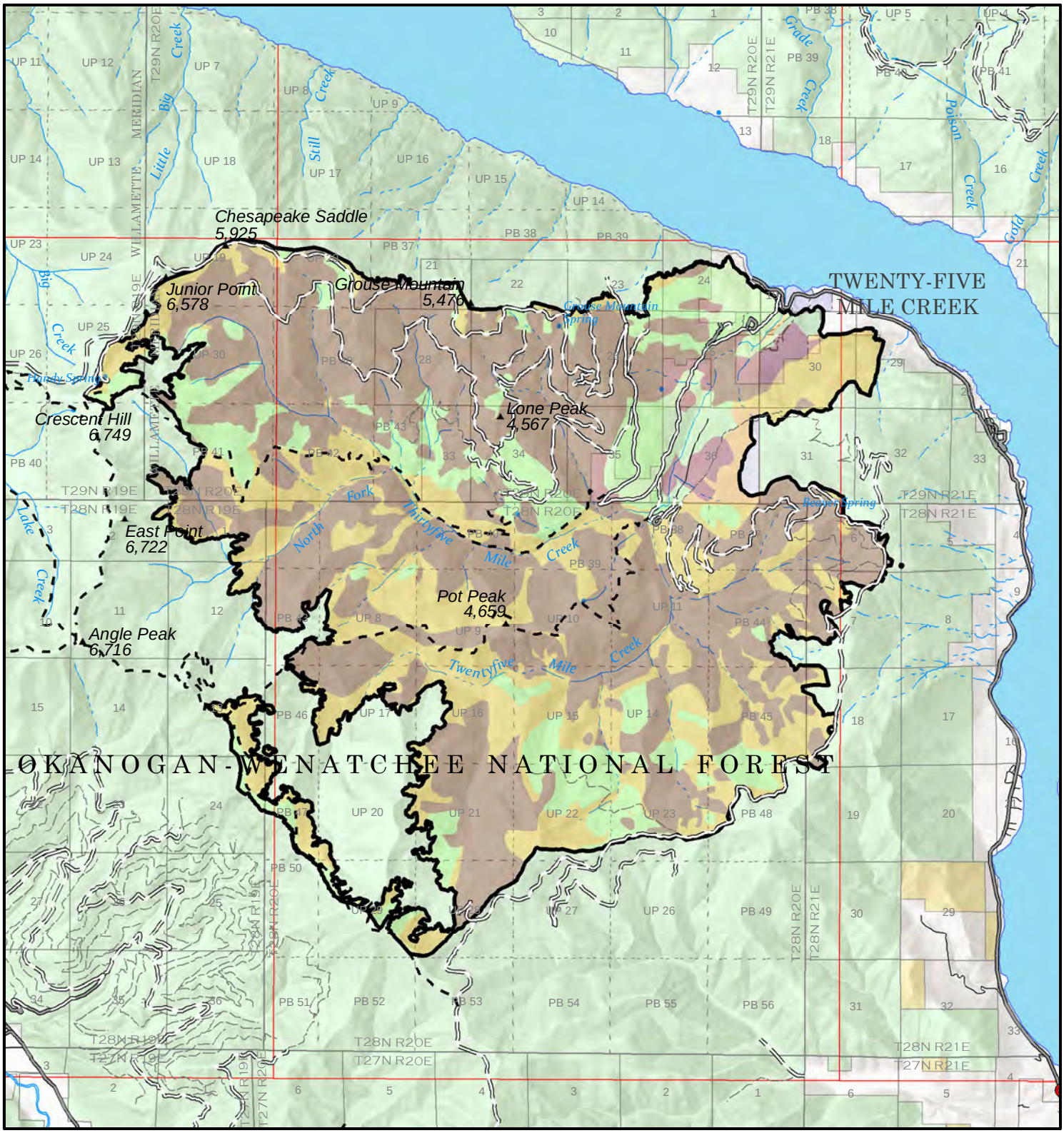


Runoff Potential - Twenty-Five Mile Fire

Twenty-Five Mile BAER - Okanogan-Wenatchee National Forest



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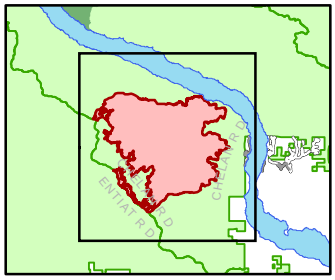

USDA Forest Service
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Runoff Potential - Twenty-Five Mile Fire

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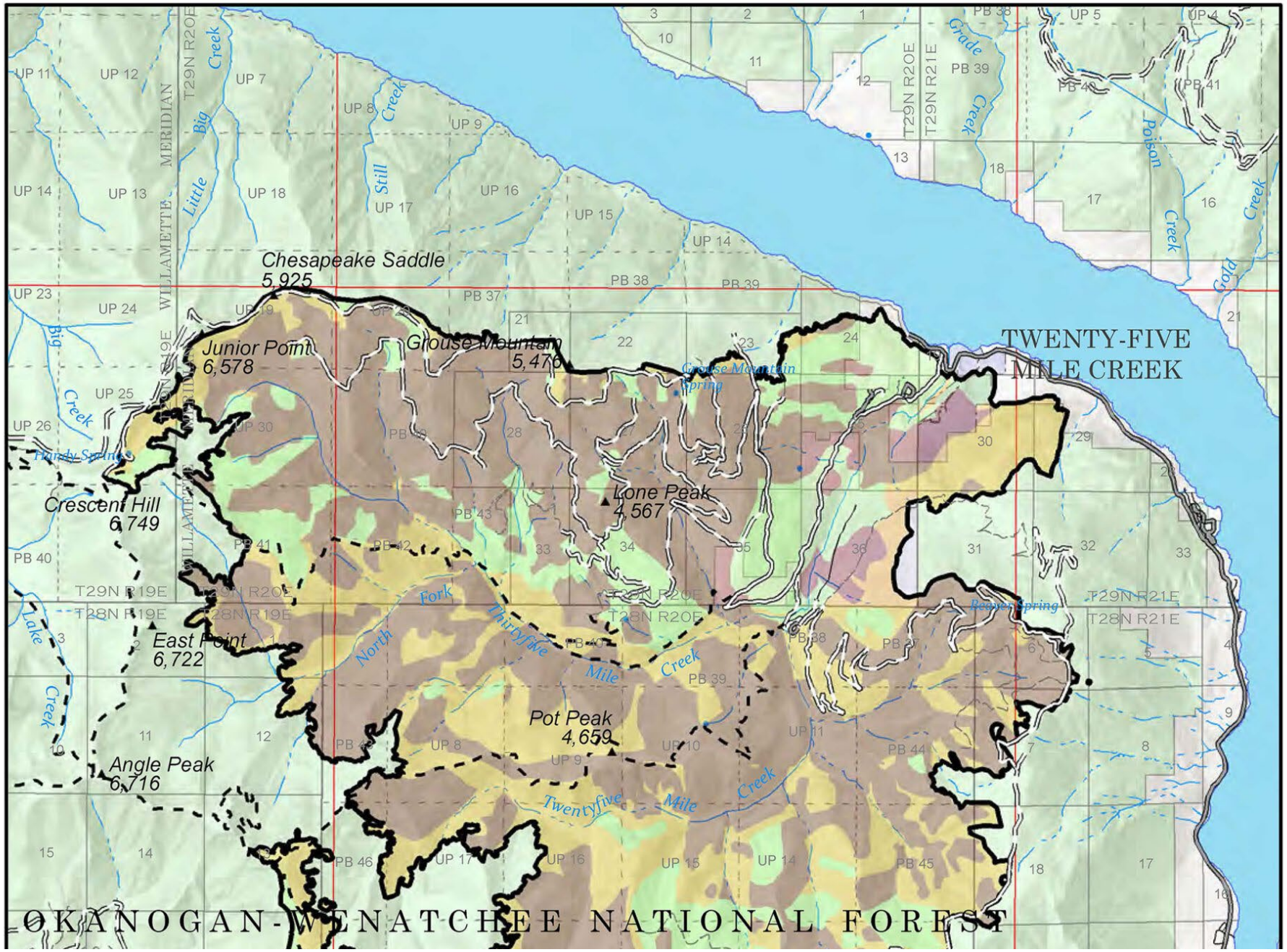

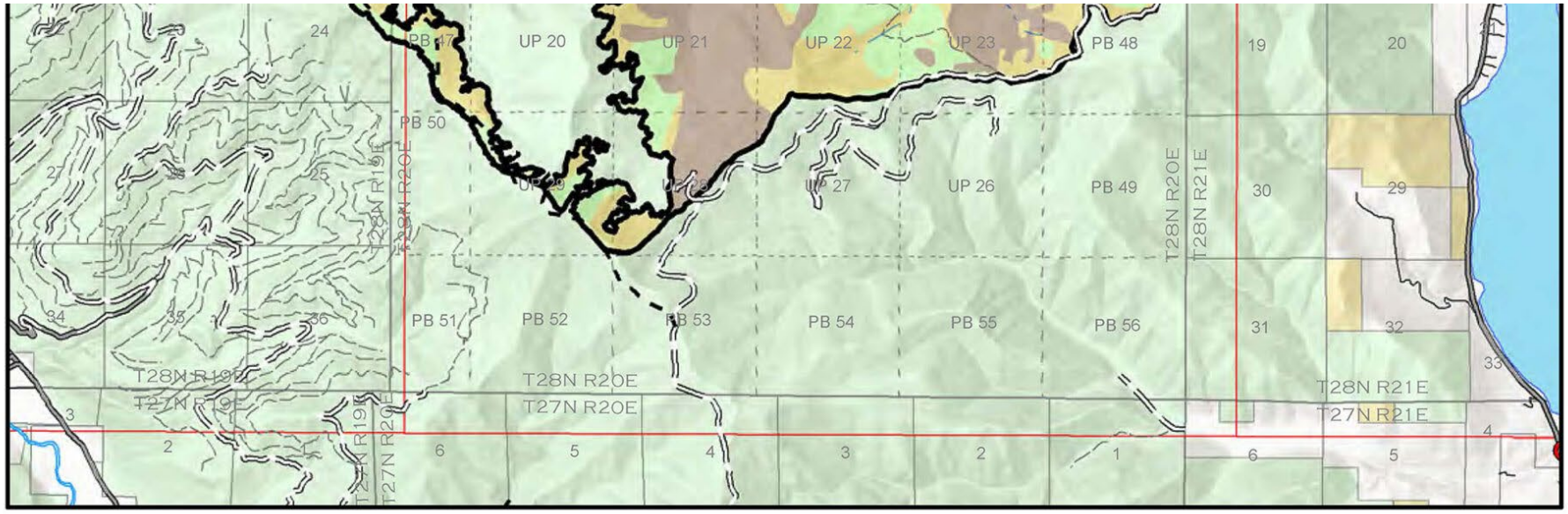

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