USDA-FOREST SERVICE FS-2500-8 (6/06)

Date of Report: September 21, 2017

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[X] 1. Funding request for estimated emergency stabilization funds
[ ] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

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

[ ] 2. Interim Report #____.
[ ] Updating the initial funding request based on more accurate site data or design analysis
[ ] Status of accomplishments to date

[ ] 3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Milli

B. Fire Number: OR-DEF000843

C. State: Oregon

D. County: Deschutes

E. Region: Pacific Northwest (R6)

F. Forest: Deschutes

G. District: Sisters Ranger District

H. Fire Incident Job Code: P6K9KN (0601)

I. Date Fire Started: 8/11/2017

J. Date Fire Contained: 60% contained as of 9/15/2017

K. Suppression Cost: $16,401,883 as of 9/15/2017

L. Fire Suppression Damages Repaired with Suppression Funds

1. Roads improved as fire line: 17.1 miles; all to have drainage installed through suppression repair.
2. Dozer lines on roads: 17.1 miles; all to have drainage installed through suppression repair.
3. Dozer lines not on roads: 11.4 miles; all to have drainage installed through suppression repair.
4. Hand lines: 1.3 miles; all to have drainage installed through suppression repair.
5. Miles of road bladed during Milli Fire, not all fire line: 50 miles

M. Watersheds:
HUC 6 subwatersheds affected by the Milli Fire. Percent of watersheds burned are reported in parentheses.

Subwatershed Name	Total Subwatershed Acres (Percent Burned)	Soil Burn Severity			
		Unburned or Very Low Acres	Low Acres	Moderate Acres	High Acres
Fourmile Butte	19,201 (38%)	11,845	2,588 (13%)	3,273 (17%)	1,495 (8%)
Lower Trout Creek	20,056 (28%)	14,493	2,634 (13%)	2,236 (11%)	693 (3%)
Upper Trout Creek	12,100 (59%)	4,962	3,412 (28%	2,987 (25%)	739 (6%)
Upper Whychus Creek	18,306 (8%)	16,774	772 (4%)	709 (4%)	51 (0%)
Grand Total	69,663 (31%)	48,074	9,406 (14%)	9,204 (13%)	2,978 (4%)

N. Total Acres Burned: 24,500 total acres

NFS Acres(23,129) BLM (0) State of Oregon (0) Private (1,371)

O. VegetationTypes: The higher elevational forests in the wilderness include lodgepole pine, mountain hemlock and subalpine fir vegetation types. Mid elevational forest vegetation includes wet mixed conifer and dry mixed conifer. Common species in the wet and dry mixed conifer types include: ponderosa pine, white fir and lodgepole pine.

P. Dominant Soils: Surface soils have fine sandy loam textures that result from fine basaltic ash deposits from older Casade vents to the west. Airfall ash overlies older residual soils in some locations. Soils are classified as ashy Viticryands within the Andisol soil order.

Q. Geologic Types: The landscape is dominated primarily by the Cascade crest's glaciated basaltic andesite volcanoes and associated platform lavas and volcanic ash/tephra. The Milli Fire perimeter transitions from high elevation, heavily glaciated mountain landforms to lower elevation, gentle relief, outwash and lava plains. The steepest terrain in the perimeter are the cirques and moraines. Till from glacial advances form belts of moraines in close vicinity, recently erupted cinder vents, chiefly from Sand Mountain chain, Belknap Crater and Collier Cone, deposited thick blankets of unconsolidated basaltic ash/tephra. Thickness of ash/tephra vary by wind distrbution. Drainages and streams dissect lava ridges and glacial moraines.

R. Miles of Stream Channels by Order or Class: See Table Below

Streams	Miles
Perennial	10.6
Intermittent	2.5
Ephemeral	0.1
Channel, Ditch or Pipeline	1.1
Grand Total	**14.4**

S. Transportation System: 9,585 acres (39%) of the fire was in the Three Sisters Wilderness

Trails: 48.4 miles **Wilderness Trails:** 18.7 miles **PCT:** 3.2 miles

Roads: See Table Below.

Maintenance Level	Miles
1 - BASIC CUSTODIAL CARE (CLOSED)	34.1
2 - HIGH CLEARANCE VEHICLES	85.2
3 - SUITABLE FOR PASSENGER CARS	3.2
4 - MODERATE DEGREE OF USER COMFORT	7.7
DECOMMISSIONED	6.1
Grand Total	**136.4**

PART III - WATERSHED CONDITION

A. **Burn Severity (acres):** Total: 2,911 (unburned); 9,406 (low); 9,204 (moderate); 2,978 (high)
NFS Land: 2,837 (unburned); 8,842 (low); 8,551 (moderate); 2,898 (high)

B. **Water-Repellent Soil (acres):** Water repellent soils developed on approximately 20% of the fire area. Of that amount approximately 8% occur in areas of steeper slopes. The ash derived soils present within the fire perimeter have a natural level of water repellency when dry.

C. **Soil Erosion Hazard Rating (acres):** Erosion Hazards listed in the Deschutes SRI for the soil types within the fire perimeter and outside of wilderness are low for approximately 44% of the area, moderate for approximately 38% of the area and high for approximately 18% of the area.

D. **Erosion Potential:** 1.2 tons/acre (soils on gently sloping terrain slopes less than 30%) and 15.4 tons/acre (soils on steeper slopes greater than 30%).

E. **Sediment Potential:** 2.6 cubic yards of potential sediment contribution from gently sloping terrain and 208 cubic yards of potential sediment contribution on steeper slopes.

F. **Debris Flow Potential:** The USGS Post-Fire Debris Flow Hazard Model is used to assess the Combined Hazard of each drainage in the burned area. The Combined Hazard Rating takes into consideration both the likelihood of occurrence and volume of available sediment. Most of the area burned is estimated to have a relatively low level of debris-flow hazard. However, some of the steeper, more severely burned terrain on the northern flanks of Black Crater are predicted to have higher likelihood values in response to a relatively modest 15-minute peak storm intensity. Field inspections found the most likely slopes in the fire perimeter to form debris flows were the north flanks of Black Crater and short but steep slopes of the moraine along the lower State Highway 242.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period	5 years
B. Design Chance of Success	80 %
C. Equivalent Design Recurrence Interval	2 years/10 years
D. Design Storm Duration	0.5 hours/ 48 hours
E. Design Storm Magnitude	0.81 inches/ 1.8 inches
F. Design Flow	30 cfs/mi^2
G. Estimated Reduction in Infiltration	20%
H. Adjusted Design Flow	60 cfs/mi^2

Summary of Watershed Response

Hydrologic Response: The primary watershed responses of the Milli Fire are expected to include: 1) an initial flush of ash, 2) rill and gully erosion in drainages and on steep slopes within the burned area, 3) potential flash floods and spring snowmelt events with increased peak flows and sediment deposition. These responses are expected to be most evident during initial 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.

Predicted post-fire peak flows show a small increase for the 2-year storm from pre-fire. Post-fire flows could lead to plugged culverts, flow over road surfaces, rill and gully erosion of cut and fill slopes, erosion and deposition along road surfaces and relief ditches, loss of long-term soil productivity and threats to human life and safety. Sedimentation and erosion of ephemeral channels is likely to occur at an accelerated rate until vegetation establishes itself and provides ground cover.

Erosion Response: The soil burn severity shows the majority of the burned area falls within the low and moderate soil burn severity levels (34% each). High soil burn severity accounted for 12% of the fire area and the remainder of fire was very low to unburned (12%). The primary areas of high severity burning occurred in the subwatersheds around Black Crater and Trout Creek Butte, resulting in a higher risk to flooding and possible sedimentation affecting water quality, roads and trails.

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

Values at Risk:

The table below is Exhibit 02 from FSM 2523.1. This matrix was used to evaluate the risk level for each value identified during this BAER assessment. See FSM 2523.1 for additional information.

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

The table below is a summary of the values (some of which were not identified as 'critical' per Exhibit 01 from FSM 2523.1) within and along the Milli fire area, as well as, the threats to those values, the probability of damage or loss, magnitude of consequences and the resulting level of risk. Red shaded cells are those values that rated out as "very high" or "high" risk. Yellow shaded cells rated out "intermediate" risk and green cells rated out "low" or "very low".

Milli Fire BAER - Forest Service Values At Risk Tracking Table

High / Very High Risk	
Intermediate Risk	
Low / Very Low Risk	

Category	Life/ Property/ Resources	Value at Risk	Threat to Value at Risk	Probability of Damage or Loss	Magnitude of Consequence	Risk	Treatment	Notes
Recreation	Life and Safety	Human Life associated with Lava Camp Trailhead	Hazard trees pose threat to Human Life and Safety adjacent to trailhead and overflow parking area	Possible	Major	High	Trailhead Hazard Tree Mitigation (TH1)	Suppression repair activities have mitigated most of the imminent hazard trees around the area However more danger trees are expected to occur over the next year This trailhead accesses Lake Camp Lake Trail #4060, North Matthieu Lake Trail #4062 and Pacific Crest Trail #2000
Recreation	Life and Safety	Human Life on Lava Camp Lake Trail #4060	Hazards such as hazard trees, falling rock and debris pose threat to Human Life and Safety.	Possible	Moderate	Intermediate	Trail Hazard Signs (P2)	Hazard sign(s) to be located at Lava Camp Trailhead Trail accesses the North Matthieu Lake Trail #4062 and Pacific Crest Trail #2000 Sign narrative to be specified by individual trail needs
Recreation	Property / Resources	Lava Camp Lake Trail #4060	Trail infrastructure damage or loss associated with expected increase in post-fire runoff and erosion and subsequent degradation of water quality and wilderness characteristics	Possible	Minor	Low	No Treatment	Trail is mostly in low burn severity area with limited drainage area that could impact trail Trail accesses the North Matthieu Lake Trail #4062 and Pacific Crest Trail #2000
Recreation	Property / Resources	Pacific Crest Trail #2000	Trail infrastructure damage or loss associated with expected increase in post-fire runoff and erosion and subsequent degradation of water quality and wilderness characteristics	Likely	Moderate	High	Trail Stabilization (T1)	National Scenic Trail Additional drainage features are needed to protect trail tread in areas adjacent to/ or downslope of moderate/high burn severity areas on steeper grades to enhance ability to distribute anticipated post-fire flows Work emphasis would be on maintaining wilderness characteristics This activity includes mitigation of only those imminent hazard trees at trail treatment locations

Recreation	Life and Safety	Human Life and Safety along the Pacific Crest Trail #2000	Human Life and Safety associated with hazards such as hazard trees, falling rock and debris	Unlikely	Major	Intermediate	Trail Hazard Signs (P2)	Hazard sign(s) to be located at State Hwy 242 and Pacific Crest Trail #2000 crossing as you enter into the fire from the north and at the southern boundary of the fire. The forest will coordinate with adjacent forests with sections of the trail in burned areas for consistency.
Recreation	Property / Resources	North Matthieu Lake Trail #4082	Trail infrastructure damage or loss associated with expected increase in post-fire runoff and erosion and subsequent degradation of water quality and wilderness characteristics	Likely	Moderate	High	Trail Stabilization (T2)	Wilderness trail Additional drainage features are needed to protect trail tread in areas adjacent to/ or downslope of moderate/high burn severity areas on steeper grades to enhance ability to distribute anticipated post-fire flows Treatment includes imminent hazard tree mitigation at trail treatment locations Trail Hazard Signs are covered under Lava Camp Lake Trail #4060
Recreation	Life and Safety	Human Life and Safety on the Cross District Snowmobile Trail #2 & 2a	Hazards such as hazard trees, falling rock and debris pose threat to Human Life and Safety	Possible	Moderate	Intermediate	Trail Hazard Signs (P2)	Locations of sign posted at south end of FSR 1018 and Cross District Trail. Trail co-exists with sections of Forest Service Road 1018, 1018-700, 1024, 1028, 1040, 1040-100, 1040-700 and 1040-730. Two (2) signings, closure for first part of winter and caution signs after first couple of storm / wind events
Recreation	Life and Safety	Human Life and Safety on the Upper Cross District Snowmobile Trail #2	Hazards such as hazard trees, falling rock and debris pose threat to Human Life and Safety	Likely	Moderate	High	Trail Hazard Signs (P2)	Locations of signs proposed at Staging Area on State Hwy 242, FSR 1040 /1040-700 junction, Upper Cross District Snowmobile Trail #2 / State Hwy 242 junction (2), Upper Cross District Snowmobile Trail #2 / FSR 1030 junction TRAIL co-exists with sections of FSR 1040 and 1040-320 Consider rerouting trail from 1040-320 to 1040-300 if trail prism is impacted by post-fire affects. Two (2) signings, closure for first part of winter and caution signs after first couple of storm / wind events

Recreation	Life and Safety	Human Life and Safety on the Upper Cross District Snowmobile Trail #2	Loss of traffic warning signs pose threat to Human Life and Safety	Possible	Major	High	Traffic Safety Signs (P3)	Replace (2) stop signs at snowmobile crossing of State Hwy 242. Stop signs would be located on each side of the Hwy 242 crossing
Recreation	Life and Safety	Human Life and Safety on the Bluegrass Loop Snowmobile Trail along FSR 1030	Hazards such as hazard trees, falling rock and debris pose threat to Human Life and Safety	Unlikely	Moderate	Low	No Treatment	This route (road and trail) was heavily prepped (thinned) along and used for a backfire operation during suppression activities. No observed hazard trees.
Recreation	Life and Safety	Human Life and Safety at Black Crater Trailhead	Hazard trees pose threat to Human Life and Safety at trailhead	Very Likely	Major	Very High	Temporary closure of Trailhead Access Road with boulders and signs (R1)	Abundant tree mortality around trailhead area. Trailhead to be closed until tree hazards are mitigated. Treatment includes closure signage.
Recreation	Life and Safety	Human Life and Safety on Black Crater Trail #4058	Hazards such as hazard trees, falling rock and debris pose threat to Human Life and Safety	Possible	Major	High	Trail Stabilization (T7)	Wilderness trail Additional drainage features are needed to protect trail tread in areas adjacent to/ or downslope of moderate/high burn severity areas on steeper grades to enhance ability to distribute anticipated post-fire flows. Treatment includes imminent hazard tree mitigation at trail treatment locations
Recreation	Life and Safety	Human Life and Safety at Millican Trailhead	Hazard trees pose threat to Human Life and Safety at trailhead	Unlikely	Moderate	Low	No Treatment	No proposed treatment because hazard trees are being mitigated under suppression repair work.
Recreation	Life and Safety	Human Life and Saftey on Millican Crater Trail #4066	Hazards such as hazard trees, falling rock and debris pose threat to Human Life and Safety	Possible	Moderate	Intermediate	Trail Hazard Signs (P2)	Wilderness trail Hazard sign(s) to be located at Millican Trailhead. Sign narrative to be specified by individual trail needs. Trail is adjacent to and downslope of moderate and high burn severity areas.

Recreation	Property / Resources	Millican Crater Trail #4066	Trail infrastructure damage or loss associated with expected increase in post-fire runoff and erosion and subsequent degradation of water quality and wilderness characteristics	Likely	Moderate	High	Trail Stabilization (T3)	Wilderness trail. Additional drainage features are needed to protect trail tread in areas adjacent to/ or downslope of moderate/high burn severity areas on steeper grades to enhance ability to distribute anticipated post-fire flows. Treatment includes imminent hazard tree mitigation at trail treatment locations
Recreation	Life and Safety	Human Life and Safety at Scott Pass Trailhead	Hazard trees pose threat to Human Life and Safety at trailhead	Possible	Major	High	Trailhead Hazard Tree Mitigation (TH2)	Suppression repair activities have mitigated most of the imminent hazard trees around the area. However more danger trees are expected to occur over the next year. This trailhead accesses the Pacific Crest Trail #2000 via the Scott Pass Trail #4068
Recreation	Life and Safety	Human Life and Safety on Scott Pass Trail #4068	Hazards such as hazard trees, falling rock and debris pose threat to Human Life and Safety	Possible	Moderate	Intermediate	Trail Hazard Signs (P2)	Wilderness trail. Hazard sign(s) to be located at Scott Pass Trailhead. Sign narrative to be specified by individual trail needs. Trail is adjacent to and downslope of moderate and high burn severity areas
Recreation	Property / Resources	Scott Pass Trail #4068	Trail infrastructure damage or loss associated with expected increase in post-fire runoff and erosion and subsequent degradation of water quality and wilderness characteristics	Likely	Moderate	High	Trail Stabilization (T4)	Wilderness trail. Additional drainage features are needed to protect trail tread in areas adjacent to/ or downslope of moderate/high burn severity areas on steeper grades to enhance ability to distribute anticipated post-fire flows. Treatment includes imminent hazard tree mitigation at trail treatment locations
Recreation	Life and Safety	Human Life and Safety on Green Lakes Trail #17	Hazards such as hazard trees, falling rock and debris pose threat to Human Life and Safety	Possible	Moderate	Intermediate	No treatment	Wilderness trail. The Deschutes National Forest will construct and hang signs at southern trailhead

Recreation	Property / Resources	Green Lakes Trail #17	Trail infrastructure damage or loss associated with expected increase in post-fire runoff and erosion and subsequent degradation of water quality and wilderness characteristics	Likely	Moderate	High	Trail Stabilization (T5)	Wilderness Trail Additional drainage features are needed to protect trail tread in areas adjacent to/ or downslope of moderate/high burn severity areas on steeper grades to enhance ability to distribute anticipated post-fire flows Treatment includes imminent hazard tree mitigation at trail treatment locations
Recreation	Property / Resources	Trout Creek Tie Trail #4067	Trail infrastructure damage or loss associated with expected increase in post-fire runoff and erosion and subsequent degradation of water quality and wilderness characteristics	Likely	Moderate	High	Trail Stabilization (T6)	Wilderness connector trail between Scott Pass (#4068) and Millican Crater (#4066) Trails Additional drainage features are needed to protect trail tread in areas adjacent to/ or downslope of moderate/high burn severity areas on steeper grades to enhance ability to distribute anticipated post-fire flows Treatment includes imminent hazard tree mitigation at trail treatment locations
Recreation	Life and Safety	Human Life and Safety at Whispering Pines Horse Camp	Burned out stump holes around horse corrals pose threat to Human Life and Safety	Likely	Moderate	High	Closure of individual site, see notes	**No funds requested** as district will flag off area until repairs can be made Archaeologic concerns with bringing in external fill material
Recreation	Property / Resources	Whychus Creek Trail #4070	Trail infrastructure damage or loss associated with expected increase in post-fire runoff and erosion and subsequent degradation of water quality	Possible	Minor	Low	No Treatment	Wild and Scenic River designation No proposed treatment
Recreation	Life and Safety	Human Life and Safety on the Met-Win Trail to Rodeo Grounds Trail #4099	Hazards such as hazard trees, falling rock and debris pose threat to Human Life and Safety	Unlikely	Moderate	Low	No Treatment	No proposed treatment as trail is located in a previously thinned area

Recreation	Life and Safety	Human Life and Safety on the Whychus Creek Overlook (Trail #4069)	Recreation facilities infrastructure damage or loss associated with expected increase in post-fire runoff or overhead hazard	Unlikely	Minor	Very Low	No Treatment	Wild and Scenic River designation No proposed treatment
Recreation	Life and Safety	Human Life and Safety on the Metolious-Windigo Trail #99 at FSR 690	Hazards such as hazard trees, falling rock and debris pose threat to Human Life and Safety	Unlikely	Moderate	Low	No Treatment	National Recreation Trail No proposed treatment
Resources	Resources	Soil Productivity and Hydrologic Function	Loss of soil productivity and degraded water quality due to increased post-fire surface runoff and erosion from high and moderate burn severity areas	Possible	Moderate	Intermediate	No Treatment	Cost benefit ratio does not justify treatment. Soil erosion expected to occur in isolated areas with no effective treatment justified
Resources	Resources	Hydrologic function as it pertains to water quality in Trout Creek, Whychus Creek and their impacted tributaries	Erosion and transport of soils, ash and/or debris from increased post-fire flows	Likely	Moderate	High	Road treatments (R2, R3, & R4) and Trail treatments (T1-T7)	No individual channel treatments identified. See Road treatments for descriptions.
Resources	Resources	Quality and quantity of T&E (Spotted Owl) habitat in and around known nesting sites	Continued loss of Late Successional Reserves from post-fire wind and storm events and post-fire insect and disease	Likely	Major	Very High	No Effective Treatment	As a result of the fire and limited LSR within the fire boundary, habitat is adversely impacted for the immediate future. Three northern spotted owl territories were impacted, Blue Grass Butte (Pair Number 5015), Black Crater (Pair Number 5023), and Trout Creek (Pair Number 5011)

Resources	Resources	Pole Creek Municipal Water Supply and Hydrologic function as it pertains to water quality in Pole Creek and its impacted tributaries	Erosion and transport of soils, ash and /or debris into Pole Creek from increased post-fire flows.	Possible	Moderate	Intermediate	No Treatment other than Interagency Coordination (P4)	This area was impacted during the Pole Creek Fire and was mostly unburned and low burn severity from the Milli Fire City of Sisters has Municipal water rights from Pole Creek However, Sisters' primary water source is from wells and not Pole Creek Pole Creek Ditch supplies water to Patterson Ranch
Botany / Weeds	Resources	Native and naturalized plant communities (FSR 1024/ 1018 road junction)	Spread of invasive plants into native habitats and loss of habitat and species to high burn severity	Very Likely	Moderate	Very High	Detection and treatment of new weed infestations (L1)	Known Knapweed population in area. Approx 0 5 mile from here (on FSR 1018) there is another patch on road right-of-way Ventenata also present Infestations are adjacent to high and moderate burn severity areas
Botany / Weeds	Resources	Native and naturalized communities (north and east of State Hwy 242 and FSR 850 Junction)	Spread of invasive plants into native habitats and loss of habitat and species to high burn severity	Likely	Moderate	High	Detection and treatment of new weed infestations (L1)	Known Knapweed populations adjacant to moderate and high burn severity areas
Botany / Weeds	Resources	Native and naturalized plant communities (south end of FSR 1018 east of the junction of FSR 1520-200, section 33)	Spread of invasive plants into native habitats and loss of habitat and species to high burn severity	Very Likely	Moderate	Very High	Detection and treatment of new weed infestations (L1)	Known Knapweed population adjacant to moderate and high burn severity areas Abundance of heavy equipment in the area during suppression operations
Botany / Weeds	Resources	Native and naturalized plant communities FSR 1514 - Whychus Rock Quarry	Spread of invasive plants into native habitats from post-fire conditions	Outside Fire Area			No Treatment	Used to stage heavy equipment during fire suppression Potential to use pit for repair / BAER work No concern with area along FSR 1514, but knapweed is present further into the pit

Botany / Weeds	Resources	Native and naturalized plant communities (Junction of FSR 1018-800 and FSR 1018-840 road up Trout Creek Butte)	Spread of invasive plants into native habitats and loss of habitat and species to high burn severity	Likely	Moderate	High	Detection and treatment of new weed infestations (L1)	Known high priority weed species (tansy ragwort) adjacent to moderate and high burn severity
Forestry	Resources	Native and naturalized plant communities associated with the White Bark Pine Trees	Loss of unique native species from post fire conditions	Possible	Moderate	Intermediate	No Effective Treatment	Candidate T&E species Some of the trees have been documented to be resistant to white pine blister rust
Area	Life and Safety	Human life and safety relative to entering NFS burn area	Hazards such as hazard trees, falling rock and debris pose threat to human life	Possible	Major	High	Road Hazard signs (P1)	Road Hazard signs to be located at FSR 1018 / State Hwy 242 junction, FSR 1040 / State Hwy 242 junction, FSR 1018 / 1018-800 junction, FSR 1505 / 1513 junction, and FSR 15, FSR 1505 (east), and FSR 1514 at the fire boundary
Roads	Life and Safety	Human Life and Safety at Lava Camp Lake Campground	Hazards trees around a couple campsite locations pose threat to Human Life and Safety	Very Likely	Major	Very High	Temporary closure of Campsite Access Road with boulders and signs (R1)	Treatment includes temporary closure of campsite access roads in the upper loop and cul-de-sac due to high number of hazard trees
Roads	Life and Safety	Human Life and Safety at Lava Camp Lake Campground Access Road (900)	Loss of traffic warning signs pose threat to Human Life and Safety	Unlikely	Major	Intermediate	Traffic Safety Signs (P3)	STOP sign needed at entrance to State Hwy 242
Roads	Life and Safety	Human Life and Safety on State Hwy 242 (which is a snowmobile route in the winter)	Hazards such as hazard trees, falling rock and debris pose threat to Human Life and Safety	Likely	Moderate	High	Road Hazard signs (P1). Interagency Coordination (P4)	Coordinate and cost share with ODOT on sign order Locations of signs to be along State Hwy 242 at both ends of fire Two larger signs (42x60) total

Roads	Property / Resources	Roads within the fire perimeter below high and moderate soil burn severity	Increased flood magnitude and hydrologic response resulting in loss or damage to roads and subsequent degradation of hydrologic function	Very Likely	Moderate	High	Storm Patrol (R4)	Concentrate on Forest Service Roads that are at high risk to damage These include FS roads 15, 1018, 1024, 1026, 1040, 1520 & 1040 spurs 300, 320, 700, 720, 730, & 800
Roads	Property / Resources	Forest Service Road 1018	Increased flood magnitude and hydrologic response resulting in loss or damage to roads and subsequent degradation of water quality	Likely	Moderate	High	Storm Proofing (R2)	Storm Proofing will increase the ability of the existing road drainage features to adequately handle anticipated post-fire flows in areas adjacent to and/or downslope of high/mod burn severity areas Along FSR 1018 from 1040 junction to 1024 junction
Roads	Property / Resources	Trout Creek Crossing at FSR 1018	Increased flood magnitude and hydrologic response resulting in loss or damage to roads and subsequent degradation to hydrologic function	Possible	Moderate	Intermediate	**No Treatment recommended based on the Cost Benefit Ratio**	The area upstream of this crossing was partially burned in Pole Creek Fire, now Milli Current culvert is at capacity for anticipated post-fire flows Due to this being a high speed road, the minimum treatment needed (drain dip) is not consistent with traveler expectations, creating the need for expensive alternatives Road provides access to Scott Pass Trailhead / Trail which will remain open
Roads	Property / Resources	Forest Service Road 1024	Increased flood magnitude and hydrologic response resulting in loss or damage to roads and subsequent degradation of water quality	Likely	Moderate	High	Storm Proofing (R2)	Storm Proofing will increase the ability of the existing road drainage features to adequately handle anticipated post-fire flows in areas adjacent to and/or downslope of high/mod burn severity areas Along FSR 1024 from 1018 junction to 1040-730 junction This road is part of the Cross District Snowmobile Trail which provides access to the Millican Trailhead / Trail, which will remain open

Roads	Property / Resources	Private Road 1018-930 at Trout Cr Crossing	Increased flood magnitude and hydrologic response resulting in loss or damage to roads and subsequent degradation of water quality	Private Land No risk assessment completed			Interagency Coordination (P4)	Coordination with NRCS to look for available funding to improve / harden outlet and stabilize drainage dip adjacent to existing culvert. Forest Service land is located both upstream and downstream of crossing. Problematic crossing over the past 11 years identified in Black Crater Fire, Pole Creek Fire and other resource analysis
Roads	Human Life and Safety	Human Life and Safety along Forest Service Road 1018-800 (to Trout Creek Butte)	Overhead hazard trees at popular dispersed campsites near standing condemned structure pose threat to Human Life and Safety	Possible	Moderate	Intermediate	Road Hazard signs (P1)	Gate originally installed for Human life and safety threat for condemned lookout tower at top of Trout Creek Butte. Gate has been ineffective for the past 3-4 years. Gate and posts burned during the fire.
Roads	Life and Safety	Forest Service Road 1040 spurs 700, 720, and 730 along east flank of Black Crater	Road infrastructure damage or loss associated with expected increase in post-fire runoff and subsequent safety concerns	Very Likely	Moderate	High	Storm Proofing (R2)	Storm Proofing will increase the ability of the existing road drainage features to adequately handle anaticipated post-fire flows in areas adjacent to and/or downslope of high/mod burn severity areas. FSR 1040-700 & 1040-730 spurs are part of the Cross District Snowmobile Trail and road failure could also cause safety issue for snowmobilers
Roads	Property / Resources	Forest Service Road 1040 spurs 700, 720, and 730 along east flank of Black Crater	Road infrastructure damage or loss associated with expected increase in post-fire runoff and subsequent safety concerns	Very Likely	Moderate	High	Install Drainage Features (R3)	These mostly insloped roads need additional drainage features in areas adjacent to and/or downslope of high/mod burn severity to accommodate anticipated post-fire flows. FSR 1040-700 & 1040-730 spurs are part of the Cross District Snowmobile Trail and road failure could also cause safety issue for snowmobilers
Roads	Property / Resources	Forest Service Road 1040-300 along flank of Black Crater	Road infrastructure damage or loss associated with expected increase in post-fire runoff	Possible	Minor	Low	No Treatment	Road is in poor condition, but risk level does not justify treatment.

Roads / Trail	Property / Resources	Forest Service Road 1040-320 along flank of Black Crater	Road infrastructure damage or loss associated with expected increase in post-fire runoff	Possible	Moderate	Intermediate	No Treatment	FSR 1040-320 (Upper Cross District Trail) is deeply entrenched Consider rerouting trail from FSR 1040-320 to FSR 1040-300 if trail prism is impacted by post-fire affects
Archaeology	Resources	Cultural Resource Sites - Classified information	Damage or loss of resource data from erosion or unauthorized removal	Unlikely	Major	Low	No Treatment	Twenty nine (29) Eligible Cultural Resource Sites that have been reviewed in the field and the concern for these sites is low. All are within moderate to high burn severity including State Hwy 242. Ongoing monitoring of this route and repairs to be coordinated with ODOT

B. Emergency Treatment Objectives:

The primary objective of this Burned Area Emergency Response Report is to recommend prompt actions deemed reasonable and necessary to effectively protect, reduce or minimize significant threats to human life and property and prevent unacceptable degradation to natural and cultural resources. The application of these BAER treatments are expected to minimize on-site and downstream damages to the identified values at risk previously mentioned. The emergency treatments being recommended by the Milli BAER Team are specifically designed to achieve the following results.

Proposed Land Treatments

The objective of the land treatments are to:

1. Promote and protect native and naturalized vegetative recovery by reducing the spread of noxious weeds (L1).

Proposed Road and Trail Treatments

The objective of the road and trail treatments are to:

1. Protect road and trail investments from becoming impassible and damaged due to increased post-fire runoff. (R2, R3, R4, T1-T7)
2. Reduce sedimentation into streams degrading water quality (R2, R3, R4, T1-T7)
3. Improve road drainage by increasing ditch and catchment basin capacity to reduce the potential for road failure due to increased flows (R2, R3)

Proposed Protection/Safety Treatments:

The objective of the protection/safety treatments are to:

1. Protect human life and safety by raising awareness through posting hazard warning signs at recreation sites, trailheads, and when entering the burn area and traveling State Hwy 242 Scenic Byway. (P1, P2, P3)
2. Coordinate with state agencies on posting of hazard warning signs along State Hwy 242 and on potential drainage improvements on private land (P4)
3. Protect worker and public safety by removing hazard trees at trailheads and within the vicinity of road and trail work. (TH1, TH2, T1-T7, R1, R2, R3)

Proposed Channel Treatments:

There are no proposed channel treatments.

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

Land **NA (only weeds)** % Channel **NA** % Roads/Trails **75** % Protection/Safety **85** %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	70	75	80
Channel	NA	NA	NA
Roads/Trails	90	90	90
Protection/Safety	85	90	95

E. Cost of No-Action (Including Loss): Critical values identified in Section A would be damaged or lost. Cost of the no action is estimated to be $988,000.

F. Cost of Selected Alternative (Including Loss): Total cost of the action alternative (including loss) is $358,000.

G. Skills Represented on Burned-Area Survey Team:

[X] Hydrology	[X] Soils	[X] Geology	[ ] Range	[X] Recreation
[X] Forestry	[X] Wildlife	[ ] Fire Mgmt.	[X] Engineering	[] Public Information
[ ] Contracting	[ ] Ecology	[X] Botany/Invasives	[X] Archaeology	[X] Hydrology
[X] Fisheries	[ ] Research	[ ] Landscape Arch	[X] GIS	

Team Leaders: Rob Tanner – Asst. Forest Hydrologist/BAER Coordinator, Deschutes and Ochoco NF
Peggy Fisher – Team Leader (t) – Forest Engineer, Deschutes and Ochoco NF

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Team Members:

Kyle Wright – Hydrologist
Bart Wills - Geology
Terry Craigg – Soil Scientist
Skyler Ogden - Recreation
Sarah Callaghan- Invasive Plants/Botany
Monty Gregg - Wildlife
Mike Riehle - Fisheries
Bryan Kurtz - Engineering
Amy Racki - Recreation
Emily Pritchard - Archaeology
Dorothy Thomas - GIS

H. Treatment Narrative:

Land Treatments:

L1 - Invasive Weed Detection and Treatment: Invasive plant detection and treatment along the Forest Service roads and highway 242 that were of high to moderate burn severity and where non-native invasive plants are absent or present in small amounts, will be necessary to prevent spread and dispersal of non-native invasive plants into newly burned and disturbed areas. Although moderate burned areas may have some intact vegetation or may experience needle fall, it is not sufficient to prohibit the spread and establishment of invasive plants. Key species that will targeted for survey and control, such as knapweeds and Ventenata, are able to survive, establish and spread even in moderately burned areas. The focus will be on locations adjacent to known weed sites, where fire suppression may have introduced invasive plants and road systems that have been previously disturbed and will have a greater potential for invasive plants to establish. The road systems are primary vectors for weed spread and Early Detection/Rapid Response (EDRR) will allow treatments to occur before these species are able to spread.

EDRR will occur on approximately 205 acres and estimated invasive plant treatments to occur across 20 acres. **Total request is for $4,865.**

Locations: 1) Junction FSR 1018/ 1024; 2) North and east of State Hwy 242 and FSR 850; 3) South end of FSR 1018 east of junction of FSR 1520-200, Section 33; and 4) Junction FSR 1018-800/ 1018-840 up to Trout Creek Butte

Treatment	Units	Unit Cost	# of Units	Total Cost
Invasive Plant Surveys/detection	Acres	$9.00	205	$1,845
Invasive Plant treatments	Acres	$151.00	20	$3,020

Road and Trail Treatments:

R2 – Storm Proofing: Storm proofing drainage features where identified in areas with high and moderate burn severity. Activity will include cleaning culverts and increasing ditch and catchment basin capacity where they exist and installing additional water bars as necessary to handle short-term post-fire flows, sediment and debris.

Locations: 1) FSR 1018 (jct 1040 to 1024); 2) FSR 1024 (Jct 1018 to 1040-730); 3) FSR 1040-700; 4) FSR 1040-720; and 5) FSR 1040-730

Treatment	Units	Unit Cost	# of Units	Total Cost
Storm Proofing	Miles	$5,675	3.4	$19,295

R3 – Install Drainage Features: Roads downslope or within the high and moderate burn severity areas were found to have inadequate drainage for post-fire short-term increased storm runoff. These have been identified at risk for gullying, loss of adequate water distribution and possible fill or ditch failure. Installation of additional drainage features (i.e drain dips and drain sags, both armored and native surfaced) will provide increased capacity and reduce risk from fillslope erosion and downcutting to the road infrastructure. The structures also reduce adverse effects to soil, water quality, and aquatic habitat from fillslope erosion. This request also includes felling of hazard trees along the portion of road to be worked on to mitigate safety concerns.

Locations: 1) FSR 1040-700; 2) FSR 1040-720; and 3) FSR 1040-730

Treatment	Units	Unit Cost	# of Units	Total Cost
Drainage Feature Installation	Miles	$16,490	2.2	$36,278

R4- Storm Patrol: Storm inspection/response will keep culvert and drainage features functional by cleaning sediment and debris from in and around features between or during storms. This work will be accomplished through Forest Service Road Crew, equipment rental, and general labor.

Locations: 1) FSR 1018; 2) FSR 1024; 3) FSR 1026; 4) FSR 1500; 5) FSR 1520; 6) FSR 1040; 7) FSR 1040-300; 8) FSR 1040-320; 9) FSR 1040-700; 10) FSR 1040-720; 11) FSR 1040-730; and 12) FSR 1040-800

Treatment	Units	Unit Cost	# of Units	Total Cost
Storm Patrol	Days	$1,550	5	$7,750

TH- Trailhead Hazard Tree Mitigation - Suppression repair efforts have mitigated the immediate danger trees within the trailheads below, however additional tree mortality is expected over the next few months around these popular trailheads that access the Pacific Crest Trail. **Total request is for $2,000.**

Treatment	Units	Unit Cost	# of Units	Total Cost
TH1-Lava Camp Lake TH	Trees	$50	20	$1,000
TH2- Scott Pass TH	Trees	$50	20	$1,000

T - Trail Stabilization - Work will include installing drainage (rolling grade dips, grade reversals, knicks), water bars and snagging trees as appropriate for worker safety. This work is necessary to protect the trail asset by diverting anticipated increases in surface runoff off the trail. This request also includes felling of hazard trees along the portion of trail to be worked on to mitigate safety concerns. **Total request is for $37,424**.

Trail Name & #/Treatment	Units	# of Units	Unit Cost	Total Cost
T1- Pacific Crest Trail #2000/Drainage	Miles	0.7	$6,135	$4,295
T2- North Matthieu Lake #4062/Drainage	Miles	0.1	$6,135	$614
T3- Millican Crater Trail #4066/Drainage	Miles	1.6	$6,135	$9,816
T4- Scott Pass #4068/Drainage	Miles	0.2	$6,135	$1,227
T5- Green Lakes #17/Drainage	Miles	1.2	$6,135	$7,362
T6- Trout Creek Tie #4067/Drainage	Miles	0.6	$6,135	$3,681
T7- Black Crater Trail/Drainage	Miles	1.7	$6,135	$10,430

Protection/Safety Treatments:

P1 – Road Hazard Signs: Signs will inform users of the dangers associated with entering and recreating within the burned area. Wording for the large warning signs along State Hwy 242 (both ends) will be coordinated with Oregon Department of Transportation (ODOT). **Total request is for $4,800**

Locations:
Large Warning Signs: State Hwy 242 (both ends)
Small Warning Signs: 1) FSR 1018/ Hwy 242 junction; 2) FSR 1040/ Hwy 242 junction; 3) FSR 1018 / 1018-800 junction (to Trout Creek Butte); 4) FSR 1505/1513 junction; 5) FSR 15 at fire boundary; 6) 1505 (east) at fire boundary; and 7) FSR1514 at the fire boundary. Plus two (2) replacement signs.

Treatment	Units	Unit Cost	# of Units	Total Cost
P1 - Installation of warning sign 30x48	Sign/Post	$400	9	$3,600
P1a - Installation of warning sign 42x60	Sign/Post	$600	2	$1,200

P2- Trail Hazard Signs: In addition to the initial installation, there will be a need to monitor and reinstall signage as it becomes worn or is otherwise damaged. Cost includes supplies and labor to install.

Locations: 1) Upper Cross District Trail #2; 2) Cross District Snowmobile Trail #2 & #2a; 3) Lava Camp Lake Trail #4060; 4) Millican Crater Trail #4066; 5) Scott Pass Trail #4068; 6) Pacific Crest Trail #2000 at both ends of fire boundary

Treatment	Units	Unit Cost	# of Units	Total Cost
Trail Hazard Signs	Sign/Post	$400	19	$ 7,600

P3- Traffic Safety Signs: Installation of traffic safety signs, STOP signs, to meet Manual of Uniformed Traffic Control Devices (MUTCD).

Locations: 1) Junction of Upper Cross District trail (north and south sides) and State Highway 242; 2) Junction of FSR 900 (Lava Camp Lake Campground) and State Highway 242.

Treatment	Units	Unit Cost	# of Units	Total Cost
Traffic Safety Signs	Each	$400	3	$1,200

R1 – Temporary Closure of Access Roads with Boulders: Lava Camp Lake Campground interior roads and the Black Crater trailhead access road will be closed using boulder placement and signage to effectively reduce the threat to life and safety for campers. The campground roads and trailhead access should be reevaluated and re-opened when hazards are no longer a threat.

Location: 1) Lava Camp Lake Campground Upper Loop and Cul-de-sac; and 2) Black Crater Trailhead

Treatment	Units	Unit Cost	# of Units	Total Cost
Temporary Closure Access Roads	Each	$2,000	3	$6,000

P4- Interagency Coordination: On going interagency coordination for the Milli Fire is considered essential for keeping city, county, state, and other agencies informed and relaying the BAER assessment findings, particularly with Oregon Department of Transportation, City of Sister Public Works (i.e. back-up Pole Creek Municipal Water Supply), and Natural Resources Conservation Service (NRCS). (Includes 5 days for transportation, 3 day for aquatics and 2 days for botany).

Treatment	Units	Unit Cost	# of Units	Total Cost
Interagency Coordination	Days	$400	10	$4,000

Part VI – Emergency Stabilization Treatments and Source of Funds

		NFS Lands					Other Lands			All
		Unit	# of		Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER $	$	units	$	Units	$	$
A. Land Treatments(L)										
L1-Invasive Survey/ Detection	acres	$9.00	205	$1,845	$0		$0		$0	
L1-Invasive Plant Treatment	acres	$151	20	$3,020	$0		$0		$0	
Subtotal Land Treatments				$4,865			$0		$0	
B. Channel Treatments										
No Treatments Recommended		$0	0	$0	$0		$0		$0	
Subtotal Channel Treat.				$0	$0		$0		$0	
C. Road and Trails (R-T)										
R2- Storm Proofing	Miles	$5,675	3.4	$19,295	$0		$0		$0	
R3- Install Drainage Features	Miles	$16,490	2.2	$36,278	$0		$0		$0	
R4- Storm Patrol	Days	$1,550	5	$7,750	$0		$0		$0	
TH(1-2)- Trailheads Protection	Trees	$50	40	$2,000	$0		$0		$0	
T(1-6) Trail Stabilization	Miles	$6,135	6.1	$37,424	$0		$0		$0	
Subtotal Road & Trails				$102,747	$0		$0		$0	
D. Protection/Safety (R-P)										
P1- Road Hazard Signs 30x48	Sign/ Post	$400	9	$3,600	$0		$0		$0	
P1a - Road Hazard Signs 42x60	Sign/ Post	$600	2	$1,200	$0		$0		$0	
P2- Trail Hazard Signs	Sign/ Post	$400	19	$7,600	$0		$0		$0	
P3 - Traffic Safety Signs	Sign/ Post	$400	3	$1,200	$0		$0		$0	
R1-Temporary Closure of Access Roads	Each	$2,000	3	$6,000	$0		$0		$0	
P4- Interagency Coordination	Days	$400	10	$4,000	$0		$0		$0	
Subtotal Structures				$23,600	$0		$0		$0	
E. BAER Evaluation										
Milli BAER				$39,450	$0		$0		$0	
F. Monitoring (M)										
No Treatments Recommended	Days	0	0	$0	$0		$0		$0	
				$0	$0		$0		$0	
Subtotal Monitoring				$131,212			$0		$0	
G. Totals										
Previously approved										
Total for this request				$131,212						

PART VII - APPROVALS

1. _____ September 22, 2017
Forest Supervisor (signature) Date

2. _____ 9/29/2017
Regional Forester (signature) Date