

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:** Bedrock Fire**B. Fire Number:** OR-WIF-230266**C. State:** OR**D. County:** Lane**E. Region:** R6**F. Forest:** Willamette**G. District:** Middle Fork Ranger District**H. Fire Incident Job Code:** P6QEW823 (0618)**I. Date Fire Started:** 7/22/2023**J. Date Fire Contained:** 98% 9/19/2023**K. Suppression Cost:** \$63,411,028 (9-17-23)**L. Fire Suppression Damages Repaired with Suppression Funds (estimates):**

1. **Fireline repaired (miles):** 11.79 miles dozerlines, 6.01 miles handlines, 36.85 miles of mixed construction line and improved roads
2. **Other (identify):**

M. Watershed Numbers:*Table 1a: Acres Burned by Watershed (HUC10 in Blue; corresponding HUC12 in white)*

HUC #	Watershed Name	Watershed Acres	Acres Burned	% Watershed Burned
1709000108	Little Fall Creek	37559	1282	3
170900010801	Upper Little Fall Creek	22335	1281	6
170900010802	Lower Little Fall Creek	15224	1	<1
1709000109	Fall Creek	123855	30293	24
170900010901	Delp Creek-Fall Creek	19097	445	2
170900010902	Portland Creek	13613	497	4
170900010903	Hehe Creek-Fall Creek	20941	14554	70
170900010904	Andy Creek-Fall Creek	22997	14797	64
170900010905	Winberry Creek	31468	0	0
170900010906	Fall Creek Lake-Fall Creek	15738	0	0

1709000407	McKenzie River	165321	4	<1
170900040701	Gate Creek	30823	0	0
170900040702	East Fork Deer Creek-McKenzie River	38926	4	<1
170900040703	Ritchie Creek-McKenzie River	30694	0	0
170900040704	Holden Creek-McKenzie River	14144	0	0
170900040705	Camp Creek	16999	0	0
170900040706	Walterville Canal-McKenzie River	33735	0	0

Table 1b: Watershed Breakdown by SBS

Watershed Name	HUC 10	Grand Total	Soil Burn Severity (SBS)				SBS Total Acres	% Watershed Burned
			High	Moderate	Low	Unburned		
Little Fall Creek	1709000108	37,559	1	110	1,107	63	1,281	3%
Fall Creek	1709000109	123,855	3,335	8,883	16,267	1,809	30,294	24%
McKenzie River	1709000407	165,321	-	-	4	-	4	<1%
Grand Total		326,735	3,336	8,993	17,378	1,872	31,579	10%

Table 1c: Watershed Breakdown by SBS

Subwatershed Name	HUC 12	Subwatershed Acres	Soil Burn Severity (SBS)				SBS Total Acres	% Subwatershed Burned
			High	Moderate	Low	Unburned		
Upper Little Fall Creek	170900010801	22,335	1	110	1,107	63	1,281	6%
Lower Little Fall Creek	170900010802	15,224	-	-	1	-	1	0%
Delp Creek-Fall Creek	170900010901	19,097	212	163	62	8	445	2%
Portland Creek	170900010902	13,613	32	179	276	11	498	4%
Hehe Creek-Fall Creek	170900010903	20,941	1,190	5,042	7,296	1,025	14,553	69%
Andy Creek-Fall Creek	170900010904	22,997	1,901	3,499	8,633	764	14,797	64%
Winberry Creek	170900010905	31,468	-	-	-	-	-	0%
Fall Creek Lake-Fall Creek	170900010906	15,738	-	-	-	-	-	0%
Gate Creek	170900040701	30,823	-	-	-	-	-	0%
East Fork Deer Creek-McKenzie River	170900040702	38,926	-	-	4	-	4	0%

Ritchie Creek-McKenzie River	170900040703	30,694	-	-	-	-	-	0%
Holden Creek-McKenzie River	170900040704	14,144	-	-	-	-	-	0%
Camp Creek	170900040705	16,999	-	-	-	-	-	0%
Walterville Canal-McKenzie River	170900040706	33,735	-	-	-	-	-	0%
Grand Total		326,734	3,336	8,993	17,379	1,871	31,579	10%

N. Total Acres Burned:

Table 2a: Total Acres Burned by Ownership Summary

Land Owner	Soil Burn Severity				Grand Total	Percent
	High	Moderate	Low	Unburned		
Bureau of Land Management	2	44	120	-	166	0.5%
Private	13	178	555	53	799	2.5%
USDA Forest Service	3,321	8,772	16,702	1,819	30,614	97%
Grand Total	3,336	8,994	17,377	1,872	31,579	100%

O. Vegetation Types: The dominant plant community is Douglas fir (*Pseudotsuga menziesii*) forest with large areas of western hemlock (*Tsuga heterophylla*). Smaller stands of Pacific silver fir (*Abies amabilis*) and white fir (*Abies concolor*) intermixed with Douglas fir and hemlock at upper elevations. Understory vegetation varies by aspect, elevation, and canopy cover throughout forest stands. Common understory composition consists of dwarf Oregon grape (*Mahonia nervosa*), salal (*Gaultheria shallon*), and huckleberry (*Vaccinium*). Riparian corridors along streams are dominated by bigleaf maple (*Acer macrophyllum*), vine maple (*Acer circinatum*), alder (*Alnus* sp.), and beaked hazelnut (*Corylus cornuta*). Other less common plant communities throughout the area include hardwood stands, dry rock gardens, rock outcrops, dry meadows, and mesic meadows.

P. Dominant Soils: Soils within the fire perimeter are generally colluvial, deep to extremely deep in depth, and somewhat well to well-drained. Dominant surface soil textures are generally coarse and classified as loamy sandy, sandy loams, though finer textures of loams and silt loams are also found in the fire area. The average surface rock fragment content ranges from 0 to 57%. Subsurface rock fragment contents range from 0 to 80%. Rock outcrops and shallow soils are often found in association with competent rock types such as welded tuffs and intrusive dikes or volcanic vents points and ridgelines. Erosion potential of soils in the fire is predominately moderate to very high. Dominant surface erosion processes are dry ravel, wind deflation along ridges, and sheet/rill erosion. Vegetative cover is key in protecting these soils types from excessive erosion.

Q. Geologic Types: The geologic setting of the Bedrock burned area is the Western Cascades division of the Cascade Geologic Province. The Western Cascades are ancestral to the modern volcanic features of the High Cascades, and consist of lavas, pyroclastic and volcanoclastic deposits that erupted between 35 to 16 million years ago and preceding the eruption of recent and modern High Cascade lavas.

The Bedrock burned area falls within the Western Cascades geologic unit known as the Little Butte Volcanics, which is composed largely of Miocene and Oligocene igneous rocks, ranging in age from 30 to 40 million years. Rock types include primarily pyroclastic deposits such as ash-flow tuffs and lahars

(volcanic mudflows); a mix of basalt, andesite, dacite lava flows; and volcanoclastic sedimentary rocks (Sherrod, 1991).

An unnamed ridgetop intrusive silicic igneous bodies north of Gibraltar Mountain occupies a central portion of the burned area. Gibraltar Mountain is a mafic vent of Little Butte age.

Younger Western Cascade volcanic rocks (sub province of the Cascades Province) are located at the eastern edge of the burned area.

Abundant and unmapped Quaternary deposits make up much of the remainder the geology, including fluvial deposits in the Fall Creek and Portland Creek canyon bottom mantling low-gradient areas of bedrock. Five mapped Quaternary landslides and multiple historic landslide points were located on the SLIDO (Statewide Landslide Information Database for Oregon) within the burned area. In addition, other landslide and alluvial fan features were observed in the burn area. SLIDO landslide susceptibility is mostly high within the entire burned area.

The terrain of the Western Cascades, particularly in the eastern portion of the burned area, is over-steepened, with a deeply incised stream network. The current high relief of the Western Cascades is a consequence of regional uplift accompanying the emplacement of High Cascade magmatic systems beginning about 8 million years ago.

Geology map for the Bedrock burn area was made from the Department of Oregon Geology and Mineral Industries (DOGAMI) Oregon Geologic Data Compilation, release 7 (Figure 2).

Highest point within the Bedrock burn area is Little Cowhorn Mountain sitting at 4,232 feet above sea level to the lowest elevation point approximately at Fall Creek at fire perimeter of 920 feet above sea level.

R. Miles of Stream Channels by Order or Class:

Table 3: Miles of Stream Channels by Order or Class

Stream Type	Soil Burn Severity				Grand Total (miles)
	High	Moderate	Low	Unburned	
Artificial Path	0.45	2.4	3.2	2.3	8.3
Intermittent	19.5	42.8	91.9	29.3	183.6
Perennial	13.5	32.6	61.8	27.5	135.5
Grand Total	33.5	77.8	156.9	59.1	327.5

"Artificial Path" are streams that flow through NHD Area polygons as with large rivers and can be considered Perennial. All "Artificial Path" stream segments through NHD waterbodies (i.e. lakes, swamp/marsh, etc.) were not included in the totals.

S. Transportation System:

Trails: *National Forest (miles): 21.2* *Other (miles): 0*

Trail Type	Soil Burn Severity				Grand Total
	High	Moderate	Low	Unburned	
Terra	5.0	7.9	4.9	3.4	21.2

Roads: *National Forest (miles): 208.4* *Other (miles): 7.4*

Operational Maintenance Level		Soil Burn Severity Classification				Grand Total
		High	Moderate	Low	Unburned	

1 - BASIC CUSTODIAL CARE (CLOSED)	2.1	6.5	34.4	8.4	51.4
2 - HIGH CLEARANCE VEHICLES	6.2	26.9	74.8	35.4	143.3
3 - SUITABLE FOR PASSENGER CARS	1.6	0.8	0.4	0.9	3.8
5 - HIGH DEGREE OF USER COMFORT	2.4	3.7	3.0	0.8	9.9
Non-Forest Service		0.4	3.9	3.1	7.4
Grand Total	12.4	38.3	116.5	48.6	215.8

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

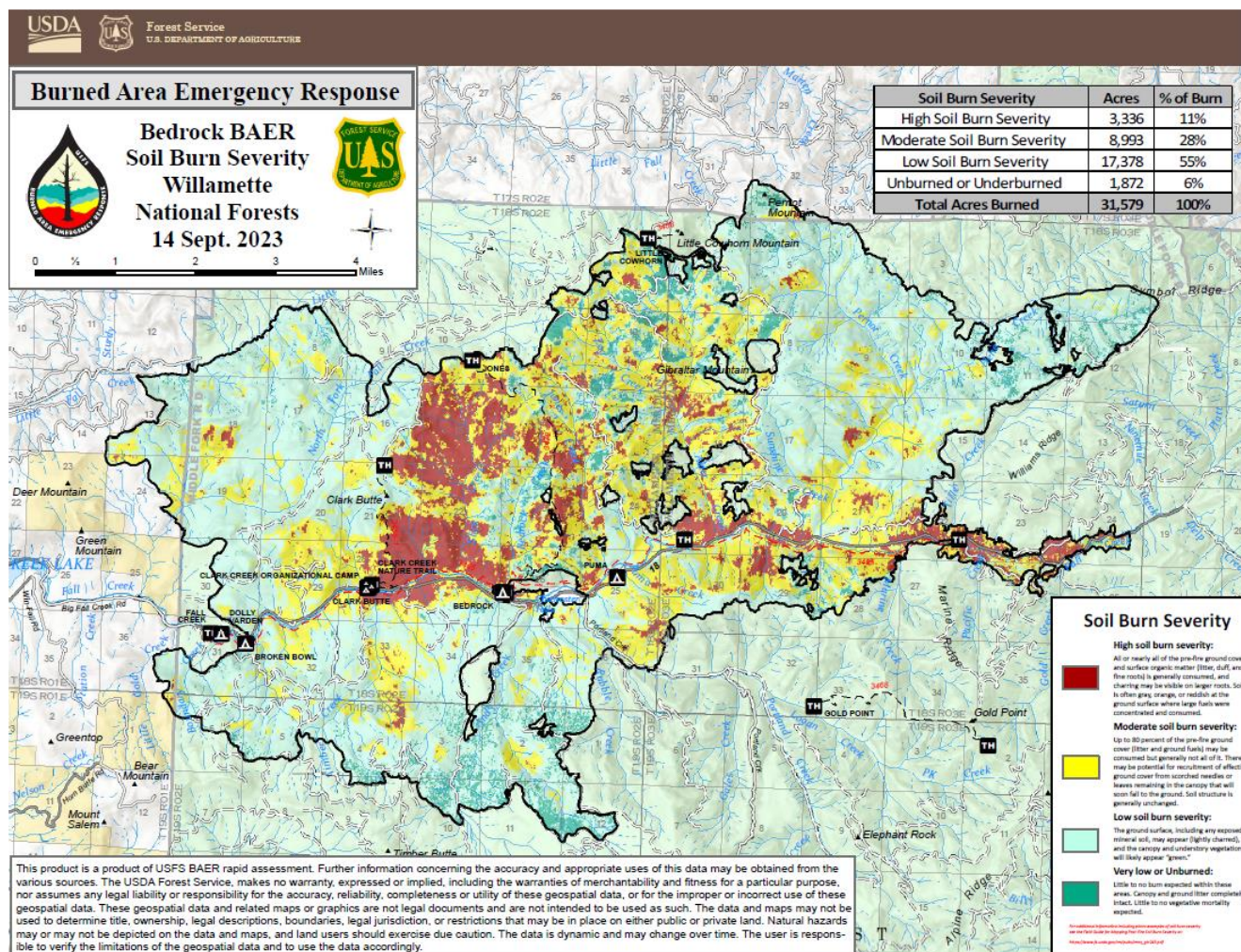


Table 4a: Burn Severity Acres by Ownership

Jurisdiction	Soil Burn Severity Classification				Grand Total
	High	Moderate	Low	Unburned	
BLM - BUREAU OF LAND MANAGEMENT		0.0	0.1	0.1	0.3
FS - FOREST SERVICE	12.4	37.9	112.6	45.5	208.4
P - PRIVATE		0.4	3.7	3.0	7.1

Grand Total	12.4	38.3	116.5	48.6	215.8
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B. Water-Repellent Soil (acres): Fire-induced or altered hydrophobicity occurred on approximately 41% of soils (100% of severely burned soils and 50% of moderately burned soils) or around 12,279 acres. Inherent hydrophobicity was also noted in field observations, which could contribute to higher counts of water repellent soils that may not have been fire induced.

C. Soil Erosion Hazard Rating:

Soil Erosion Hazard Rating (acres):

Erosion Risk Rating	Area (acres)	% of Area
Low	2529	8
Moderate	18,489	59
High	7920	25
Very High	2640	8
Total	31,579	100

D. Erosion Potential: 69 tons/acre/year

E. Sediment Potential: 20,313 tons/acre

F. Estimated Vegetative Recovery Period (years):

	Burn Severity		
Pre-fire condition	low	medium	high
early seral	0-5	1-15	1-30
mid seral	1-15	1-30	30-50
late seral	1-15	20-75	200-250

G. Estimated Hydrologic Response: The Bedrock Fire burned three HUC10 watershed, Fall Creek (24%), Little Fall Creek at (3%), and McKenzie River (<1%) as well as six HUC12 subwatersheds, Upper Little Fall Creek (6%), Lower Little Fall Creek (<1%), Delp Creek-Fall Creek (2%), Portland Creek (4%), Hehe Creek-Fall Creek (69%), Andy Creek-Fall Creek (64%), and East Fork Deer Creek-McKenzie River (<1%). The Bedrock Fire was also a reburn of three different fires within the past two decades, Clark Fire (2005), Jones Fire (2017), and Gales Fire (2021). Soil burn severity mapping inherently included the reburn areas from the previous three fires. However, the Gales fire only had two years of recovery and therefore its soil burn severity map was adjusted to reflect current expected runoff conditions so that the modeled basins would represent cumulative effects. This was done by creating a decision matrix to combine the soil burn severity values in multiple reburn areas. Due to the small amount of burned area from the Bedrock Fire within the 5th Code of Little Fall Creek, and more specifically the 6th Code subwatershed of Upper Little Fall Creek, the watersheds' overall hydrologic response will be minimal particularly due to the amount of low SBS compared to moderate/high.

Increased discharge from post-fire storm events was calculated using the Cooper et. al (2005) regional regression equation for interior watersheds with a mean elevation below 3,000 feet (Regression Equation 2B). We calculated increased discharge for both a 2-year peak runoff event as well as a 5-year peak runoff event which have an 88% and 49% chance of occurring within the next 3 years. Post-fire runoff estimates were calculated by associating modifiers per each soil burn severity throughout a weighted area of each basin modeled. Modifiers for each soil burn severity were selected based on the Beachie Lionshead fire Hydrologist BAER report and then adapted for soil surface runoff expectations based on observations by the BAER soil scientists. A bulking factor modifier was applied to the modeled post-fire 2-year peak flood and the 5-year peak flood Gusman (2011). The bulking factors used are more conservative as sediment transportation in the Fall Creek watershed hasn't been measured, but large woody material and gravel bars were observed during site visits. Regression "clear water runoff" peak flow events are predicted to increase by 1.2 – 2.1 times and 1.1 – 2.0 times larger for the 2-year and 5-year recurrence intervals respectively. Similarly, estimated peak flows accounting for an influx of sediment and large wood (hyper-concentrated

flows) are predicted to be 1.3 – 7.1 and 1.2 – 5.9 times larger for the 2-year and 5-year peak recurrence intervals respectively.

The watershed and modeled basin responses are expected to be most evident during the first initial and larger storm events immediately after the fire. Thereafter, watershed responses are expected to become less evident as vegetation is reestablished, providing ground cover, increasing surface roughness, stabilizing soils and improving soil infiltration capacity. The estimated vegetative recover for watersheds affected by the Bedrock fire is expected to be 2-3 years for areas with low and moderate soil burn severity and 5-10 years with high soil burn severity. Flood potential will continue to decrease as vegetation reestablishes increasingly over time eventually returning the majority of basins' hydrographs back to a state of pre-fire conditions, but this time of recovery is typically longer than initial vegetative response.

- H. **Landslide and Debris Flow Potential:** The Bedrock burned area is located within high to very high landslide susceptibility (2020, Calhoun). Steep and unstable hillslopes, with linear drainages, especially slopes which experienced moderate to high burn severity, are present across much of the burned area. Instability is most pronounced where pyroclastic and volcanoclastic lithologies are dominant, and these rock types make up approximately 75% of the bedrock, including the steepest, most incised, and unstable portions of the landscape throughout the Bedrock burned area. The Statewide Landslide Information Database for Oregon (SLIDO) has 11 historic landslide points and five mapped landslide polygons on the Bedrock Fire burned area (Figure 2, geology map). Two unmapped pre-fire small landslide slump features were recognized during BAER field investigation in the burned area. Based on the high susceptibility of landslides, new landslides are likely to develop within the burned areas over the next 10 years in the moderate to high burn severity area.

Evapotranspiration is no longer occurring allowing the precipitation to accumulate as groundwater on the slope. The extra water raises the pore pressure which reduces the strength of the soils. The added water also increases the mass of the soil. With the increased mass and lower strength, the soils will fail within the weathered tuff which acts as a plane of weakness. Over the next five years the roots will decompose further weakening the soils. A long duration rainstorm or rain on snow event could trigger the slide.

Debris flow morphology and depositional fans are evident in this area. The U.S. Geological Survey Landslide Hazards Program ran the debris model for the Bedrock Fire. The USGS provided estimates of debris flow likelihood, volume, and combined hazard for several design storms with a range of peak 15-minute intensities at 24mm/h within the burned areas. Several drainages (Clark Creek, Slick Creek, Bedrock Creek, Indian Creek, Timber Creek, Jones Creek, Alder Creek, Puma Creek, tributaries to Hehe Creek, as well as some unnamed tributaries to Fall Creek had a moderate debris flow risk. Culverts along National Forest Roads, 1800, 1817, 1830, 1825, 1831, 1832, and 1816 have an elevated risk of failing if they are undersized and or plugged with sediment prior to the first damaging storm. Based on empirical data, the largest basin area we have identified as producing a debris flow is 8 square kilometers.

The debris flow model was developed in Southern California and Colorado and additional calibration in other areas of the western United States, including the Cascade Mountains. Due to the model's potential inaccuracies, this is just one tool to assist in focusing on areas where critical values are potentially at risk. Other tools are LiDAR, aerial photos, past debris flows, historical information to evaluate debris flow hazards, and field investigations.

Rockfall within the burned area increases because of the removal of stabilizing vegetation and organic litter within one year of the wildfire and then declines in following years. Rockfall process is that unconsolidated rocks dislodge and roll, slide or bounce downslope until their energy is dissipated on lower angle slopes. Rockfall can dry ravel in the absence of water but is exacerbated by rain and tree fall.

PART V - SUMMARY OF ANALYSIS

Introduction/Background

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 Directive No. 2520-2019 by using the BAER risk assessment. An abbreviated version of the Bedrock Fire Critical Value table is included below for BAER critical values with high or very high-risk rating for all resources and for very high, high, and intermediate risk rating for human life and safety. A complete version of this table including all resources and risk determinations is available upon request.

Table 5: 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

Table 6. Bedrock Critical Value Ratings

Value	Life/ Property/ Resources	Critical Value	Threat to Value	Probability of Damage or Loss	Rationale for Probability	Magnitude of Consequence	Rationale for Magnitude	Risk	Recommended Treatment
BAER critical value	Cultural Resources	6180600117	Looting	Very Likely	No ground cover near major road, site located among modern and historic refuse	Major	TCP	Very High	Mulching, consultation with tribes, and monitoring
BAER critical value	Cultural Resources	06180600047 Clark Creek Organizational Camp	Hazard trees	Very Likely	Large down tree in Amphitheater with burned wooden seats and loss of fencing, Hazard trees above Camp kitchen and remaining cabin	Moderate	damage to cultural resource resulting in long-term effects	Very High	Refer to recreation
BAER critical value	Life and Safety	People traveling on FS Roads within or directly adjacent to Moderate and High Severity Burn areas	Flooding, debris flows, rock fall, hazard trees	Likely	Several roads (1825, 1832, 1833, 1831, and 1800) rated as having major or moderate consequences. These roads would have snags, felling of trees, rock/land movement or other unforeseen timing of hazards.	Major	Human safety at risk from post fire hazards - Several roads (1825, 1832, 1833, 1831, and 1800) rated as Likely or Very Likely of having major injury or loss of life.	Very High	Gate/close roads to reduce exposure, warning signs at entrance points
BAER critical value	Property - Roads	Fall Creek (#1800000) ML 5	People driving over bridge with damaged guardrails and falling into Falls Creek	Likely	It's likely someone can drive off the bridge	Major	The Falls Creek channel is many feet below the bridge. If someone drove off there would be injury or loss of life.	Very High	Replace burned guardrail over bridge near Zog Creek crossing
BAER critical value	Life and Safety	Broken Bowl Campground	Hazard trees	Unlikely	Only one campsite burned and no hazard trees	Major	Any hazard trees that fall when campground is opened would cause major injury or loss of life	Intermediate	None
BAER critical value	Life and Safety	Big Pool Campground	Hazard trees	Likely	Hazard trees	Major	Any hazard trees that fall when campground is opened would cause major injury or loss of life	Very High	Close existing gates. Closure along the Falls Creek 1800 road will also reduce risks.
BAER critical value	Life and Safety	Clark Creek Organizational Camp	Debris flow risk is moderate and many hazard trees.	Very Likely	Debris flow risk is moderate and many hazard trees. Campground is reservation only and has gate	Major	Any hazard trees that fall when organizational camp is opened would cause major injury or loss of life	Very High	Keep site close until next summer. Close existing gate to keep vehicle traffic out of site. Closure along the Falls Creek 1800 road will also reduce risks.

BAER critical value	Life and Safety	Bedrock Campground	Hazard trees and Debris Flows	Possible	Debris flow risk is high, no hazard trees due to past fires	Major	Debris flow risks are high from winter storms. Summer thunderstorms are possible.	High	Sign, Already an existing gate. No Hazard trees
BAER critical value	Life and Safety	Bedrock Day Use	Hazard Trees	Very Likely	Day use area has several hazard trees	Major	Any hazard trees that fall when campground is opened would cause major injury or loss of life	Very High	Sign, No gate at site. Visitors can still access by walking past gate. Road 1800 closer will reduce access.
BAER critical value	Life and Safety	Puma Campground	Slash	Possible	There are no hazard trees from the fire	Moderate	No hazard trees	Intermediate	None
BAER critical value	Life and Safety	Dispersed Sites	Hazard trees at most sites and one site near Fall Creek	Very Likely	Select hazard trees	Major	Human life at risk from post fire hazards	Very High	Gates along the main Falls Creek road will give warning to these sites.
BAER critical value	Life and Safety	Clark Butte Trail (#3456.1)	Hazard trees	Very Likely	Many areas with hazard trees	Major	Any hazard trees would cause major injury or loss of life	Very High	Upper section needs trail rebuilt from suppression and there is no connection. Close trail to reduce hazard trail risks, signs
BAER critical value	Life and Safety	Jones Trail (#3472), Falls Creek National Recreation Trail (#3455), Clark Fall/Tie Trail (#3456.2)	Hazard trees	Very Likely	Many areas with hazard trees	Major	Any hazard trees would cause major injury or loss of life	Very High	Close trail, signs
BAER critical value	Life and Safety	Clark Creek Nature Trail (#3456)	Hazard trees	Likely	Select areas with hazard trees	Major	Any hazard trees would cause major injury or loss of life	Very High	Close trail, signs
BAER critical value	Life and Safety	Clark Butte (Lower) Trailhead	Hazard trees	Very Likely	Many areas with hazard trees	Major	Any hazard trees would cause major injury or loss of life	Very High	Sign
BAER critical value	Life and Safety	Falls Creek National Recreation Trailhead (west)	Hazard trees	Very Likely	Many areas with hazard trees	Major	Any hazard trees would cause major injury or loss of life	Very High	None
BAER critical value	Life and Safety	Fall Creek Trailhead (1833)	Hazard trees	Likely	Select areas with hazard trees	Major	Any hazard trees would cause major injury or loss of life	Very High	None
BAER critical value	Natural Resources - Soil and Water	Hydrologic Function (Slick Creek subbasin)	Altered hydrologic function	Very Likely	Multiple fires have altered the subbasin vegetation so the hydrograph will no longer respond as it did in previous decades. This is due to changed soil conditions and loss of forest vegetation.	Major	Effects are anticipated to last many decades	Very High	None

BAER critical value	Natural Resources - Soil and Water	Hydrologic Function (other drainages in fire)	Altered hydrologic function	Likely	Lower rates of infiltration, high soil hydrophobicity, and higher rates of runoff due to loss of canopy cover, ground cover, and channel stabilizing vegetation. Reduced slope stability from moderate and high SBS areas from both rainfall and snowmelt. Increased peak flows due to higher runoff	Moderate	Hydrologic function expected to recover naturally over time and re-establishment of native vegetation to replace ground cover.	High	None
BAER critical value	Natural Resources - Soil and Water	HeHe up to Pernot Creek and Fall Creek (Impaired Waters)	Increased solar radiation and stream temperatures	Very Likely	Summer temperatures are already warm, and loss of canopy will keep them elevated	Moderate	It will take several decades before the channel has enough shade to reduce stream temperatures	Very High	None
BAER critical value	Natural Resources - Soil and Water	Portland Creek and Little Fall Creek (Impaired Waters)	Localized solar radiation and stream temperature increases	Very Likely	Summer temperatures are already warm, and loss of canopy will keep them elevated	Moderate	It will take several decades before the channel has enough shade to reduce stream temperatures	Very High	None
BAER critical value	Natural Resources - T&E habitat	T&E Species: Northern Spotted Owl Habitat and NSO Critical Habitat	Further loss of suitable habitat from continuing tree mortality due to delayed mortality, flooding, and landslides	Very Likely	We are seeing substantial (10-15%) additional loss of NSO habitat following the initial fire assessment in following years. In some cases, this additional delayed mortality has caused functional home ranges to become impaired, impaired territories to become non-functional and nest patches to become non-viable.	Moderate	Delayed mortality is expected to further reduce the forest wide amount of suitable and dispersal habitat by 0.1%. It is expected to reduce the forest wide amount of suitable and dispersal habitat in critical habitat by 0.2% and 0.4%, respectively. It will further impair 28 territories, but not render any non-functional. Delayed mortality will further adversely affect 22 nest patches and could cause two of them to become non-viable due to lack of habitat. Delayed mortality is unlikely to create barriers or additional strong filters to spotted owl landscape movements or dispersal.	Very High	None

BAER critical value	Natural Resources - Native Plants	Intact native plant communities	Invasive plant establishment in areas of high burn severity.	Very Likely	Willamette NF priority weed species are known from areas outside the burn perimeter, along roads. These species rapidly colonize in bare soil and high light conditions created by high severity fires. Intact native plant communities are now threatened with alterations from introduced invasive plants or known infestations spreading into the newly disturbed and burned areas.	Moderate	Priority weed species can invade and persist in newly-created complex early seral areas. Native plant communities and ecosystem functions are very difficult to restore once invasive plants are established. Invasive plants prevent native forage and pollinator habitat from developing. The optimal plan is to remove the first invading plants before a new population can establish.	Very High	Monitor and EDRR in areas of high and moderate soil burn severity within the fire perimeter and adjacent to FS system roads in 2024.
Other FS value	Natural Resources - Native Plants	Suppression Repair- Prevention of invasive plants in intact forest communities	Invasive plant colonization of areas disturbed by suppression	Likely	Clearing fire lines and exposed mineral soil, created ideal conditions for new infestations to establish. Suppression and repair equipment and personnel likely moved seeds from known and unmapped populations to the newly disturbed areas.	Moderate	Considerable long-term effects to intact native plant communities. The magnitude of consequence to invaded plant communities is very high, especially in areas with very low overstory canopy closure. Native plant communities and ecosystem functions are very difficult to restore once invasive plants are established. The optimal plan is to remove the first invading plants before a new population can establish.	High	EDRR treatment and monitoring of the road system and main suppression lines within the fire perimeter in 2024.
BAER critical value	Property - Other	Clark Creek Organizational Camp	Hazard trees and potential flooding from runoff and possible debris flows in Clark Creek	Very Likely	Hazard trees and possible debris flows that can damage structures	Major	Historic Infrastructure if damaged would be substantial	Very High	Remove hazard trees
BAER critical value	Property - Other	Bedrock Campground	Debris flows	Possible	Chance of storm is 20-40%	Major	Will bury the road and campsites if it were to occur	High	None

BAER critical value	Property - Other	Bedrock Day Use	Hazard Trees	Very Likely	Several trees near toilet that can hit structure	Major	Property Damage is limited to low economic investment	Very High	Close area
BAER critical value	Property - Other	Clark Butte (Lower) Trailhead	Hazard trees	Very Likely	Hazard trees and debris flows that can damage structures	Major	Toilet and paved parking lot at risk	Very High	Drop select hazard trees
BAER critical value	Property - Roads	#1800412	Elevated runoff, flooding and dry ravel, debris flows, tree and rockfall from post fire conditions, culvert failure, hazard trees falling on roads, slope failure above and below roads	Likely	Hazard trees and debris flows that can damage structures	Moderate	ML 2 road, loss of road prism, loss of access and increased sedimentation into adjacent drainages	High	Gate/close road, let trees fall, clear it next dry season/improve drainage, storm patrol, warning signs at entry points
BAER critical value	Property - Roads	Alder Creek (#1828000/#1828402)	Elevated runoff, flooding and dry ravel, debris flows, tree and rockfall from post fire conditions, culvert failure, hazard trees falling on roads, slope failure above and below roads	Likely	Hazard trees and debris flows that can damage structures	Moderate	ML 2 road, loss of road prism, loss of access and increased sedimentation into adjacent drainages	High	Open road, cut out fallen trees, fix drainage, gate road, storm patrol, warning signs at entry points
BAER critical value	Property - Roads	Tiller Ridge (#1832000)	Elevated runoff, flooding and dry ravel, debris flows, tree and rockfall from post fire conditions, culvert failure, hazard trees falling on roads, slope failure above and below roads	Very Likely	Hazard trees and debris flows that can damage structures	Major	ML 2 road, loss of road prism, loss of access and increased sedimentation into adjacent drainages	Very High	Road drainage, storm patrol, warning signs at entry points, gate an entrance

BAER critical value	Property - Roads	Portland Creek drainage (#1825000, #1825164, #1825217)	Elevated runoff, flooding and dry ravel, debris flows, tree and rockfall from post fire conditions, culvert failure, hazard trees falling on roads, slope failure above and below roads	Very Likely	Hazard trees and debris flows that can damage structures	Major	ML 2 road, loss of road prism, loss of access and increased sedimentation into adjacent drainages. The 1825164 closed road if not addressed will send significant sediment to other roads downslope and risk damaging them.	Very High	Gate/administratively close rd to minimize risk from rockfall, replace 15" concrete ditch relief culvert, gate/administratively close rd to minimize risk from rockfall, warning signs at entry points, remove culvert and fill on 1825164 (rebuild barrier at entrance), and upsize culverts on channel passing through 1825217, and 1825000
BAER critical value	Property - Roads	#1817406	Elevated runoff, flooding and dry ravel, debris flows, tree and rockfall from post fire conditions, culvert failure, hazard trees falling on roads, slope failure above and below roads	Likely	Hazard trees and debris flows that can damage structures	Moderate	ML 2 road, loss of road prism, loss of access and increased sedimentation into adjacent drainages	High	Road drainage, storm patrol, warning signs at entry points
BAER critical value	Property - Roads	Pacific Creek (#1833000)	Elevated runoff, flooding and dry ravel, debris flows, tree and rockfall from post fire conditions, culvert failure, hazard trees falling on roads, slope failure above and below roads	Likely	Hazard trees and debris flows that can damage structures	Moderate	ML 2 road, loss of road prism, loss of access and increased sedimentation into adjacent drainages	High	Road drainage, gate, warning signs at entry point if gate not approved
BAER critical value	Property - Roads	HeHe Creek (#1831000)	Elevated runoff, flooding and dry ravel, debris flows, tree and rockfall from post fire conditions, culvert failure, hazard trees falling on roads, slope failure above and below roads	Likely	Hazard trees and debris flows that can damage structures	Major	ML 2 road, loss of road prism, loss of access and increased sedimentation into adjacent drainages	Very High	Road drainage, gate, warning signs at entry point if gate not approved, clear culvert at Sunshine Creek, enlarge culvert at unnamed crossing, and clear an additional culvert on another unnamed trib, storm patrol

BAER critical value	Property - Roads	Fall Creek (#1800000) ML 5	Elevated runoff/flooding, debris flows and dry ravel, tree and rockfall from post fire conditions blocking roadway and damaging pavement, clogged culverts	Likely	Outside of first mile, road is on opposite side of river from the fire. First mile mostly below low and unburned SBS slopes	Major	Loss of paved, double lane, ML 5 road that is access to Beckler Campground, multiple other campgrounds, trailheads and rec sites	Very High	Gate/administratively close rd, replace burned guardrail over bridge near Zog Creek crossing, road drainage, signage, clean culvert at Tiller crossing, storm patrol
BAER critical value	Property - Trails	Jones (#3472)	Elevated runoff in non-ridgetop locations	Very Likely	Area above is unburned or has low intensity SBS	Major	There is minimal threat to property from post-fire flooding or debris flows.	Very High	Trail drainage, signs
BAER critical value	Property - Trails	Falls Creek National Recreation Trail (#3455)	Increased flow and erosion causing trail prism and drainage structure failures, hazard trees near wood bridges	Very Likely	Passes through high and moderate burn severity areas.	Major	There is a high risk of erosion from burned hillslopes that can washout the trail tread.	Very High	Trail drainage and protect bridges
BAER critical value	Property - Trails	Clark Creek Nature Trail (#3456)	Increased flow and erosion causing trail prism and drainage structure failures	Very Likely	Passes through high and moderate burn severity areas.	Moderate	There is a high risk of erosion from burned hillslopes that can washout the trail tread.	Very High	Trail drainage, signs
BAER critical value	Property - Trails	Clark Fall/Tie Trail (#3456.2)	Increased flow and erosion causing trail prism and drainage structure failures	Very Likely	Passes through high and moderate burn severity areas.	Major	There is a high risk of erosion from burned hillslopes that can washout the trail tread.	Very High	Trail drainage, signs

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.

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

Land: 90

Channel: NA

Roads/Trails: 80

Protection/Safety: 90

D. Probability of Treatment Success

Table 7: Probability of Treatment Success

	1 year after treatment	3 years after treatment	5 years after treatment
Land	85	85	85
Channel	N/A	N/A	N/A
Roads/Trails	80	85	85
Protection/Safety	90	95	95

E. Cost of No-Action (Including Loss): \$5,758,800

F. Cost of Selected Alternative (Including Loss): The VAR analysis summary identified that the total treatment cost is estimated at \$542,920 with an expected benefit of \$12,065,508. The summary implied minimum value of protecting non-market resource critical values is justified for the treatments proposed in this BAER assessment. The expected benefit/cost ratio was 22.2.

G. Skills Represented on Burned-Area Survey Team:

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

Second Team Leader: John Chatel

Phone(s) 971-801-5379

Email: john.chatel@usda.gov

Forest BAER Coordinator: Wendy Peterman

Email: wendy.peterman@usda.gov

Phone(s): 541-225-6321

Team Members:

Table 8: BAER Team Members by Expertise

Expertise	Team Members
<i>Team Leader</i>	John Chatel
<i>Team Leader (t)</i>	Wendy Peterman
<i>GIS Lead</i>	Dave Keenum
<i>GIS (t)</i>	Charles Brockway
<i>GIS (t)</i>	Tim Merten
<i>Soils</i>	Ut Huynh
<i>Soils (t)</i>	Vance Almquist
<i>Geologist</i>	Bart Wills
<i>Hydrology</i>	Alex Makic
<i>Hydrology (t)</i>	Jamie Sheahan Alonso

<i>Engineering</i>	Kevin Duchow
<i>Recreation</i>	Eric Amstad
<i>Botany</i>	Christina Veverka
<i>Fisheries</i>	Garry Sanders
<i>Heritage Resources</i>	Megan Berryoung
<i>Wildlife</i>	Joe Doerr
<i>PIO</i>	Kassidy Kern

H. Treatment Narrative:

Land Treatments:

EDRR BAER - P1a

Purpose of Treatment: The surveys and treatments are to prevent the establishment and rapid expansion of invasive plants into the adjacent burned NFS lands. EDRR is prescribed in order to mitigate long term impacts of the species persistence at the site and adjacent forest. The purpose of treatments is to promote native plant establishment and proliferation by removing or preventing competition from the invasive plant population.

General Description: Early detection and treatment of new invasive plant infestations is the most efficient method for preventing such infestations from establishing and expanding into recently burned areas. Burn Areas; Invasive plant detection surveys and treatments – Detection surveys for Willamette Forest high priority invasive plants will occur near known invasive plant occurrences within Bedrock Fire perimeter on National Forest System (NFS) lands. Focus areas will be those FS roads that traverse moderately to severely burned areas, and Special Habitat Areas that were moderately to severely burned. These areas pose the highest risk for invasive weeds. Multiple site visits (for detection) will be needed throughout the summer growing season (April-September 2024). Infestations may be treated immediately or mapped for treatment via contractor. BAER funding authorization will be used to meet EDRR objectives from spring 2024 to September 30th, 2024.

Location (Suitable) Sites: High priority roads totaling approximately 95 across NFS lands would receive detection surveys and treatments. Special Habitat Areas totaling 81 acres would receive detection surveys and treatments.

Design/Construction Specification(s): Detection surveys along high and moderate severity burn areas at risk to invasive species. Documentation will include GPS mapping, flagging, and entering occurrences into the NRM-IS (Invasive Species) database; treatment data entered into FACTS. Herbicide treatments will follow specifications outlined in the Forest's 2007 Invasive EIS.

Suppression EDRR – P1b

Purpose of Treatment: The surveys and treatments are to prevent the establishment and rapid expansion of invasive plants into the adjacent burned NFS lands. EDRR is prescribed in order to mitigate long term impacts of the species persistence at the site and adjacent forest. The purpose of treatments is to promote native plant establishment and proliferation by removing or preventing competition from the invasive plant population.

General Description: Early detection and treatment of new invasive plant infestations is the most efficient method for preventing such infestations from establishing and expanding into recently burned areas. Suppression Lines: Invasive plant detection surveys and treatments – Detection surveys for high priority invasive plants will occur along ground-disturbed suppression areas (e.g., dozer lines, hand lines, drop points, staging areas, etc.) on NFS lands. Infestations will be treated immediately or mapped for treatment by contractor. Multiple site visits (for detection) will be needed throughout the summer

growing season, April-August 2024. Infestations may be treated immediately or mapped for treatment via contractor. This is the best option for managing new invaders that were either introduced during suppression actions or established from bare ground created by those actions. BAER funding authorization will be used to meet EDRR objectives from spring 2024 to September 30th, 2024.

Location (Suitable) Sites: Suppression lines, staging areas, drop points, etc. totaling approximately 453 acres across NFS lands would receive detection surveys and treatments where needed.

Design/Construction Specification(s): Detection surveys will entail driving or hiking vector roads and suppression lines, and visiting disturbance areas such as drop points, heli-spots, etc. Documentation will include GPS mapping, flagging, and entering occurrences into the NRM-IS (Invasive Species) database; treatment data entered into FACTS. Herbicide treatments will follow specifications outlined in the Forest's 2007 Invasive EIS.

Heritage and Cultural Resource Protection - H1

Purpose of Treatment: Minimize the theft of exposed materials or vandalism.

General Description: The site consists of several mounds and significant precontact cultural material exposed on the ground surface. This site was previously recorded as a historic pit site. There is historic debris scattered across the entire bench that have been exposed by the fire due to lack of vegetation. This site is visible from the road and a popular dispersed recreation site. The exposure of historic debris is enticing for looters to access and collect the precontact material that is also visible on the surface. Standing dead danger trees are still present on-site. Because of danger trees, Forest Service employees left the area, and the extent of the mounds remains unknown. Once ethnographic references were found that verified what we were seeing on the ground, Forest Service employees have not returned to the site out of respect for the tribes. The roads into the area will continue to be closed with existing gates until stronger gates can be installed.

Location (Suitable) Sites: The site is located on a bench near Alder Creek (43.984496, -122.4932) in T18 S, R 03 E, Sec 19.

Design/Construction Specification(s): The treatment is dependent on the needs and wants of both tribes during consultation. The following recommended treatment can be amended as needed to respect their wishes. The recommended treatment includes:

1. Two members from each tribe to survey around 57 acres in and around the Alder Creek terraces to delineate a treatment area. This will determine the amount of native seed and ag straw appropriate to mask the site and reestablish soil health. Due to the sensitivity of this site, this treatment needs to be executed by tribal members. There are numerous standing dead trees on the site, and it is not safe to access during bad weather or windy conditions. An escort to the site can be provided by a red carded Forest Service Heritage professional. The survey should take no more than 16 hours.
2. Depending on the size of the treatment area recommended by the tribes, up to five tribal members from each tribe (10 total) will be needed to reseed the area with native grasses and pollinators. The estimated treatment area is based on the known site area (~2.28acres) and features on LiDAR (~3.45acres) which is around a total of ~7.87 acres. Edible plants should be avoided as they attract human activity. Ag straw should be applied over the seed treated area and must be spread no higher than 2 inches over 60% of the landform to allow for proper regeneration. Application of the ag straw should be done by hand to avoid further damage to the site. This treatment should take no longer than 40 hours per person to disseminate the seed and ag straw.
3. Post treatment monitoring will occur by two tribal members (one from each tribe) every month for one year. Site visits and monitoring schedule should be coordinated by the tribes. Monitoring days should take no longer than 8 hours.

Channel Treatments: None

Roads and Trail Treatments:

Storm Proofing (storm proofing existing drainage features) - R1

Purpose of Treatment: The watersheds burned in the Bedrock Fire will show the effects of the fire including increased runoff, sediment, and debris transport. These effects could result in filling the drainage structures such as ditches, water bars, rolling dips, plugging culverts and potentially overtopped or washed away road surfaces. Removing the material from these structures will allow them to continue to function properly and move water across the road instead of allowing it to overtop the structure and potentially run down the road. Re-establish water bars where appropriate to continue positive roadway drainage. Treatments are recommended to minimize the risks to public safety and protect the investment of the transportation system from the expected increased post-fire runoff.

General Description: A variety of road drainage stabilization treatments have been prescribed for Forest Service Roads within the Bedrock Fire. These treatments are necessary to mitigate the predicted effects that will occur to the transportation infrastructure system due to the changed landscape.

Location (Suitable) Sites: All roads within the fire perimeter are to some degree going to be affected by the effects of the fire. The most important roads to focus on will be those roads that travel through the high and moderate soil burn severity areas of the fire. Fifty mile of road will have drainage improved on the 1832000, 1833000, and all maintenance level 2 (1817, 1831, 1825, 182517, and 1825264) and 5 (1800) roads in moderate and high severity.

Design/Construction Specification(s):

1. Ditch Cleaning – Where present, drain ditches along the length of the roads shall have all existing silt and debris removed and either hauled away or side cast such that the material cannot reenter the drainage structure during a runoff event.
2. Culvert Cleaning – Remove any blockages from inlet, outlet and inside barrel and straighten bent inlets and outlets when possible. Catchment-basins shall have all existing silt and debris removed from in front of the culvert inlet so that they are functioning at full capacity. Culverts are typically 18 inch to 24-inch ditch relief culverts.
3. Cross Drain Culvert Replacement – Culverts are undersized for the anticipated flows and need to be upsized and set at a slope close to the stream gradient or at least 2%.
4. Water Bar and Rolling Dip Re-establishment and cleaning – remove the material that has accumulated in the water bars and rolling dips. Ensure that proper drainage is achieved so that water can leave the roadway. This is most effectively done while grading the road.
5. Channel Clearing - The removal of recent loose debris that is directing water towards the road or bridge structure that will cause severe scour during high precipitation events.

Storm Inspection and Response - R3

Purpose of Treatment: The purpose of the monitoring is to evaluate the condition of roads for motorized access and to identify and implement maintenance of the treatments to road surfaces and flow conveyance structures to provide safe access across FS lands.

The patrols are used to identify those problems such as debris caught in culvert inlets, plugged or partially plugged culverts, and washed-out roads associated with the treatments that have been implemented and are no longer functioning properly.

Forest personnel will survey the roads within the fire perimeter after storms. Survey will inspect road surface condition, any new hillside rills, ditch erosion, and culverts/inlet basins for capacity to accommodate runoff flows. A plan, similar to a FERM (Flood Emergency Road Maintenance) plan, should be drafted to help identify where to concentrate the patrols and the responsibilities of those prior to, during and post large flow events.

General Description: The steep slopes within the Bedrock Fire combined with the lack of vegetation in the moderate and high burn severity portions of the fire will lead to increased run off and material being washed down onto the roads from any precipitation events. The material that is delivered onto the roadways could end up in the roadway drainage features and potentially into the creeks.

Location (Suitable) Sites: The patrols should first focus on the Forest Service roads that receive the most traffic. The Forest and district can identify the most susceptible areas and roads across the districts within the fire perimeter. Fifty miles of road will have storm patrols on the 1832000, 1833000, and all maintenance level 2 (e.g., 1817, 1831, 1825) and 5 (1800) roads in moderate and high severity.

Design/Construction Specification(s):

1. FS personnel will direct the work.
2. Immediately upon receiving heavy rain the FS will send out patrols to identify road hazard conditions – obstructions such as rocks, sediment, washouts – and plugged culverts so the problems can be corrected before they worsen or jeopardize motor vehicle users.
3. Heavy equipment necessary to mechanically remove any obstructions from the roads and culvert inlets and catch basins shall be mobilized as needed.
4. All excess material and debris removed from the drainage system shall be placed outside of bank-full channel where it cannot re-enter stream channels.

Culvert Removal - R4.

Purpose of Treatment: Drainage above closed road has a high severity burn that will increase flows to a culvert that is already buried at its inlet and overflowing into the ditch eroding the road fill.

General Description: The plugged culvert, road fill, and depositional area above the culvert will be removed to reestablish the natural drainage and prevent further erosion of the closed road. If this is not removed, then many cubic yards of material will impact the roads below and critical fish habitat in Portland Creek.

Location (Suitable) Sites:

NFSR #	NAME	TREATMENT
1825264	Road doesn't have a name; located above Portland Creek off of 1825217	Water bar the road, there is an 18" culvert at the crossing at approximately MP 0.18. Remove the culvert and material above the roadway, the material in the roadway and shape the drainage close to its natural slope. Close the road with a berm at the junction with 1825217.

Design/Construction Specification(s): none

R7. Relief Culvert

Purpose of Treatment: The damaged cross drain culverts no longer function due to damage including having HDPE culverts that melted. Not only are these culverts not functioning as hydraulic structures, but they have left a cavern under the roadway creating a safety concern.

General Description: Several cross-drain culverts are damaged to the point where they are not repairable and need to be replaced so they function properly for anticipated flows associated with the effects of the Bedrock Fire.

Location (Suitable) Sites:

All roads within the fire perimeter are to some degree going to be affected by the effects of the fire. The most important drainage crossings to focus on will be those roads that travel through and down canyon from the high and moderate soil burn severity areas of the fire. A few damaged culverts are listed below:

NFSR #	NAME	TREATMENT
1817000	Cowhorn MP 3.91	Replace the melted HDPE Culvert with a 24" x 60' CMP
1817000	Cowhorn MP 4.32	Replace the melted HDPE Culvert with a 24" x 60' CMP
1817000	Cowhorn MP 4.84	Replace the melted HDPE Culvert with a 36" x 60' CMP
1817000	Cowhorn MP 4.89	Replace the melted HDPE Culvert with a 24" x 60' CMP
1817000	Cowhorn MP 5.00	Replace the melted HDPE Culvert with a 24" x 60' CMP
1817000	Cowhorn MP 5.26	Replace the melted HDPE Culvert with a 24" x 50' CMP
1817000	Cowhorn MP 5.6	Replace the damaged culvert with a 24" x 50' CMP
817000	Cowhorn MP 5.72	Replace the damaged culvert with a 24" x 50' CMP
1817000	Cowhorn MP 6.33	Replace the damaged culvert with a 24" x 50' CMP
1817000	Cowhorn MP 6.83	Replace the damaged culvert with a 36" x 40' CMP
1825000	Portland Creek MP 0.12	Replace damaged culvert with 24" x 60' CMP
1825000	Portland Creek MP 0.47	Replace damaged culvert with 24" x 60' CMP
1825000	Portland Creek MP 0.85	Replace the damaged culvert with a 36" x 40' CMP
1825000	Portland Creek MP 1.04	Replace the damaged culvert with a 24" x 60' CMP

Design/Construction Specification(s): Cross Drain Culvert Replacement – Culverts are damaged and/or undersized for the anticipated flows and need to be replaced and set at a slope close to the stream gradient or at least 2%.

Upsized Culvert – R11

Purpose of Treatment: The watersheds burned in the Bedrock Fire will show the effects of the fire with an increase in flows from precipitation events. This effect could result in plugging culverts and potentially overtopped or washed away road surfaces. Increasing the capacity of the culvert or crossing will allow for continued hydraulic connectivity while minimizing the risks to public safety and protecting the investment of the transportation system from the expected increased post-fire runoff.

General Description: Two culverts are undersized for the anticipated flows associated with the effects of the Bedrock Fire.

Location (Suitable) Sites: All roads within the fire perimeter are to some degree going to be affected by the effects of the fire. The most important drainage crossings to focus on will be those roads that travel through and down canyon from the high and moderate soil burn severity areas of the fire. A few are listed below:

NFSR #	NAME	TREATMENT
1825217	Unnamed	Replace the culvert at MP 0.09 with a 36"x 35' culvert. This is the drainage below the culvert on 1825264 and is undersized and full of material currently. There isn't enough height difference between the roadway surface and the natural ground as you move down the road gradient to allow for a rolling dip. The channel is defined at the crossing and there isn't enough cover above the culvert to put a dip there. Pulling the culvert would prevent work that is being done further up the road, on portions that leave the fire perimeter.

1831000	He He Creek @ MP 1.6	Current culvert is a 48" CMP, replace with a 72" x50' round or preferably squash culvert (if available), as squash culverts give a wider base and shorter height while maintaining the same capacity. This is a high traffic road and removing the culvert or installing a drive through dip is not practical.
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Design/Construction Specification(s): Culvert Replacement – Culverts are undersized for the anticipated flows and need to be upsized and set at a slope close to the stream gradient or at least 2%.

Trail Drainage Stabilization - T1

Purpose of Treatment: The purpose of the trail stabilization treatments is to allow water to (1) sheet flow across the trail, and (2) where water does collect, to shed off the trail as soon as possible. Water is a trail's worst enemy, and the trail treatments are intended to minimize the time and distance that water spends on the trails by building features into the trail that shed the water. Where water flow over the trail cannot be avoided, armoring the trail will stabilize it and stop or slow down erosion. By doing these treatments, the trail prism will be protected from the increased hydrological response that is expected for post-fire storm events.

General Description: Trail stabilization work over 13.8 miles: Install drainage (Rolling Grade Dips/Grade reversals/Nicks) features where needed to stabilize trail. Install Waterbars only where necessary and then only Rock. Clean out existing waterbars. Armor drainage crossings. Outslope trail bench/prism as needed. Remove hazard trees, where needed, for worker safety.

Location (Suitable) Sites:

Fall Creek National Recreation Trail #3455 – 7.1 miles
 Jones Trail #3472 – 4.3 mile
 Clark Butte Trail #3456.1 – 1.4 miles
 Clark/Fall Tie Trail #3456.2 – 0.1 miles
 Clark Creek Nature Trail #3456 – 0.9 miles

Design/Construction Specification(s): If contracted, line out work with agency trail expert. De-berm trail where needed, re-establish 5% Outslope, install knicks, and rolling grade dips; minimize waterbar use where grade reversal methods can be used. If waterbars must be used, use only rock. Clean out existing waterbars or replace with grade reversal methods. Armor drainage crossings where needed. Remove hazard trees, as needed, for worker safety.

Protection/Safety Treatments:

Road Hazard Signs - S1a

Purpose of Treatment: The purpose of "Burned Area Warning Signs" is to reduce the risks to human life and safety by alerting motorists of existing threats while traveling the authorized routes within the areas susceptible to flooding, debris flows, hazards trees, and all other risks attributable to post fire events on the landscape.

General Description: This treatment is for installation of "Entering Burned Area" warning signs.

Location (Suitable) Sites: Locations for "Burned Area" warning signs will be located at all points of entries by use of forest system roads into the burned areas. These locations are as follows:

- On FSR 1800000 (Fall Creek Road), near the intersection with 1816000
- ON FSR 1800000 (Fall Creek Road), at the fire perimeter on the east side
- On FSR 1818000 (Four Hills) at the fire perimeter near the intersection with 1806000

- On FSR 1825000 (Portland Creek) at the fire perimeter on the southern end of the road
- On FSR 1832000 (Tiller Ridge) at the northern edge of the fire perimeter
- On FSR 1817000 (Cowhorn) on the north end of the fire perimeter
- On FSR 1831000 (He He Creek) on the north edge of the perimeter
- On FSR 1831383 near the intersection with 1831384 so that it covers both roads
- On FSR 1831384 near Pernot Mtn at the fire perimeter
- On FSR 1806000 near the intersection with the 1817000 road

Design/Construction Specification(s): “Burned Area” warning signs along the roads shall measure, at a minimum, 30 inch by 36 inch and consist of 0.08” aluminum, sheeted in high intensity yellow with black letters, which is shown in the photo below. The “BURNED AREA” lettering shall be 4C inch.



Road Closure and Barricade Markers Signs shall conform to the M.U.T.C.D. standards and shall be installed per Federal Highway Safety Standards.

Road Hazard Signs (Rockfall) - S1a

Purpose of Treatment: This treatment is for installation of “Rockfall” warning signs.

General Description: The purpose of “Rockfall Warning Signs” is to reduce the risks to human life and safety by alerting motorists of existing rockfall threats while traveling the authorized routes within the areas.

Location (Suitable) Sites: Locations for “Rockfall” warning signs will be located at either end of the rockfall areas. These locations are as follows:

- On 1825000 (Portland Creek) – approximately MP 0.62 and MP 0.82
- On 1800000 (Fall Creek) – approximately MP

Design/Construction Specification(s): “FALLEN ROCKS” warning signs along the roads shall measure, at a minimum, 36 inch by 36 inch and consist of 0.08” aluminum, sheeted in high intensity yellow with black letters, which is shown in the photo below. The “FALLEN ROCKS” lettering shall be 4C inch.



Road Closure and Barricade Markers Signs shall conform to the M.U.T.C.D. standards and shall be installed per Federal Highway Safety Standards.

Trail/Recreation Hazard Signs - S1b

Purpose of Treatment: The public needs to be made aware of the hazards associated with post-fire events, such as falling objects, hazard trees (especially during wind events), mud slides and rolling rocks (especially during heavy rain events), and potential for flooding (especially during heavy rain events). These hazard warning signs will inform the public, increase safety, and transfer responsibility of post-fire effects safety to the public.

General Description: Install hazard warning sign at recreation sites to inform the public of the hazards associated with post-fire events, such as falling objects, hazard trees (especially during wind events), mud slides and rolling rocks (especially during heavy rain events), and potential for flooding (especially during heavy rain events). Elevated risks will persist in fire impacted areas even after closures are lifted. Warning signs inform the public of the elevated risk.

Location (Suitable) Sites:

Broken Bowl Campground	Clark Butte (Upper) Trailhead	Clark Butte Trail #3456.1
Big Pool Campground (x2)	Clark Butte (Lower) Trailhead	Clark Creek Nature Trail #3456
Clark Creek Organizational Camp	Johnny Creek Trailhead	Clark/Fall Tie Trail #3456.2
Bedrock Campground	Jones (Upper) Trailhead	Johnny Creek Nature Trail #3454.1
Bedrock Day Use	Fall Creek (Road 1828) Trailhead	Jones Trail #3472
Puma Campground	Fall Creek National Recreation Trail #3455 (x5)	

Design/Construction Specification(s):

- Install hazard warning sign at each of the above listed recreation sites.
- Sink a U-channel post or Square tube post at the entrances to the listed sites. Place in conspicuous locations.
- Mount 36" X 24" Polyflex or Aluminum signs (with pre-drilled holes) to U-channel or Square tube posts. Use fender washers, if necessary, to prevent bolt head from pulling through sign during high wind events.
- Periodically check signs and maintain or replace as needed.

Physical Closure Devices (gate, berm, boulders, etc.) - S2

Purpose of Treatment: The primary reason of installing the gates is for public safety especially during periods of expected moderate to high rainfall events. Gates are also effective at closing areas where safety concerns have not been mitigated. In the event severe stormy weather passes over the Bedrock Fire area, a line officer may decide they need to close the roads that would be affected by the expected run off. A gate would be necessary in preventing the public from accessing the area of the forest by vehicle during these severe weather events. Gates from the previous fire exist, however, these have

been easily ripped out and shown not to be effects. Therefore stronger gates will be installed at key entrances into the fire to protect the heritage values and access to dangerous roads, trails, and campsites.

General Description: This treatment is for the installation of steel post gates to close roads when necessary for public safety and to develop and implement closure orders when necessary.

Location (Suitable) Sites: Locations for the steel post gates are indicated in the table which follows:

Road	Location
FSR 1800000 Double Swing	West end of road near Dolly Varden Campground; need the start of the burned area
FSR 1800000 Double Swing	East End of the fire, there is a gate from the Gales Fire still standing but the turnaround location is on the wrong side, move gate 300 feet down the road so the turnaround is usable.
FSR 1831000 Single Swing	Near the intersection with the 1800000 Road
FSR1831000 Single Swing	Below the intersection with the 1831386? (Pernot Mountain Road)
FSR 1832000 Single Swing	Near the intersection with the 1800000 Road
FSR 1832000 Single Swing	Near the intersection with the 1832347 Road; somewhere around there where there is a good turnaround
FSR1833000 Single Swing	Near the intersection with the 1800000 Road, prior to the bridge so that it closes the trailhead, and no one parks on the bridge.

Design/Construction Specification(s): The gates shall be constructed according to the *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects FP-14* (Similar to the photo below). All signing associated with the gate installation shall follow Forest Service Engineering Manual 7100-15 and the Federal Highways Manual of Uniform Traffic Control Devices (MUTCD). This includes typical gate barricade markers and object markers and any signs that may be installed with the gate such as a road closed sign.

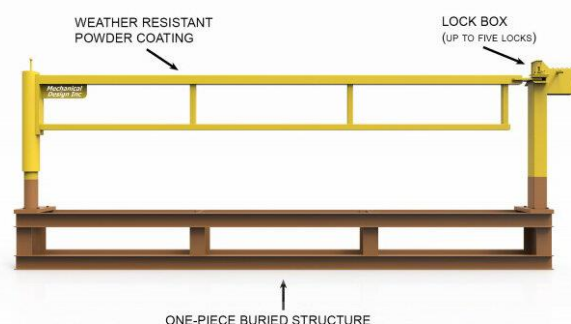


Figure 1

All gates shall be constructed as shown in Figure 1 and shall have signage that meets the MUTCD standards for road closures.

All gates shall be able to be secured in the open position so as not to be a hazard to traffic. Cables, chains, or single-wire barriers shall never be used across any roadway because they are not readily visible to road users. Travel management signs may be used on gates to display access and travel management restrictions and closures. Refer to the Sign Installation Guide for additional information about the required gate signs.

Road closure information will be posted on the gates and through public notices.

Hazard Tree Falling - S3 (Recreation Sites)

Purpose of Treatment: Burned trees may pose an unacceptable risk to property. Hazard trees will be mitigated in locations needed to protect property.

General Description: Select hazard trees would be felled at trailheads and recreational sites to protect high value infrastructure (toilets), and bridges.

Location (Suitable) Sites:

- Big Pool Campground
- Clark Creek Organizational Camp
- Bedrock Day Use
- Clark Butte (Lower) Trailhead
- Fall Creek Trail Bridge at Milepost 1.61
- Fall Creek Trail Bridge at Milepost 1.76
- Fall Creek Trail Bridge at Milepost 2.19
- Fall Creek Trail Bridge at Milepost 3.94

Design/Construction Specification(s):

- Take down all hazard trees identified to be a threat to property such as toilet buildings.
- Take down hazard trees identified to be a threat to human life or safety at sites where there is no threat to property, but there is threat to human life or safety, [and where it is impractical or more expensive to close the site to the public, or where it is necessary for worker safety while they are performing other BAER emergency work].
- Place trees on contour (where possible) in locations that do not adversely affect road drainage.
- Review hazards of felling trees/JHA before implementation.

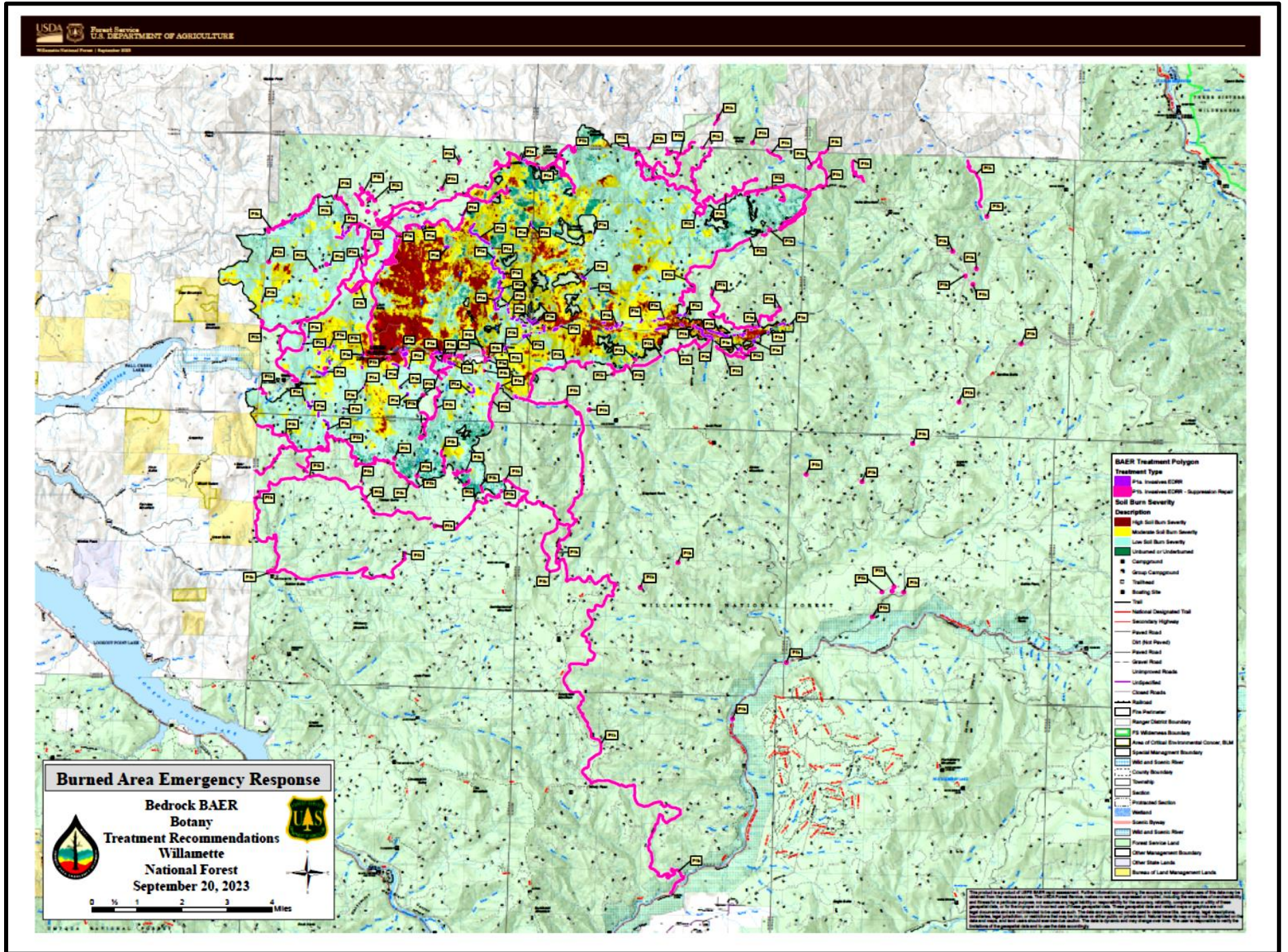
Guardrail Repair – S4

Purpose of Treatment: The purpose of the treatment is the protection of motorists and Forest Service staff conducting emergency treatments who travel along Fall Creek Road, across the Alder Creek bridge.

General Description: During the Bedrock Fire, the timber curb on the Alder Creek bridge was burnt and damaged and no longer functional as a safety feature as intended.

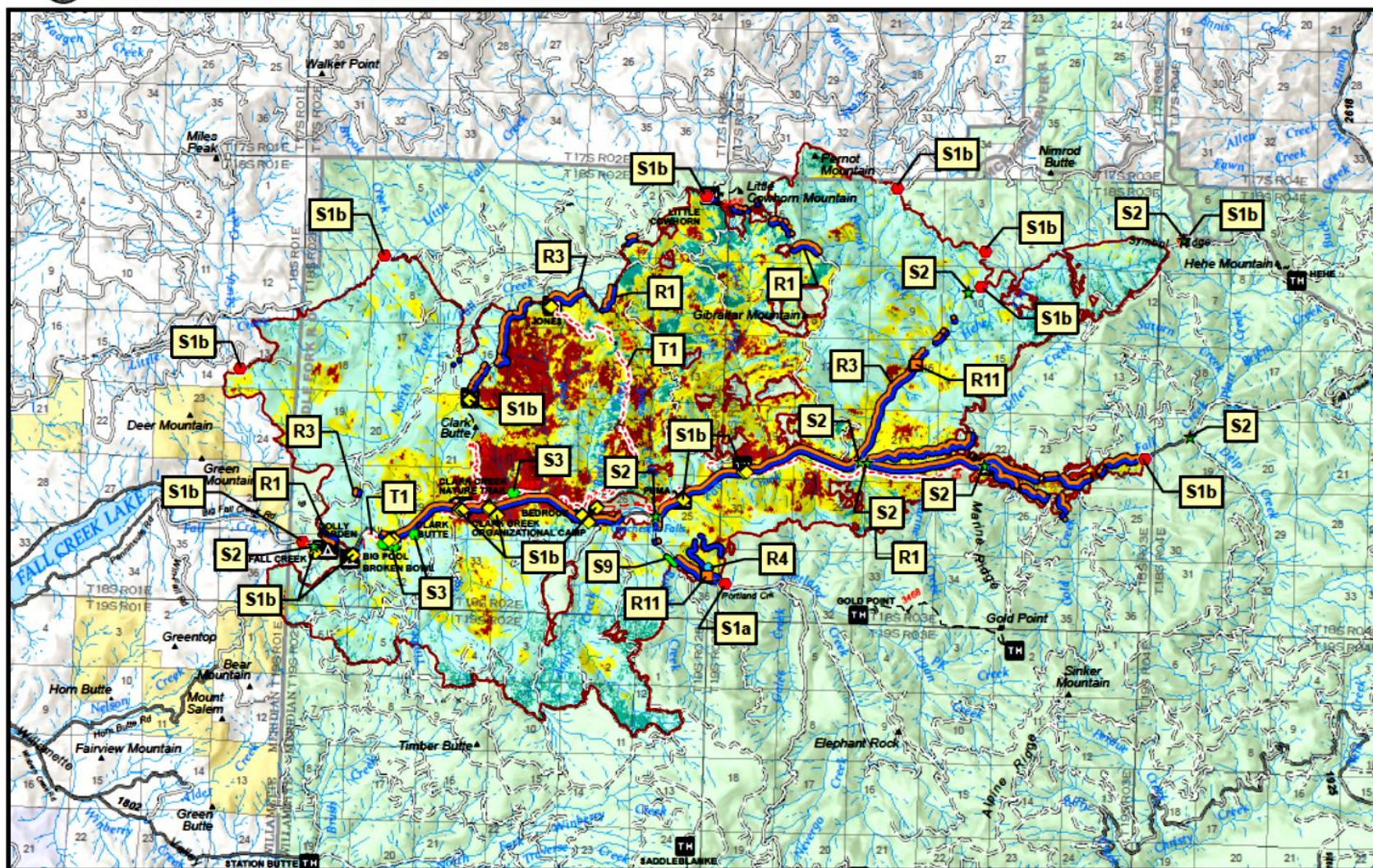
Location (Suitable) Sites: The curbing on Alder Creek Bridge is located along Fall Creek Road (FSR #1800000) at approximately milepost 18.8.

Design/Construction Specification(s): Replacement of the damaged curbing shall be per Section 716 of the *FP14-Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects*.





Road & Trail Treatment Recommendations Bedrock Fire BAER - Willamette National Forest



USDA Forest Service Disclaimer

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Treatment Recommended

- ◆ R4. Culvert Removal
- ◆ R11. Up-Size Culvert
- ◆ S1a. Road Hazard Signs
- ◆ S1b. Trail/Recreation Hazard Signs
- ★ S2. Physical Closure Devices
- ★ S3. Hazard Tree Felling
- R1. Storm Proofing (storm proofing existing drainage features)
- R3. Storm Inspection and Response
- S9. Rock-Fall Mitigation
- T1. Trail Drainage Stabilization

- Bedrock Fire Perimeter
- Soil Burn Severity**
- High Soil Burn Severity
- Moderate Soil Burn Severity
- Low Soil Burn Severity
- Unburned or Underburned

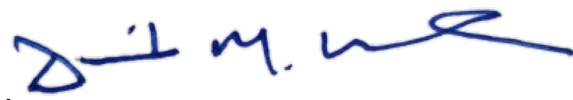


PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS

Line Items	Units	Unit Cost	NFS Lands		Other	Other Lands		Total
			# of Units	BAER \$		# of units	Fed \$	
A. Land Treatments								
EDRR P1a	Acre	177	176	\$31,152	\$0		\$0	\$31,152
EDRR P1a	Acre	164	453	\$74,292	\$0		\$0	\$74,292
H1. Heritage/Cultural Protection	Site	23,690	1	\$23,690				\$23,690
<i>Subtotal Land Treatments</i>				<i>\$129,134</i>	<i>\$0</i>		<i>\$0</i>	<i>\$129,134</i>
B. Channel Treatments								
				\$0	\$0		\$0	\$0
<i>Subtotal Channel Treatments</i>				<i>\$0</i>	<i>\$0</i>		<i>\$0</i>	<i>\$0</i>
C. Road and Trails								
R1. Storm Proofing	Miles	1,850	50	\$93,092	\$0			\$93,092
R3. Storm Inspection/Response	Miles	731	50	\$36,800	\$0		\$0	\$36,800
R7. Relief Culvert	EACH	4,214	14	\$59,000				\$59,000
R11. Upsized Culverts	EACH	12,750	2	\$25,500	\$0			\$25,500
R4. Culvert Removal	EACH	30,000	1	\$30,000				\$30,000
T1. Trail Drainage Stabilization	Miles	5,000	14	\$69,000			\$0	\$69,000
				\$0	\$0			\$0
<i>Subtotal Road and Trails</i>				<i>\$313,392</i>	<i>\$0</i>		<i>\$0</i>	<i>\$313,392</i>
D. Protection/Safety								
S1a. Road Hazard Signs (General)	EACH	812	10	\$8,120	\$0		\$0	\$8,120
S1a. Road Hazard Signs Rockfall	EACH	695	4	\$2,780	\$0		\$0	\$2,780
S1b. Trail/Recreation Hazard Signs	EACH	375	22	\$8,250	\$0			\$8,250
S2. Physical Closure Device	EACH	9,442	7	\$66,094	\$0		\$0	\$66,094
S4. Guardrail Repair	EACH	6,425	1	\$6,425			\$0	\$6,425
S3. Hazard Tree Falling	EACH	50	176	\$8,800			\$0	\$8,800
<i>Subtotal Protection/Safety</i>				<i>\$100,469</i>	<i>\$0</i>		<i>\$0</i>	<i>\$100,469</i>
E. BAER Evaluation								
Initial Assessment	Report	\$114,831	1	\$114,831	\$0		\$0	\$114,831
<i>Subtotal Evaluation</i>				<i>\$114,831</i>	<i>\$0</i>		<i>\$0</i>	<i>\$114,831</i>
F. Monitoring								
				\$0	\$0		\$0	\$0
<i>Subtotal Monitoring</i>				<i>\$0</i>	<i>\$0</i>		<i>\$0</i>	<i>\$0</i>
G. Totals				\$657,826	\$0		\$0	\$657,826
Previously approved								

PART VII - APPROVALS

1.



Forest Supervisor

9/21/2023

Date