

Date of Report: October 18, 2020**BURNED-AREA REPORT****PART I - TYPE OF REQUEST****A. Type of Report**

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

**B. Type of Action**

- 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)
- 2. Interim Request # 1
  - Updating the initial funding request based on more accurate site data or design analysis

**PART II - BURNED-AREA DESCRIPTION****A. Fire Name:** Lionshead Fire**B. Fire Number:** OR-WSA-000077**C. State:** OR**D. County:** Jefferson, Wasco, Marion, and Clackamas**E. Region:** 6**F. Forest:** Willamette NF, Mt Hood NF, and Deschutes NF**G. District:** Detroit RD, Clackamas River RD, and Sisters RD, respectively**H. Fire Incident Job Code:**  
PANFV7 (1502)**I. Date Fire Started:** August 16, 2020**J. Date Fire Contained:** (est)  
October 30, 2020**K. Suppression Cost:** (est) \$47.6 million (10/3/2020)**L. Fire Suppression Damages Repaired with Suppression Funds (estimates):**

1. **Fireline repaired (miles):**
2. **Other (identify):** Approximately 15.7 miles of dozer line and 17.4 miles of handline were constructed on FS lands, with an additional 80.7 miles of brushing, blading and snagging along roads for contingency line. Suppression repair activities have started on these lines but completed mileage was not available at the time of this report.

**M. Watershed Numbers:***Table 1: Acres Burned by Watershed*

HUC #12	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
170703060604	Badger Creek	25,503	8,247	32%
170900050207	Boulder Creek- North Santiam River	24,753	21,074	85%

HUC #12	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
170900110201	Cub Creek	14,883	6,619	44%
170900110105	East Fork Collawash River	10,395	1,389	13%
170900050303	French Creek-Detroit Lake	15,212	881	6%
170900110202	Headwaters Clackamas River	25,985	3,820	15%
170900050103	Humbug Creek	10,391	191	2%
170703010910	Jefferson Creek	18,092	7,904	44%
170900110203	Lowe Creek-Clackamas River	19,729	714	4%
170900050302	Lower Blowout Creek	14,730	888	6%
170900050105	Lower Breitenbush River	9,203	7,709	84%
170703060402	Middle Creek-Boulder Creek	27,566	19,005	69%
170703060605	Mill Creek Canal	20,720	2,194	11%
170900050205	Minto Creek-North Santiam River	21,648	1,630	8%
170900050102	North Fork Breitenbush River	16,255	16,255	100%
170900050204	Pamelia Creek	15,475	1,144	7%
170900050208	Sauers Creek-North Santiam River	8,700	3,852	44%
170900050101	South Fork Breitenbush River	13,082	13,082	100%
170703060603	South Fork Warm Springs River	16,555	195	1%
170900050301	Upper Blowout Creek	19,750	1,327	7%
170900050104	Upper Breitenbush River	20,395	16,648	82%
170703011002	Upper Metolius River	31,566	7,422	24%
170703060401	Upper Mill Creek	26,528	21,391	81%
170703060301	Upper Shitike Creek	29,754	16,013	54%
170900050206	Whitewater Creek	11,619	10,490	90%

HUC #12	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
170703011001	Whitewater River	20,894	14,391	69%

**N. Total Acres Burned:***Table 2: Total Acres Burned by Ownership*

OWNERSHIP	ACRES
NFS	104,992
WILLAMETTE NF: 85,678 ACRES	
MT HOOD NF: 17,231 ACRES	
DESCHUTES NF: 2,083 ACRES	
OTHER FEDERAL	91,637
BIA 91,576 ACRES	
ARMY CORPS 61 ACRES	
STATE	533
PRIVATE	7,018
UNDETERMINED	
TOTAL	204,180

**O. Vegetation Types:** The vegetation types within the Lionshead Fire are comprised of Douglas-fir/Western hemlock (46%), mixed conifer (16%) Douglas-fir/True fir (13.4%), Non-forested (10.8%), Mountain hemlock (9.6%) and noble fir (4.3%). Understory composition is dominated by salal, Oregon grape, swordfern, thimbleberry, vine maple and Oregon hazelnut in lower elevations, and beargrass, thin-leaved huckleberry, and rhododendron in higher elevations. Many non-forested areas are considered unique and special habitats and have extensive rare and sensitive plant populations within them.

**P. Dominant Soils:** Soils across FS lands in the Lionshead Fire tend to have sandy loam to loam surface textures and are largely derived from glacial deposits, colluvial materials, or residuum derived from tuffs, breccias, and basalts. Most soils have volcanic ash in the surface layers, generally have high water holding and nutrient retention capacities, and are considered productive forest soils. Most common soil classifications in the western parts of the fire are Andic Humudepts (Aschoff, Browder, Cadenza, Kinney, Zygore series) or Typic Haplolyands (Idanha, Hummington, Longbow, Oneonta, Battleax series). As one moves to the east and north, the landscape transitions to gentler terrain influenced by more recent glacial processes, and soils become even rockier, coarser textured, lower in organic matter, and less developed. Talus slopes and debris chutes are common. Wet meadows and organic-rich soils are present in many of the lake basins. Lava flows with little or no soil or timber cover are present on the far southeast side of the fire on the Deschutes National Forest. Volcanic ash and pumice from the eruption of Mt. Mazama has a stronger influence on soils east of the Cascade Crest.

**Q. Geologic Types:** Bedrock within the Lionshead Fire mainly consists of Pliocene to Holocene igneous extrusive rocks: basalt, basaltic andesite, dacite, rhyolite in the form of vents, domes, flows and cinder cones. Unconsolidated deposits of volcanic ash, pumice, and cinders are common. Surficial deposits mostly are composed of alluvium, fluvial glacial, glacial till, rockslide, landslide and debris flow materials.

## R. Miles of Stream Channels by Order or Class:

*Table 3: Miles of Stream Channels by Order or Class*

STREAM TYPE	MILES OF STREAM
PERRENIAL	405
INTERMITTENT	835
EPHEMERAL	0
OTHER (ARTIFICIAL PATH)	36

## S. Transportation System:

**Trails:** National Forest (miles): 108      Other (miles): 0

**Roads:** National Forest (miles): 422      Other (miles): 440

*Table 4: Miles of Road by Maintenance Level*

ROADS: NATIONAL FOREST TOTAL (MILES)	422
1 - BASIC CUSTODIAL CARE (CLOSED)	110
2 - HIGH CLEARANCE VEHICLES	279
3 - SUITABLE FOR PASSENGER CARS	14
4 - MODERATE DEGREE OF USER COMFORT	1
5 - HIGH DEGREE OF USER COMFORT	18
<b>OTHER (MILES)</b>	<b>440</b>

## PART III - WATERSHED CONDITION

### A. Burn Severity (acres):

*Table 5: Burn Severity Acres by Ownership*

Soil Burn Severity	NFS			Other Federal (List Agency)		State	Local Government	Private	<b>Total</b>	% within the Fire Perimeter
	Willamette	Mt. Hood	Deschutes	BIA	Army Corps					
Unburned	13,389	1,681	306	12,036	1	32	0	1,868	29,314	14.4%
Low	33,446	5,715	766	35,724	38	342	0	2,647	78,680	38.5%
Moderate	30,114	7,591	975	37,714	22	145	0	1,987	78,548	38.5%
High	8,729	2,244	35	6,102	0	14	0	516	17,639	8.6%
<b>Total</b>	<b>85,678</b>	<b>17,231</b>	<b>2,083</b>	<b>91,576</b>	<b>61</b>	<b>533</b>	<b>0</b>	<b>7,018</b>	<b>204,180</b>	

**B. Water-Repellent Soil (acres):** Hydrophobic soils were present at nearly every point that was assessed in the field across all burn severity classes. Significant natural hydrophobicity is common in ash-influenced soils in the Cascades. When organic layers are removed by fire, runoff related to naturally occurring hydrophobicity may be more pronounced. It is likely that fire also exacerbated existing hydrophobicity and increased its extent, but it is not possible to make reliable predictions about fire effects and the extent of fire-induced hydrophobicity. Based on field assessments and knowledge of local soil types, some degree of hydrophobicity should be assumed on all upland acres.

**C. Soil Erosion Hazard Rating:**

Erosion Hazard Rating	Total Acres of FS Lands*	Percent Total FS Lands
Very Severe	17	0.02%
Severe	32,876	31%
Moderate	31,907	30%
Slight	34,140	33%
Not rated	5,793	6%
<b>Grand Total</b>	<b>104,733</b>	<b>100%</b>

Moderate and High SBS in Severe or Very Severe Erosion Hazard	Total Acres	Total Acres of FS Lands*
High SBS, Severe Erosion Hazard	3,537	3,230
Moderate SBS, Very Severe Erosion Hazard	2	2
Moderate SBS, Severe Erosion Hazard	14,036	13,225
<b>Grand Total</b>	<b>17,575</b>	<b>16,457</b>

\*Total acreages reported here may vary slightly from total acreages reported elsewhere due to coverage discrepancies in GIS layers queried for this analysis.

**D. Erosion Potential:** Pre-fire erosion potentials are significantly less than one ton per acre per year. The average erosion potential for the 5-year storm across burned FS lands in the Lionshead Fire is about 11.6 tons per acre. The following erosion rates for selected HUC12 watersheds of concern were calculated from post-fire erosion models for a five-year storm in ERMIT (see Soils Report).

Lionshead Subwatersheds	5-Year Storm Mean Erosion Potential (tons per acre) for Burned Portions Only	5-Year Storm Mean Erosion Potential (tons per acre) for Entire Subwatershed
Boulder Creek-North Santiam River	9.8	8.3
Cub Creek	4.6	2.1
French Creek-Detroit Lake	14.6	14.4
Headwaters Clackamas River	3.7	0.5
Lower Breitenbush River	16.1	14.2
North Fork Breitenbush River	10.8	10.8
Sauers Creek-North Santiam River	16.3	7.3
South Fork Breitenbush River	13.1	13.1
Upper Breitenbush River	16.7	13.7
Whitewater Creek	10.3	9.3

**D. Sediment Potential:** Assuming a 50% delivery ratio of reported erosion rates, the average sediment potential across burned FS lands in the Lionshead Fire is about 5.8 tons per acre.

**E. Estimated Vegetative Recovery Period (years):** Vegetation recovery will vary depending on plant association group, soil type, aspect, and soil burn severity. Areas that burned at low severity will generally recover within the first two years. Areas that burned with moderate soil severity may recover the shrub layer, for the most part, in 3-5 years with canopy formation occurring much later. For sites with high soil burn severity full stand replacement is expected and recovery may take decades.

**F. Estimated Hydrologic Response (brief description):** The Lionshead Fire mostly burned within the Breitenbush River, Headwaters of the North Santiam River, and the Upper Clackamas River watersheds, with large areas of high severity burn in the Devils Creek drainage and reburn of areas in the Whitewater Creek drainage. The primary watershed response is expected to include an initial flush of ash and burned materials; rill and gully erosion in drainages and on steep slopes in the burned area; increased peak flows and sediment transport and deposition into Detroit Reservoir; and debris flows. These responses will likely lead to increased water quality concerns for municipal and domestic drinking water providers within and downstream of the fire perimeters. Watershed responses are dependent on the occurrence of rainstorm and rain-on-snow events and will likely be greatest with initial storm events. Disturbances will become less evident as vegetation is reestablished, providing ground cover that reduces erosion and increasing surface roughness to slow flow accumulation and increase infiltration.

## PART V - SUMMARY OF ANALYSIS

### Introduction/Background

The Lionshead Fire started on August 16<sup>th</sup>, 2020 in Lionshead Canyon on the Confederated Tribes of Warm Springs Reservation approximately 14 miles west of the Warm Springs community. The fire primarily burned on Reservation lands prior to making a significant run towards the west during an historic wind event on September 8<sup>th</sup>. This run spread the fire onto a significant portion of NFS Lands (Willamette, Mount Hood and Deschutes National Forests) as well as other jurisdictional lands. The Lionshead Fire heavily impacted several communities in the Santiam drainage and Breitenbush area, including the loss of 264 resident homes in Detroit, OR. As of October 18th, 2020, the fire was 204,469 acres and 46% contained with an estimated containment date of October 31st, 2020. The BAER assessment started on September 28, 2020 with the final close-out completed on October 15th, 2020. The Critical Values spreadsheet in the project file summarizes critical values evaluated and the risk assessment to identify where a BAER emergency existed that warranted treatment. The risk assessment focused on the most probable damaging storm events, which are typically longer duration wetting rains that occur in the fall or snowmelt in the spring.

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

*Table 4: 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):** Human life/safety is at risk on NFS land from threats associated with post-fire related hazard trees, rock fall, increased flooding and debris flows, and loss of egress/access throughout the burned area, but particularly on roads and trails. A fair number of Forest Service roads access private lands or communities and cannot be closed. Almost all of these roads have post-fire safety concerns that need to be addressed in some fashion to allow for safe travels (i.e. signage, guard rail replacement, storm proofing). In addition, there are a fair number of HDPE (plastic) culverts that were compromised and will need replacement prior to allowing for safe travel.

Fire also destroyed Forest Service owned and privately owned (under special use permit) facilities. The Breitenbush Community lost approximately 71 recreation residence buildings (on NFS lands) alone. These burned facilities now pose an immediate threat to human life and adjacent surface waters, many of which are domestic drinking water source areas or designated Critical Habitat for Threatened and Endangered Fish. Building ash is hazardous due to the known associated contaminates such as asbestos, lead-based paint and hazardous household waste.

2. **Property (P):** Damage to or loss of sections of road and trail could occur from increased runoff, erosion, flooding, and potentially debris flows within and downslope or downstream of areas of moderate and high soil burn severity. Forest Service roads for ingress and egress to the 154-acre Breitenbush Community (that has approximately 85 permanently staff that live there) are at risk to increased runoff, erosion and flooding. Due to the intensity and size of the fire along with the number of blow down and rockfall several roads and trails were not accessible for the team to survey. Known roads impacted are FSR 46, 2231, 2231870, 2234100, and 1003. In addition, 24.7 miles of trails within the fire perimeter have sections of trail tread that are at unacceptable risk to post-fire damage.

Compromised (burnt up/melted) plastic culverts are expected to continue to degrade over the winter months and compromise road integrity. Loss of cross road drainage is a significant threat to a lot of roads within the fire area.

Several Forest Service owned recreation facilities are at risk for additional damage due to hazard trees weakened by the fire. Again, due to the downed trees, debris and rocks in roadways, a lot of these structures were not accessible and could not be surveyed.

3. **Natural Resources (NR):**

- a. **Water quality** is a major post fire concern as elevated erosion rates and stream flows can impact drinking water supplies and associated filtration systems. Increased sediment and debris transport can also increase sediment loading and reduce water storage capacity in flood storage reservoirs. Critical Habitat for Upper Willamette Chinook and Steelhead is at risk to degradation with increased fine sediment and reduced stream shading post-fire. Water quality managers in the North Santiam Basin are also considering the potential for increased harmful algal blooms due to sediment transport into Detroit Lake. Continued communication and coordination with partners and downstream users related to water quality is

considered essential for relaying the BAER assessment findings, particularly with municipal water supply providers and the Army Corps of Engineers.

The Beachie and Lionshead fires impacted source water drainages for numerous municipal and private domestic drinking water supplies. Downstream municipal users dependent on rivers originating in the fire area include: Salem, Stayton, Lyons, Mehema and Gates on the N. Santiam River, Idanha and Detroit which are reliant on the Rainbow and Mackey drainages, respectively, and Jefferson and Albany with intakes on the Santiam River. Private users include Breitenbush Hot Springs Resort, the N. Santiam Sportsmen Club, Opal Creek Ancient Forest Center, and residential intakes for recreational residences in the Stahlman and Breitenbush areas. Several Forest Service Campgrounds rely on water from unnamed tributaries. Some of these intakes have been damaged in the fire and new systems will need to be developed. Other systems are at threat of degraded water quality or at risk of intakes and systems becoming clogged or damaged by high flows.

- b. Native and naturalized plant communities**, where invasive species or noxious weeds are absent or present in minor amounts, are at risk of invasion by known weed populations. Many of these weeds are on the State of Oregon's noxious weeds list and are adjacent to areas of high and moderate SBS, and areas disturbed by suppression activities. Noxious weed infestations pose a serious threat to the composition, structure, and function of native plant communities. Crown canopy was highly reduced to eliminated (moderate to high intensity burned areas); as was shrub and forb cover in the understory. These disturbed areas are now highly vulnerable to noxious weed spread from existing infestations or adjacent sources. Invasive plants of concern include False brome, Armenian blackberry, Spotted knapweed, Canada thistle, Scotch broom and Tansy ragwort.
- c. Threatened and Endangered Fisheries and Wildlife** species exist within the burn area. Species of concern include the Northern Spotted Owl, Upper Willamette Chinook and Upper Willamette Steelhead Trout. Thousands of acres of Northern Spotted Owl suitable habitat were converted to non-habitat, resulting in critical consequences. However there are no effective treatments to mitigate the impacts to the Owls at this point, other than following seasonal restrictions, where feasible, for activities that would adversely impact use of remaining viable habitat. Increased habitat degradation and juvenile and sub-adult mortality of Chinook salmon is possible due to accelerated sedimentation, loss of stream shade and large wood, and potential accelerated channel erosion in the Breitenbush and Metolius Rivers. Road and trail related treatments will mitigate additional sedimentation due to road fill failures and lack of drainage capacity. Fish and wildlife specific actions are more long-term where strategic assessments are needed to inform actions. There are no specific treatment recommendations for fisheries at this point, other than those already recommended by hydrology, engineering and recreation (i.e. storm proofing road features, replacing culverts, storm inspection and response, road/trail stabilization).
- d. Soil Productivity** - Reduced ground cover, reduced infiltration, and altered soil structure following wildfire increases the risk of soil erosion and mass wasting. Human life and safety, infrastructure function and stability, stream function, fish viability, and soil productivity can all be threatened from sheet and rill erosion,

debris flows, mass wasting, road slumping, and sediment delivery to streams. In some cases, these risks may persist for several years after the fire. While low SBS may increase the likelihood of soil-moving events, these events are most likely and most severe in areas of moderate to high SBS. Many of the landscapes within the fire area are prone to natural slope failures and debris flows. Some deep-seated landslides/slumps are also present. It is difficult to predict how fire will elevate the relative risk of these natural processes. Areas with high burn severity and high predicted hillslope erosion rates may result in sediment bulking/loading in debris flow-prone channels. Reduced surface cover and loss of slope stability due to root mortality may increase susceptibility to shallow rapid slope failures. Increased stream flows may impinge on the toeslopes of deep-seated earth flows, and when combined with reduced slope strength associated with root mortality, may make large slumps more likely.

4. **Cultural and Heritage Resources:** There are several cultural sites within the fire, including a few with significance to the Confederated Tribes of Warm Springs. The largest threat to most of the sites within the fire is from looting from the public due to visibility and erosion damage from increased post-fire surface runoff. Cultural resources at risk include traditional use areas, prehistoric lithic scatters, rockshelters, mining and railroad camps, mills and historic trails. Of those that qualify as BAER Critical Values, there are three sites that are at risk to looting and/or degradation from erosion.

## B. Emergency Treatment Objectives:

### Proposed Land Treatments

The objective of the land treatments is to:

1. Promote and protect native and naturalized vegetative recovery by reducing the spread of noxious weeds and reduce the spread of noxious weeds due to suppression activities. (L1a/L1b)
2. Stabilize and disguise cultural sites in order to avoid the loss of site elements resulting from looting, vandalism, and/or erosion. (L5b)
3. **Note -** No active land treatments are recommended for long-term soil productivity. Allowing for natural recovery is the recommended course of action. Landscape mulching/seeding treatments within feasible treatment areas were analyzed to determine whether a meaningful decrease in erosion/sediment delivery could be realized at the catchment scale. Data analysis found that implementing mulching treatments would result in a small overall decrease in erosion of 0.5 to 1.5 tons per acre. Even where the greatest incremental decreases could be realized, the overall erosion rate would remain high. This minimal decrease is not significant enough to meaningfully protect long-term soil productivity in these drainages nor meaningfully reduce the amount of sediment delivered to waterways. Many areas have already experienced significant soil loss as a result of two major precipitation events that occurred in late September and mid-October. It is also likely that additional damaging storm events would occur before treatments could be implemented.

### Proposed Road and Trail Treatments

The objective of the road and trail treatments are to:

1. Protect road and trail investments from becoming impassable and damaged due to increased post-fire runoff. (RT1a, RT2, RT4, RT5, RT13)

2. Reduce sedimentation into streams degrading water quality important for T&E Fish species and municipal drinking water. (R1a, RT2, RT4, RT5, RT13)
3. Improve road crossing drainage by increasing ditch and catchment basin capacity and replacing burned up HDPE (High Density Polyethylene – plastic) culverts to reduce the potential for road failure due to increased flows. (RT1a, RT4, RT5)

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 on the 46 road. (P1a, P1b)
2. Posting of hazard warning signs along various Forest Service roads and trails to warn users of potential hazards resulting from post-fire conditions. (P1a, P1b, P2)
3. Protect worker and public safety by removing hazard trees at trailheads and within the vicinity of road turn outs. Also provide for safety by removing hazard trees associated with BAER treatments and within the vicinity of road, trail and hazardous material mitigation BAER treatment sites. (RT5, RT13, P3a, P4, P5, P6)
4. Protect the traveling public, including permanent residents from the Breitenbush Community, along FSR 46 from vehicular accidents by replacement of critical traffic control devices (guardrail). (P4)
5. Protect employees and drinking water source areas from exposed hazardous materials as a result of burnt forest service facilities, and structures under Special Use Permit on NFS land. (P5)
6. Protect downstream human life and property through facilitation and authorization (through special use permit) of the installation of early warning systems on NFS lands. (P10)
7. Protect Forest Service investments and recreation infrastructure. (P6, P3a)

Proposed Channel Treatments:

1. Information sharing and special use authorization of burned intake facilities on Forest Service lands for municipal water service providers including the Breitenbush community and the Cities of Detroit and Idanha. (C1)

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

Land: 90

Channel: 85

Roads/Trails: 75

Protection/Safety: 90

**D. Probability of Treatment Success**

Table 5: Probability of Treatment Success

	<i>1 year after treatment</i>	<i>3 years after treatment</i>	<i>5 years after treatment</i>
<i>Land</i>	80	85	90
<i>Channel</i>	90	90	90
<i>Roads/Trails</i>	80	85	90
<i>Protection/Safety</i>	80	90	90

**E. Cost of No-Action (Including Loss):** Approximately \$1.3 million based on road and trail reconstruction, expansion of invasive weeds, and damage and loss of FS facilities, Critical Habitat and cultural resources. Cost of injuries to public and personnel and loss of municipal drinking waters were not included in this analysis, although treatments were developed for protection of those.

**F. Cost of Selected Alternative (Including Loss): \$1,128,306 (\$1,295,306 Including loss)**

**G. Skills Represented on Burned-Area Survey Team:**

Soils       Hydrology       Engineering       GIS       Archaeology  
 Weeds       Recreation       Fisheries       Wildlife

Other:

Facilities/Hazmat  
PIO  
BAER Liaison

**Team Leader:** Rob Tanner

Email: robert.tanner@usda.gov

**Phone(s):** 503.812.3221

**Forest BAER Coordinator:** Fred Levitan

Email: frederick.levitan@usda.gov

**Phone(s):** 541.731.2593

**Team Members:** *Table 6: BAER Team Members by Skill*

Skill	Team Member Name
<i>Team Lead(s)</i>	Rob Tanner
<i>Assistant Team Lead(s)</i>	Peggy Fisher, Kyle Wright, Dan Rife
<i>Soils</i>	Sarah Hash; Nori Koehler
<i>Hydrology</i>	Leah Tai, Jamie Sheahan-Alonso, Kacey Largent
<i>Geology</i>	Barton Wills
<i>Engineering</i>	Daniel Matthews, Cody Phillips, Chris Martin, Justin Nettleton, Bryan Kurtz
<i>Facilities/Hazmat</i>	Roger Bell
<i>GIS</i>	Dorothy Thomas, Ian Yau, Tara McKinnon
<i>Archaeology</i>	Mike Boero
<i>Weeds/ Botany</i>	Krista Farris
<i>Recreation</i>	Josh Weathers, Brandon Haraughty
<i>Fisheries</i>	Richard Vacirca
<i>BAER Liaison</i>	Zachary Spears
<i>PIO</i>	Kassidy Kern
<i>Wildlife</i>	Joe Doerr, Esmeralda Bracamonte, Ruby Seitz
<i>Other</i>	

**H. Treatment Narrative:**

**Land Treatments:**

**L1a. / L1b. Invasives EDRR and Invasives EDRR Suppression:** Early detection/rapid response (EDRR) surveys will focus on areas where unimpaired native plant communities (that burned at high or moderate soil burn severity) have known State of Oregon listed noxious

weeds adjacent to them, as well as areas disturbed by suppression activities. EDRR will be used to minimize the potential for new noxious weed infestations and ensure the natural recovery of native vegetation. Heavy equipment used for suppression activities travelled through areas of known weed populations to unaffected areas, which substantially increased the risk of noxious weed spread in these disturbed areas. Detection and treatment of new and existing noxious weed infestations will reduce the likelihood of spread to disturbed areas and allow for the re-establish of native and naturalized plant communities. Invasive plants of concern include False brome, Armenian blackberry, Spotted knapweed, Canada thistle, Scotch broom and Tansy ragwort. All of these are on Oregon Department of Agriculture's List of Noxious Weeds.

Treatment	Units	Unit Cost	# of Units	Total Cost
L1a - Invasives EDRR	Acres	\$130	182	\$23,660
L1b- Invasives EDRR-Suppression	Acres	\$130	325	\$42,250

**L5b - Cultural Treatments (mulch/disguise):** 3 sites in the Lionshead Fire area have been identified as having values at risk of damage to or loss of site elements resulting from looting, vandalism, and/or erosion. Treatments includes road closure, slash covering, and hazard tree abatement.

Treatment	Units	Unit Cost	# of Units	Total Cost
L5b. Cultural Treatments (mulch/disguise):	Site	\$2,241	3	\$6,725

#### Channel Treatments:

**C1. Source Water Protection:** Special use reauthorization and access will be needed for drinking water providers to maintain burned intake structures on Forest Service lands. The drinking water service providers and have been impacted include: The private inholding of the Breitenbush community, Cities of Detroit and Idanha. These systems will require coordination for access on NFS lands for maintenance and repairs of water systems.

Treatment	Units	Unit Cost	# of Units	Total Cost
C1. Source Water Protection	Days	\$400	10	\$4,000

#### Roads and Trail Treatments:

Only those FS roads and trails within or below areas burned at moderate or high SBS and have increased risk of damage due to post-fire conditions are recommended for emergency response. Proposed treatments are designed to improve drainage at drainage crossings and along adjacent slopes in order to remove higher levels of runoff from trails and roads before extensive damage or loss of infrastructure can occur. Roads and trails were designed to be practical, economic treatments to mitigate risk to acceptable levels.

**RT1a. Road Drainage (storm proofing existing drainage features):** This treatment includes storm proofing drainage features identified for critical value roads that are susceptible to damage or failure due to increase post-fire flows. Activity will include cleaning culverts, enhancing ditches, catchment basin and lead-out ditch capacity where they exist, road berm or ditch slump removal, and replacement of burn-out drop inlet covers as necessary to handle post-fire flows, sediment and debris. Includes FS Roads 46, 2231, 2231870, 2234100 & 1003.

Treatment	Units	Unit Cost	# of Units	Total Cost
RT1a. Road Drainage	Miles	\$4,520	21	\$94,920

**RT2. Storm Inspection and Response:** Storm inspection and response will keep culvert and drainage features functional by cleaning sediment and debris from in and around features between or during storms. Increase the frequency of storm inspections and availability of equipment to clean out culvert inlets based on local weather forecasts. This work will be accomplished through Forest Maintenance Contract, equipment rental, and general labor.

Treatment	Units	Unit Cost	# of Units	Total Cost
RT2. Storm Inspection and Response	Day	\$2,000	18	\$36,000

**RT4. Armored Dip:** Armored dips are recommended in locations where the existing culvert is undersized for post-fire short-term increased runoff. These sites are at risk of plugging, overtopping and road prism failure. Installation of these features will provide increased capacity and reduce the associated risk to road infrastructure.

Treatment	Units	Unit Cost	# of Units	Total Cost
RT4. Armored Dip	Each	\$2,500	3	\$7,500

**RT5. Culvert Modification:** HDPE culverts (plastic) were damaged and/or destroyed as a result of the fire and need to be replaced to allow for user safety and to maintain a functional drainage system in order to protect surface waters from sedimentation. This treatment would only occur on roads that cannot be closed including the 46 road to Breitenbush, the secondary route out of Breitenbush (2231) as well as removing 3 on the Mt. Hood National Forest.

Treatment	Units	Unit Cost	# of Units	Total Cost
RT5. Culvert Modification	Each	\$5,600	34	\$190,400

**RT. 13- Trail Drainage:** 24.7 miles of trail will require drainage treatments due to increased post-fire runoff and erosion compromising trail tread. Work will include installing drainage (rolling grade dips, grade reversals), step-down drain installations (armored drainage crossings), restoring out slope, re-establishing tread, replacing damaged retaining structures where necessary, and snagging trees as appropriate for worker safety.

Treatment	Units	Unit Cost	# of Units	Total Cost
RT13. Trail Drainage	Mile	\$5,882	24.7	\$145,285

#### **Protection/Safety Treatments:**

Treatments are specifically designed to protect the public, employees, contractors, and municipal waters from immediate threats as a result of the fire. Threats include hazard trees, rock fall, potential flood and debris flows, and hazardous materials.

**P1a. Road Warning Signs:** Signs will inform users of the dangers associated with entering and recreating within the burned area.

Treatment	Units	Unit Cost	# of Units	Total Cost

P1a. Road Hazard Signs	Sign/Post	\$600	24	\$12,600
P1a. Road Closure Signs	Sign/Post	\$450	12	\$5,400
<b>Total Cost</b>				<b>\$4,500*</b>

\*\$13,500 was previously received so the additional \$4,500 requested is what is needed to complete this work.

**P1b. Trail/Recreation Hazard Signs:** This cost estimate is for placing information boards and posting hazard related signs to notify the public of post fire hazards and maintenance for one year (see recreation report for locations).

Treatment	Units	Unit Cost	# of Units	Total Cost
P1b. Trail/Recreation Hazard Signs	Sign/Post	\$70	78	\$5,460

**P2. Road Closure Devices:** Jersey Barriers will discourage public use of areas that have a high post-fire risk to human life and safety.

Treatment	Units	Unit Cost	# of Units	Total Cost
P2. Road Closure Device	Each	\$650	24	\$15,600

**P3a. Hazard Trees (developed sites):** Work will include removal of hazard trees in the immediate vicinity of areas where the public will congregate, predominately at trailheads that are not expected to be closed. The cost of hazard tree removal is estimated at an average \$90 per tree, based on recent removal costs provided by local concessionaires (cost may be higher or lower per tree due to size, complexity and number of adjacent structures).

Treatment – P3a. Hazard Trees	Units	# of Units	Unit Cost	Total Cost
<b>Mt. Hood</b>				<b>\$6,750</b>
Fish Lake (East)	Hazard Trees	5	\$90	\$450
Fish Lake (West)	Hazard Trees	5	\$90	\$450
Horseshoe Saddle	Hazard Trees	10	\$90	\$900
Lodgepole	Hazard Trees	5	\$90	\$450
Monon Lake	Hazard Trees	10	\$90	\$900
Olallie Lake (East)	Hazard Trees	10	\$90	\$900
Olallie Lake (West)	Hazard Trees	10	\$90	\$900
Pacific Crest Trail - MTH	Hazard Trees	10	\$90	\$900
Red Lake (East)	Hazard Trees	5	\$90	\$450
Red Lake (West)	Hazard Trees	5	\$90	\$450
<b>Willamette</b>				<b>\$8,100</b>
Cheat Creek	Hazard Trees	5	\$90	\$450
Crown Lake	Hazard Trees	5	\$90	\$450
Humbug Flats	Hazard Trees	10	\$90	\$900
Leone Lake	Hazard Trees	5	\$90	\$450
Roaring Creek	Hazard Trees	5	\$90	\$450
South Breitenbush	Hazard Trees	15	\$90	\$1,350

South Breitenbush Gorge	Hazard Trees	5	\$90	\$450
South Breitenbush Gorge	Hazard Trees	5	\$90	\$450
Stahlman Point	Hazard Trees	5	\$90	\$450
Triangulation	Hazard Trees	20	\$90	\$1,800
Whitewater	Hazard Trees	5	\$90	\$450
Woodpecker Ridge	Hazard Trees	5	\$90	\$450
<b>Grand Total</b>				<b>\$14,850</b>

**P4. Guardrail Repair:** This treatment will repair and replace sections of guardrail that have been compromised from the fire. Treatment will also include cleanup of existing guardrail and mitigation of danger trees along the work areas. Existing guardrail is a critical traffic control device for protection of the traveling public, including permanent residents from the Breitenbush Community, along FSR 46.

Treatment	Units	Unit Cost	# of Units	Total Cost
P4. Guardrail Repair	Lineal Ft	\$64.74	7073	\$457,906

**P5 – Hazardous Material (FS Facilities):** Pumping of the vaults of two (2) burned up Romtec toilets at Peninsula Campground on the Mt. Hood National Forest that pose a safety hazard or could contaminate drinking water source areas.

Treatment	Units	# of Units	Unit Cost	Total Cost
P5. Hazardous Materials	Site	1	\$2,500	\$2,500
<b>Total Cost:</b>				<b>\$2,500</b>

**P5. Hazardous Material (Breitenbush Recreations Residences):** The entire 71 cabin Breitenbush recreation residence home tract burned as a result of the Lionshead Fire. Of the 71 homes, 40 pose a direct water quality threat due to potentially hazardous materials in Devils Creek and South Fork Breitenbush River. Treatment will stabilize hazardous materials by installing straw waddles to direct water away from the footprint of the burned structures. In addition, hazmat absorbent socks in between the burnt structures will keep hazardous materials adjacent streams. For crews to operate safely overhead hazardous will be mitigated prior to engaging in hazardous material stabilization. The State (EPA) is supposedly going to clean up the hazardous material sites, but with the large workload of this activity in and around communities that burned, the BAER Team recommends this preventative measure to protect drinking water and T&E species and habitat.

Treatment	Units	Unit Cost	# of Units	Total Cost
P5. Hazardous Material (Breitenbush Recreations Residences)				
Specialized Materials	Cabin	\$325	40	\$13,000
Crews of Installation	Days	\$2,600	10	\$26,000
Hazard Tree Mitigation	Days	\$2,000	5	\$10,000
<b>Total Cost</b>				<b>\$49,000</b>

**P5. Hazardous Material (Chemeketans Cabin and Santiam Sportsmen Club):** The Chemeketans trail club cabin was burned down as the result of the Lionshead fire. The cabin

site sits adjacent to Whitewater Creek with any contaminated runoff flowing directly into Whitewater Creek. The Santiam Sportsmen Club has several cabins and structures directly adjacent to Detroit Reservoir that burnt as a result of the Lionshead fire. Treatment will install straw waddles directing water away from the footprint of the burned structure and hazmat absorbent socks between the burnt structures and adjacent streams.

Treatment	Units	Unit Cost	# of Units	Total Cost
<b>P5. Hazardous Material (Chemeketans Cabin and Santiam Sportsmen Club):</b>				
Specialized Materials	Cabin	\$325	6	\$1,950
Crews of Installation	Days	\$1,000	6	\$6,000
		<b>Total Cost</b>		<b>\$7,950</b>

**P6. Infrastructure Protection:** This treatment will mitigate hazard trees from falling and damaging Forest Service properties with significant economic value such as large picnic shelters and toilets.

Recreation Site Name	Units	# of Units	Unit Cost	Total Cost
<b>Mt. Hood</b>				<b>\$12,600</b>
Lower Lake Campground	Hazard Trees	15	\$90	\$1,350
Paul Dennis Campground	Hazard Trees	15	\$90	\$1,350
Camp Ten Campground	Hazard Trees	15	\$90	\$1,350
Peninsula Campground	Hazard Trees	25	\$90	\$2,250
Horseshoe Lake Campground	Hazard Trees	25	\$90	\$2,250
Breitenbush Lake Campground	Hazard Trees	25	\$90	\$2,250
Olallie Lake Day Use Area	Hazard Trees	15	\$90	\$1,350
Olallie Lake Guard Station	Hazard Trees	5	\$90	\$450
<b>Willamette</b>				<b>\$7,200</b>
Breitenbush Campground	Hazard Trees	10	\$90	\$900
Cleator Bend Group Campground	Hazard Trees	5	\$90	\$450
Cove Creek Campground	Hazard Trees	5	\$90	\$450
Detroit Flats Day Use Area	Hazard Trees	5	\$90	\$450
Fox Creek Group Camp	Hazard Trees	10	\$90	\$900
Hoover Campground	Hazard Trees	5	\$90	\$450
Humbug Campground	Hazard Trees	5	\$90	\$450
Piety Island Campground	Hazard Trees	5	\$90	\$450
Southshore Campground	Hazard Trees	5	\$90	\$450
Upper Arm Day Use Area	Hazard Trees	20	\$90	\$1,800
Whispering Falls Campground	Hazard Trees	5	\$90	\$450
<b>Grand Total</b>				<b>\$19,800</b>

**P8. Early Warning System Permitting and Support:** This treatment provides support in the form of any required review and expedited permit processing for a cooperating organization to install a precipitation or stream stage monitoring device that would be installed to provide early warning of flooding to relevant agencies. Current interested agencies include, National Weather Service, USGS, Portland State University and Army Corps of Engineers. \$4000 was previously funded in the Initial 2500-8. There is no additional request at this time.

Treatment	Units	Unit Cost	# of Units	Total Cost
P8. Early Warning System Permitting and Support	Days	\$400	10	\$4,000

**I. Monitoring Narrative:**

**PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS**

Line Items	Units	Cost	NFS Lands			# of units	Other Lands		# of Units	Non Fed \$	Total \$
			Unit	# of Units	BAER \$		Other \$	Fed \$			
<b>A. Land Treatments</b>											
L1a. Invasives EDRR	Acres	\$130	182	\$23,660	\$0						
L1b. EDRR Suppression	Acres	\$130	325	\$42,250	\$0						
L5b- Cultural Treatments	Site	\$1,345	5	\$6,725							
<i>Subtotal Land Treatments</i>					\$72,635						
<b>B. Channel Treatments</b>											
C1. Source Water Protection	Days	\$400	10	\$4,000	\$0						
<i>Subtotal Channel Treatments</i>					\$4,000						
<b>C. Road and Trails</b>											
RT1a. Road Drainage	Miles	\$4,520	21	\$94,920	\$0						
RT2. Storm Inspect and Response	Days	\$2,000	18	\$36,000							
RT4. Armored Dip	Each	\$2,500	3	\$7,500							
RT5. Culvert Modification	Each	\$5,600	34	\$190,400	\$0						
RT13. Trail Drainage	Miles	\$5,882	24.7	\$145,285							
<i>Subtotal Road and Trails</i>					\$474,105						
<b>D. Protection/Safety</b>											
P1a. Road Warn/Close Signs	Each	\$500	9	\$4,500	\$0						
P1a. Road Warn/Close Signs	Each	\$500	27	\$13,500							
P1b. Trail Rec Warning Signs	Each	\$70	78	\$5,460							
P2. Road Closure Devices	Each	\$650	24	\$15,600	\$0						
P3a. Hazard Tree FS Facilities	Each	\$90	165	\$14,850	\$0						
P4. Guardrail Repair	Lin Ft	\$64.74	7073	\$457,906	\$0						
P5. HazMat - Septic Pump	Site	\$2,500	1	\$2,500	\$0						
P5. HazMat Stabilize Breit. Rec Res	Site	\$1,225	40	\$49,000							
P5. HazMat Special Use Cabins	Site	\$1,325	6	\$7,950							
P6. Infrastructure Protection	Each	\$90	220	\$19,800							
P8. Early Warning Permitting	Days	\$400	10	\$4,000	\$0						
<i>Subtotal Protection/Safety</i>					\$577,566						
<b>E. BAER Evaluation</b>											
Initial Assessment	Report			\$98,840							
<i>Subtotal Evaluation</i>					\$98,840						
<b>F. Monitoring</b>											
<i>Insert new items above this line!</i>					\$0						
<i>Subtotal Monitoring</i>					\$0						
<b>G. Totals</b>											
Previously approved					\$17,500						
Total for this request					<b>\$1,128,306</b>						

**PART VII - APPROVALS**

1. SHANDA DEKOME Digitally signed by SHANDA DEKOME  
Date: 2020.10.20 12:58:40 -07'00'
- Forest Supervisor, Deschutes National Forest Date
2. Forest Supervisor, Mt. Hood National Forest Date
3. D. M. W. 10/20/2020  
Forest Supervisor, Willamette National Forest Date