

A. Fire Name: Bull of the Woods

B. Fire Number: OR-MHF-000233

C. State: Oregon

D. County: Clackamas

E. Region: 6

F. Forest: Mt. Hood National Forest

G. District: Clackamas River

H. Fire Incident Job Code: P6FR3R

I. Date Fire Started: 8/17/2010 (lightning)

J. Date Fire Contained: 10/12/2010
(declared contained on 11/2/10)

K. Suppression Cost: \$ 4,570,430

L. Fire Suppression Damages Repaired with Suppression Funds

1. Fireline waterbarred (miles): none
2. Fireline seeded (miles): none
3. Other (identify):

M. Watershed Number: Collawash River (1709001101)

N. Total NFS Acres Burned: 2909 wilderness acres: 2686 non-wilderness acres: 223

O. Vegetation Types: Western Hemlock, Pacific Silver Fir, and Mountain Hemlock Zones

P. Dominant Soils: cobbly sandy loam to cobbly silty loam, gravelly silt loam, silt loam, sand loam..

Q. Geologic Types:

The Bull of the Woods fire occurred in an area underlain by four primary geologic units: 1) older volcanic rock, including andesite and basalt lava flows, pyroclastic flows, and mudflows; 2) diorite intrusive rock; 3) ancient landslide deposits; and 4) glacial till deposits. Glacial and fluvial erosion has created generally steep hillslopes and sharp ridge crests in the older volcanic rock and diorite intrusive rock geologic units. Glacial cirque floors, glacially widened valley bottoms, and ancient landslide deposits have low to moderate slopes.

R. Miles of Stream Channels by Order or Class: perennial: 5.6 miles intermittent: 8.8 miles

S. Transportation System

Trails: 3.2_ miles Roads: 0.3 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 1096 (unburned) 364_ (low) 776__ (moderate) 683 __ (high)

B. Water-Repellent Soil (acres): unknown

C. Soil Erosion Hazard Rating (acres):
1119_ (low) 176 (low-moderate) 336 (moderate-high)

D. Erosion Potential: 14 to 24 tons/acre (ERMit Model)

E. Sediment Potential: 8960 - 15360 cubic yards / square mile (ERMit Model)

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years):	<u>10</u>
B. Design Chance of Success, (percent):	<u>n/a (no drainage structures threatened)</u>
C. Equivalent Design Recurrence Interval, (years):	<u>2 year¹</u>
D. Design Storm Duration, (hours):	<u>24 hour</u>
E. Design Storm Magnitude, (inches):	<u>2.9</u>
F. Design Flow, (cubic feet / second/ square mile):	<u>53 csm (USGS Streamstats)</u>
G. Estimated Reduction in Infiltration, (percent):	<u>estimated 5-50%</u>
H. Adjusted Design Flow, (cfs per square mile):	<u>69-105 csm²</u>

¹ 2 year recurrence interval selected because of high likelihood of a 2 year flood occurring soon after the fire.

² Estimated Streamstats streamflow modified by percent of watershed in high/moderate burn severity, and adjusted for estimated post-fire bulking with sediment/woody debris.

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

Invasive Plants

Spotted and diffuse knapweed, Canada Thistle, Bull Thistle, St. John's Wort, Scotch Broom, Tansy Ragwort, hairy cat's ear, and orange hawkweed may present in the vicinity of various portions of the fire area. Crew carriers, other vehicles, equipment (masticators), and fire personnel patrolling the area in the vicinity of the fire may have spread invasive plant seeds outside the perimeter of the fire area, or transported and introduced invasive plant seed from infestations outside the fire area. Drop points, parking areas, sling spots, medic sites, and roads where masticators brushed roadside vegetation may be invaded by invasive non-native plants not currently growing in the vicinity of the Bull of the Woods fire. Prevention measures have included checking equipment to make sure it is clean before entering the fire area. Postfire control measures of invasive plants next spring may include manual (handpulling), mechanical (mowing), and/or chemical (herbicide) treatment (wherever permitted). Repeated treatment in successive years following the fire may be needed to effectively control invasive plant species.

Geologic Hazards/Slope Stability – Potential Effects on Trails and Water Quality

Debris Flow Potential

Debris flows are a type of landslide that typically occurs in a confined creek channel. Debris flows are mixtures of soil, rock, and water with the consistency of very wet concrete. They are capable of traveling many miles if the channel geometry allows. Debris flows can initiate from hillslope landslides that reach the channel and then transform into debris flows, or from the mobilization of channel material in very steep confined channels. Usually debris flows initiate during intense rainfall events.

Debris flows can incorporate downed logs and knock over trees, sometimes creating log jams that may temporarily dam the channel. A dam-burst can restart the debris flow.

On the Debris Flow Potential Map all possible debris flow channels have been color coded to indicate those channel segments with the potential to experience in-channel debris flow initiation (red), scour (blue), transport (yellow), and deposition (green). A channel segment in the transport zone will experience extensive movement of channel material but no net loss in the volume of that material.

Aerial photos (2004) indicate that 2 channels within the fire perimeter have experienced debris flows in approximately the last 20 years: Pine Cone Creek and "South Welcome C" Creek.

Debris Flow Hazard Evaluation

The steep hillslopes within much of the fire perimeter have generally well-developed drainage systems. These channels are steep and confined, and are prime candidates to host a debris flow. If adjacent hillslopes have had their vegetation and root structure destroyed by the fire, then the potential for a debris flow increases.

Several factors can be evaluated to assess the relative debris flow hazard of creek channels within the Bull of the Woods fire perimeter.

1. Channel length (feet) within initiation zone (steeper than 36%) (**IZ**)
2. Channel length (feet) within scour zone (steeper than 18%) (**SZ**)
3. Number of channel heads (**CH**)
4. Channel length (feet) within high burn severity (**HB**)
5. Channel length (feet) within moderate burn severity (**MB**)

More channel heads and longer potential debris flow channel lengths suggest a greater hazard for debris flows at the channel mouth or at any other evaluated point along the channel. Debris flows often initiate at channel

heads from small debris slides in the adjacent hillslopes that deliver sediment into the channel. The longer the channel length, the more likely some log and sediment jam can temporarily dam the channel. If the jam were to burst, then a debris flow could result.

The most hazardous channels (most likely to host a fire-enhanced debris flow) within the Bull of the Woods fire perimeter are listed below. This evaluation was made by a slope stability specialist using the 5 factors listed above. The channels are listed in the approximate order of debris flow hazard beginning with the highest hazard. Only those channels with a relatively high hazard are listed. Many creeks within the fire perimeter are unnamed. Creek names that are in quotes in the table below are assumed names based on nearby geographic features. Each listed channel includes all tributaries to that channel that are within the fire perimeter. The creeks named "South Welcome A", "South Welcome B", "South Welcome C", and "South Welcome D" are those four creeks tributary to Elk Lake Creek that are south of Welcome Creek and north of Mother Lode Creek, listed from north to south.

Channel name	IZ	SZ	CH	HB	MB	Trail Crossings at Risk
"South Welcome A"	9200'	500'	5	6400'	1100'	none
Pine Cone	9400'	2800'	5	2800'	4700'	559 Elk Lake Creek Trail
"Lenore"	6400'	400'	6	1000'	2500'	555
"East Shreiner"	3900'	900'	3	400'	2700'	none
"South Welcome D"	5000'	0'	3	1200'	2200'	none
Welcome	2400'	1800'	6	0'	2600'	559 Elk Lake Creek Trail
"South Welcome B"	3800'	0'	2	900'	0'	none
"South Welcome C"	3200'	0'	1	800'	1000'	none
"Welcome Lakes"	0'	1700'	2	900'	800'	554

Resources at Risk

Roads and Trails:

Roads: The only road present near the fire perimeter is the 6380-130 road below the eastern edge of the burned area along the Collawash River. During the BAER field survey a partially plugged culvert and several partially plugged road cross drains were found on this road. Engineering staff were notified to have the culverts cleaned so they can handle any post-fire runoff. No roads or road/creek crossings are at any significant increased risk from fire-enhanced debris flows.

Trails: Field evaluations of several miles of trails within the fire area indicated that further damage to the trail from fire runoff would not be significant, and at present no additional erosion control measures were needed to prevent further damage from post-fire runoff. National Fire plan funds will be requested to repair significant damage to the trail tread and also cut hazard trees that cannot be repaired with BAER funding.

Trail/creek crossings can be destroyed by debris flows. The trail/creek crossings at the highest risk are displayed in the table above. The Elk Lake Creek Trail crossing at Pine Cone Creek is the crossing most at risk from damage by debris flows, by far. Dispersed campsites near that crossing could be damaged by debris flows in the Pine Cone Creek channel.

Warning signs should be posted at the trailhead and at all dispersed campsites near the Elk Lake Creek Trail crossing at Pine Cone Creek to discourage hikers and campers from occupying those campsites. The signs could read: "Danger: due to recent wildfires upslope from here, this area is likely to experience periodic mudflows and debris flows. Do not camp here."

Water Quality: Water quality can be adversely affected by debris flows that transport large quantities of fine sediment. All the creeks considered here are ultimately tributaries to the Collawash River, which flows into the Clackamas River, a municipal water supply for cities many miles downstream. The Collawash River already transports large quantities of fine sediment as a result of numerous active landslides along its banks. It is unlikely that the volume of fine sediment transported by fire-enhanced debris flows will be large enough to be noticeable in the Collawash River. Even though the potential for a significant effect on downstream water

quality is small, water providers downstream should be notified of the potential for some post fire debris flows in the burned area.

Soil: Some fairly high levels of surface soil erosion are expected during the first several winters in areas where burn severity was moderate or high. No BAER treatment measures are planned because most of the burned area is in Wilderness, and no downstream life or property are threatened except for the potential for debris flows on the Elk Lake trail. The non-wilderness portion of the Bull of the Woods fire west of the Collawash River had a moderate burn severity, but field observations made during the BAER survey indicated there would probably be minimal delivery sediment to streams because of the mosaic nature of the burn and distance from streams. The lack of access in this area would limit any BAER treatments to Heli-mulching, etc., which would not be cost effective considering the minimal amount of estimated impact.

B. Emergency Treatment Objectives:

No emergency BAER treatments, other than invasive plant surveys, are planned to minimize surface erosion because most of the Bull of the Woods Fire are in wilderness where no BAER activities are permitted unless life or property are threatened.

The objective of invasive plant surveys is to detect fire-suppression related invasive plant infestations early so they can be treated.

C. Probability of Completing Treatment Prior to Damaging Storm or Event: N/A

Land ___ % Channel ___ % Roads/Trails ___ % Protection/Safety ___ %

D. Probability of Treatment Success: N/A

	Years after Treatment		
	1	3	5
Land			
Channel			
Roads/Trails			
Protection/Safety			

E. Cost of No-Action (Including Loss): N/A

F. Cost of Selected Alternative (Including Loss): \$ 2000

G. Skills Represented on Burned-Area Survey Team:

<input checked="" type="checkbox"/> Hydrology	<input checked="" type="checkbox"/> Soils	<input checked="" type="checkbox"/> Geology	<input type="checkbox"/> Range	<input type="checkbox"/>
<input checked="" type="checkbox"/> Recreation	<input type="checkbox"/> Wildlife	<input type="checkbox"/> Fire Mgmt.	<input type="checkbox"/> Engineering	<input type="checkbox"/>
<input type="checkbox"/> Contracting	<input type="checkbox"/> Ecology	<input checked="" type="checkbox"/> Botany	<input type="checkbox"/> Archaeology	<input type="checkbox"/>
<input type="checkbox"/> Fisheries	<input type="checkbox"/> Research	<input type="checkbox"/> Landscape Arch	<input checked="" type="checkbox"/> GIS	

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FAX:

H. Treatment Narrative:

(Describe the emergency treatments, where and how they will be applied, and what they are intended to do. This information helps to determine qualifying treatments for the appropriate funding authorities. For seeding treatments, include species, application rates and species selection rationale.)

Invasive Plant Surveys: Sites used by fire staff for lookouts, drop points, etc. will be surveyed next spring for invasive plants that may have been brought in by fire personnel, and their vehicles and equipment. Approximately 22 miles of roadsides treated with a masticator will be surveyed for invasive plants that may have been brought in by the equipment.

Trail Signing: Post signs at trailheads to notify users of hazardous conditions.

I. Monitoring Narrative:

(Describe the monitoring needs, what treatments will be monitored, how they will be monitored, and when monitoring will occur. A detailed monitoring plan must be submitted as a separate document to the Regional BAER coordinator.)

Part VI – Emergency Stabilization Treatments and Source of Funds
Interim #

Line Items	Units	Unit Cost	NFS Lands		Other \$	Other Lands				All Total \$
			# of Units	BAER \$		# of units	Fed \$	# of Units	Non Fed \$	
A. Land Treatments										
Invasive Plant Surveys	1	\$2,000	1	\$2,000	\$0		\$0		\$0	\$2,000
trail signs	1	600	1	\$600	\$0		\$0		\$0	\$600
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Land Treatments</i>				\$2,600	\$0		\$0		\$0	\$2,600
B. Channel Treatments										
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Channel Treat.</i>				\$0	\$0		\$0		\$0	\$0
C. Road and Trails										
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Road & Trails</i>				\$0	\$0		\$0		\$0	\$0
D. Protection/Safety										
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Structures</i>				\$0	\$0		\$0		\$0	\$0
E. BAER Evaluation					6600					
				---			\$0		\$0	\$0
<i>Insert new items above this line!</i>				---	\$0		\$0		\$0	\$0
<i>Subtotal Evaluation</i>				---	\$0		\$0		\$0	\$0
F. Monitoring										
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Monitoring</i>				\$0	\$0		\$0		\$0	\$0
G. Totals				\$2,600	\$0		\$0		\$0	\$2,600
Previously approved										
Total for this request				\$2,600	6600					\$9,200

PART VII - APPROVALS

1. /s/ Kathryn J. Silverman for
Forest Supervisor (signature)

12/12/2010
Date

2.
Regional Forester (signature)

Date