Date of Report: 10.18.2021

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: Fourmile Fire

B. Fire Number: P4N01P21

C. State: Idaho

D. County: Valley

E. Region: R4

F. Forest: Payette NF

G. District: Krassel

H. Fire Incident Job Code: P4N01P21

I. Date Fire Started: 05-18-2021

J. Date Fire Contained: 06-08-2021

K. Suppression Cost: $17,000

L. Fire Suppression Damages Repaired with Suppression Funds (estimates):

1. **Fireline repaired (miles):** 1.25
2. **Other (identify):**

M. Watershed Numbers:

Table 1: Acres Burned by Watershed

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
170602080407	Goat Creek-South Fork Salmon River	17880	4	0%
170602080409	Fourmile Creek-South Fork Salmon River	27627	986	3.6%

N. Total Acres Burned:

Table 2: Total Acres Burned by Ownership

OWNERSHIP	ACRES
NFS	990
OTHER FEDERAL (LIST AGENCY AND ACRES)	
STATE	
PRIVATE	
TOTAL	990

O. Vegetation Types: South aspects have very scattered stands of ponderosa pine, wheatgrass, fescue, sagebrush, and bitterbrush plus annual grasses such as cheatgrass. East and north aspects have scattered to dense stands of Douglas-fir over cheatgrass and fescue. Present vegetation is Douglas-fir and ponderosa pine over pinegrass, ceanothus and other tall brush species. Habitat types are mostly Douglas-fir/pinegrass or snowberry.

P. **Dominant Soils:** Lithic Xeropsamments, mixed, mesic, Lithic Hapludolls, sandy, mixed, frigid and Lithic Cryopsamments, mixed. These soils have loamy sand to sandy loam surfaces over loamy sand and sand subsurfaces.

Q. Geologic Types: Idaho Batholith, Porphyritic muscovite-biotite granite-granodiorite, Younger plutonic series

R. Miles of Stream Channels by Order or Class:

Table 3: Miles of Stream Channels by Order or Class

STREAM TYPE	MILES OF STREAM
PERENNIAL	1.8
INTERMITTENT	0.9
EPHEMERAL	
OTHER (DEFINE)	

S. **Transportation System:**
Trails: *National Forest (miles):* *Other (miles):*
Roads: *National Forest (miles):* 2.0 *Other (miles):*
Airstrips:

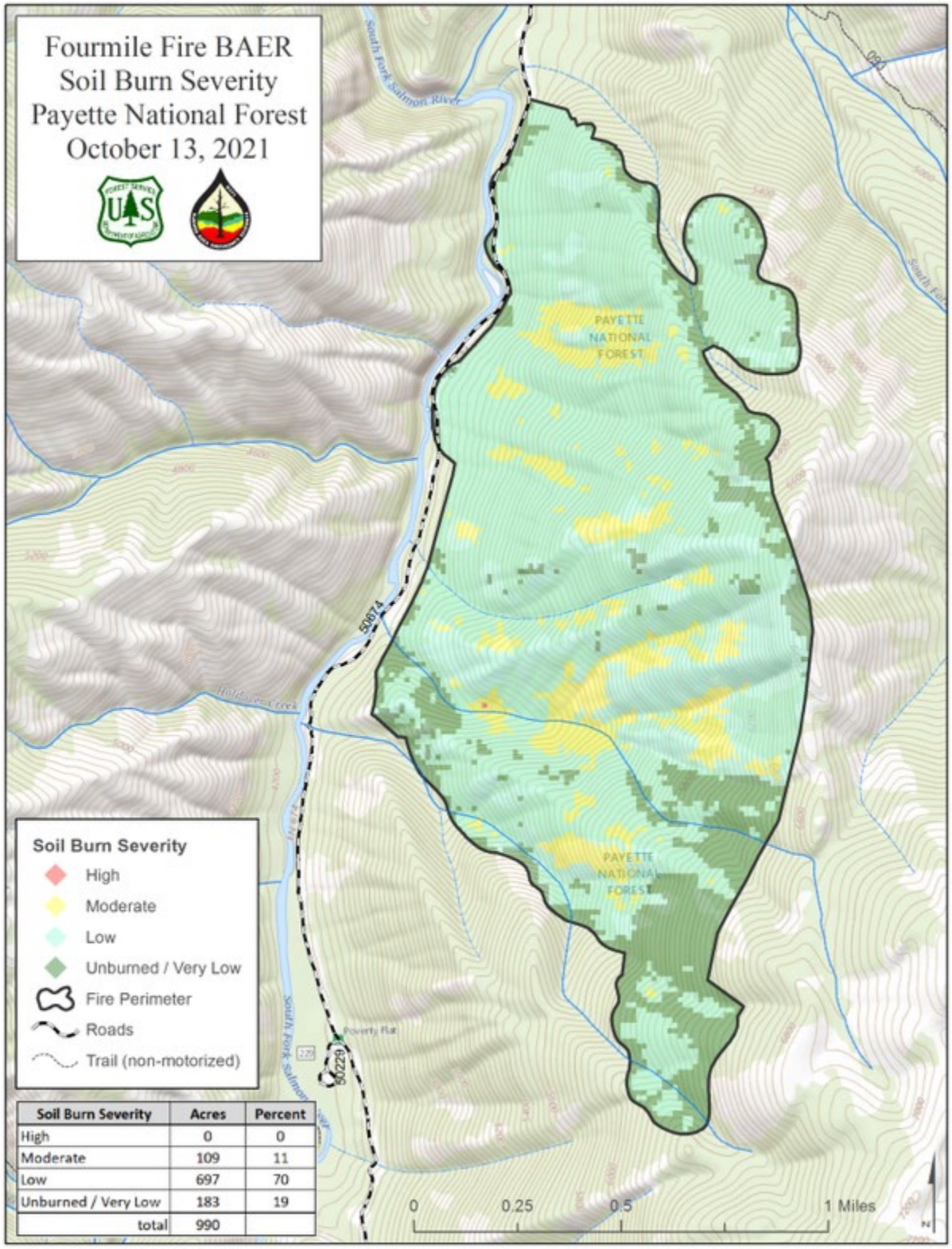
PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Table 4: Burn Severity Acres by Ownership

Soil Burn Severity	NFS	Other Federal (List Agency)	State	Private	Total	% within the Fire Perimeter
Unburned	183					19
Low	697					70
Moderate	109					11
High	0					12
Total	990					100

Fourmile Fire Soil Burn Severity Map



Soil Burn Severity	Acres	Percent
High	0	0
Moderate	109	11
Low	697	70
Unburned / Very Low	183	19
total	990	

B. Water-Repellent Soil (acres): Hydrophobic soil conditions were either not present or very weak. This is due to the low to moderate SBS, retention of the soil organic horizon post-fire and overall lack of OM available to volatilize and create hydrophobic conditions.

C. Soil Erosion Hazard Rating: Land type-based erosion hazard ratings for the burned area is: Low 22 acres (2%), Moderate 115 acres (12%), High 853 acres (86%).

D. **Erosion Potential:** The dominant land type within the fire area, River Breaks Land, has one of the highest natural geologic erosion rates in the Forest. The surface erosion hazard is very high as is the surface erosion of road cut and fill slopes. The debris slide hazard is the highest in the Forest. Maintaining stable roads in this land type is very difficult. Dominant slope gradients are 65 to 85 percent. Elevations range from 3,500 to 6,000 feet and is within the rain on snow zone. Aspects are mostly south and west. Erosion by overland flow is dominant and is very quickly concentrated into draws and drainages. Ground cover percentages are low, generally less than 50 percent although some north aspects may have 80 percent ground cover.

The fire area was analyzed for shallow landslide hazards using the PNF land slide prone (LSP) GIS map based on the landslide predictive model SINMAP (Pack et al. 1998). Modeling produces a stability index for each 30-meter topographic cell that are then grouped into four relative hazard classes: stable, low, moderate, and high. Land Slide Prone hazard rating within the fire perimeter is: Stable 306 acres (31%), Low 216 acres (22%), Moderate 124 acres (13%), High 343 (35%)

E. **Sediment Potential:** The potential for debris slides and delivery of sediment to streams is very high. The Fourmile fire occurred on River Breaks Lands which have formed by water erosion and are adjacent to large rivers. These landtypes are dissected by ephemeral and first order drainages that flow into the S.F. Salmon River and are susceptible to overland flow, gully erosion and subsequent debris flows. Maintaining stable roads in this landtype is very difficult and impacts would be high because of the adjacent rivers.

F. Estimated Vegetative Recovery Period (years): 3 to 5

G. Estimated Hydrologic Response (brief description): Increased runoff from high intensity storms is likely within the burned area. An early August 2021 precipitation event occurred with a 1-hour intensity of 0.35 in (~3-year recurrence interval), resulting in multiple debris torrents that blocked the road below. Widespread rill and gullying were observed within the fire perimeter post-storm.

Hydrologic modeling of small perennial watersheds (<700 acres; bankfull distance <6ft) intersecting the burn perimeter predicted varying responses to 10-year precipitation events of 1 hr, 2 hr, and 24 hr duration. Increased runoff from the burn was predicted to vary from 16-64% (24 hr) to >1000% (2 hr). Absolute magnitude increases in storm-generated flow prediction ranged from 1.04 cfs (1 hr) to 20.8 cfs (24 hr).

Using the greatest predicted storm runoff (24-hour storm) culvert sizing for the two perennial drainages was performed; both existing culverts are 24 inches in diameter. Modeling results indicate undersized culverts at the aforementioned channels.

Culvert Capacity Assessment

Watershed	Modeled 10-yr, 24-hr event flow (cfs) [pre-fire]	Modeled 10-yr, 24-hr event flow (cfs) [post-fire]	Existing Culvert Diam. (in)	Minimum Culvert Diam. (in) [pre-fire]	Minimum Culvert Diam. (in) [post-fire]
Joe's Camp Cr.	42.3	63.1	24	37	45
Lower Poverty Cr.	50.7	58.6	24	40.5	44

PART V - SUMMARY OF ANALYSIS

Introduction/Background

The Fourmile Fire began as a prescribed fire on the Krassel Ranger District on May 6th, 2021. It was declared a wildfire on May 18th once it had burned outside of the project boundary at which time fire suppression began. Fire containment ocured on June 8th, controled on July 4th and declaired out on July 19th, 2021, with a fire area of 990 acres. On August 6th 0.35 inches of precipitiation was recorded from a one hour storm having a return interval of approximatetly 2 to 3 years. This high intensity rain storm inititated overland flow, rill and gully erosion of ephemeral and intermittent channes and multiple debris flows. It initiated two debris flows within perennial tributaries (Joe's Camp Creek and Lower Poverty Creek) that are tributaries to the South Fork Salmon River (SFSR). These and an additional three debris flows crossed the SFSR road and into the SFSR, temporarily closing the road. Debris plugged several culverts and divereted flow down the SFSR Road and into the SFSR. Non-BAER road cleanup was completed by the PNF road crew in August. The two perennial stream crossings have 24" culverts that are undersized and should be sized to 46" culverts to pass estimated post-fire flows.

August 6th debris flows crossing road and into the SFSR

The primary values at risk from post-fire effects due to the Fourmile Fire are: human life and safety from falling trees and rolling rocks and dispersed camping located on alluvial fans of burned watersheds, transportation and infrastructure (roads and culverts), designated critical habitat for ESA-listed Chinook Salmon, steelhead and bull trout and Chinook Salmon spawning redds and site integrity of cultural resources. The SFSR road is the only access route to and from the community of Yellow Pine, Idaho, for six months of the year during the snow season.The primary threats caused by the fire include increased runoff and accelerated hillslope erosion which is expected to continue for 3 to 5 years following the fire until the burned watersheds recover.

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

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**

Human Life and Safety (HLS): Post-fire HLS Critical Values include recreating public, Yellow Pine residents that use the SFSR Road and Forest Service employees. Threats include flooding, debris flows, hazard trees and rock fall, and loss of the only ingress and egress to the community of Yellow Pine during winter months. These threats exist along roads downstream or downslope of burned slopes, particularly in areas that concentrate water. Threats to recreating public is increased at dispersed campsites located on alluvial fans below perennial streams that have had post fire debris flows. **High Risk** (possible, major) to forest visitors, Yellow Pine residents and Forest Service employees traveling on the SFSR road (FS Road #674) within and adjacent to the burned area due to the increased threat of falling trees, rolling rocks, flash floods and debris flows. (*Public Safety Treatments, PS-01 Warning Signs*). **High Risk** (possible, major) for SFSR Road closure due to debris slides and damage to road infrastructure (*see Road Treatment, RT-01 Post Storm Inspection and Response*). **High Risk** (possible, major) to recreating public at two dispersed campsites located at Joe's Camp Creek and Lower Poverty Creek due to debris flows and flooding. (*Public Safety Treatments, PS-02 Closure of dispersed campsites and warning sings*)

2. **Property (P):** Post-fire P Critical Values includes two miles of the SFSR Road that is within or downslope of the fire area. Post-burn conditions and the observed and predicted watershed response indicate a threat to the SFSR Road from flooding, debris flows, hazard trees and rock fall can damage road surfaces, culverts, drainage features, retaining walls and cut and fill slope stability. There is a **Very High Risk** (likely, major) to The SFSR Road from increased overland flow, accelerated hillslope erosion and debris flows concentrating on road segments downslope of burned areas. Damage to or failure of road segments constitute a loss of Forest Service infrastructure. (*Road Treatment, RT-01 Post Storm Inspection and Response*).
3. **Natural Resources (NR):** Post-fie NR threats from sediment delivery to SFSR designated critical or suitable occupied habitat for ESA-listed species, Chinook Salmon, steelhead and bull trout. There is an **Intermediate Risk** (Unlikely, major) to ESA species and habitat. Treatments to reduce the risk to these values is addressed by proposed Road Treatments (*see Road Treatment, RT-01 Post Storm Inspection and Response*).
4. **Cultural and Heritage Resources:** The Fourmile Fire has no previously recorded cultural resources or cultural surveys within the burn perimeter. At this time there are no known cultural or heritage resource values at risk within the fire perimeter. However, there are 4 previously recorded cultural resources within 250 meters of the fire perimeter that may be impacted by any erosion or landslide events.

B. Emergency Treatment Objectives:

Public Safety Objectives (*PS-01 Warning Signs and PS-02 Closure of dispersed campsites and warning sings).* The overall purpose of this treatment is to reduce risks to human life and safety by warning motorists and/or Forest visitors of existing threats while traveling within or camping downstream of the burned area.

Road Treatment Objectives (*RT-01 Post Storm Inspection and Response)*. The objectives are to implement emergency road inspections and response to reduce the potential for damage or failure of the SFSR Road that includes the roads paved surface, culverts, french drains, and retaining walls to provide safe access across FS lands. This treatment reduces the risk to designated critical or suitable occupied habitat for Chinook Salmon, steelhead and bull trout by mitigating the additional loss of infrastructure and associated sediment/debris impacts to the SFSR. In addition, this treatment reduces the Human Life and Safety Risk from the loss of the only ingress and egress to the community of Yellow Pine during winter months.

C. Probability of Completing Treatment Prior to Damaging Storm or Event:
Land: N/A
Channel: N/A
Roads/Trails: Very High. Road clearing occurred following the August storm event.
Protection/Safety: High

D. Probability of Treatment Success

Table 6: Probability of Treatment Success

	1 year after treatment	*3 years after treatment*	*5 years after treatment*
Land			
Channel			
Roads/Trails	80	90	90
Protection/Safety	80	90	90

E. Cost of No-Action (Including Loss): $1,380,000 (from cost benefit spreadsheet)

F. Cost of Selected Alternative (Including Loss): $57,100

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: John Dixon
Email: john.dixon@usda.gov **Phone(s)** W-208-634-0639 C-541-517-5120

Forest BAER Coordinator: Leigh Bailey
Email: Susan.Bailey@usda.gov **Phone(s):** 208-634-0793

Team Members: *Table 7: BAER Team Members by Skill*

Skill	**Team Member Name**
Team Lead(s)	John Dixon
Soils	John Dixon
Hydrology	John Dixon, Cameron Carsley (trainee)
Engineering	Ben Dreier
GIS	Cameron Carsley
Archaeology	Marielle Pedro Black
Weeds	Joshua Simpson
Recreation	Joshua Simpson
Fisheries	Caleb Zurstadt
Wildlife	Brian Davis
Botany	
Other	

H. Treatment Narrative:

Land Treatments: N/A

Channel Treatments: N/A

Roads and Trail Treatments: Storm Inspection and Response: The overall purpose of this treatment is to reduce the potential for loss and further damage to the SFSR Road and drainage features from potential future storm events that result in flooding and debris slides. This treatment is in lieu of installing new road drainage structures by keeping existing structures functioning through an emergency response when needed following post fire events**.** Engineering and District personnel will patrol the SF Road during or after high-intensity summer thunderstorms and spring snowmelt. Patrols will inspect road surface conditions, ditches, and culverts/inlet basins for capacity to accommodate runoff flows. If small slides are encountered the PNF road crew and equipment would maintain road infrastructure. If Large slides are encountered, contracted heavy construction equipment would be used to maintain road infrastructure through an emergency contract. Landslide debris material will be removed and transported to suitable disposal areas. Anticipated slides will likely damage existing retaining walls leading to an increased risk of future slides. Funding for timbers is for the cost of the purchase of the timbers if needed. Erosion control to reduce sedimentation to the SFSR will be applied to road cut and fill slopes, culvert catchment basins and landslide waste material. Erosion control includes seeding of native species and mulch.

Road Treatment Costs

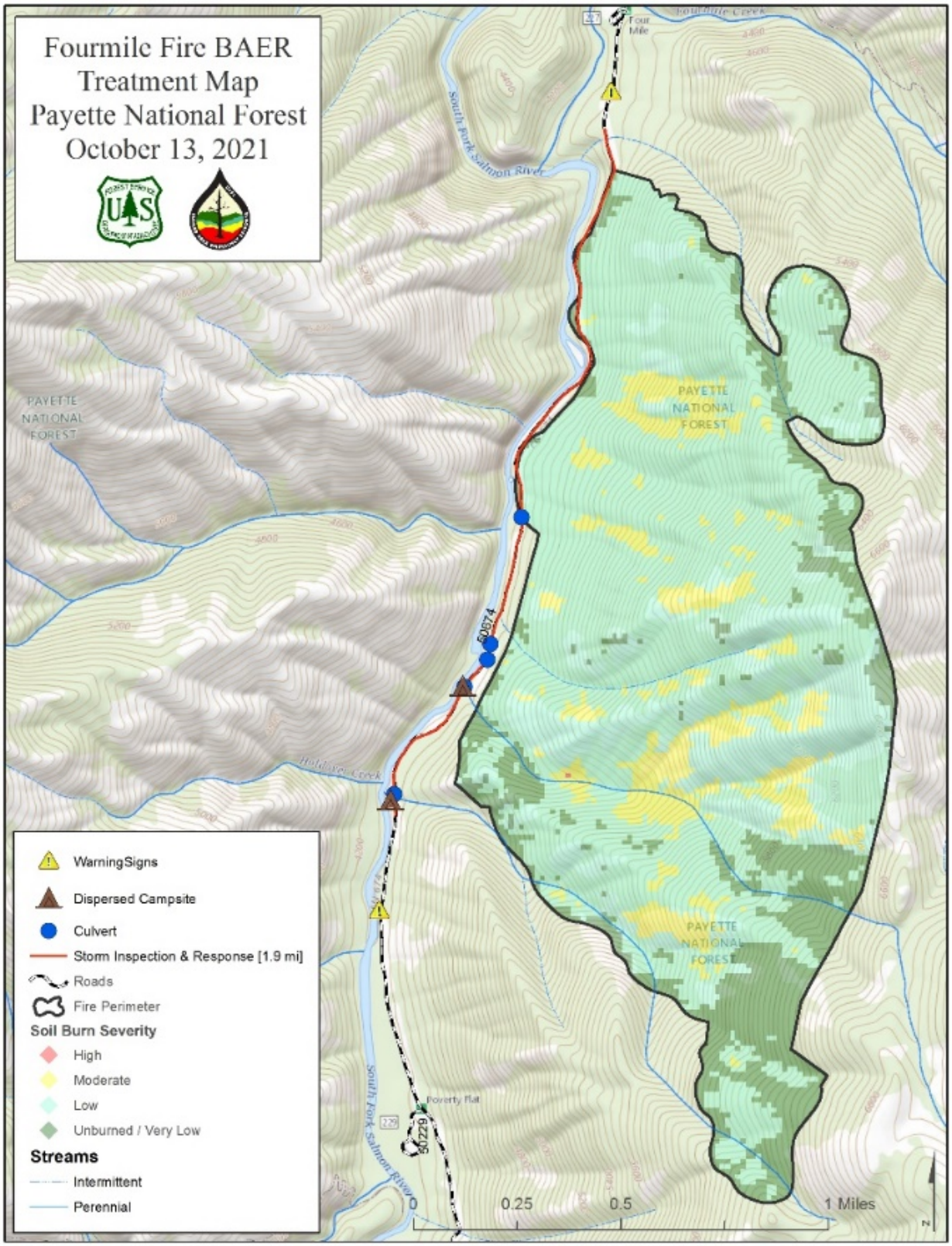
Line Items	Units	Unit Cost	# of Units	BAER $
C. Road and Trails				
Storm Patrol overtime	hrs.	40	40	$1,600
Equipment use and FOR in lieu of contract action	LS	2,000	2	$4,000
FS Operator overtime	Hr.	40	40	$1,600
Contract emergency repair of slides	ea.	18,000	2	$36,000
Retaining Wall Timbers	ea.	500	20	$10,000
Erosion control materials	ea.	2,500	1	$2,500

Protection/Safety Treatments: Public Safety Objectives (*PS-01 Warning Signs and PS-02 Closure of dispersed campsites).* Warning signs informing the public they are entering a burn area and the hazards will be installed along the SFSR Road at both ends of the fire. The closure and signing of two dispersed camp sites informing the public they are temporarily unavailable due to unsafe, unstable conditions.

Protection and Safety Treatments

Line Items	Units	Unit Cost	# of Units	BAER $
Protection/Safety				
Closed Camp Signs	ea.	200	2	$400
Install BAER signs	ea.	500	2	$1,000

Fourmile BAER Treatment Map



I. Monitoring Narrative: N/A

PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS

Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Channel Treatments				$0	$0		$0		$0	$0
C. Road and Trails										
Storm Patrol - overtime	hr.	40	40	$1,600	$0		$0		$0	$1,600
Equipment use and FOR in lieu of contract action	LS	2,000	2	$4,000	$0					$4,000
FS Operator overtime	hr.	40	40	$1,600	$0					$1,600
Contract emergency repair of slides	ea	18,000	2	$36,000	$0					$36,000
Retaining Wall Timbers	ea	500	20	$10,000	$0					$10,000
Erosion control materials	ea	2,500	1	$2,500	$0		$0		$0	$2,500
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road and Trails				$55,700	$0		$0		$0	$55,700
D. Protection/Safety										
Install signs at closed camps (PS-02)	ea	200	2	$400	$0		$0		$0	$400
Install BAER signs **(PS-01)**	ea	500	2	$1,000	$0		$0		$0	$1,000
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Protection/Safety				$1,400	$0		$0		$0	$1,400
E. BAER Evaluation										
Initial Assessment	Report	$3,000	1	---	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				---	$0		$0		$0	$0
Subtotal Evaluation				$0	$0		$0		$0	$0
F. Monitoring										
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring				$0	$0		$0		$0	$0
G. Totals				$57,100	$0		**$0**		**$0**	**$57,100**
Previously approved										
Total for this request				**$57,100**						

PART VII - APPROVALS

1. LINDA JACKSON Digitally signed by LINDA JACKSON Date: 2021.10.28 09:51:58 -06'00' 10/28/21

Forest Supervisor Date