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 #___
☐ Updating the initial funding request based on more accurate site data or design analysis

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Loch Katrine

B. Fire Number: WA-MSF-000348

C. State: WA

D. County: King

E. Region: R6

F. Forest: Mt. Baker-Snoqualmie

G. District: Skykomish Ranger District

H. Fire Incident Job Code: [redacted]

I. Date Fire Started: 9/1/2022

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

K. Suppression Cost: [redacted]

L. Fire Suppression Damages Repaired with Suppression Funds (estimates):
1. **Fireline repaired (miles): 0 miles dozer and handline on NF lands**
2. **Other (identify):**

M. Watershed Numbers:

Table 1: Acres Burned by Watershed

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
1711001001	N.F. Snoqualmie River	65,908	1,918	3%
171100100102	Sunday Cr-NF Snoqualmie River	14,534	1,123	8%
	Hancock Cr NF Snoqualmie River	22,757	795	3%

N. Total Acres Burned:

Table 2: Total Acres Burned by Ownership

OWNERSHIP	ACRES
NFS	948
OTHER FEDERAL (LIST AGENCY AND ACRES)	0
STATE	0
PRIVATE	970
TOTAL	1,918

O. Vegetation Types: Pacific silver fir (51%), western hemlock (24%) and mountain hemlock (22%), with minor occurrences of Sitka spruce, subalpine fir-Engelmann spruce, white fir-grand fir, Douglas-fir and non-forest meadows.

P. Dominant Soils:
Nagrom-Rock outcrop complex (30%)
Playco loamy sand (16%)
Kaleetan sandy loam (14%)
Rock outcrop-Haywire complex (11%)
Nagrom sandy loam (10%)
14 other map units (19%)

Q. Geologic Types:
Mount Persis volcanic rocks (56%)
Index Batholith Sunday Creek stock (24%)
western melange belt K-feldspar sandstone (14%)
5 other map units (6%)
Dominant rock types are volcanics (andesites and pyroclastic and intrusive granitics. Landscapes within the burned area were formed primarily from glacial scour and deposition. Volcanic ash occurs sporadically across the mountain ranges and seldom exceeds one inch in depth.

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	15.63
INTERMITTENT	15.29
EPHEMERAL	0
OTHER (DEFINE)	0

S. **Transportation System:**
Trails: *National Forest (miles):* 0.01 *Other (miles):*
Roads: *National Forest (miles):* 0.0 *Other (miles):*

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

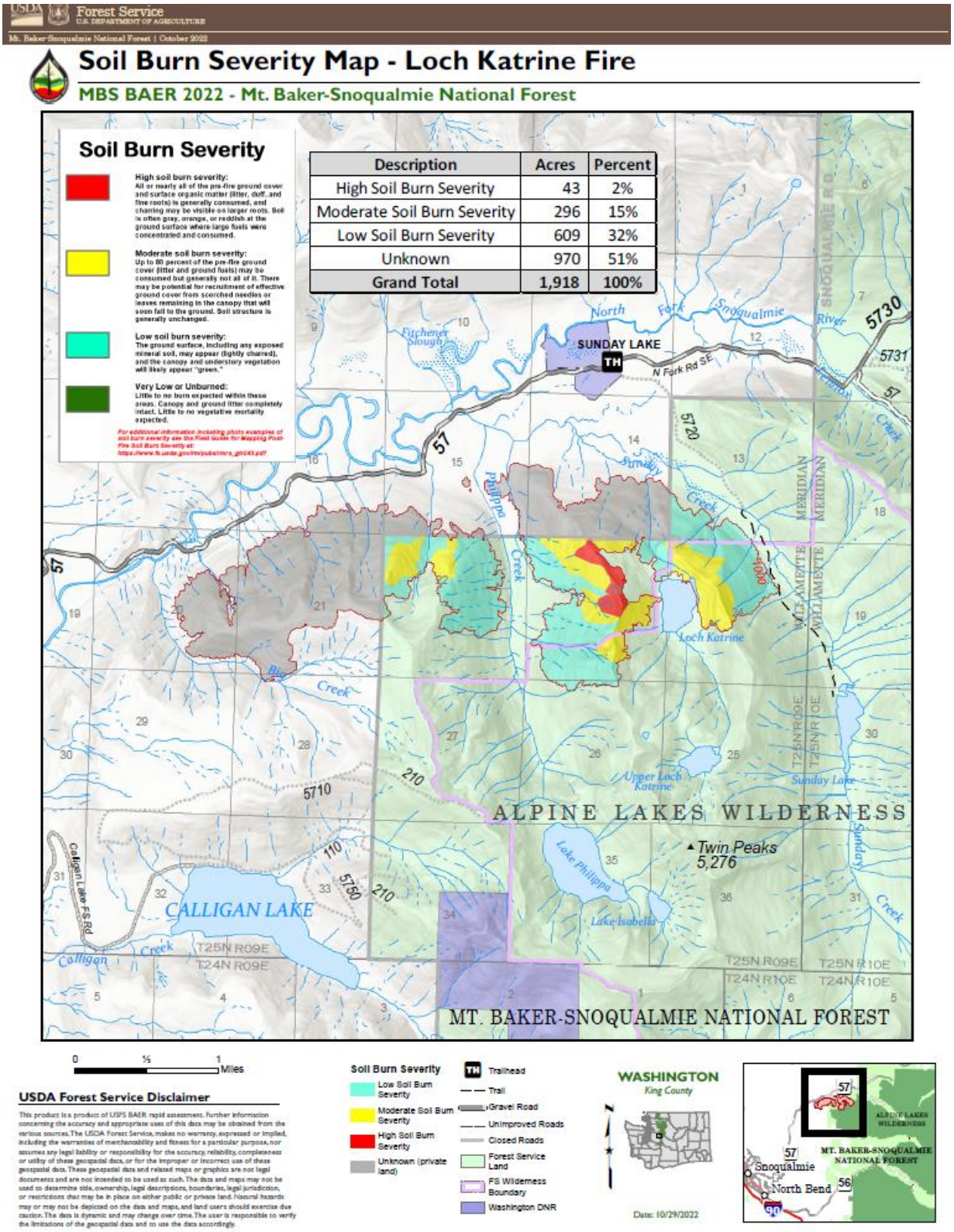


Table 4: Burn Severity Acres by Ownership

Soil Burn Severity	NFS	% NFS lands in Fire Perimeter	Other Federal (List Agency)	State	Private	Total	% within the Fire Perimeter
Not Classified	0	0	--	--	970	0	51%
Low	609	64%	--	--	--	609	32%
Moderate	296	31%	--	--	--	296	15%
High	44	5%	--	--	--	44	2%
Total	948	100%	--	--	970	1,918	100%

B. Water-Repellent Soil (acres): 192 (20% of NFS lands)
Natural or inherent water repellency is estimated to be discontinuous based on medium to coarse textured surface soils and volcanic ash. With the absence of moderate and high SBS conditions, post-fire water repellency is not predicted to noticeably increase over background, unburned conditions. Where it does occur, fire-induced surface repellency is expected to be temporary, breaking up within 1-2 years and decreasing toward natural levels.

C. Soil Erosion Hazard Rating:

SEH	Pre-fire Acres	Pre-fire Percent	Post-fire Acres	Post-fire Percent	Acre Gain/Loss
L	356	38	350	37	-5
M	137	14	143	15	+5
H	455	48	455	48	0
Total Acres	**948**		**948**		

D. Erosion Potential: range is estimated at 44 to 93 tons/acre based on SBS.

E. **Sediment Potential:** 29 to 49 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 eroded soil potentially delivered as sediment to nearest 1st order channel).

F. Estimated Vegetative Recovery Period (years): This is the period of time, in years, for vegetation to develop across the burned area that would reduce runoff and erosion to essentially prefire conditions.

	Burn Severity		
Vegetation Cover Type	Low	Moderate	High
Non-forest grasses & shrubs	0-1	2-3	5+
High-density Mixed Conifer Forest (early seral)	0-3	1-5	1-10
High-density Mixed Conifer Forest (mid seral)	1-5	1-10	20+
High-density Mixed Conifer Forest (late seral)	1-10	10-50	100+

G. Estimated Hydrologic Response (brief description):
The Loch Katrine fires are within the North Fork Snoqualmie River HUC 10 watershed; percent area burned is 3%. Within that watershed, the fires cross two subwatersheds with a range of 3-8% burned. Those subwatersheds include the Sunday Creek-North Fork Snoqualmie River located within the North Fork Snoqualmie River watershed. Increased discharge from post fire storm events was calculated using mean annual precipitation and the USGS Regression equations for ungagged streams in Washington. We calculated increased peak-flow discharge for a 2-yearstorm 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, just as the first BAER analysis had done for the Bolt and Suiattle fires. The estimated post-fire discharge for both subwatersheds show minimal changes to discharge. The highest increase of discharge is within the Sunday Creek-North Fork Snoqualmie River subwatershed, however it is only estimated to have an increase of 1.1 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):
Given the remote location of this fire the critical values identified during the BAER assessment that have potential to be at risk as defined in FSM 2523.1 only include natural resources (plant communities). The BAER team evaluated the risk to this critical value in accordance with the Interim Directive No. 2520-2019 by using the BAER risk assessment. A 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	[redacted]	Debris Flows and runoff	Unlikely	Low soil burn severity above site	Moderate	Low chance of runoff hitting site	Low	No Treatments	No Treatments
BAER critical value	Life and Safety	Sunday Lake Trail #1000	Debris Flows and runoff	Possible	Small amount of moderate-SBS burned hillslopes above	Minor	Trail is flat and any material would go over the trail rather than down it.	Low	No Treatments	No Treatments
BAER critical value	Natural Resources - Soil and Water	Soil Productivity	Direct threat is accelerated soil erosion with increased sediment delivery from loss of organic soil cover and inherent water repellency. Soil erosion and sediment delivery are potential threats to other values.	Possible	Post-fire impacts to soil productivity generates a Low Risk. As such, soil erosion is not expected to not result in irreversible impacts to soil productivity and natural recovery is the recommended post-fire treatment for this BAER Critical Value.	Minor	Approximately 17% of the Loch Katrine fire is moderate or high SBS. The Low Risk was driven primarily by field data and observations that focused on the components leading to the Final SBS. The immeasurable changes in post-fire water repellency, surface erosion hazard and erosion-sediment potential support a Minor Risk rating.	Low	G1. Mulching, G3. Soil amendments	Natural recovery due to absence of emergency conditions.
BAER critical value	Natural Resources - Soil and Water	Water Uses - Private Water Supply	Erosion and transport of soils, ash, and/or debris into the NF Snoqualmie and its tributaries effected by increased post-fire flows.	Possible	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	Minor and localized sediment effects from erosion and debris flows.	Low	No Treatments	Coordinate with local agencies and municipalities to share data on post-fire effects.
BAER critical value	Natural Resources - Soil and Water	Water Quality/Hydrologic Function	Post-fire seasonal sediment increases, ash, nutrient loading and/or other debris	Unlikely	Based on soil burn severity and peak flow modeling, increased discharge and sedimentation will occur and lessen naturally over-time.	Minor	Hydrologic function expected to recover naturally over time and re-establishment of native vegetation to replace ground cover.	Very Low	Road Treatments	See road Treatments. No individual channel treatments identified. Displacement of soils will be localized and recoverable.
BAER critical value	Natural Resources - Native Plants	Native or Naturalized plant communities	Invasive plant establishment in areas of high burn severity from dozerlines	Possible	There are no known surveys or invasive plant occurrences in the burned area. Species brought in by equipment could rapidly colonize in bare soil in moderate/high severity 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	Intermediate	No Treatments	No Treatments

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
							plants prevent native forage and pollinator habitat from developing. T			
BAER critical value	Natural Resources - Native Plants	Suppression Repair- Prevention of invasive plants in intact forest communities	Invasive plant colonization of areas disturbed by suppression	Likely	Clearing fire lines and exposed mineral soil, creating ideal conditions for new infestations to establish. Suppression and repair equipment and personnel likely moved seeds from known and unmapped populations to the newly disturbed areas.	Moderate	Considerable long-term effects to intact native plant communities. The magnitude of consequence to invaded plant communities is very high, especially in areas with very low overstory canopy closure. Native plant communities and ecosystem functions are very difficult to restore once invasive plants are established. The optimal plan is to remove the first invading plants before a new population can establish.	High	P1b. Invasives EDRR - Suppression	Invasives EDRR - Suppression
BAER critical value	Property - Trails	Sunday Lake Trail Bridge on Tributary	Debris Flows and runoff	Unlikely	Majority of drainage outside of fire	Minor	Very low risk of debris flow and runoff	Very Low	No Treatments	No Treatments
BAER critical value	Property - Trails	Sunday Lake Trail #1000	Debris Flows and runoff	Possible	Small amount of moderate-SBS burned hillslopes above	Minor	Trail is flat and any material would go over the trail rather than down it.	Low	No Treatments	No Treatments

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 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: 85%
Channel: NA
Roads/Trails: NA
Protection/Safety: NA

D. Probability of Treatment Success

Table 6: Probability of Treatment Success

	1 year after treatment	*3 years after treatment*	*5 years after treatment*
Land	85	75	75
Channel	N/A	N/A	N/A
Roads/Trails	N/A	N/A	N/A
Protection/Safety	N/A	N/A	N/A

E. Cost of No-Action (Including Loss): There is no market value for the loss of native and naturalized communities.

F. Cost of Selected Alternative (Including Loss): There is no market value for the loss of native and naturalized communities.

G. Skills Represented on Burned-Area Survey Team:

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

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	**Team Member Name**
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)
PIO	Christine Pyle

H. Treatment Narrative:

Land Treatments:
Suppression EDRR

Purpose of Treatment: To respond to the potential for rapid invasion of invasive plants into native plant communities on the MBS. EDRR is prescribed in order to mitigate long term impacts to native plant communities within and in the vicinity of the fire's boundaries. The purpose of treatments is to promote native plant establishment and proliferation by removing or preventing competition from invasive plant populations.

General Description: Invasive plant detection surveys and treatments – Detection surveys for Mt. Baker-Snoqualmie National Forest (MBS) high priority invasive plants will occur along ground-disturbed suppression lines on National Forest System lands. 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 new invaders that were either introduced during suppression actions or established as a result of bare ground created by suppression actions. Treating suppression lines would reduce the likelihood of introduced plants establishing and moving into burned areas. BAER funding authorization will be used to meet EDRR objectives during the spring and summer of FY23.

Location (Suitable) Sites: Two suppression lines totaling approximately 1.13 miles (3.63 acres) in length across NFS lands would receive detection surveys and subsequent treatments. These lines are all decommissioned or closed roads that were re-opened and access improved to assist in firefighting operations. A GIS layer of suppression lines needing surveys can be found in the BAER Assessment's T drive folder.

Design/Construction Specification(s): Detection surveys entail hiking suppression lines and identifying all plant species that have germinated or are growing within the area of disturbance. Plants confirmed to be on the MBS's high priority list will be treated on the spot. 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. Due to locked gates for Snoqualmie Timber and Campbell Global it is difficult to access to national forest lands within the burn. As a result, extensive hiking multiple times over the summer is required by the SCA field crew. SCAs are being hired because the forest doesn't have seasonal staff. SCA require a per diem, housing, and stipend which is factored into the overall costs.

Channel Treatments: None

Roads and Trail Treatments: None

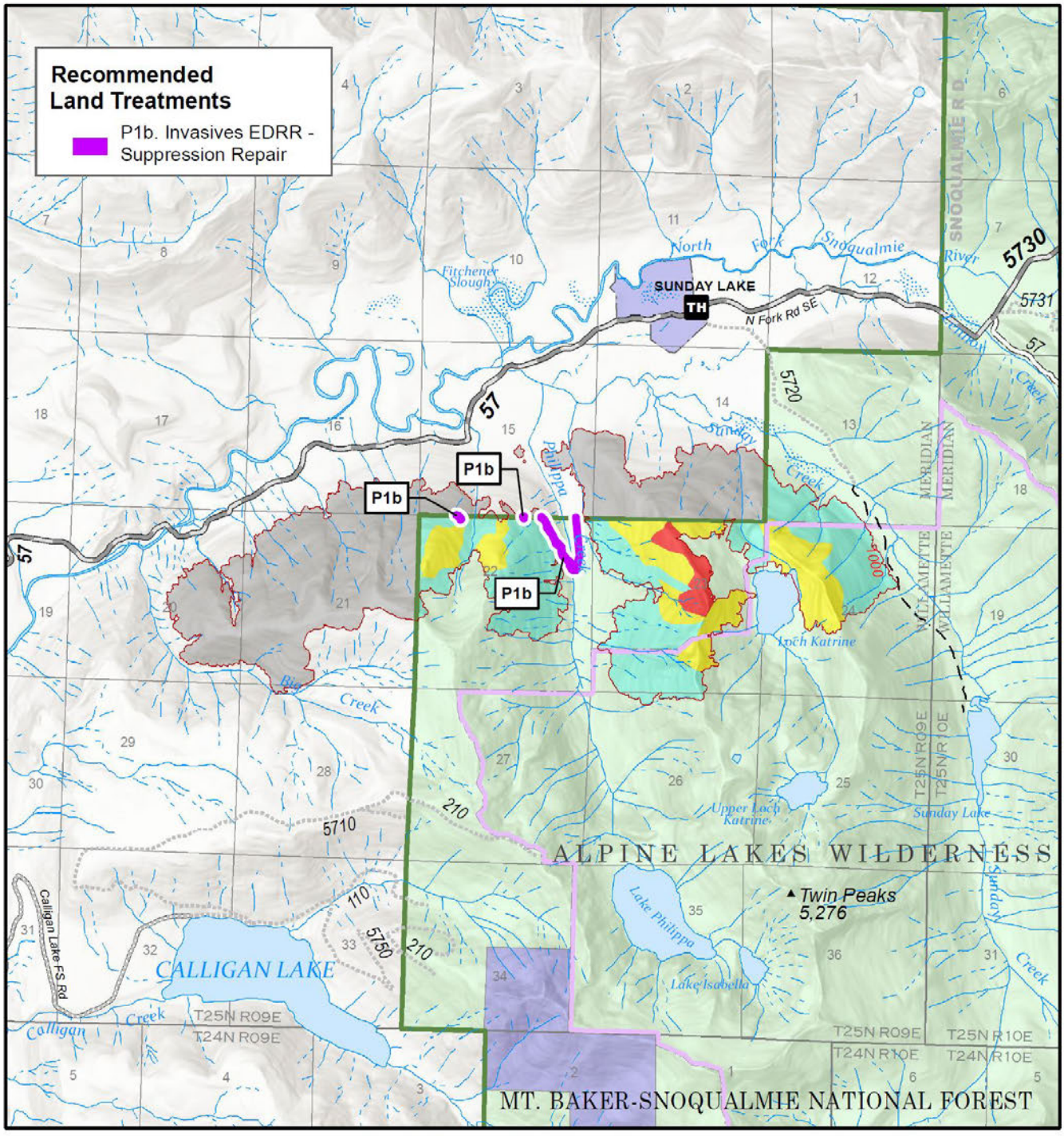
Protection/Safety Treatments: None

I. Monitoring Narrative: None

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

Recommended Treatments - Loch Katrine Fire

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



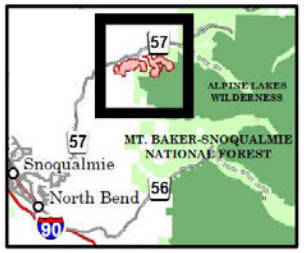
0 ½ 1 Miles

Soil Burn Severity
- Low Soil Burn Severity
- Moderate Soil Burn Severity
- High Soil Burn Severity
- Unknown (private land)

- Trailhead
- Trail
- Gravel Road
- Unimproved Roads
- Closed Roads
- Forest Service Land
- FS Wilderness Boundary
- Washington DNR

WASHINGTON
King County

Date: 10/30/2022



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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]										
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PART VII - APPROVALS

1. ____

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