

**Date of Report: 10/20/2020****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 #\_\_\_\_\_  
☐ Updating the initial funding request based on more accurate site data or design analysis

**PART II - BURNED-AREA DESCRIPTION****A. Fire Name: Archie****B. Fire Number: OR-UPF-000436****C. State: OR****D. County: Douglas****E. Region: R6****F. Forest: Umpqua National Forest****G. District: North Umpqua****H. Fire Incident Job Code: P6NKL8 (0615)****I. Date Fire Started: 9/8/2020****J. Date Fire Contained: 95% (as of 10/18/2020)****K. Suppression Cost: \$34.8M****L. Fire Suppression Damages Repaired with Suppression Funds (estimates):**

1. Fireline repaired (miles): 72.1 miles  
2. Other (roads): 48.3 miles

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

Subwatershed Name	Total Subwatershed		Subwatershed Outside the Fire	Soil Burn Severity							
				Unburned or Very Low		Low		Moderate		High	
	Acres	% Burned		Acres	%	Acres	%	Acres	%	Acres	%
Apple Creek-North Umpqua River	11,727	15%	8,969	955	8%	1,037	9%	740	6%	25	0%
Bradley Creek-North Umpqua River	19,932	43%	10,787	588	3%	1,825	9%	4,824	24%	1,907	10%
Cooper Creek-North Umpqua River	27,738	1%	27,394	128	0%	94	0%	122	0%		0%
East Fork Rock Creek	14,309	88%	605	1,082	8%	2,060	14%	5,071	35%	5,491	38%

Emile Creek	8,697	8%	7,951	63	1%	228	3%	446	5%	10	0%
Gassy Creek- Calapooya Creek	25,530	8%	22,911	617	2%	757	3%	1,083	4%	163	1%
Headwaters Calapooya Creek	19,430	23%	14,150	789	4%	789	4%	2,764	14%	939	5%
Hinkle Creek- Calapooya Creek	23,518	47%	12,124	362	2%	1,254	5%	6,654	28%	3,125	13%
Lower Canton Creek	17,301	10%	13,595	1,941	11%	1,009	6%	690	4%	65	0%
Lower Little River	21,781	9%	19,013	719	3%	1,017	5%	957	4%	77	0%
Lower Rock Creek	24,578	100%		24	0%	715	3%	9,250	38%	14,588	59%
Lower Steamboat Creek	16,557	0%	16,527	6	0%	11	0%	13	0%		0%
Middle Little River	18,429	5%	17,292	236	1%	436	2%	433	2%	32	0%
Panther Creek	12,172	8%	10,192	1,019	8%	690	6%	269	2%	3	0%
Susan Creek-North Umpqua River	21,961	90%	1,115	1,149	5%	2,563	12%	10,034	46%	7,099	32%
Thunder Creek-North Umpqua River	16,587	72%	4,156	534	3%	1,077	6%	5,826	35%	4,993	30%
Upper Rock Creek	23,855	28%	16,077	1,045	4%	1,589	7%	3,055	13%	2,089	9%
Williams Creek-North Umpqua River	12,413	79%	2,132	436	4%	1,529	12%	5,670	46%	2,645	21%
<b>Grand Total</b>	<b>336,515</b>	<b>36%</b>	<b>204,991</b>	<b>11,692</b>	<b>3%</b>	<b>18,681</b>	<b>6%</b>	<b>57,901</b>	<b>17%</b>	<b>43,251</b>	<b>13%</b>

#### N. Total Acres Burned:

Table 1: Total Acres Burned by Ownership

OWNERSHIP	ACRES
NFS	26,645
OTHER FEDERAL (BLM)	40,429
STATE	39
PRIVATE	63,847
UNDETERMINED	620
<b>TOTAL</b>	<b>131,580</b>

- O. **Vegetation Types:** The Archie Creek Fire has impacted three main landscapes on Forest Service land. To the south of the Umpqua River, a primarily Western hemlock (*Tsuga heterophylla*), Douglas fir (*Pseudotsuga menziesii*), Sugar pine (*Pinus lambertiana*) and Incense cedar (*Calocedrus decurrens*) forest dominates with understories of Golden chinquapin (*Chrysolepis chrysophylla*), Pacific rhododendron (*Rhododendron macrophyllum*), snowbrush (*Ceanothus velutinus*) and manzanita (*Arctostaphylos* species). Primary ground cover species include Vanilla leaf (*Achlys triphylla*) and Dwarf Oregon grape (*Mahonia nervosa*). To the north of the river and atop the cliffs, the forest is dominated by Douglas fir, Madrone (*Arbutus menziesii*), Big-leaf maple (*Acer grandiflorum*), Oceanspray (*Holodiscus discolor*) and Deerbrush (*Ceanothus integrerrimus*) with ground cover of Iris (*Iris chrysophylla*), Whipple vine (*Whipplea modesta*) and a variety of understory grasses. This forest type is interspersed by dry rocky meadows with populations of Oregon white oak (*Quercus garryana*) and Poison oak (*Toxicodendron diversilobum*). Down from the cliffs, in the much moister creek draws at the highway level, Douglas fir, Big-leaf Maple and Grand fir (*Abies grandis*) cover populations of Pacific dogwood (*Cornus nutallii*), Salal (*Gaultheria shallon*), Vine maple (*Acer circinatum*) and Sword fern (*Polystichum minutum*).
- P. **Dominant Soils:** Dominant soils originate from residuum and colluvium materials with components of Mazama volcanic materials and minor components of volcanic ash deposits. Soils range from loamy sands, sandy loams, loams, and clay loams with varying amounts of rock content, generally increasing with

depth. Rock outcrops with exposed rocks is common throughout the area making up 14% of soils mapped in the Umpqua National Forest Soil Resource Inventory (SRI). Soils tend to be shallow to moderately deep, depth to bedrock less than 3 feet up to 8 feet. Dominant soils in this area originate from andesites to basalts commonly as well as areas of weathered red breccia, highly weathered breccias, tuffs, and welded tuffs. These soils are generally moderately well to well drained with rapid to moderate permeability.

#### Q. Geologic Types:

The Archie Creek Fire perimeter is located within the Western Cascade province of the Oregon Cascade Range. In general, the landscape is a steeply dissected block of Tertiary tuffs and lavas. Six geologic units are present within the fire perimeter. The largest unit by area, Tub, which is made of columnar basaltic lava flows and breccia, is found on both sides of the North Umpqua River. A band of tuff (Tut) runs south of, and roughly parallel to, the river. A sedimentary and volcanoclastic rock unit composed of lapilli tuff, mudflow deposits (lahars), and flow breccia (Tus) is found throughout the fire perimeter. Landslide deposits, basalt and andesite intrusions, and silicic vent complexes are also found in the area.

Weathered rocks in this province support relatively high rates of runoff and erosion. Consequently, mass wasting processes are common throughout the landscape. Many landslides have been mapped by the State of Oregon Department of Geology and Minerals Industries (DOGAMI). Most of these landslides appear in the tuff and sedimentary units; very few landslides occur within the basalt unit. A relatively large landslide deposit occurs along the western border of the area of interest. A mapped fault located upgradient of the deposit may be responsible, in part, for the mass wasting events that have occurred along the slope. Several large landslides are also mapped on either side of Panther Ridge, especially on its south face (near Panther Creek).

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

Table 2: Miles of Stream Channels by Order or Class

STREAM TYPE	MILES
PERENNIAL (FISH BEARING)	45.46
PERENNIAL (NON-FISH BEARING)	125.09
INTERMITTENT	295.26

#### S. Transportation System:

**Trails:** National Forest (miles): 47.38      Other (miles):  
**Roads:** National Forest (miles): 109.58      Other (miles): 8.567

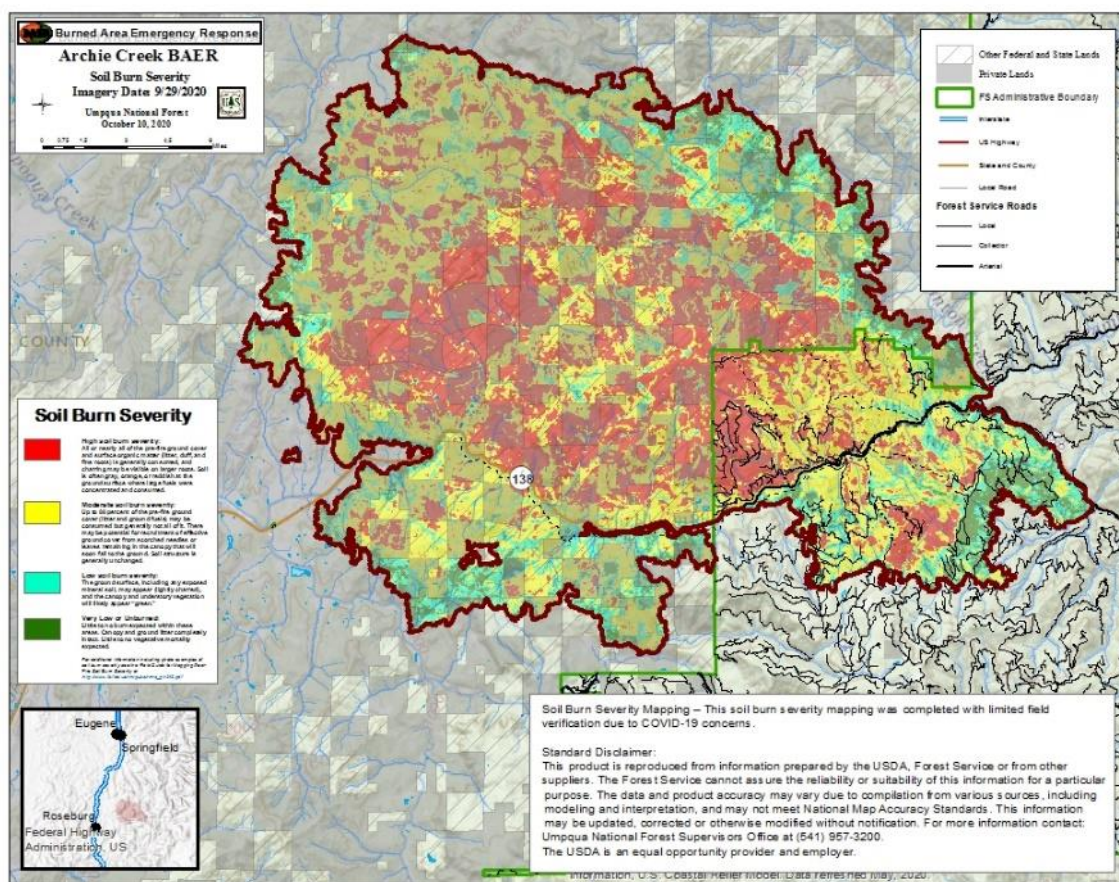
### PART III - WATERSHED CONDITION

#### A. Burn Severity (acres):

Table 3: Burn Severity Acres by Ownership

Soil Burn Severity	BLM	PVT	State	Forest Service	Total	% within the Fire Perimeter
Unburned	4,198	4,514	0	2,980	11,692	9
Low	6,381	7,911	29	4,360	18,681	14
Moderate	14,564	31,356	10	11,971	57,901	44
High	15,273	20,867	0	7,111	43,251	33
Total	40,415	64,648	39	26,422	131,524	100

Figure 1. Soil Burn Severity Map – Archie Fire

**B. Water-Repellent Soil (acres):**

Water Repellency	Acres
Slight	7,394
Moderate	4,599
High	9,364

**C. Soil Erosion Hazard Rating:**

Soil Erosion Rating	Acres	Percent of Fire
Low	3,758	14%
Moderate	14,439	53%
High	8,794	32%
Very High	240	1%

**D. Erosion Potential:**

Erosion Potential after 1 <sup>st</sup> year following fire (tons/acre)		
Soil Burn Severity	Range	Average

Moderate	14.22-20.05	18.09
High	13.94-37.59	25.48

**E. Sediment Potential:** 4,522- 6,370 cubic yards/mile

**F. Estimated Vegetative Recovery Period (years):** The estimated vegetation recovery time for the vegetative cover is expected to be approximately 2-5 years.

**G. Estimated Hydrologic Response (brief description):** Fire effects can cause water-repellant (hydrophobic) soil conditions, and the resulting decreased infiltration can lead to amplified surface runoff, erosion, channel scour and instability, and sediment transport and deposition. Hydrologic effects anticipated from the Archie fire include significantly increased runoff and peakflows resulting in flooding, debris flows, and landslides. Larger catchments such as Fairview and Williams Creeks will see 79% and 90% peak flow increases over pre-fire conditions. The smaller catchments such as Burnt Creek and Fall Creek tributaries will see even greater increases in peak flows, 163% and 202% respectively. Changes to channel morphology from increased annual peak flows and runoff velocities include rill and gully erosion, debris flows in steep headwater basins, scour and incision in low order channels and deposition in higher order streams. The loss of large wood from streams will further exacerbate stream channel morphological changes. These responses are expected to be greatest during large storm events for the next several years and will remain chronic but less evident as vegetation is established, providing cover, increasing surface roughness, and stabilizing and improving the infiltration capacity of the soils. The estimated vegetation recovery time for the vegetative cover is expected to be approximately 2-5 years.

Stream temperature increases are expected to affect most perennial streams within areas of high tree mortality and will persist until effective shade is restored; this could take decades.

Changes in water chemistry are also expected to occur from the Archie Creek Fire. Chemical changes are due primarily to increases in nutrients carried to water courses from burned areas. Increases in various forms of nitrogen, phosphorous, and several cations are often observed in the first few storms following a fire (NWCG 2001). These nutrients are not hazardous to humans but can result in cyanobacteria blooms and eutrophication in downstream receiving waters. Water quality normally returns to pre-burn levels within 1 to 2 years following fire (NWCG 2001).

## **PART V - SUMMARY OF ANALYSIS**

### **Introduction/Background**

Several fires within the Pacific Northwest started following an uncharacteristic high wind event and above average fire risk for the area. The Archie Creek Fire was detected on September 8, 2020 at approximately 7:30 a.m. in the Steamboat Springs area along Highway 138, east of Glide, Oregon. On September 10th, 2020, it merged with the Star Mountain Fire in the Susan Creek area. The fire burned on the North Umpqua Ranger District of the Umpqua National Forest, the Roseburg District of Bureau of Land Management land, private timber land and through the communities of Rock Creek and Steamboat along both sides of the Umpqua River and the Rogue-Umpqua Scenic Highway. The fire is currently 131,542 acres and 95% contained (as of 10/13/2020). Approximately 64,622 acres were private property, including private timber land and residences. Forest Service lands accounted for 26,490 acres, and BLM accounted for 40,391 acres. Within the fire area 51,424 acres were high severity, 43,084 acres were moderate severity, 19,514 acres were low severity and 17,555 acres were unburned according to the BARC map.

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

Critical Values identified during the BAER assessment that have potential to be at risk as defined in FSM 2523.1 include human life and safety of employees and public, FS property (roads, trails, administrative, recreation infrastructure), cultural resources, natural resources including Threatened and Endangered species

habitat, native plant communities, soil and water resources. The BAER team evaluated the risk to these critical values in accordance with the Interim Directive No. 2520-2019 by using the BAER risk assessment. The Archie Creek Fire Critical Value table is attached as Appendix.

Table 4: Critical Value Matrix

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	<b>RISK</b>		
Very Likely	<b>Very High</b>	<b>Very High</b>	<b>Low</b>
Likely	<b>Very High</b>	<b>High</b>	<b>Low</b>
Possible	<b>High</b>	<b>Intermediate</b>	<b>Low</b>
Unlikely	<b>Intermediate</b>	<b>Low</b>	<b>Very Low</b>

### 1. Human Life and Safety (HLS):

The Archie Creek fire area is surrounded by numerous communities that use the Umpqua National Forest for a variety of multiple-use activities. The post-fire environment poses increased hazards to the general public, and Forest Service employees who travel, work or recreate on National Forest System lands. Fire is expected to cause increases in rock fall, debris fall, and road/trail failure at multiple locations causing a risk to human life/safety. There will be increased soil erosion along NFS road, trails, trailheads and complete loss of trail tread at certain locations, which is hazardous to human use. Additionally, there are numerous danger trees throughout the burn perimeter. Hazardous waste from burnt toilets remains at burnt recreation facilities, causing a threat to both human safety and water quality. As a result of the fire, the probability of damage/loss of life/safety along these roads/trails is **likely/very likely**, and the magnitude of consequence of human life/safety is **major**, thus there is a **high to very high** risk for human life and safety in the post-fire environment.

**2. Property (P):** There are numerous roads and multiple recreation sites and trail infrastructure (hiking, biking, trailheads) within the Archie Creek fire perimeter. The fire burned approximately 109 miles of road and 47 miles of hiking trails at various soil burn severities. Approximately 10 miles of Hwy 138 (National Scenic By-way) was also impacted. Hwy 138 (managed by ODOT) serves as a major east-west transportation artery for the local communities surrounding the Umpqua National Forest and is a National Scenic By-way. There are several affected facilities including the Steamboat Work Center, Steamboat water tower, and Steamboat private residences that were affected by the fire. Ten miles of the North Umpqua River, which is designated as a Wild and Scenic River was also affected by low to moderate severity burns. Multiple trailheads, active and decommissioned campgrounds, recreation infrastructure (vault toilets, boat launch site) were affected by different soil burn severities. Numerous culverts were affected by hazard trees that fell onto the structures. The post-fire conditions of these properties in combination of the watershed response indicate that there will be increased risk of road/trail failure due to rock fall, debris fall and flooding. Woody material is expected to mobilize and flow onto roads and trails, blocking culverts. As ditches and culverts become compromised, there is an increased risk of failure with a potential for loss of the property itself. It is expected that danger trees will continue to fall throughout the fall/winter/spring of 2020-2021 onto roads/trails and infrastructure. The probability of damage/loss of property is very **likely/likely/possible**, and the magnitude of consequence of property loss is **major**, thus the risk is **very high/high** risk to Forest Service property (roads and trails) as a result of the post-fire environment.

### 3. Natural Resources (NR):

#### Soil

Overall, the probability of damage to soil productivity is **likely** and the magnitude of consequence is **moderate**, thus the risk determination is **high** based on the following:

The portion of the fire that burned in high SBS (27%) with steep terrain is expected to have high erosion rates based on topography, lack of ground cover, and erosion modeling results. The erosion potential outputs from the modeling greatly exceed both the T factor and natural sedimentation rates. The occurrence of slumps and slides, natural to the area will likely be accelerated. While soil loss will likely result in long term effects to soil productivity, most of the soils are resilient and have good potential for soil recovery based on decomposition rates and observed recovery from past fires on the Umpqua. The needle casts remaining in the trees in the moderate SBS (45%) areas will help in infiltration and nutrient replenishment.



### Wildlife

The Archie Creek fire burned within a large portion of spotted owl suitable and designated critical habitat. There are 14 historic spotted owl cores that were impacted by the Archie Creek Fire and approximately 18,686 acres of spotted owl critical habitat. Within the Archie Creek fire, 10,301 acres of suitable habitat had over 50% BA mortality with 63% (6,465 acres) of that experiencing 90%-100% BA mortality. Post fire, 11 of the 14 cores are below 50% NRF, with 5 of those cores having little to no acres of NRF following the fire. High severity burn patches may have short term benefits by increase foraging habitat for spotted owls, however for owls to persist long term they require a portion of the remaining habitat to be suitable for nesting and roosting. A limiting factor of habitat use by spotted owls is distance to suitable nesting and roosting habitat. Within these large patches of post-fire habitat, territory turnover may increase, suggesting that the habitat was only able to support owls temporarily before they relocate or die. The spotted owl sites impacted by the Archie Creek fire represented a strong hold of spotted owls with the state of Oregon. The loss of spotted owl territories along with their suitable habitat will have long term impacts to the recovery of the species.

### Botany

Aggressive perennial invasive plants are present within the burned area, primarily on travel routes and powerline corridors. These infestations are within or adjacent to burned areas. Unique habitats identified by the forest and several survey and manage fungi species populations important for old growth forest structure were also located in areas that burned in the high and moderate severity.

Invasive plants are highly adapted to take advantage of early seral conditions created after fire and are able to out compete native plants for resources. There is a **Probability of Damage and Loss is Very Likely** to native plant populations due to invasive plants species adjacent to previously uninfested areas that have been burned at a moderate to high intensity. While the interiors are mostly free of weeds, the primary corridor (Hwy 138), as well as nearly all auxiliary forest roads for accessing the fire are lined with dense populations of Meadow knapweed and Perennial peavine, as well as many other infestations of less populous species. These invasive plant infestations would have considerable long-term effects with eventual displacement of native plants (**Moderate magnitude**) due to impacts of soil burn severity decreasing soil productivity for native plant communities and deterioration of habitat and direct competition from invasive plants spreading along suppression lines into previously un-infested areas that inhibit regeneration of native plant species. Spread of invasive plants into un-infested areas due to conditions created by the fire pose direct competition for resources including water, nutrients, above and underground growing space, allelopathy, changes in microhabitat, and direct suppression and mortality. Decreases in native plant diversity by reducing habitat for native plant species and wildlife and shifts from diverse native plant communities to non-native invasive plant dominance in dry habitats alter future fire behavior, intensity, extent, and season of burning. Invasion of burned areas by non-native invasive plant species could lead to a loss of local plant populations that result in a loss of species viability and important biological refuges such as both wet and dry meadows. Natural Resources-Native Plants were identified as a **Very High** risk to critical values such as native plant populations and unique meadow habitats.

### Fisheries

The burned perimeter contains 16.7 miles of Designated Critical Habitat for Coho salmon and a total of 18.3 miles of suitable occupied habitat for Coho salmon. The probability of fine sediment or a debris flow reaching Designated Critical Habitat of ESA fish species is **Very Likely** (90-100% occurrence) within 1-3 years, specifically for Coho salmon habitat in Williams Creek and the North Umpqua River. The magnitude of consequences would be **Moderate**, as pulses of sediment can degrade their habitat, meeting the category of "damage to critical natural or cultural resources resulting in considerable or long-term effects." Other effects (e.g., peak flows, temperature) contribute to this magnitude as well. Therefore, the risk determination is **Very High**.

### 4. Cultural and Heritage Resources:

Nine cultural resource sites were identified as critical values within the Archie Fire (five precontact sites, one historic site, and three multicomponent sites). These sites include lithic scatter sites (precontact) and refuse

scatter sites (historic). When there are both precontact and historic refuse scatter sites, they are labeled multicomponent. When assessing fire impacts, four sites were found to have additional features outside of their previously documented boundary. Over half of the nine total sites experienced a high severity burn, causing irreversible loss of archaeological data due to the effects of the fire. However components of these sites still remain intact.

The four precontact sites experienced a moderate to high burn severity. Fire effects include complete vegetation removal which has increased visibility, prospective erosion, and looting/vandalism potential. There were also irreversible effects to artifacts and identification of previously undocumented site components. The single historic site was unable to be visited due to safety and access issues. Effects from the fire are unknown, but it is likely to have experienced a moderate burn intensity based on the results of SBS map. The three multicomponent sites experienced high burn severity. Effects are identical to the precontact sites listed above.

Upon evaluating all of the cultural resource critical values the probability of damage or loss was found to be **very likely** due to the lack of protective cover and the risk of erosion. The magnitude of consequences (loss of scientific data present in archaeological deposits) is **major**, making the risk **very high**. Treatments are being recommended to five of the nine sites. Treatments are targeted to limit the risks at each site. These treatments include seeding, administrative closure of a road, directional felling of trees for erosion and limiting visibility, camera surveillance, and monitoring. Four of the nine sites are recommended for monitoring only due to the unlikelihood of success for any reasonable treatment.

Archaeological surveys will be necessary to protect heritage critical values from impacts of implementing other BAER treatments. It is important that there is coordination between heritage resource specialists and other specialists in the implementation phase so cultural resources are not lost or damaged during treatment implementation. To avoid damage to cultural resources by equipment and actions during implementation and comply with Section 106 of the National Historic Preservation Act qualified archeologists will perform assessment of the work sites and the proposed activities.

## **B. Emergency Treatment Objectives:**

The primary objective of this Burned Area Emergency Response Report is to recommend treatments to manage identified unacceptable risks from “imminent post-wildfire threats to human life and safety, property, and critical natural resources on National Forest System lands” (FSM 2523.02). These treatments are expected to substantially reduce the probability of damage to identified BAER critical values. Below, the objectives are the proposed treatments are included.

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

**Land: 90**

**Channel: N/A**

**Roads/Trails: 60**

**Protection/Safety:60**

## **D. Probability of Treatment Success**

*Table 5: Probability of Treatment Success*

	<b>1 year after treatment</b>	<b>3 years after treatment</b>	<b>5 years after treatment</b>
<b>Land</b>	75	75	80
<b>Channel</b>	N/A	N/A	N/A
<b>Roads/Trails</b>	80	80	80
<b>Protection/Safety</b>	80	80	85

**E. Cost of No-Action (Including Loss):** \$1,070,381.00. The significance of protecting human life and safety assumed to be self-evident and not included in this calculation.



**F. F. Cost of Selected Alternative (Including Loss): \$716,399.00****G. Skills Represented on Burned-Area Survey Team:**

☒ Soils      ☒ Hydrology      ☒ Engineering      ☒ GIS      ☒ Archaeology  
☒ Weeds      ☒ Recreation      ☒ Fisheries      ☒ Wildlife  
☒ Geology

**Team Leader:** “Andy” Mark Casillas**Email:** mark.casillas@usda.gov**Phone(s)** 480-766-3672**Assistant Team Leader:** Anne Poopatanapong**Email:** anne.poopatanapong@usda.gov**Phone(s)** 971-201-9489**Forest BAER Coordinator:** Joseph Blanchard**Email:** joseph.blanchard@usda.gov**Phone(s):** 541-957-3356**Team Members:** *Table 6: BAER Team Members by Skill*

Skill	Team Member Name
<i>Team Lead(s)</i>	Andy Mark Casillas; Anne Poopatanapong
<i>Soils</i>	Sarah Brame, Leslee Crawford
<i>Hydrology</i>	Mark Sommer
<i>Engineering</i>	Steve Hanussak; Robert E. Lee
<i>GIS</i>	Christopher Strobl; Dorothy Thomas
<i>Archaeology</i>	Christopher Kelly; Amber Nelson
<i>Weeds</i>	Helen Lau; Crystal Shepard
<i>Recreation</i>	Sklyer Ogden; Vern Shumway
<i>Fisheries</i>	Eric Merten
<i>Wildlife</i>	Errin Trujillo; Courtney Dever
<i>Geology</i>	Edward Gazzetti

**H. Treatment Narrative:****Land Treatments****(L-1a; L-1b) Early Detection Rapid Response EDRR**

Preventing invasive plants from establishing in weed-free burned areas is the most effective and least costly management method. This can be accomplished through early detection and eradication by careful monitoring. Two options for rehabilitation of burned and suppression areas are recommended:

**1. Early Detection Rapid Response (EDRR) (L1a):** It is critical to perform EDRR actions for invasive plants in the spring and fall of 2021. Early detection and treatment of invasive plants is critical to prevent establishment. Treatment is most effective when infestations are small and it is critical to treat the infestations before they can produce seed. EDRR would be used to survey, treat, and monitor invasive plants (noxious weeds) in moderate to high severity burn areas adjacent to existing invasive populations, roads, trails, dozer line, drop points, staging areas and unique habitats identified by the forest. There are approximately 1499 acres of prescribed BAER EDRR treatment in the Archie Creek Fire. This work should be at the discretion of the local botanists or invasive coordinator and their local knowledge of these invasive plant populations (Table 2).

**2. Suppression Impacts to BAER (L1b):** Approximately 6.4 acres of dozer line and 4.7 acres of landings, staging areas and drop sites were utilized during suppression activities (Table 5). The district should consider excluding traffic in these areas until native vegetation is well established (at least 2 growing seasons) (FEIS).

Table 8. Treatment Areas *see map in Botany report*

BAER EDRR			
Disturbance Form	Buffer (ft)	Acres	Notes

Trails and Roads	20	583	within High/Mod soil burn severity only
Unique habitats	0	365	within High/Mod soil burn severity only
Invasive plant population perimeter	50	185	within High/Mod soil burn severity only
<b>Subtotal</b>		<b>1,133</b>	
<i>Suppression EDRR</i>			
<b>Disturbance Form</b>	<b>Buffer (ft)</b>	<b>Acres</b>	<b>Notes</b>
Drop points & Staging areas	0	4.70	within the fire perimeter
Dozer lines	0	6.40	within the fire perimeter
<b>Subtotal</b>		<b>11.10</b>	
<b>Total</b>		<b>1,144.1</b>	

Table 9. Treatment Cost

Rehabilitation Item	Unit	Cost	Description of costs
<i>BAER EDRR (1133 acres(2))**</i>	\$30 /per Acre	\$67,980	Spring 2021 and Fall 2021 Early detection rapid response surveys and treatment along roadsides, trails and in unique habitat that experienced Mod/High severity burning and is adjacent to known weed populations.
<i>Suppression EDRR (11.10 acres (2))**</i>	\$30 /per Acre	\$666	Spring 2021 and Fall 2021 Early detection rapid response surveys and treatment on the dozer line/drop points/staging areas.
<b>Total Cost of Treatment:</b>		<b>\$68,646</b>	<b>Complete all recommended BAER EDRR and Suppression activities associated with the Archie Creek Fire</b>

\*\* Costs are based on 2 seasons; spring and fall treatments

### **(L-2) Cultural Resource Protection**

Limiting visibility and access to cultural/heritage sites is needed as the fire as exposed multiple surface sites. Treatments are targeted to limit the risks at each site. Tree felling, camera surveillance and monitoring are types of treatments used to reduce heritage and cultural resource losses within the fire perimeter. The seeding will accelerate vegetative growth to stabilize the soil and limit visibility. A botany technician will be used to implementation of seeding. Coordination between the Oregon Historic Preservation Office and Tribal Governments will be needed for sites.

Cultural Resources Treatments	Units	# of Units	Unit Cost	Total Cost
CR1 – Tree Felling	Days	2	\$325	\$650
CR2 – Implementation Monitoring	Days	2	\$355	\$710
CR3 – Camera Surveillance	Equipment	1	\$250	\$250
CR4 – Seeding	Per Pound	100lbs	\$43	\$4,300
CR4 – Tech for Seeding	Days	2	\$135	\$270
CR5 – Vehicle Usage	Month/Mileage	2 Days/200 miles	\$16 per day/0.35 per mile	\$86
CR6 – Administrative	Days	12	\$444	\$5,328
<b>Cultural Resource Protection</b>				<b>\$11,594</b>

**Channel Treatments:** n/a

## **Roads and Trail Treatments**

### **(RT-1) Trail Storm Proofing**

Storm proofing of trails is needed along specific sections of trails in preparation of increased winter run-off and debris flow. Drainage features will be cleaned and additional drainage features will be installed in order to protect the trail infrastructure from further damage. This work will be focused on segments of trail impacted by moderate and high soil burn severity and where the trail prism is still intact.

<b>Property Protection - Storm Proofing - \$9,000 / 5-day week for crew of 8</b>				
<b>Facility/Trail Name</b>	<b>Trail Number</b>	<b>Work Needed</b>	<b>Days Needed</b>	<b>Cost</b>
Williams Creek & Tie Trails	1513, 1513A	Storm Proof	1	
North Umpqua Trail (Panther)	1414	Storm Proof	6	
<b>TOTAL COST</b>				<b>\$12,000</b>

### **RT-2 Ditch and Culvert Cleanout**

Catchment-basins and ditch lines are filled with debris material. Areas of roadways lack proper drainage structures, which channel water along roadway surface. Clean culverts, drain ditches, and catchment basins of sediment and debris. This work will be focused on segments of road impacted by moderate and high soil burn severity.

<b>Road</b>	<b>Length</b>	<b>Description</b>
4710	8.95	Clean culverts and ditches, and catchment basins of sediment and debris, install additional cross ditches
4710-020	6.51	Clean culverts and ditches, and catchment basins of sediment and debris, install additional cross ditches
4710-021	0.3	Clean culverts and ditches, and catchment basins of sediment and debris, install additional cross ditches
4710-050	3.55	Clean culverts and ditches, and catchment basins of sediment and debris, install additional cross ditches
4710-480	4.36	Clean culverts and ditches, and catchment basins of sediment and debris, install additional cross ditches
4711	7.59	Clean culverts and ditches, and catchment basins of sediment and debris, install additional cross ditches. Coordinate with fire suppression and repair, as some of these are being taken care of through those operations
4711-015	4.76	Clean culverts and ditches, and catchment basins of sediment and debris, install additional cross ditches

<b>Ditch and Culvert Cleanout</b>	
Total Length of Road	36 mi
Estimated BPA Cost	\$2,400 /mi
Mobilization	\$1,000
Admin 9 days*\$300/day	\$2,700
<b>Total cost</b>	<b>\$90,200</b>

**RT-4 Storm Inspection and Response**

Roads within the Archie Creek Fire contain drainage structures that cross streams located in watersheds that have a high to moderate burn severity. Storm inspection/response keeps culvert and drainage structures functional by cleaning sediment and debris from the inlet between or during storms. Monitor road drainage structures after significant storm events to ensure the maximum drainage capacity is maintained until the natural re-vegetation of the burned area has occurred. This work will be focused on segments of road impacted by moderate and high soil burn severity.

<b>Storm Inspection &amp; Response</b>	
Total Length of Road	39.46 mi
Road Crew	\$3,000.00 /Day
Mobilization	\$1,000
Road Crew days	23
Road Inspectors	\$400.00 /Day
Road Inspector Days	10
<b>Total</b>	<b>\$75,000</b>

**RT-5 Culvert Upgrade**

Eight culverts are undersized for post-fire flows and culvert modification is recommended for increased flow and debris expected as a result of the fire. Other less expensive treatments were considered and determined to be inadequate to reduce risk down to acceptable levels. These areas are now at risk of causing the road prism to fail and damage to the traveled roadway. Removing of burnt/destroyed culverts and installing larger culverts where culvert failure is likely and the road fills are large enough that water will be trapped without the capability of overflowing the road surface. One of the 8 culverts (Wright Creek) is undersized for post-fire flows. It is also needs to be in compliance of Umpqua NF land management plan and NWFP for aquatic organism passage. Ensure that the culvert is sized to allow water to flow freely into the structure and meet hydraulic capacity of the culvert and any requirements for aquatic species passage.

Culvert Upgrades					
Assumption: culverts need to be 60' long					
Stream	Swamp Crk	Raspberry Crk	NU Facial	Archie Crk	Wright Crk
Road	4710	4710-480	4710-480	4710-480	4711
MP	0.45	0.32	2.63	3.16	0.34
Dia. Need	6'	6'	4'	5'	12'
Length	60'	60'	60'	60'	60'
Culvert Costs	Dia	Pipe / LF	Band / EA	Gasket / EA	
	6'	\$118.00 /LF	\$76.47 /EA	\$52.42 /EA	
	5'	\$84.20 /LF	\$62.55 /EA	\$43.69 /EA	
	4'	\$44.76 /LF	\$51.14 /EA	\$34.93 /EA	
	24"	\$18.12 /LF	\$28.32 /EA	\$17.47 /EA	
	18"	\$13.85 /LF	\$24.78 /EA	\$13.11 /EA	
	Oper	Equip	Total		
Excavator	\$66.51 /hr	\$48.66 /hr	\$115.17		
Compactor	\$64.93 /hr	\$31.65 /hr	\$96.58		
Whacker Packer	\$49.94 /hr	\$3.18 /hr	\$53.12		
Dump Truck	\$51.09 /hr	\$32.36 /hr	\$83.45		
Laborer	\$49.94 /hr		\$49.94		
Dewatering			\$600.00		
Crushed Rock			\$40.00 /CY		
Riprap			\$30.00 /CY		
Pitrun			\$15.00 /CY		
Swamp Crk		Raspberry Crk		NU Facial	
Culvert & Bands	\$7,337.78	Culvert & Bands	\$7,337.78	Culvert & Bands	\$2,857.74
Excavation	\$7,479.16	Excavation	\$4,560.68	Excavation	\$4,560.68
Rock	\$1,700.00	Rock	\$1,200.00	Rock	\$1,350.00
Admin	\$800.00	Admin	\$400.00	Admin	\$400.00
Total	\$21,300.00	Total	\$16,600.00	Total	\$11,300.00
Archie Crk		Wright Crk			
Culvert & Bands	\$5,264.48	Estimated	\$200,000.00		
Excavation	\$5,554.92	Survey & Design	\$70,000.00		
Rock	\$1,300.00	Total	\$270,000.00		
Admin	\$400.00				
Total	\$15,400.00				
				<b>Total w/o AOP</b>	<b>\$64,600</b>
				<b>Total w/ AOP</b>	<b>\$334,600</b>

Burned Culvert Replacement	
Sites	3
Cost/Site	\$2,000
Admin	\$300
<b>Total</b>	<b>\$6,300</b>

### RT-6 Armored Dips and Hardened Fords

Armored dips and Hardened fords provide increased capacity and reduce risk from fillslope erosion and downcutting to the road infrastructure. The structures also reduce adverse effects to soil, water, and aquatic habitat from fillslope erosion. Armored dips should be installed on the down slope side, in locations where culvert failure is possible or likely. Install armored dips where they will be most efficient and on the down slope side, in locations where culvert failure is likely. These armored dips will assist to remove water from the roadbed, preventing the water from flowing down at risk roads.

Armored Dips	
Sites	3
Riprap	\$30.00 /CY
Pitrun	\$15.00 /CY
Excavation	\$1,600.00 /EA
Admin	\$500.00

Total	\$3,000.00 /EA
<b>Total Cost</b>	<b>\$9,500</b>

<b>Hardened Fords</b>	
Sites	2
Riprap	\$30.00 /CY
Pitrun	\$15.00 /CY
Excavation	\$800.00 /EA
Admin	\$500.00
Total	\$2,000.00 /EA
<b>Total Cost</b>	<b>\$4,000</b>

### **RT-8 Repair Burned Stumps in Road**

The roads within the burned area of the Archie creek Fire were found to have root wads and logs that have burned out leaving holes in the fill slope, and in some cases under the road. These areas are now at risk of causing the road prism to fail due to erosion resulting from the moderate and high soil burn severity around these sites. Excavate and remove any remaining woody debris in the fill slope holes and backfill material in place of the voids. In some locations, to prevent further damage, riprap is required to stabilize the fill slope.

<b>Repair Burned Stumps in Road</b>			
Sites	5		
	Oper	Equip	Total
Excavator	\$66.51 /hr	\$48.66 /hr	\$115.17
Compactor	\$64.93 /hr	\$31.65 /hr	\$96.58
Pitrun			\$15.00 /CY
Crushed Rock			\$40.00 /CY
Admin	\$300.00 /Day		
	<b>Cost/Site</b>	<b>\$1,394.01 /EA</b>	
<b>Total Cost</b>			<b>\$7,600</b>

### **Protection/Safety Treatments**

#### **P-1 Warning/Closure Signs and/or Barriers**

Warning and closure signs and/or barriers are needed at the locations below to inform and prevent users from using trails. Signs will be placed at strategic locations. Signs will remain in place during administrative closure of the area. Warning signs will remain in place after closure orders are lifted to educate the public about the hazardous conditions of the area.

Facility/Trail Name	Trail Number	Item	Number and location	Cost including posts, sign, hardware
Fall Creek Falls Trail	1502	Sign	(4) one at each end	\$360
Williams Creek & Tie Trails	1513	Sign	(6) one at each end	\$540

Riverview Trail	1530	Sign	(4) one at each end	\$360
Mace Mountain Trail	1518	Sign	(4) one at each end	\$360
Cougar Creek Trail	1507	Sign	(2) one at trailhead	\$180
McDonald Trail	1515	Sign	(2) one at trailhead	\$180
Panther Section – N. Umpqua Trail	1414	Sign	(4) one at each end	\$360
North Umpqua Trail (Mott)	1414	Sign	(4) one at each end	\$360
North Umpqua Trail (Tioga)	1414	Sign	(4) one at each end	\$360
Bogus Creek Campground	N/A	Sign	(2) at entrance	\$180
Bogus Creek Raft Launch	N/A	Sign	(2) at entrance	\$180
Wright Creek Camping Area	N/A	Sign	(2) at parking area	\$180
North Umpqua River	N/A	Sign	(3) warning signs only one each at Boulder Flat, Gravel Bin, and Horseshoe Bend	\$270
North Umpqua Trailhead (Mott)	1414	Plastic Jersey Barrier	(2) one at each end	\$900
North Umpqua Trailhead (Tioga)	1414	Plastic Jersey Barrier	(2) one at each end	\$900
Labor Cost				\$3,600
<b>Total</b>				<b>\$9,270</b>

### **P-2 Hazard Tree Removal at Steamboat Water Tank**

Removal of hazard trees around the Steamboat water tank are needed to protect the water tank from failure.

Property Protection – Removal of Hazard Trees				
Facility/Trail Name	Trail Number	Cost per tree	Number of tree	Cost
Steamboat Water Tank	Fall hazard trees around FS tank	\$100/tree	10	\$1,000
<b>TOTAL COST</b>				<b>\$1,000</b>

### **P-3 Burnt Bridge Removal at Trailheads**

Bridges that were partially consumed by the fire now pose a concern for water quality and aquatic habitat for Coho salmon from pressure treated wood in the waterway. Removal of the burnt structures impacting streams is needed before high flows this winter.

Life and Safety - Bridge Removal - \$9,000 / 5-day week for crew of 8			
Facility/Trail Name	Trail Number	Work Needed	Cost
North Umpqua Trail (Mott)	1414	Bridge Removal by hand crew	\$4,000
North Umpqua Trail (Panther)	1414	Bridge Removal by hand crew	\$4,000
Fall Creek Falls Trailhead	Remove two bridges	Excavator, sawyer, two 20 yd dumpsters	\$8,500



			<b>\$16,500</b>
<b>TOTAL COST</b>			

**P-4 Debris/hazmat removal at recreation sites**

Hazmat and debris abatement is needed at specific campgrounds, trailheads and boat launch areas. Treatments are intended to mitigate for hazards for natural resources and human/life and safety.

Facility/Trail Name	Work Needed		Cost
Bogus Creek Campground	Remove hazardous debris around worksites, pump and cap septic tanks, cap vault at raft launch, cut hazard trees around worksites	Campground already gated to prevent entry by public	\$11,500
Bogus Creek Raft Launch	Fell hazard trees	Raft launch is along pullout on Hwy 138 and cannot be effectively closed	\$1,000
Wright Creek Trailhead and Camping Area	Cut hazard trees, cap vault	Multiple entry points. Less expensive to mitigate hazard trees then to install gates	\$1,000
Williams Creek Campground	Cap pit toilet		\$500
North Umpqua Wild and Scenic River	Relocate hazard trees from river navigation routes for safety of on river users. Trees will be moved to the side of the channel, bank, or a stable location in the riparian area.		\$16,000
<b>TOTAL COST</b>			<b>\$30,000</b>

**P-5 Hazard Signs**

Install warning signs for flash flooding and potential debris flows. Install "Entering Burned Area Fallen Rock and Debris" signs where necessary to properly alert the travelers of the dangers ahead. "Road Closed" signs should also be used in conjunction with gated closures, see emergency road closure.

Signs	
Signs Needed	12
Sign cost	\$75.00 /EA
Post & Hardware	\$40.00 /EA
Labor	\$175.00 /EA
Total	\$290.00 /EA
Admin	\$900.00
<b>Total Cost</b>	<b>\$4,400</b>

**I. Monitoring Narrative:**

Implementation monitoring would occur on roads that lead to critical life and safety infrastructure. Utilize storm patrol to monitor road drainage structures after significant storm events to ensure the maximum drainage capacity is maintained until the natural re-vegetation of the burned area has occurred. Monitoring, survey, and treatment are all part of the Early Detection and Rapid Response (EDRR) recommendation for invasive plants (noxious weeds) treatment. This will occur for the first year following the containment of the fire and will occur in moderate severity burn areas adjacent to roads and trails and on dozer line. Resource monitoring will occur within the next year to ensure that the appropriate heritage protection treatments have mitigated post-fire effects from erosion and exposure to looting. All of the above monitoring has been accounted for in other treatments therefor no additional monitoring funding is being requested.

## **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											
BAER EDRR	acre	60	1133	\$67,980	\$0			\$0		\$0	\$67,980
Suppression EDRR	acre	60	11.1	\$666							
Cultural Resource Protection	each	11,594	1	\$11,594	\$0			\$0		\$0	\$11,594
Subtotal Land Treatments				\$80,240	\$0			\$0		\$0	\$79,574
B. Channel Treatments											
Insert new items above this line!				\$0	\$0			\$0		\$0	\$0
Subtotal Channel Treatments				\$0	\$0			\$0		\$0	\$0
C. Protection and Safety Treatments											
Trail Closure/Warning Signs	each	174	43	\$7,470	\$0			\$0		\$0	\$7,470
Debris/Hazamat Removal	each	30,000	1	\$30,000	\$0			\$0		\$0	\$30,000
Trail closure Barrier	each	450	4	\$1,800	\$0			\$0		\$0	\$1,800
Steamboat Water Tank Hazard tree removal	each	1,000	1	\$1,000				\$0		\$0	\$1,000
Burnt Trail Bridge Removal	each	4,125	4	\$16,500				\$0		\$0	\$16,500
Road Signs	each	367	12	\$4,400				\$0		\$0	\$4,400
Insert new items above this line!				\$0	\$0			\$0		\$0	\$0
Subtotal Road and Trails				\$61,170	\$0			\$0		\$0	\$61,170
D. Road and Trail Treatments											
Trail Storm Proofing	days	1,714	7	\$12,000	\$0			\$0		\$0	\$12,000
Ditch and Culvert Cleanout	miles	2,506	36	\$90,200	\$0			\$0		\$0	\$90,200
Storm Inspection and Response	mile	1,901	39.46	\$75,000				\$0		\$0	\$75,000
Culvert Upgrades Non AOP	each	12,920	5	\$64,600				\$0		\$0	\$64,600
Culvert Upgrade AOP	each	270,000	1	\$270,000				\$0		\$0	\$270,000
Culvert Replacement	each	2,100	3	\$6,300				\$0		\$0	\$6,300
Armored Dips	each	3,167	3	\$9,500				\$0		\$0	\$9,500
Hardened Ford	each	2,000	2	\$4,000				\$0		\$0	\$4,000
Repair Burned Stumps in Road	each	1,520	5	\$7,600				\$0		\$0	\$7,600
Subtotal Protection/Safety				\$539,200	\$0			\$0		\$0	\$539,200
E. BAER Evaluation											
Initial Assessment	Report			\$136,075	\$0			\$0		\$0	\$136,075
Subtotal Evaluation				\$136,075	\$0			\$0		\$0	\$136,075
F. Monitoring											
None				\$0	\$0			\$0		\$0	\$0
Subtotal Monitoring				\$0	\$0			\$0		\$0	\$0
G. Totals				\$680,610	\$0			\$0		\$0	\$816,019
Previously approved											
Total for this request				\$680,610							

**PART VII - APPROVALS**

1.	_____	10.21.2020
	Forest Supervisor	Date