Date of Report: 10/14/2021

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: Bull Complex

B. Fire Number: OR-MHF-000753

C. State: Oregon

D. County: Clackamas & Marion

E. Region: Pacific Northwest (06)

F. Forest: Mt Hood (06) & Willamette (18)

G. District: Clackamas River and Detroit Ranger Dists. (05 & 04 respectively)

H. Fire Incident Job Code: P6N7RD21

I. Date Fire Started: 8/2/2021

J. Date Fire Contained: N/A

K. Suppression Cost: $33,428,367 (as of 10/7/2021),

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

1. **Fireline repaired (miles):** Total = 5 mi. (dozer line = 3 mi, handline = 2 mi.)
2. **Other (identify):** Completed road as line = 9 mi.

M. Watershed Numbers:

Table 1: Acres Burned by HUC-12 SubWatershed

HUC#	HUC 12 Subwatershed Name	Total Acres	% of Subwatershed Burned	Subwatershed Outside the Fire Perimeter	Soil Burn Severity							
					Unburned or Underburned		Low		Moderate		High	
					Acres	%	Acres	%	Acres	%	Acres	%
170900050103	Humbug Creek	10,391	22%	8,067	420	4%	1,524	15%	353	3%	27	0%
170900050501	Opal Creek	12,102	0.1%	12,085	6	0%	10	0%	1	0%	0	0%
170900110101	Upper Hot Springs Fork	10,217	8%	9,377	222	2%	450	4%	141	1%	27	0%
170900110103	Lower Hot Springs Fork	18,272	3%	17,674	142	1%	370	2%	83	0%	3	0%
170900110104	Elk Lake Creek	17,181	79%	3,604	2,482	14%	8,347	49%	2,442	14%	306	2%
170900110105	East Fork Collawash River	10,395	41%	6,091	1,402	13%	2,465	24%	260	3%	178	2%
170900110106	Happy Creek-Collawash River	14,533	26%	10,688	1,277	9%	2,146	15%	382	3%	41	0%
170900110201	Cub Creek	14,883	1%	14,690	56	0%	132	1%	4	0%		0%
170900110203	Lowe Creek-Clackamas River	19,729	3%	19,187	105	1%	412	2%	24	0%	2	0%
	Grand Total	**127,704**	**21%**	**101,462**	**6,113**	**5%**	**15,855**	**12%**	**3,689**	**3%**	**584**	**0%**

N. Total Acres Burned:

Table 2: Total Acres Burned by Ownership

OWNERSHIP	ACRES
NFS	26,242
OTHER FEDERAL (LIST AGENCY AND ACRES)	0
STATE	0
PRIVATE	0
TOTAL	26,242

O. Vegetation Types: Dominantly dense conifer forest cover types interspersed with small patches of wetlands, dry meadows, high-elevation alpine scrub, and larger previously burned-over areas comprised of woody brush and fire-killed snags. Potential vegetation types comprised primarily of western Hemlock and Pacific Silver fir zones and a lesser extent of the Mountain hemlock zone. Forest structure comprised of old growth and large late-seral unmanaged stands, mid-seral stands of fire origin, and previously burned over young-seral sapling. Also present to a lesser extent are managed stands and plantations in the young-seral, stem exclusion stage as well as early- to mid-seral pole size stands; some of which have been recently thinned.

P. Dominant Soils: Soils formed from glacial till and colluvium of igneous and pyroclastic parent material, including large ancient landslide deposits (earthflow features). Dominantly well drained, very rocky andisols and inceptisols with a udic moisture regime and frigid and cryic temperature regimes. Slopes are moderately steep to very steep. Soil depths vary primarily from shallow to moderately deep, though earthflow soils are typically deep. Dominant soil textures consist of sandy loam, loams, and some silt loams.

Q. Geologic Types: Generally, a complex of alternating sequences of weathered pyroclastic formations (conglomerates, tuffs, and lahars) and igneous (andesite, dacite, basalt) flow rocks. Documented formations include the Little Butte volcanics that intermix or underlie locally the Sardine formation. Includes the intrusive complex of the Bull-of-the-Woods that infused into the Sardine formation.

R. Miles of Stream Channels by Order or Class:

Table 3: Miles of Stream Channels by Order or Class

Stream Type	Soil Burn Severity				Grand Total
	Unburned or Underburned	Low	Moderate	High	
Perennial	23	36	6	0	65
Intermittent	38	65	12	3	118
Artificial Path	2	1	0		2
Grand Total	**63**	**101**	**18**	**4**	**186**

S. Transportation System:
Trails:

Table 4: Trail Miles by Burn Severity, Forest, and Wilderness Designations

National Forest and Wilderness Designation	Soil Burn Severity				Grand Total
	Unburned or Underburned	Low	Moderate	High	
Mt. Hood National Forest	***12.10***	***19.40***	***5.75***	***1.09***	***38.34***
Non-Wilderness	1.76	3.04	0.27		5.07
Bull of the Woods Wilderness	10.34	16.37	5.48	1.09	33.27
Opal Creek Wilderness		0.00			0.00
Willamette National Forest	***0.63***	***0.67***			***1.30***
Bull of the Woods Wilderness	0.45	0.55			0.99
Opal Creek Wilderness	0.18	0.12			0.30
Grand Total	**12.73**	**20.07**	**5.75**	**1.09**	**39.64**

Roads: *National Forest (miles):* *Other (miles):*

Table 5: Road Miles by Burn Severity and Forest

Soil Burn Severity	Mt. Hood NF	Willamette NF	Total Miles
Unburned or Underburned	11	6	17
Low	5	6	10
Moderate	0	0	0
High	0		0
Grand Total	**16**	**12**	**28**

PART III - WATERSHED CONDITION

A. Soil Burn Severity (acres):

Table 6: Soil Burn Severity Acres by Forest and Wilderness Designations

Soil Bun Severity	Mt. Hood National Forest			Willamette National Forest				Grand Total
	Bull of the Woods Wilderness	Non-Wilderness	Total	Bull of the Woods Wilderness	Opal Creek Wilderness	Non-Wilderness	Total	
Unburned or Underburned	4,314	1,212	5,526	112	6	468	587	6,113
Low	11,576	2,352	13,928	268	10	1,648	1,927	15,855
Moderate	3,065	233	3,298	4	1	386	391	3,689
High	514	40	554		0	30	30	584
Grand Total	**19,470**	**3,837**	**23,307**	**385**	**17**	**2,533**	**2,935**	**26,242**

B. **Water-Repellent Soil (acres):** About 42% of the field samples exhibited hydrophobic tendencies. Strong repellency at the surface was detected where soils were dry in low SBS and unburned. Weak or no repellency was observed where soils at the surface had been wetted by recent rains in low and moderate SBS.

C. Soil Erosion Hazard Rating: See Soil Erosion Index map

D. **Erosion Potential:** Estimates using the ERMiT model/tool concluded that following the first 5 years after the fire hillslope erosion could be increased to about 14 tons/ac on average where SBS was moderate to high.

E. **Sediment Potential:** Maximum model outputs of erosion and sedimentation amounted to 30,833 cu. yds./sq. mi. This amount is believed to be over-estimated, but it could represent a reasonable expectation of the response to a 5-year intense storm or heavy rain-on-snow event compared to pre-fire conditions.

F. Estimated Vegetative Recovery Period (years): Based upon nearby burned over fire scars from 2020, 2015, 2014, and 2011 effective ground cover exceeding 60% reestablishes within 2-3 years.

G. Estimated Hydrologic Response: Fire effects on peak streamflow were estimated for the watershed- and subwatershed- scale (10^{th} & 12^{th}-field hydrologic units), and the catchment-scale (14^{th}-field hydro unit) using the Wildcat5 Rainfall-runoff Hydrograph model (Hawkins and Barreto-Munoz, 2016). Model estimates on an area-weighted average indicated an approximate 72% increase in the 5-year peak streamflow event for the 12-field hydrologic units impacted by the fire. The Dicky Creek and Elk Lake Creek drainages exhibited the greatest modeled increases of 109 and 85 percent respectively. At the 10th-field, or watershed scale, modeling outputs indicated that the 5-year peak flow for the Collawash river at its mouth would be increased above pre-fire conditions by an estimated 4%.

PART V - SUMMARY OF ANALYSIS

Introduction/Background

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

Table 7: 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**

1. **Human Life and Safety (HLS):**
   Roads – On average, tree mortality adjacent to road segments where SBS is moderate to high is greater than 50%. Imminenet hazrd trees are abundant, posing a risk to human life and safety.

   - Probability = Possible, Magnitude of Consequences = Major, Risk = Very High
   - Unacceptable risk, treatment justified to mitigate risk

   Trails – Tree mortality along trail segments where SBS is moderate to high and tree mortality is greater than 50% have anabundance of imminent hazard trees.
   - Probability = Possible, Magnitude of Consequences = Major, Risk = Very High
   - Unacceptable risk, treatment justified to mitigate risk

   Municipal Watershed – The Clackamas basin serves as a drinking water source for over a half-million residents of Portland suburbs. Increased runoff and sedimentation from steep slopes where SBS is moderate to high could be expected to potentially cause some increase in turbidity that impacts drinking water quality. Post-fire ash and nutrients could impact disinfection and water treatment effectiveness.
   - Probability = Likely, Magnitude of Consequences = Minor, Risk = Low
   - No treatment needed. Dilution factor from many downstream inputs, water treatment practices, and existing water quality monitoring mitigate the potential post-fire effect. *Communication to water providers to convey assessment findings recommended.*

2. **Property (P):**

Roads – Few road segments are located within the fire perimeter. Most are within low SBS. No culverts or drainage structures identified as threatened. Single, short segment of the 6370 could be damaged by falling fire-killed trees.

- Probability = Possible, Magnitude of Consequences = Minor, Risk = Low
- No treatment(s) needed.

Bridges – There are two road bridges over the East Fork of the Collawash river on FSR 6380 that are surrounded by burned over lands and on the edge of the fire perimeter.

- Probability = Unlikely, Magnitude of Consequences = Moderate, Risk = Intermediate
- No treatment(s) needed.

Trails – Tree mortality along trail segments where SBS is moderate to high and tree mortality is greater than 50% have an abundance of fire killed trees. Erosion risk where slopes are steep is high (see Map of Erosion Risk Index)

- Probability = Very Likely, Magnitude of Consequences = Moderate, Risk = Very High
- Unacceptable risk, treatment justified to mitigate risk

3. Natural Resources (NR):

Invasive Plants, Native Vegetation, TES/S&M Plants – Existing infestations of St. Johnswort, Scotch broom, Tansey Ragwort, Smooth brome, and Canadian thistle are documented within near proximity of the fire footprint that have been disturbed by fire suppression actions and the fire itself outside of the wilderness, particularly where SBS is moderate to high. The disturbed areas would be vectors for increasing the extent of infestation, potentially into the wilderness and beyond, increasing competition that could result in an irreversible loss of habitat.

- Probability = Very Likely, Magnitude of Consequences = Major, Risk = Very High
- Unacceptable risk, treatment justified to mitigate risk

Special Habitats & Sugar Pine Botanical Area – Same as invasive plants. SBS around these sites is mostly low, though canopy mortality around some is greater than 50%. Native seed sources remain as do live seed bank in soil. Natural regeneration potential and resilience is considered low to moderate due to the presence of white pine blister rust.

- Probability = Possible, Magnitude of Consequences = Minor, Risk = Low
- No treatment(s) needed

Soil Productivity – Burned over terrain is dominantly categorized as unburned or low SBS. Moderate and high SBS amounts to about 16% of the total fire area. Steep slopes coupled with Moderate and high SBS are prone to accelerated erosion (see Soil Erosion Index Map) and loss of long-term soil productivity. Resilience of soils inherently high supported by annual rainfall averaging greater than 60 in./yr. Effective ground cover expected to naturally recover and exceed 60% within 2-3 years. Living underground biota, fine roots, viable seed bank, & rhizomes present near or within soil surface.

- Probability = Possible, Magnitude of Consequences = Minor, Risk = Low
- No treatment(s) needed

TES Fish – Distribution of listed salmon and steelhead habitat extends into the fire perimeter or is immediately downstream. Sedimentation from moderate and high SBS could negatively impact spawning beds and water quality, potentially diminishing local population viability.

- Probability = Likely, Magnitude of Consequences = Minor, Risk = Low
- No treatment(s) needed

TES Wildlife – A total of about 21,294 acres of suitable Northern Spotted owl (NSO) habitat was burned over. Areas (~7,019 acres) where the canopy was reduced greater than 50% by fire induced tree mortality has resulted in a loss of highly suitable and suitable habitat for the long-term. Locally,

21 documented territories were impacted to varying degrees. Viability of known or historic nest sites in some has been diminished.

- Probability = Very Likely, Magnitude of Consequences = Moderate, Risk = Very High
- No viable treatment(s) to prescribe would be effective to mitigate effects. *Emergency consultation may be warranted. Further analysis recommended.*

Wild & Scenic River Designation – The East Fork of the Collawash has been designated a Wild and Scenic River. Outstanding Remarkable Values for this river segment include a Special Status Plant & geology. Fire effects to ORVs however, is considered minimal. A small proportion of the overall available habitat for the plant has been impacted where SBS is moderate to high but the effects are localized and potentially recoverable.

- Probability = Likely, Magnitude of Consequences = Minor, Risk = Low
- No treatment(s) needed

Wilderness Designation – Wilderness values and enforcement of regulation could be threatened by encroachment of non-wilderness, motorized users. There may become a need for more frequent short-term regulated use and waivers to address fire related damages to trails and back country camping sites.

- Probability = Possible, Magnitude of Consequences = Moderate, Risk = Intermediate
- Possible treatment(s) or monitoring needed

4. Cultural and Heritage Resources:

The need for protecting heritage or cultural resources is not concluded to be needed.

Willamette National Forest

	Site Number / Site Type	Risk	Probability of damage or loss	Magnitude of consequences	Burn severity	Slope Percentage	Landform	Upstream Contribution
1	**35MA021** Lithic Scatter	Low	Unlikely	Moderate	Unburned	29	Upper slope, mesa	Low
2	**35MA068** Lithic Quarry	Very Low	Unlikely	Minor	Low	40	Ridge	Low
3	**35MA072** Lithic Scatter	Very Low	Unlikely	Minor	Low	32	Upper slope, mesa	Low
4	**35MA312** Mining Complex	Low	Unlikely	Moderate	Unburned	73	Upper Slope / Ridge	Low
5	**35MA372** Historic Trail	Low	Unlikely	Moderate	Low	11	Upper Slope / Ridge	Low

Mt. Hood National Forest

	Site Number / Site Type	Risk	Probability of damage or loss	Magnitude of consequences	Burn severity	Slope Percentage	Landform	Upstream Contribution
6	**663NA042** Rock Features	Intermediate	Unlikely	Major	Low	40	Ridge	Low
7	**663NA104** Lithic Scatter	Very Low	Unlikely	Minor	Low	15	Plain, small	Moderate
8	**663EA212** Sheep Camp	Low	Unlikely	Moderate	Unburned	19	Upper slope, mesa	Low
9	**663EA221** Lookout	Low	Unlikely	Moderate	Unburned	47	Ridge	Low
10	**665NA021** Lithic Scatter	Very Low	Unlikely	Minor	Unburned	18	upland drainage, headwaters	Low
11	**665EA144** BOW Lookout	Very Low	Unlikely	Minor	Moderate	55	Ridge	Low

12	**665NA179** Lithic Scatter	Very Low	Unlikely	Minor	Low	53	Upper slope, mesa	Low
13	**665NA180** Lithic Scatter	Very Low	Unlikely	Minor	Low	40	Midslope drainage, shallow valley	Moderate
14	**665NA182** Lithic Scatter	Very Low	Unlikely	Minor	Unburned	25	Midslope drainage, shallow valley	Moderate

B. Emergency Treatment Objectives:

Protect and mitigate unacceptable risks to life and property. Place warning signs at designated locations on roads and at trailheads. Prevent access to the Bull-of-the-Woods Wilderness until trail repair can be completed. Block access to a single road segment to mitigate risk of imminent hazard trees.

Conduct EDRR where vectors for the expansion of invasive species have been increased or enhanced to ameliorate the risk.

C. Probability of Completing Treatment Prior to Damaging Storm or Event:
Land: Invasive plants: Low
Channel: NA
Roads/Trails: Low
Protection/Safety: High

D. Probability of Treatment Success

Table 4: Probability of Treatment Success

	1 year after treatment	***3 years after treatment***	***5 years after treatment***
Land	Low	High	
Channel	NA		
Roads/Trails	Low	High	
Protection/Safety	High		

E. Cost of No-Action (Including Loss): NA

F. Cost of Selected Alternative (Including Loss): $228,368. (see Section 6 – List and Cost of Prescribed Treatments)

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Todd Reinwald
Email: todd.reinwald@usda.gov **Phone(s)** 503.668.1769 offc, 971.325.5153 cell

Forest BAER Coordinator: same as team leader
Email: **Phone(s):**

Team Members:*Table 5: BAER Team Members by Skill*

Skill	**Team Member Name**
Team Lead(s)	Todd Reinwald
Soils	Ut Huynh
Hydrology	Todd Parker
Engineering	Pete Huppi, Aaron Lamp
GIS	Dolores Weisbaum

Skill	Team Member Name
Archaeology	Trent Skinner
Weeds	Lin Kyan
Recreation	Jody Matz
Other	

H. Treatment Narrative:

Land Treatments: Invasive Plants: Conduct EDRR where vectors for the expansion of invasive species have been increased or enhanced to ameliorate the risk. These include areas where suppression activities disturbed documented sites where invasive plants grow, areas where moderate and high SBS are adjacent to, and threaten native vegetation and wilderness. Existing treatment contracts and agreements with local county and SWCD to be utilized.

Channel Treatments: NA

Roads and Trail Treatments: Stabilize segments of trails identified for high risk of damage from accelerated erosion, heightened runoff, flooding, and fire-killed trees. Costs include signs, posts, hardware, concrete, and installation.

Protection/Safety Treatments: Install warning signs for future public use when area closures are lifted that warn of fire related hazards. Temporarily close roads and trails to all public access until imminent hazards of fire-killed trees is either ameliorated or considered to have diminished to pre-fire inherent background levels in time.

Sign costs include shipping, signs, posts, hardware, concrete, and installation/labor. Gate costs include fabrication, shipping, hardware, concrete, gate signs, and installation/labor.

I. **Monitoring Narrative:** Post-fire following year monitoring of invasive species threats to facilitate early detection and initiate a rapid response would occur. Post-treatment monitoring could be expected to evaluate invasive treatment effectiveness.

Monitoring for indicators of wilderness and area closure encroachment would take place during trail repair and stabilization projects, annual road/trail maintenance, routine field & wilderness patrol, and visitor use monitoring. Personnel funds would be covered by budgeted fixed cost salary funds from regular appropriations.

PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS

Line Items	Units	Unit Cost	# of Units	BAER $	Other $	# of units	Fed $	# of Units	Non Fed $	Total $
A. Land Treatments										
P1a. EDRR Invasive	ac	358	53	$18,974	$0		$0		$0	$18,974
P2b. EDRR Invasive (suppre	ac	168	508	$85,344	$0		$0		$0	$85,344
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$104,318	$0		$0		$0	$104,318
B. Channel Treatments										
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Channel Treatments				$0	$0		$0		$0	$0
C. Road and Trails										
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road and Trails				$0	$0		$0		$0	$0
D. Protection/Safety										
S1a. Road Hazard signs	ea	700	10	$2,500	$0		$0		$0	$2,500
S1b. Trail Hazard signs	ea	385	30	$11,550						$11,550
S2. Road gates	ea	20,000	1	$20,000						$20,000
S2. Road gates	ea	15,000	6	$90,000	$0		$0		$0	$90,000
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Protection/Safety				$124,050	$0		$0		$0	$124,050
E. BAER Evaluation										
Initial Assessment	Report			---	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				---	$0		$0		$0	$0
Subtotal Evaluation				$0	$0		$0		$0	$0
F. Monitoring										
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring				$0	$0		$0		$0	$0
G. Totals				$228,368	$0		**$0**		**$0**	**$228,368**
Previously approved										

PART VII - APPROVALS

1. Meta Loftsgaarden Digitally signed by Meta Loftsgaarden Date: 2021.10.22 09:59:07 -07'00' 10/22/2021

Mount Hood Forest Supervisor Date

2. David M. Warnack 10/15/2021

Willamette Forest Supervisor Date