Date of Report: 10/31/2022

BURNED-AREA REPORT

PART I - TYPE OF REQUEST

A. Type of Report

☒ 1. Funding request for estimated emergency stabilization funds
☐ 2. No Treatment Recommendation

B. Type of Action

☐ 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)

☒ 2. Interim Request # 1 All additions/changes are in red text
☐ Updating the initial funding request based on more accurate site data or design analysis

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Suiattle River, Boulder Lake, Lake Toketie

B. Fire Number: Suiattle: WAMSF 000334
Boulder Lake: WAMSF 000304
Lake Toketie: WAMSF 000312

C. State: WA

D. County: Skagit

E. Region: R6

F. Forest: Mt. Baker-Snoqualmie

G. District: Darrington Ranger District

H. Fire Incident Job Code: Suiattle: [redacted]
Boulder Lake: [redacted]:[redacted]
Toketie: [redacted]

I. Date Fire Started: 8/30/2022

J. Date Fire Contained: Estimate date: 11/30/2022

K. Suppression Cost: Suiattle: [redacted]
Boulder Lake: WAMSF 000304: [redacted]
Lake Toketie: WAMSF 000312: [redacted]

L. Fire Suppression Damages Repaired with Suppression Funds (estimates):

1. **Fireline repaired (miles):** 0 miles dozer and handline
2. **Other (identify):**

M. Watershed Numbers:

Table 1: Acres Burned by Watershed

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
171100060303	Circle Creek-Suiattle River	25,363	2,058	8%
171100060304	Big Creek	13,757	566	4%
171100060302	Buck Creek	21,542	987	5%
171100060305	Tenas Creek-Suiattle River	30,361	4032	13%

N. Total Acres Burned:

Table 2: Total Acres Burned by Ownership

OWNERSHIP	ACRES
NFS	7,588
OTHER FEDERAL (LIST AGENCY AND ACRES)	0
STATE	0
PRIVATE	55
TOTAL	7,643

O. Vegetation Types: (In ascending elevation) Western Hemlock, Pacific Silver Fir, Mountain Hemlock

P. Dominant Soils:
Soils within the fire area are dominated by volcanic colluvium, generally ashy sandy loam and ashy loamy sand from volcanic eruptions. The soils on the steeper slopes tend to be shallow and less productive, whereas the valley bottoms to mid slopes tend to be deeper and very productive. The volcanic ash in the soils also contributes to high soil productivity, though this ashy component can be easily transported by wind and water due to its low particle density. Because productive soils produce high biomass forests, high surface fuel concentrations were predominant in the forested portions of the fire, particularly on middle and lower slopes. Where the forests burned with high fire intensity, the soils predictably were burned with high severity.

Q. Geologic Types:
Late Pleistocence alpine glaciations are responsibly for carving the U-shaped glacial troughs that form the primary drainage network in the area. Thin discontinuous veneers of glacial till from these alpine deposits have been mapped in limited areas within the fire. Deposits related to the late Pleistocene Puget lobe of the Cordillaeran ice-sheet have also been mapped in limited portions of the burn area along the margins of the Skykomish River valley. These deposits include glaciolacustrine clay and silt deposited in ice-dammed lakes that flooded the valley, as well as sand and gravel deposited by outwash from the receding ice sheet. Erosion of the steep slopes in the burn area has deposited alluvial fans at the mouth of many of the tributary streams, localized rock fall deposits at the base of over steepened rock outcrops, and landslides.

R. Miles of Stream Channels by Order or Class:

Table 3: Miles of Stream Channels by Order or Class

STREAM TYPE	MILES OF STREAM
PERENNIAL	71
INTERMITTENT	8
EPHEMERAL	
OTHER (DEFINE)	

S. **Transportation System:**
Trails: *National Forest (miles):* 4 *Other (miles):*
Roads: *National Forest (miles):* 9.87 *Other (miles):*

PART III - WATERSHED CONDITION

A. Burn Severity (acres): The acre values in the .dbf I received that combines SBS, soil map units and ownership does not match the acre values on the published SBS map. I cannot finish these tables and will need the correct values to finish the Soil Resource Report.

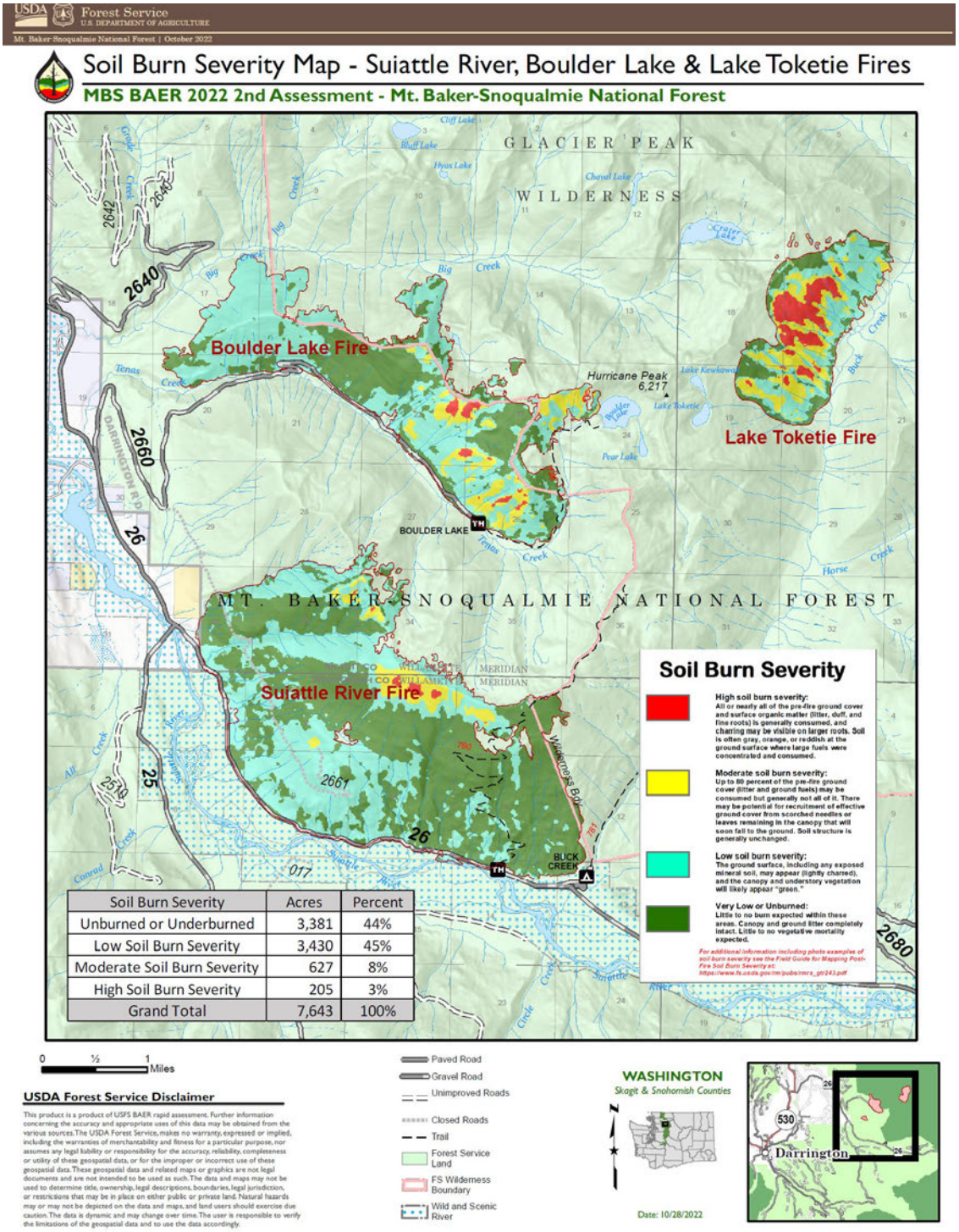


Table 4: Burn Severity Acres by Ownership

Soil Burn Severity	NFS	Other Federal (List Agency)	State	Private	Total	% within the Fire Perimeter
Unburned	3,370	0	0	10	3,381	44%
Low	3,386	0	0	44	3,430	45%
Moderate	627	0	0	0	627	8%
High	205	0	0	0	205	3%
Total	7,588	0	0	54	7,643	100%

B. Water-Repellent Soil (acres): Strong and medium water repellency at the mineral surface is estimated to increase by 232 acres. This is roughly a 23% increase over background or natural water repellency for unburned conditions. Increased water repellency occurs primarily where the fire burned at high and moderate SBS, with greater likelihood in surface soils having medium- to coarse textures (sandy loam) and volcanic ash. Where it does occur the fire-induced surface repellency is expected to be temporary, breaking down within 1 to 2 years and decreasing toward natural levels.

C. Soil Erosion Hazard Rating:

SEH Class	Pre-fire Acres	Pre-fire Percent	Post-fire Acres	Post-fire Percent	Gain/Loss
Low	271	4	259	3	-12
Moderate	1,835	24	1,658	22	-177
High	5,537	72	5,726	75	189
Total Acres	7,643		7,643		

D. Erosion Potential: Erosion potential estimated to range from 16 to 83 tons/acre, based on SBS.

Pourshed	Acres	Average Erosion (tons/acre)	Total Erosion (tons)
Suiattle	30	83	2,490
Boulder	209	16	3,344
Toketie Pourshed 1	131	57	7,467
Toketie Pourshed 2	167	18	3,006

See Soil Sediment map in Initial 2500-8 for pourshed locations.

E. Sediment Potential: 8 to 42 tons/acre. Estimated from erosion potential (eroded volume) that is decreased by a sediment delivery coefficient based on SBS, hillslope length, shape and existing obstructions/structure that decreases downslope movement of eroded soil potentially delivered as sediment to nearest 1st order channel).

F. Estimated Vegetative Recovery Period (years):

		Burn Severity	
Pre-fire condition	low	medium	high
non forest	0-2	0-2	1-2
early seral	0-5	1-10	1-10
mid seral	1-5	1-10	30
late seral	1-10	10-50	200

G. Estimated Hydrologic Response (brief description):

The Suiattle fires are within the Lower Suiattle River HUC 10 watershed; percent area burned is 7%. Within that watershed, the fires cross four subwatersheds with a range of 4-13% burned. Those subwatersheds include the Big Creek, Buck Creek, Circle Creek-Suiattle River and Tenas Creek-Suiattle River subwatersheds located within the 5th Field Lower Suiattle River watershed.

Increased discharge from post fire storm events was calculated using both local stream gages and USGS Regression equations for ungagged streams in Washington. We calculated increased peak-flow discharge for a 2-year storm event, because that event has a 75% probability of occurring in with two years of the fire when vegetation is at its lowest recovery period. A bulking factor for post fire discharge was calculated using similar techniques from two other BAER assignments in the area; the Norse Peak Fire on the Mt.

Baker Snoqualmie and the Cougar Creek Fire on the Okanogan-Wenatchee. The estimated post-fire discharge for all four subwatersheds show minimal changes to discharge. The highest increase of discharge is within the Tenas Creek- Suiattle River subwatershed, however it is only estimated to have an increase of 1.2 times the pre-burn amount of discharge.

The responses are expected to be most evident during initial and larger storm events immediately after the fire. Thereafter, responses are expected to become less evident as vegetation is reestablished, providing ground cover, increasing surface roughness, and stabilizing and improving the infiltration capacity of the soils. The estimated vegetative recovery for watersheds affected by the fires is expected to be approximately 3 years, primarily due to the favorable growing conditions. Flood potential will decrease as vegetation reestablishes, providing ground cover, increasing surface roughness, and stabilizing and improving the infiltration capacity of the soils. Time for recovery of elevated peak flows to base flow will likely take longer than the vegetative recovery period in this region.

PART V - SUMMARY OF ANALYSIS

Introduction/Background

A. Describe Critical Values/Resources and Threats (narrative):

Critical Values identified during the BAER assessment that have potential to be at risk as defined in FSM 2523.1 include human life and safety of employees and public, FS property (roads, trails, recreation infrastructure), cultural resources, natural resources including Threatened and Endangered species habitat, native plant communities, soil and water resources. The BAER team evaluated the risk to these critical values in accordance with the 2520 by using the BAER risk assessment. The Suiattle Fires Critical Value table is included below for BAER critical values for all resources.

Table 5: Critical Value Matrix

Probability of Damage or Loss	**Magnitude of Consequences**		
	Major	Moderate	Minor
	RISK		
Very Likely	**Very High**	**Very High**	**Low**
Likely	**Very High**	**High**	**Low**
Possible	**High**	**Intermediate**	**Low**
Unlikely	**Intermediate**	**Low**	**Very Low**

Value	Life/ Property/ Resources	Critical Value	Threat to Value	Probability of Damage or Loss	Rationale for Probability	Magnitude of Consequence	Rationale for Magnitude	Risk	Treatment Options Considered	Recommended Treatment
BAER critical value	Cultural Resources									
BAER critical value	Cultural Resources									
BAER critical value	Cultural Resources									
BAER critical value	Cultural Resources									
BAER critical value	Cultural Resources									
Non-FS value	Cultural Resources									
Non-FS value	Cultural Resources									
BAER critical value	Life and Safety	People traveling on all FS Roads within or directly adjacent to fire	Flooding, debris flows, rock fall, hazard trees	Very Likely	Large Potential of snags, felling of trees, rock/land movement or other unforeseen timing of hazards	Major	Human safety at risk from post fire hazards	Very High	Road Warning Signs at Fire Perimeter, Closure	No treatment

Value	Life/ Property/ Resources	Critical Value	Threat to Value	Probability of Damage or Loss	Rationale for Probability	Magnitude of Consequence	Rationale for Magnitude	Risk	Treatment Options Considered	Recommended Treatment
BAER critical value	Life and Safety	Buck Creek Campground	Flooding causing toilet overflow hazmat	Possible	Site is on historic debris flow	Moderate	Human illness at risk from hazmat	Intermediate	Pump toilets at flood risk before high flow season. Remove toilet in closed area of campground	No treatment
BAER critical value	Life and Safety	Buck Creek Campground	Hazard trees, Debris flow, flooding	Possible	Site is on historic debris flow	Major	Human life at risk from post fire hazards. Chance of debris jam forming and breaking in subsequent storms.	High	Warning sign at campground entrance; close campground for one year after fire.	S1a. Road Hazard Signs at perimeter and crossings below fire, S12 Administrative closure of road 2660 - **install gate at forest boundary (10.4 miles from start of road) on the 2600 road below Suiattle River Fire until snow melt is complete then re-access.**
BAER critical value	Life and Safety	Dispersed Site on Buck Creek	Debris flow, flooding	Possible	Site is on historic debris flow and is not elevated from creek	Major	Human life at risk from post fire hazards	High	Warning sign at dispersed site, site eradication	S5. Hazardous Material Stabilization. Pump toilets before high flow season.
BAER critical value	Life and Safety	Boulder Lake Trailhead	Elevated runoff, tree and rock fall from post fire conditions	Likely	Moderate-high SBS burned hillslopes above	Major	Human life at risk from post fire hazards	Very High	Warning sign at trailhead	S1b. Trail/Recreation Hazard Signs. Warning sign at campground entrance. **Close campground at gate for one year at gate.**

Value	Life/ Property/ Resources	Critical Value	Threat to Value	Probability of Damage or Loss	Rationale for Probability	Magnitude of Consequence	Rationale for Magnitude	Risk	Treatment Options Considered	Recommended Treatment
BAER critical value	Life and Safety	Boulder Lake Trail section within, or directly adjacent to, the fire and within or below High and Moderate SBS	Elevated runoff, tree and rock fall from post fire conditions	Likely	Moderate-high SBS burned hillslopes above	Major	Large potential of snags, felling of trees, rock/land movement or other unforeseen timing of hazards	Very High	Warning sign at trailhead	S1b. Trail/Recreation Hazard Signs. Warning sign at trailhead
BAER critical value	Life and Safety	Boulder Lake Trail section within, or directly adjacent to, the fire and within or below Low and Un-burned SBS	Elevated runoff, tree and rock fall from post fire conditions	Unlikely	Area Unburned	Major	Large potential of snags, felling of trees, rock/land movement or other unforeseen timing of hazards	Intermediate	Warning sign at trailhead	S1b. Trail/Recreation Hazard Signs. Warning sign at trailhead
BAER critical value	Life and Safety	Buck Creek Trail	No Threats Observed	Unlikely	Area Unburned	Minor	Threats to life and safety unknown at this time	Very Low	No Treatment	No Treatment
BAER critical value	Life and Safety	Huckleberry Mountain Trail - 780	Potential for a few danger trails	Unlikely	Majority of area is unburned or low SBS	Major	Users rarely stop along trail	Intermediate	**Warning Signs**	**Warning Signs**
BAER critical value	Natural Resources - Soil and Water	Soil Productivity	Loss of long-term soil productivity	Possible	Loss of formerly stable organic layer, loss of soil structure, hydrophobicity, loss of soil from erosion, impacts soil microbial community occurring in moderate and high SBS areas.	Minor	Soil conditions in moderate to high burn severity have detrimental impacts to soil structure or consumption or roots, erosion modeling.	Low	G1. Mulching, G3. Soil amendments	No treatment
BAER critical value	Natural Resources - Soil and Water	Hydrologic Function	Altered hydrologic function	Possible	Lower rates of infiltration, high soil hydrophobicity, and higher rates of runoff due to loss of canopy cover, ground cover, and channel stabilizing vegetation. Reduced slope stability from moderate and high SBS areas from both rainfall and snowmelt. Increased peak flows due to higher runoff	Minor	Hydrologic function expected to recover naturally over time and re-establishment of native vegetation to replace ground cover.	Low	G1. Mulching G3. Felling logs horizontally across hillslopes	No Treatment

Value	Life/ Property/ Resources	Critical Value	Threat to Value	Probability of Damage or Loss	Rationale for Probability	Magnitude of Consequence	Rationale for Magnitude	Risk	Treatment Options Considered	Recommended Treatment
BAER critical value	Natural Resources - Soil and Water	Wild and Scenic River - Suiattle	Changed post-fire conditions that would degrade potential outstanding remarkable values (ORVs)	Possible	Increased peak flow modeling show minor increases in discharge. However, the drainage shows signs of instability.	Minor		Low	No known effective treatments	No Treatment
BAER critical value	Natural Resources - Soil and Water	Water Uses - City of Anacortes Lower Skagit River Watershed Municipal & Private Water Supply	Erosion and transport of soils, ash, and/or debris into the Suiattle River and it's tributaries effected by increased post-fire flows.	Unlikely	No private water sources on the Suiattle. Users downstream of these watersheds will likely see effects but it is not known what those effects will be and to what extent they are addressed by user.	Minor	Intake miles downstream and many other unburned water sources	Very Low	No known effective treatments	No Treatment
BAER critical value	Natural Resources - Soil and Water	Water Quality/Hydrologic Function	Post-fire seasonal sediment increases, ash, nutrient loading and/or other debris	Possible	Based on soil burn severity and peak flow modeling, increased discharge and sedimentation will occur and lessen naturally over-time.	Minor	Ground cover will recovery within 1-3 years improving hydrologic function	Low	Road Treatments	See Road Treatments. No individual channel treatments identified. Displacement of soils will be localized and recoverable.
BAER critical value	Natural Resources - T&E habitat	Suiattle River, Boulder Lake--Critical habitat or suitable habitat for Puget Sound Chinook salmon, steelhead and bull trout in Tenas Creek, Big Creek, and Suiattle River	Rearing or spawning habitat degradation: smothering/scouring of redds or channel instability from fine and coarse sediments or increased flows.	Possible	While the Suiattle Fire has grown by 37 times, this acreage represents a small percentage of the watershed and burned with low, un- or underburned severity. The fire is mostly away from the bank of the Suiattle. The probability of affecting habitat in the Suiattle River is unlikely. The Boulder Lake Fire does not have a lot of high/mod burn. The additional burn was mostly low, un- or unburned severity. Critical habitat is at	Minor	Distance to habitats and burns with mostly low or unburned severity could result in short-term, localized effects from fire activity. The lower Suiattle River Watershed is over 100,000 acres, and fire-related habitat degradation would not result in a noticeable effect to these	Low	No Treatment	No Treatment

Value	Life/ Property/ Resources	Critical Value	Threat to Value	Probability of Damage or Loss	Rationale for Probability	Magnitude of Consequence	Rationale for Magnitude	Risk	Treatment Options Considered	Recommended Treatment
					closest 1.4mi in Big Creek downstream of Teepee Falls; probability is unlikely in Big Creek. Critical habitat in Tenas Creek is now at closest 0.3mi. With about 5 miles of stream-adjacent burn, Tenas Creek also has the capacity to transport wood and sediments to critical habitats in its lower reaches. The probability is possible for Tenas Creek.		Suiattle or Sauk River populations.			
BAER critical value	Natural Resources - T&E habitat	Lake Toketie--Critical habitat or suitable habitat for Puget Sound Chinook salmon, steelhead and bull trout in Buck Creek	Rearing or spawning habitat degradation: smothering/scouring of redds or channel instability from fine and coarse sediments or increased flows, or from remobilization of existing log jam and accumulated sediments.	Likely	The Lake Toketie Fire has a large percentage that burned with high/moderate severity and is immediately upslope of bull trout critical habitat in Buck Creek. Timing of storms and increased sediment potential would be concurrent with presence of redds.	Minor	There is a greater likelihood of localized effects to bull trout habitat immediately downslope and just downstream of the fire. Bull trout also spawn in Horse Creek and rear down to the mouth. If a large debris flow remobilizes the existing 20ft log jam in lower Buck Creek and releases the bedload and fine sediments stored behind it, Chinook and steelhead spawning habitat in lower Buck Creek could also be degraded for multiple years as the channel	Low	No Treatment	No Treatment

Value	Life/ Property/ Resources	Critical Value	Threat to Value	Probability of Damage or Loss	Rationale for Probability	Magnitude of Consequence	Rationale for Magnitude	Risk	Treatment Options Considered	Recommended Treatment
							readjusts. The jam is not a complete barrier and fish are accessing habitats upstream. Mostly in wilderness, natural disturbances are not unusual. The lower Suiattle River Watershed is over 100,000 acres, and fire-related habitat degradation would not result in a noticeable effect to these Suiattle or Sauk River populations.			
BAER critical value	Natural Resources - Native Plants	Native and Naturalized plant communities	Scotch Broom exists along old alignment of road 26 within the fire in low burn severity areas that has a long-lasting seed bank. However, there are nearby pockets with bare ground where this species could be established.	Likely	Mt Baker-Snoqualmie NF priority weed species are known from areas outside of the burn perimeter, along roads. These species rapidly colonize in bare soil and high-light conditions created by high severity fires. Intact native plant communities are now threatened with alteration from introduced invasive plants or known infestations spreading into the newly disturbed and burned areas.	Moderate	Priority weed species can invade and persist in newly created complex early seral areas. Native plant communities and ecosystem functions are very difficult to restore once invasive plants are established. Invasive plants prevent native forage and pollinator habitat from developing. The optimal plan is to remove the first invading plants before a	High	**P1a. Invasives EDRR**	**P1a. Invasives EDRR**

Value	Life/ Property/ Resources	Critical Value	Threat to Value	Probability of Damage or Loss	Rationale for Probability	Magnitude of Consequence	Rationale for Magnitude	Risk	Treatment Options Considered	Recommended Treatment
							new population can establish. Priority invasive species are restricted to areas of full sunlight and do not typically persist under overstory canopy closure > 50%.			
BAER critical value	Natural Resources - Native Plants	Suppression Repair-Prevention of invasive plants in intact forest communities	Potential for invasive plant colonization of areas disturbed by suppression.	Possible	There is only one drop point on a road and a short segment of improved road on NF lands.	Minor	Limited long-term effects to intact native plant communities.	Low	No Treatment	No Treatment
BAER critical value	Property - Other	Buck Creek Campground	Debris flow, flooding	Possible	Site is on historic debris flow	Major	Multiple bathrooms are at risk of being hit by flooding and debris flow	High	Relocate bathrooms	No Treatment
BAER critical value	Property - Other	Boulder Lake Trailhead	Erosion of site from increased flow/flooding	Unlikely	Trailhead has elevation above creek	Minor	Property has low value. It consists of barrier rocks and sign	Very Low	No Treatment	No Treatment
BAER critical value	Property - Roads	Forest Road 2660 - Tenas Creek Road	Elevated runoff, flooding and dry ravel, debris flows, tree and rockfall from post fire conditions	Possible	Moderate-high SBS burned steep hillslopes above the road, Road is below entire Boulder Lake Fire	Major	ML 3 gravel road, loss of road prism, loss of access to Boulder Lake Trailhead. Increased sedimentation into Tenas Creek and downstream drainages	High	Stormproof, remove culverts below crossings of high and moderate SBS, close road, storm inspection and response	S12. Closure of roads to public until snow melt is complete then re-access. Road already blocked with ecology blocks. **Fire burned more of the Boulder Creek drainage. Move warning signs to eco blocks (S1a)**

Value	Life/ Property/ Resources	Critical Value	Threat to Value	Probability of Damage or Loss	Rationale for Probability	Magnitude of Consequence	Rationale for Magnitude	Risk	Treatment Options Considered	Recommended Treatment
BAER critical value	Property - Roads	Upper Tenas Creek Bridge - FSR 2660 MP 4.2	Scour from elevated runoff, logjams, debris flows, washout from post fire conditions	Possible	Entire fire is upstream of bridge crossing. Watershed above the crossing burned with pockets of high and moderate SBS. Inspection reports note that previous debris flows have overtopped the bridge	Major	Loss of Bridge, loss of substantial investment, loss of access to Tenas Creek Road and Boulder Creek Trailhead	High	Close Bridge to traffic, remove bridge, inspect bridge after runoff and intense events. Storm inspection response with heavy equipment.	S12. Administrative Closure of bridge to public until after snow runoff, R3. Storm Inspection and Response with heavy equipment
BAER critical value	Property - Roads	Tenas Creek Bridge on FSR 2600 at MP 7.9	Scour from elevated runoff, logjams, debris flows, washout from post fire conditions	Unlikely	Previous debris flows that damaged Upper Tenas Creek Bridge did not damage Tenas Creek bridge.	Major	Loss of Bridge, loss of substantial investment, loss of access to Tenas Creek Road and Boulder Creek Trailhead	Intermediate	Risk Rating does not warrant treatment	No Treatment
BAER critical value	Property - Roads	Buck Creek Bridge on FSR 2600 at MP 15.4	Scour from elevated runoff, logjams, debris flows, washout from post fire conditions	Possible	Massive logjam already upstream of crossing, signs of recent debris flows in campground upstream, Crossing is downstream of entire Lake Toketie Fire	Major	Loss of Bridge, loss of substantial investment, loss of access 2600 road beyond (Trailheads and admin sites beyond crossing)	High	Close Bridge to traffic, remove bridge, inspect bridge after runoff and intense events. Storm inspection response with heavy equipment.	R3. Storm Inspection and Response with heavy equipment
BAER critical value	Property - Roads	All non-surveyed ML 1 roads within or directly adjacent to the fire and within or High and Moderate SBS	Elevated runoff, flooding and dry ravel, debris flows, tree and rockfall from post fire conditions	Possible	Moderate-high SBS burned hillslopes above and below	Minor	ML 1 roads are assumed to be hydrologically stable	Low	Risk Rating does not warrant treatment	No Treatment
BAER critical value	Property - Roads	All non-surveyed ML 1 roads within, or directly adjacent to, the fire and within or below Low and Un-burned SBS	Elevated runoff, flooding and dry ravel, debris flows, tree and rockfall from post fire conditions	Unlikely	Low and un-burned SBS burned hillslopes above and below	Minor	ML 1 roads are assumed to be hydrologically stable	Very Low	Risk Rating does not warrant treatment	Risk Rating does not warrant treatment

Value	Life/ Property/ Resources	Critical Value	Threat to Value	Probability of Damage or Loss	Rationale for Probability	Magnitude of Consequence	Rationale for Magnitude	Risk	Treatment Options Considered	Recommended Treatment
BAER critical value	Property - Roads	All non-surveyed ML 2 roads within, or directly adjacent to, the fire and within or below High and Moderate SBS	Elevated runoff, flooding and dry ravel, debris flows, tree and rockfall from post fire conditions	Likely	Moderate-high SBS burned hillslopes above and below	Moderate	ML 2 road, loss of road prism, loss of access and increased sedimentation into adjacent Drainages	High	Close road, assess road	Close road, assess road
BAER critical value	Property - Roads	All non-surveyed ML 2 roads within, or directly adjacent to, the fire and within or below Low and Un-burned SBS	Elevated runoff, flooding and dry ravel, debris flows, tree and rockfall from post fire conditions	Unlikely	Low and un-burned SBS burned hillslopes above and below	Moderate	ML 2 road, loss of road prism, loss of access and increased sedimentation into adjacent Drainages	Low	Risk Rating does not warrant treatment	Risk Rating does not warrant treatment
BAER critical value	Property - Roads	All non-surveyed ML 3 and higher roads within, or directly adjacent to, the fire and within or below High and Moderate SBS	Elevated runoff, flooding and dry ravel, debris flows, tree and rockfall from post fire conditions	Very Likely	Moderate-Low SBS burned hillslopes above and below	Major	ML 3 and higher roads represent major investment and are typically collectors and access FS infrastructure (admin/rec sites), loss of road prism, loss of access to spur roads off collectors and increased sedimentation into adjacent drainages.	Very High	Close road, assess road	S12. Close roads administratively until they can be assessed
BAER critical value	Property - Roads	All non-surveyed ML 3 and higher roads within, or directly adjacent to, the fire and within or below Low and Un-burned SBS	Elevated runoff, flooding and dry ravel, debris flows, tree and rockfall from post fire conditions	Unlikely	Low and un-burned SBS burned hillslopes above and below	Major	ML 3 and higher roads represent major investment and are typically collectors and access FS infrastructure (admin/rec sites), loss of road prism, loss of access to spur roads off collectors and	Intermediate	Risk Rating does not warrant treatment	No Treatment

Value	Life/ Property/ Resources	Critical Value	Threat to Value	Probability of Damage or Loss	Rationale for Probability	Magnitude of Consequence	Rationale for Magnitude	Risk	Treatment Options Considered	Recommended Treatment
							increased sedimentation into adjacent drainages.			
BAER critical value	Property - Roads	FSR 2600 (Suiattle River) Road Crossing below Suiattle River Fire	Elevated runoff, flooding and debris flows and plugging from slash and other post fire debris.	Likely	High and moderate burn severity occurred in the headwaters that drain to this road. Culverts and ditchlines can't handle the predicted runoff because they are overgrown	Moderate	Loss of paved, double lane, ML 5 and ML 4 road that is access to Buck Creek Campground, trailheads and admin sites	High	Close road, remove culvert, storm inspection and response with heavy equipment	**Storm proofing to clear culvers and ditchlines**
BAER critical value	Property - Trails	Boulder Lake Trail section within, or directly adjacent to, the fire and within or below High and Moderate SBS	Increased flow causing trail prism and drainage structure failures	Likely	Moderate-high SBS burned hillslopes above	Moderate	Loss of trail prism	High	Stormproof trail by adding drainage dips	T1. Trail Drainage Stabilization. Stormproof trail by adding drainage dips 0.3 miles, **add 0.2 miles**
BAER critical value	Property - Trails	Boulder Lake Trail section within, or directly adjacent to, the fire and within or below Low and Un-burned SBS	Increased flow causing trail prism and drainage structure failures	Unlikely	Area Unburned	Moderate	Loss of trail prism	Low	No Treatment	No Treatment
BAER critical value	Property - Trails	Buck Creek Trail - 781	No Threats Observed	Unlikely	Area Unburned	Minor	Threats to property unknown at this time	Very Low	No Treatment	No Treatment
BAER critical value	Property - Trails	Huckleberry Mountain Trail - 780	Localized runoff	Possible	Unburned and low SBS	Minor	Very limited runoff that could impact small segments of trail	Low	No Treatment	No Treatment

B. Emergency Treatment Objectives:
The primary objective of this Burned Area Emergency Response Report is to recommend treatments to manage identified unacceptable risks from "imminent post-wildfire threats to human life and safety, property, and critical natural resources on National Forest System lands" (FSM 2523.02). These treatments are expected to substantially reduce the probability of damage to identified BAER critical values.

C. Probability of Completing Treatment Prior to Damaging Storm or Event:
Land: 75
Channel: NA
Roads/Trails: 75
Protection/Safety: 90

D. Probability of Treatment Success

Table 6: Probability of Treatment Success

	1 year after treatment	*3 years after treatment*	*5 years after treatment*
Land	75	75	75
Channel	N/A	N/A	N/A
Roads/Trails	80	80	80
Protection/Safety	90	90	90

E. Cost of No-Action (Including Loss): [redacted]

F. Cost of Selected Alternative (Including Loss): [redacted]

G. Skills Represented on Burned-Area Survey Team:

☒ Soils ☒ Hydrology ☒ Engineering ☒ GIS ☒ Archaeology
☒ Weeds ☒ Recreation ☒ Fisheries ☐ Wildlife
☐ Other:

First Team Leader: Joe Blanchard
Email: joseph.blanchard@usda.gov **Phone(s)** 203-241-7340

Second Team Leader: John Chatel
Email: john.chatel@usda.gov **Phone(s)** 971-801-5379

Forest BAER Coordinator: John Kelley
Email: john.kelley@usda.gov **Phone(s):** 760-660-4189

Team Members: *Table 7: BAER Team Members by Skill*

Skill	**Second Team Member Names**
Team Lead	John Chatel
Assistant Team Lead	John Kelley
Soils	Terry Hardy
Hydrology	Rae Kursky
Engineering (t)	Jamison Humburg
GIS	Dave Keenum
Archaeology	Megan Berryoung
Weeds	Shauna Hee
Recreation	Eric Amstad
Geologist	Kate Michelson (WA DNR)

Skill	Second Team Member Names
PIO	Christine Pyle

Skill	First Team Member Names
Team Lead(s)	Joe Blanchard
Soils	Ryan Sparhawk
Hydrology	Kacey Largent
Hydrology (t)	Rae Kursky
Engineering	Ken Bigelow
GIS	Dave Keenum
Archaeology	Megan Berryoung
Weeds	Kevin James
Recreation	Brent Freeman
Geologist	Kate Michelson (WA DNR)
PIO	Amy Linn

H. Treatment Narrative:

Land Treatments:

Suppression EDRR - P1a.

Purpose of Treatment: The treatments are to prevent the establishment and rapid expansion of Scotch broom into the adjacent late successional forest. EDRR is prescribed in order to mitigate long term impacts of the species persistence at the site and adjacent forest. The purpose of treatments is to promote native plant establishment and proliferation by removing or preventing competition from the invasive plant population.

General Description: Invasive plant detection surveys and treatments – Detection surveys for Mt. Baker-Snoqualmie National Forest (MBS) high priority invasive plants will occur adjacent to the extent of known invasive plant occurrences within moderate severity pockets where this species could spread. Positive plant detections will be treated on the spot either manually or with herbicide. Early detection survey and rapid response treatments are the best option for managing invasive plants that have a high likelihood of spreading into burned areas. BAER funding authorization will be used to meet EDRR objectives during the spring and summer of FY23.

Location (Suitable) Sites: Approximately 74.14 acres of NFS lands would receive detection surveys and treatments. The 74.14 acres is a known occurrence of Scotch broom (Cytisus scoparius) within the burn perimeter of the incident. A GIS layer of the infestation needing surveys and treatments can be found in the BAER Assessment's T drive folder.

Design/Construction Specification(s): Detection surveys entail hiking through the infested area and locating plants, including recent germinants. Once the extent of all plants have been found and mapped, they will be treated during the same visit. The USFS National Invasive Plant Survey and Detection protocols will be followed for detection surveys. Manual and herbicide treatments will be consistent with the Forest's Invasive Plant 2015 Record of Decision. Detection surveys and subsequent treatments will occur twice during the growing season.

Interagency Consultation- H2

Purpose of Treatment: [redacted]

General Description: [redacted]

Location (Suitable) Sites: [redacted]

Design/Construction Specification(s): None

Project Cost Template			
Project Name:	Suiattle Consultation		
Project Estimates (add lines if needed):			
Additional Unit Capacity Needs (e.g. detailers/seasonals/O			**10 hour days**
Grade	**Cost/day**	**Days needed**	**$** [redacted]
GS-11 Heritage Lead	[redacted]		$
			$ -
			$ -
			$ -
			$ -
Other Materials and Services (including contracting costs):			
Item	**Cost/unit**	**Units needed**	**$** -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
Total funding requested:			**$** [redacted]

Channel Treatments: None

Roads and Trail Treatments:

Gates on Roads – S2

Purpose of Treatment: The primary reason of installing the gates is for public safety especially during periods of expected moderate to high rainfall events. In the event severe stormy weather passes over the Suiattle Fire area a line officer may decide they need to close the roads that would be affected by the expected run off. A gate would be necessary in preventing the public from accessing the area of the forest by vehicle during these severe weather events. The closure orders will be necessary when it is determined there is a danger to the public caused by potential debris flows and flooding from the hill slopes above the roads.

General Description: This treatment is for the installation of steel post gates to close roads when necessary for public safety and to develop and implement closure orders when necessary.

Location (Suitable) Sites: FSR 2600 - At MP 10.4, which is at the boundary of private land and FS owned land

Design/Construction Specifications: Install 'Powder River' Style gate at road entry point with locking posts in concrete (footings or anchored into ecology blocks). Travel management signs may be used on gates to display access and travel management restrictions and closures. Refer to the Sign Installation Guide for additional information about the required gate signs. Road closure information will be posted on the gates and through public notices.

Storm Inspection and Response – R3

Purpose of Treatment: The watersheds burned in the Suiattle Fire will show the effects of the fire via increased runoff rates, erosion, sediment, and debris transport creating a future concern for roads and associated drainage structures. Several high and moderate burn severity areas drain to road 2600. The road's drainage ditches and culverts are overgrown and can't accommodate the predicted runoff. The effects could result in filling the ditches, plugged culverts and potentially overtopped or washed away road surfaces and fill slopes.

Treatments are recommended to minimize the risks to public safety and protect the investment of the transportation system from the expected increased post-fire runoff. Treatments include: Clean existing inlets and catch basins, Dig ditches, waterbars and dips deeper than existing to increase capacity where particularly high runoff is expected to occur based on hydrological models. Remove earthen berms off outside edge of road where it could prevent water from exiting roadway and blade road to remove high spots to facilitate drainage over and off roadway.

General Description: Several road stabilization treatments have been prescribed for Forest Service road 2600 in order to storm proof crossings within the Suiattle Fire that will be directly impacted by post fire events. These treatments are necessary to provide an intercept path for sheet flows off fire-impacted slopes and associated debris without filling in and diverting flow into the traveled-way of the road which will mitigate the predicted effects that will occur to the transportation infrastructure system.

Location (Suitable) Sites: FSR 2600 - MP 10.9 to MP 13.4

Design/Construction Specifications:

- Ditch Cleaning – All drain ditches along the length of the roads shall have all existing silt and debris removed and either hauled away or side cast such that the material cannot reenter the drainage structure during a runoff event.
- Culvert Cleaning – Remove any blockages from inlet, outlet and inside barrel and straighten bent inlets and outlets. Catchment-basins shall have all existing silt and debris removed to between 6 inches and 12 inches below the bottom of the culvert. Hauled away or side cast the material so that it cannot reenter the drainage structure during a runoff event. Culverts are typically 18 inch to 24 inch ditch relief culverts, with some larger but are easily accessible by equipment, i.e. backhoe. Individual culverts that are larger or have larger fill above the culverts that are not easily accessed with equipment and will need to be cleaned by hand are counted on an individual basis.
- Carsonite Installation - Install a single white carsonite post with green retroreflective tape to identify the location of the inlet during patrols.

Storm Inspection and Response with Heavy Equipment - R3

- Objective: Monitor bridge openings for logjams/debris flows or scour. Mobilizing heavy equipment to clear opening and maintain hydraulic capacity prior to failure of bridges. Assumes 2 days of time for equipment and emergency mobilization. Response requires heavy equipment with multiple personnel to ensure existing drainage and road remain in functional status.
- Description: Buck Creek and Upper Tenas Creek Bridges openings that if partially or fully blocked by debris would require heavy equipment and personnel to clean out the hydraulic opening and maintain functional statue. For treatment cost estimates it would be up to two days cleaning out hydraulic openings of the culverts and bridges and likely require an excavator, dump truck, sawyer, swamper and laborer. Given the uncertainty of timing and emergency nature of responding a [redacted] mobilization cost was added to the cost estimate. Inspection by qualified persons, determination of effectiveness, coordination of treatment restoration. [redacted]

Storm Inspection with Heavy Equipment Response Costs			
Equipment/Worker	*Rate/Hr*	*Hrs*	*Costs*
Excavator	[redacted]	[redacted]	[redacted]
Dump Truck	[redacted]	[redacted]	[redacted]

Swamper	[redacted]	20	[redacted]
Laborer	[redacted]	20	[redacted]
Sawyer	[redacted]	20	[redacted]
	Subtotal =		[redacted]
[redacted]	Emergency Mobilization =		[redacted]
	Total =		[redacted]

Suiattle River BAER Assessment Area - USFS Treatment Schedule

Treatment	Unit	Unit Cost	Quantity	Cost
Storm Inspection & Response w/ Heavy Equipment - R3	EACH	[redacted]	2	[redacted]
		Suiattle BAER NF Totals =		[redacted]

Trail Drainage - RT1

Purpose of Treatment: Allow water to (1) sheet flow across the trail, and (2) where water does collect, to shed off the trail as soon as possible. Treatments are intended to minimize the time and distance that water spends on the trails by building features into the trail that shed the water. Where water flow over the trail cannot be avoided, armoring the trail will stabilize it and stop or slow down erosion. By doing these treatments, the trail prism will be protected from the increased hydrological response that is expected for post-fire storm events. Use rolling grade dips or knicks instead of waterbars. Good rolling grade dips can be built quicker than installing a waterbar, and a rolling grade dip works better.

General Description: Install drainage (Rolling Grade Dips/Grade reversals/Nicks) features where needed to stabilize trail. Install Waterbars only where necessary and then only Rock. Clean out existing waterbars. Armor drainage crossings. Re-establish trail bench/prism as needed. Remove hazard trees, where needed, for worker safety.

Location (Suitable) Sites: Boulder Lake Trail #740

Design/Construction Specification(s):

- If contracted out, line out work with agency trail expert. De-berm trail where needed, re-establish 5% Outslope, install knicks, and rolling grade dips; minimize waterbar use where grade reversal methods can be used. If waterbars must be used, use only rock. Clean out existing waterbars or replace with grade reversal methods. Armor drainage crossings where needed.
- Remove hazard trees, as needed, for worker safety.
- The second BAER assessment determined that the original BAER request of funding for 3 days of overtime labor funding was inadequate for constructing drainage features. The second BAER assessment is requesting an additional 7 days of overtime labor funding to make up for the original deficit, as well as funding work for the additional 0.2 miles of drainage work. [redacted] per mile for non-wilderness trails was used since you don't get the same economy of scale with 0.5 mile of trail like you would with more mileage.

Additional Unit Capacity Needs (e.g., detailers/seasonals/OT):			
Grade	Cost/ 10 hour day	Days needed	$
Recreation Program Manager Overtime (GS-9 in Seattle Locality)	[redacted]	1	[redacted]
Crew Leader Overtime (GS-7 in Seattle Locality)	[redacted]	1	[redacted]

Laborer Overtime (GS-5 in Seattle Locality)	[redacted]	1	[redacted]
Total funding requested:			[redacted]

Protection/Safety Treatments:

Install Road Hazard/Warning Signs - S1a

- Objective: Notify public of potential road hazards and unsafe conditions.
- Description: Install signs at Forest entry points and replace fire damaged warning signs. Cost includes ordering all material (sign panels, posts, wind bracing and connection hardware) plus time and equipment to install. [redacted]

Suiattle Fires BAER Assessment Area - USFS Treatment Schedule

Treatment	Unit	Unit Cost	Quantity	Cost Carson
Warning Sign - S1a	EACH	[redacted]	3	[redacted]
			Total =	[redacted]

Trail/Recreation Hazard Signs - S1b

Purpose of Treatment: The public needs to be made aware of the hazards associated with post-fire events, such as falling objects, hazard trees (especially during wind events), mud slides and rolling rocks (especially during heavy rain events), and potential for flooding (especially during heavy rain events). These hazard warning signs will inform the public, increase safety, and transfer responsibility of post-fire effects safety to the public.

General Description: Install hazard warning sign at recreation sites to inform the public of the hazards associated with post-fire events, such as falling objects, hazard trees (especially during wind events), mud slides and rolling rocks (especially during heavy rain events), and potential for flooding (especially during heavy rain events).

Location (Suitable) Sites: Signs warning the public of hazards should be applied at:

- Huckleberry Mountain TH (Suiattle River Fire)
- Boulder Lake TH to warn users "Burned Area, Flash Floods, Fallen Trees, Rock and Debris" because the trailhead and trail are adjacent to the burn.
- Signs warning the public of hazards should be applied at the entrance to Buck Creek CG, and the dispersed camping area across the creek from Buck Creek CG to warn users "Flash Flood Area, Fallen Trees, Rock and Debris" because these sites are not adjacent to the burn, but are at risk of flash flooding and debris flow.

Design/Construction Specification(s):

- Install hazard warning sign at each of the above listed recreation sites.
- Sink a U-channel post or Square tube post at the entrances to the listed sites. Place in conspicuous locations.
- Mount 12" X 10" Polyflex or Aluminum signs (with pre-drilled holes) to U-channel or Square tube posts. Use fender washers, if necessary, to prevent bolt head from pulling through sign during high wind events.
- Periodically check signs and maintain or replace as needed.

Signs to notify and warn the public of the hazards			

Rec site name	Sign number	Cost	Amount	$
Buck Creek CG	(FW8-14f) 48 X 24 – 4C- INCH LETTERS	[redacted]	1	[redacted]
Dispersed site on Buck Creek	(TFW8-14f) 14 X 8 – 1B-INCH LETTERS	[redacted]	1	[redacted]
Boulder Lake TH	(TFW8-14d) 12 X 10 – 1B-INCH LETTERS	[redacted]	1	[redacted]
Posts/Hardware		[redacted]		[redacted]
Overtime for coordination and install		[redacted]		[redacted]
Total funding requested:				[redacted]

1. P5. Hazardous Materials
   The vault toilets at Buck Creek CG at risk of flooding should be pumped. These toilets pose a potential risk to human health and safety if they flood because that would cause the hazardous materials in their vaults to overflow.

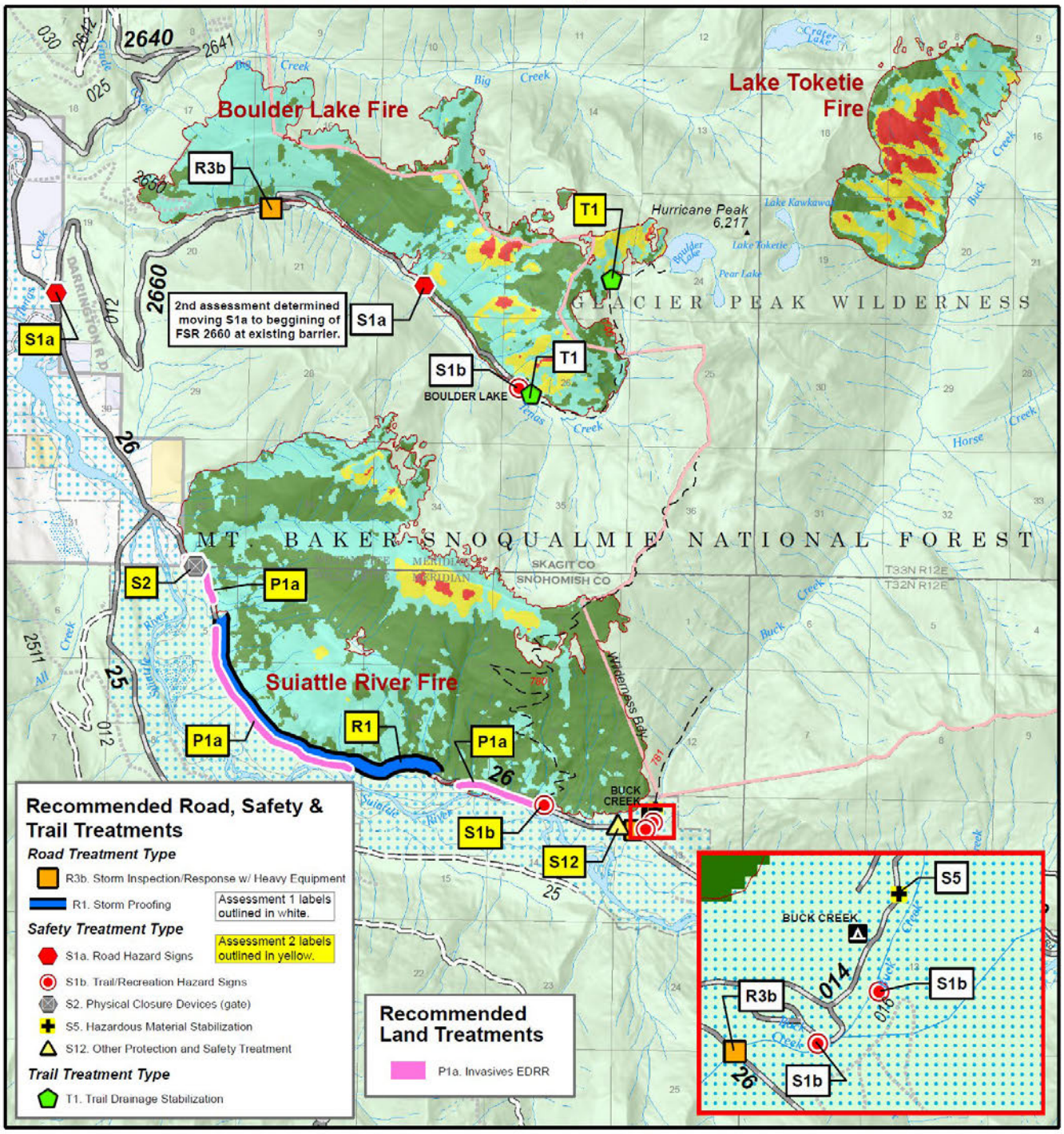
Additional Unit Capacity Needs (e.g. detailers/seasonals/OT):			
Grade	**Cost/ 10 hour day**	**Days needed**	**$**
Recreation Program Manager Overtime (GS-9 in Seattle Locality)	[redacted]	1	[redacted]
Other Materials and Services (including contracting costs):			
Item	**Cost/unit**	**Units needed**	**$**
Pit Toilet Pumping Contract	[redacted]	3	[redacted]
Total funding requested:			[redacted]

I. Monitoring Narrative: None

USDA Forest Service
U.S. DEPARTMENT OF AGRICULTURE
Mt. Baker-Snoqualmie National Forest | October 2022

Recommended Treatments - Suiattle River, Boulder Lake & Lake Toketie Fires

MBS BAER 2022 2nd Assessment - Mt. Baker-Snoqualmie National Forest



0 ½ 1 Miles

Fire Boundary
Campground
Trailhead
Trail
Paved Road
Gravel Road
Unimproved Roads
Closed Roads

Soil Burn Severity
Unburned
Low
Moderate
High
Wild and Scenic River
Forest Service Land
FS Wilderness Boundary

WASHINGTON
Skagit & Snohomish Counties

Date: 10/30/2022

USDA Forest Service Disclaimer

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PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS- Boulder Lake Fire

			NFS Lands			Other Lands				All
		Unit	# of		Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER $	$	units	$	Units	$	$
[redacted]										
						[redacted]				
[redacted]										
[redacted]										
				[redacted]						
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	[redacted]									
	[redacted]									

PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS- Lake Toketie Fire

			NFS Lands			Other Lands				All
		Unit	# of		Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER $	$	units	$	Units	$	$
[redacted]										
[redacted]										
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				[redacted]						
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[redacted]										

PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS- Suiattle River Fire

			NFS Lands				Other Lands				All
		Unit	# of		Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER $	$	units	$	Units	$	$
A[redacted]										
[redacted]										

PART VII - APPROVALS

1._____

Forest Supervisor Date