Date: September 30, 2021

Knob Fire 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: Knob

B. Fire Number: CA-SRF-000795

C. State: CA

D. County: Humboldt County

E. Region: 05 – Pacific Southwest

F. Forest: Six Rivers National Forest

G. District: Lower Trinity District

H. Fire Incident Job Code: P5N89A (0510)

I. Date Fire Started: 08/29/2021

J. Date Fire Contained: 100% (as of 9/12/2021)

K. Suppression Cost: $6.07 million (as of 09/28/2021)

L. Fire Suppression Damages Repaired with Suppression Funds (estimates): as of 09/22/2021

Item	Unit	Amount Identified	Amount Repaired	No Repair Needed	Unknown	Remaining
Mapped Dozer Line	Miles	4.05	0	0.02	0	4.03
Road as Control Line	Miles	1.93	0	0	0.01	1.92
Mapped Hand Line	Miles	1.74	0	0.15	0.1	1.03
Hand/Dozer Line	Miles	0	0	0	0	0
Safety Zone/Staging	Count	7	0	0	0	7
Drop Points	Count	3	0	0	2	1
Helispots	Count	0	0	0	0	0

M. Watershed Numbers:

HUC #	Watershed Name	Total acres	% of Watershed Burned	Acres Burned
180102120505	Mingo Creek – South Fork Trinity River	28,798	0.17	48.65
180102120504	Old Campbell Creek	14,849	0.53	78
180102111206	Campbell Creek – Trinity River	31,089	7.4	2,302

N. Total Acres Burned: Based on 09/23/2021 BARC data

Land Ownership	% Acres Burned	Acres
Non-FS	36	878
Six Rivers National Forest	64	1,551
	Total	**2,429**

O. Vegetation Types:

Source: Most recent USFS Region 5 Existing Vegetation layers from the Remote Sensing Lab

Dominant Vegetation Type	Acres	Dominant Vegetation Type	Acres
Barron	0.29	Oregon White Oak	229.3
Lower Montane Mixed Chaparral	27.66	Black Oak	24.26
Upper Montane Mixed Chaparral	198.71	Willow	0.03
Pacific Douglas-Fir	1,553.96	Red Alder	6.02
Douglas-Fir - Ponderosa Pine	8.52	Tanoak (Madrone)	255.11
Annual Grasses and Forbs	18.03	Manzanita Chaparral	4.46
Riparian Mixed Hardwood	1.40	Montane Mixed Hardwood	38.06
Gray Pine	4.16	Urban/Developed (General)	0.14
Canyon Live Oak	58.13	River/Stream/Canal	0.258

P. Dominant Soils:

Soil Name	Acres	Slope in %	Texture
Clallam Family	1,213	35-70	Sandy Loam
Madden Family	120	20-50	Clay Loam
Holland Family	746	5-35	Gravelly Sandy Loam
Skalan Family	333	35-70	Loam
Riverwash	17	2-10	Sandy Loam

The Clallam soils series consists of moderately deep to densic materials, moderately well drained soils formed in glacial till over very compact glacial till. Slopes are generally range from 0 to 30 percent. These soils develop in a mild marine climate and have cool, dry summers and cool, moist winters. They have moderately rapid permeability above the very compact glacial till (A and Bw horizons) and very slow permeability in the very compact glacial till (Cd horizons). Timber production and wildlife are the principal uses.

The Madden soil series consists of moderately deep, well drained soils formed in material weathered from serpentinite. Madden soils are on mountain sideslopes and ridges and have slopes of 15 to 50 percent. These soils develop in warm dry summers and cool wet winters. They naturally have moderate runoff and moderately slow permeability due to their clay properties. These soils are used for watershed values, wildlife habitat, and some timber production.

The Holland soil series are on linear backslope and footslope positions of hill and mountain slopes and are used mainly for commercial timber production. The Holland series consists of very deep, well drained soils that formed in material weathered from granitic rock. Holland soils have slopes of 2 to 75 percent.

The Skalan soil series consists of moderately deep, well drained soils that formed in residuum weathered from gneiss and other related metamorphic rocks with an influence of volcanic ash and loess in the upper part. Skalan soils are on rolling to very steep uplands and have slopes of 5 to 65 percent. The climate is characterized by cool, moist winters and warm, dry summers.

Riverwash consists of very recent depositions of gravel, sand, and silt alluvium along major stream and their tributaries. Gravel bars make up the majority of these areas.

Q. Miles of Stream Channels by Order or Class:

Stream Type	Miles of Stream
Perennial	2.16
Intermittent	6.44
Ephemeral	16.05*
Canal/Ditch	0

*Ephemeral Streams only mapped on FS Land

R. Transportation System:

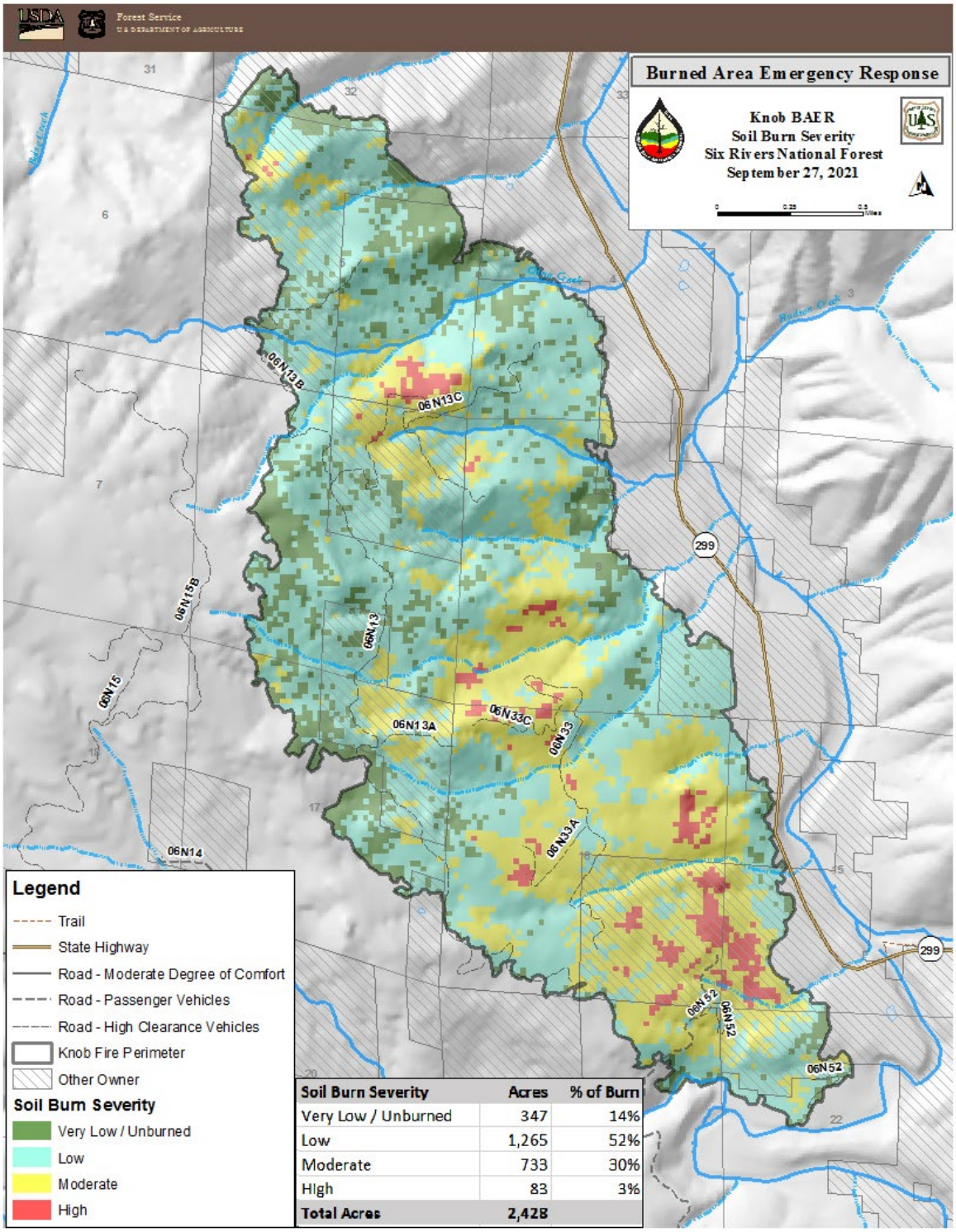
Six Rivers NF	Length (mi)
Trails	0
Level 1 – Administrative Use	0.38
Level 2 – High Clearance Vehicle	9.09
Level 3-5 – Passenger Vehicles	0.5
TOTAL	**9.97**

This includes the NFS roads/trails that are on private within the fire but not non-fs roads on private.

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Soil Burn Severity	Acres	% of Fire Area
High	83	4
Moderate	733	30
Low	1,265	52
Unburned or Very Low	347	14
Total Acres	***2,429***	***100***



B. Water-Repellent Soil (acres):

Water repellency is a natural property that results from wax-like exudates from biological process that coat soil particles. These compounds are non-polar whereas water is a polar compound. Polar and non-polar compounds do not mix; the biological exudates repel water causing rainfall to bead up and resist infiltration. As stated, water repellency is a natural soil property, but heat from the fire vaporizes some of the compounds and they condense lower in the soil when it contacts cooler soil. This tends to make the water repellency stronger, or more severe. Approximately 30-50% (approximately 729 to 1,215 acres) of the soils within the Knob fire have hydrophobicity traits or have had an increase in these traits.

C. Soil Erosion Hazard Rating:

Soil Burn Severity	Slope Class	Erosion Hazard Rating	Acres
Very Low / Unburned	All	Low	347
Low	All	Low	1,265
Moderate and/or High	<10%	Low	20
Moderate	10-20%	Low	144
High	10-20%	Moderate	25
Moderate	20-35%	Moderate	239
High	20-35%	High	32
Moderate	>35%	High	332
High	>35%	Very High	25
		Total	**2,428**

D. Erosion Potential: maps

Modeled pre-fire soil erosion under a 30% exceedance probability scenario ranged from 0.0 tons per acre to 7.71 tons/acre. This averaged 3.99 tons per acre for the fire area. Modeled post-fire soil erosion under 30% exceedance probability scenario ranged from 0.0 tons per acre in low and very low soil burn severity areas, 27.6 tons per acre in steeper moderate soil burn severity areas, to 31.1 tons per acre in isolated high soil burn severity areas in the first year following the fire. The average erosion rate for the Knob fire is 15.8 tons per acre, resulting in 51,106 tons of eroded hillslope sediments in the first year following fire. See the following maps, which were produced from the ERMiT model runs distributed spatially across the entire burned area.

It should be noted, the model had limitations. For example, rock content is limited to 50% but some soils within the fire contained a higher percentage of rock fragments. Therefore, modeled values represent maximum anticipated soil loss on representative slopes within the drainage. Furthermore, as noted above natural soil structure and fine roots throughout low soil burn severity areas also add to the stability of the landscape which would result in a lower estimate of sediment potential that was not produced by the models.

Modeled pre-fire and post-fire soil erosion under a 10% exceedance probability scenario was also modeled and is in the Forest records for reference.

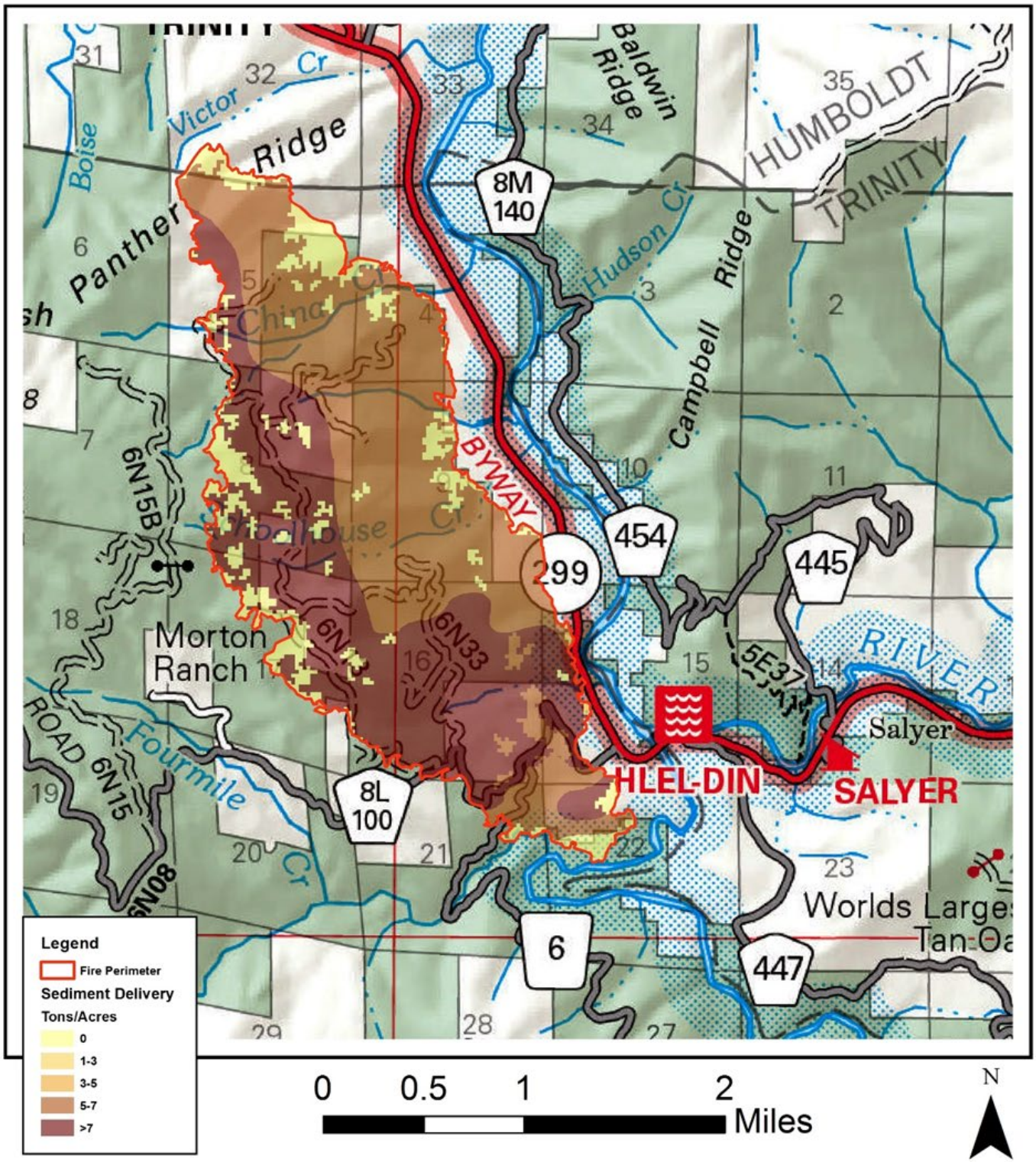
The Knob fire has natural effective ground cover over most of the fire. Needle cast from live and dead trees has already covered most of the unburned, low, and moderate soil burn severity areas. There is a lack of effective ground cover in the high soil burn severity area. This area has slope averaging 15-30% which will be a moderate to high erosion hazard rating for that area.

ERMiT estimates for erosion potential in tons per acre were converted to cubic yards per square mile. Conversion estimates are below:

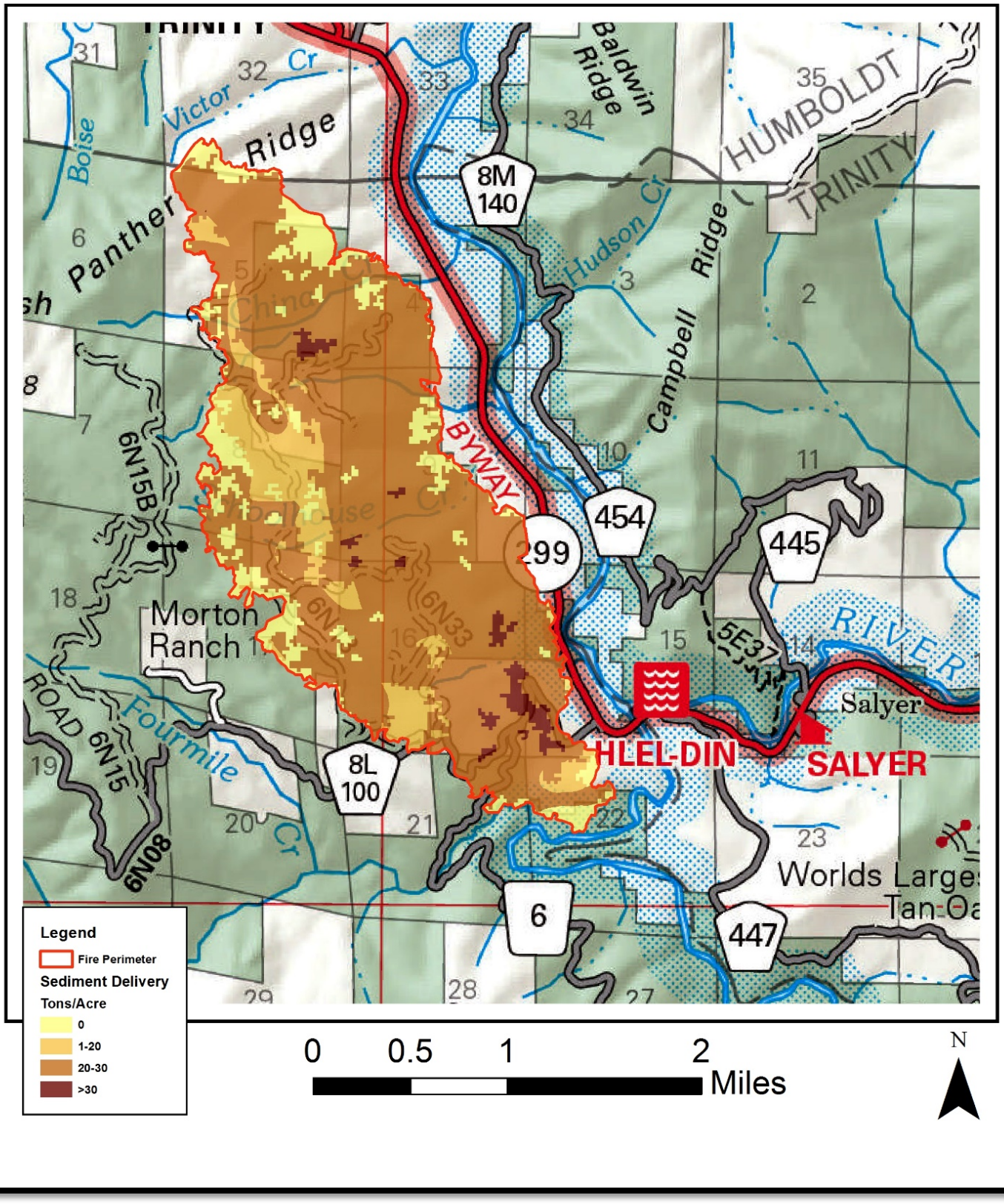
- 640 acres = 1 square mile
- 1.5 tons (aggregate, sand, soil) = 1 cubic yard

It is assumed 50% of sediment would be delivered based on undulating microtopography, surface rock fragments, and needle cast and litter cover in low SBS that would function as sediment delivery interrupters. Sediment potential ranged from 0 to 6,635 cubic yards per square mile in the first year following the fire under a 30% exceedance probability. The average sediment potential rate for the Knob Fire is 3,371 cubic yards per square mile.

Pre-Fire Erosion Rates for 5 Year Event



Post-Fire Erosion Rates for 5 Year Event



E. Sediment Potential: Geology and Geomorphology

The assessment area of the Knob Fire lies within the Klamath Mountains Physiographic Province and is underlain predominantly by Paleozoic and Mesozoic metavolcanic and metasedimentary rock, along with minor amounts of Tertiary and Quaternary sediments. Tectonic processes have created sedimentary formations and plutons and have accreted numerous terranes to the western margin of North America. Two of these distinct geologic bodies occur within the fire area: The Rattlesnake Creek and Western Klamath Terranes (Table below).

Belt/Assemblage	Age	Terrane/Formation	Rock type
Western Paleozoic & Triassic	Triassic	Rattlesnake Creek	Metavolcanics plus Metasediments, Peridotite
Western Paleozoic & Triassic	Triassic to Late Cretaceous	Western Klamath	Metavolcanics, Metasediments, Micaceous Schist, Metagraywacke, Chert, Peridotite, Serpentinite

F. Estimated Vegetative Recovery Period (years):

Vegetation recovery rate for trees and shrubs is 5 to 10 years, soils 20 to 30 years. Areas with very low, low soil burn severities which constitutes 66% of the SBS in the fire, will have a faster natural recover time, especially in vegetation types with dominant hardwoods of white oak, black oak, canyon live oak, tanoak and madrone.

H. Estimated Hydrologic Response:

The watersheds in the Knob Fire are mostly in an unburned to a low burn severity, with moderate severities in the south. The responses can include: 1) an initial flush of ash, 2) rill and gully erosion in drainages and on steep slopes within the burned area, 3) flooding with some increased peak flows and sediment deposition, and 4) increased suspended sediment that will extend beyond the fire perimeter. These responses are expected to be most evident during initial storm events immediately after the fire. Thereafter, responses are expected to become less evident as vegetation reestablishes, providing ground cover, increasing surface roughness, and stabilizing and improving the infiltration capacity of the soils.

Streamflow is expected to increase post fire during the vegetation recovery period, with the largest flow increase expected in the first year after the fire. Watersheds with higher total burned areas or higher intensity burned areas may have a greater flow increase than watersheds with lower burn intensities or less watershed area burned. As a result, increases in turbidity are expected within streams across the burned area and increased flow may also contribute to the ability for debris flows or local erosion events to mobilize downstream. In low and moderate severity burn areas, evidence of unburned plant roots provide evidence that plant recovery may begin in the first few years after the fire, reducing the potential for erosion. However, high severity areas generally do not have plant roots present and will be at risk for a longer period.

We assessed the upstream watershed burn severity and changes to flow at specific locations where critical values were potentially at risk. This analysis is critical information for evaluating the risk of a critical value both on and off NFS lands and the results of this analysis can be found in the Hydrology Report. Flow increases at pour point analysis locations are expected to increase as much as 2.8 times pre-fire flow, as with School House Creek.

Table 11. HUC12 Sub watersheds within the Knob Fire burn perimeter, acres burned at different soil burn severities, and percent moderate and high SBS.

HUC 12 Name	Total Acres	Acres Burned	% Watershed Burned	Unburned	Low SBS	Moderate SBS	High SBS	% Moderate & High SBS
Campbell Creek-Trinity River (180102111206)	31,089	2,304	7.4	29,118 (93.7%)	1,202 (3.9%)	688 (2.2%)	81 (0.3%)	2.47
Mingo Creek-South Fork Trinity River (180102120505)	28,798	49	0.2	28,757 (99.9%)	32 (0.1%)	9 (0.03%)	0 (0%)	0.03
Old Campbell Creek (180102120504)	14,850	78	0.5	14,778 (99.5%)	33 (0.2%)	36 (0.24%)	2 (0.2%)	0.26

Table 12. Elevation and Average Annual Precipitation for Select Pour Points.

PP#	Select Pour Points	Max Elevation (ft)	Min. Elevation (ft)	Average annual precip (in)	% above 6,000 ft
PP1	School House Creek	3,470	626	63	0%
PP2	Knob Fire Footprint	3,841	444	56	0%

Table 13. Comparison of pre- and post-fire peak flow related to the 2-year return interval

				2 yr. RI Peak Flow				
HUC 10 Watershed	**PP#**	**Modeled Pour Point**	**% of Mod & High SBS**	**Pre-Fire Q (CFS)**	**Post-Fire Q (CFS)**	**Post-Fire Bulked Q (CFS)**	**Bulked Q Compared to Pre-Fire Q (Time increase)**	**Flood Hazard Rating**
Campbell Creek-Trinity River	PP1	Schoolhouse Creek	23%	368	830	1,038	2.8	HIGH
Campbell Creek-Trinity River	PP2	Knob Fire Footprint-Trinity River Removed	17%	555	707	884	1.6	MODERATE

PART V - SUMMARY OF ANALYSIS

Introduction/Background

The Knob Fire was reported on Sunday, August 29, 2021. It began about 3 miles south-southwest of Willow Creek on the Six Rivers National Forest. The forest decided to have the Knob Fire managed by the Incident Management Team working on the Monument Fire. 100% containment was achieved the morning of September 12, 2021. All evacuation orders and warnings had been lifted. The cause of the fire remains undetermined.

A BAER assessment team began field reconnisance of the burned area on September 21 to begin burn severity mapping, hydrologic response, and to identify geological hazards. Total acreage mapped by the Incident Management Team was 2,421 acres. The BARC map indicted a boundary of 2,429 acres. The BAER team used the BARC map acreages in all the assessments within this report.

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

Table 14: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**

Probability of Damage or Loss: *The following descriptions provide a framework to estimate the relative probability that damage or loss would occur within 1 to 3 years (depending on the resource):*
Very likely*. Nearly certain occurrences (90% - 100%)*
Likely*, Likely occurrence (50% - 89%)*
Possible*. Possible occurrence (10% - 49%)*
Unlikely*. Unlikely occurrence (0% - 9%)*

Magnitude of Consequences:
Major*. Loss of life or injury to humans; substantial property damage; damage to critical natural or cultural resources*
Moderate*. Injury or illness to humans; moderate property damage; damage to critical natural or cultural resources resulting in considerable or long-term effects.*
Minor*. Property damage is limited in economic value and/or too few investments; damage to critical natural or cultural resources resulting in minimal, recoverable or localized effects.*

1. Human Life and Safety:

- *Forest Visitors Safety:*
  The BAER team identified potential threats to Forest visitors/recreating public, and agency personnel (visiting or post-fire treatments) that are within or downstream/downslope of burned slopes, especially those with a moderate-high burn severity, from flooding and debris flows, hazard trees, loss of ingress and egress along/at roads, trails, and permitted sites. The probability of damage or loss is **possible**, resulting from hazard trees along travel routes within the burn area have not been mitigated. Likewise, there are numerous road-stream crossings within the burn area or directly below moderate/high burn severity that are now at risk from flooding, debris flows, and rockfall. The magnitude of consequences is **major**, as a tree strike or entrapment could lead to serious injury or loss of life. As such, the risk is considered **high/very high.**

  - BAER funds are requested to treat these risks (*Treatments PS-1*).

- *Roads:*
  Regarding vulnerable roads and incidental infrastructure, threat exists at segments of roads in close proximity to creeks and at major drainage crossings if the public is traveling on the road during a significant flood event or are traveling after un-observed damages have occurred and road failures are triggered. Many burned-out stump holes have compromised the traveled way of the road. Additionally, hazard trees will persist for years and threaten travelers along burned alignments. The probability of damage or loss is **likely.** The magnitude of consequences are **Major** due to a tree strike or rock fall that could result in serious injury or loss of life. Driving over a burned stumps and logs could lead to injury or loss of life and damage to property. The resulting risk rating is **Very High.**

- BAER funds are NOT requested to treat these risks because the local resources completed the repair before the completion of this report

2. Property:

- *Roads:*

There are 9.97 miles of Forest Service system roads within the fire perimeter. 3.84 miles (OP ML 2-5) of NFS Roads are within High/Moderate SBS areas These road prisms are at risk from increased runoff, erosion, and debris flows. The probability of damage or loss is **likely.** The magnitude of consequences are **moderate** because undersized and inadequate drainage structures are not expected to convey the expected increase in post-fire runoff and erosion and may damage Forest Service road infrastructure. The resulting risk rating is **High.**

- BAER funds are NOT requested to treat these risks because the local resources completed the repair before the completion of this report

- *06N06*:

Approximately 500 feet west of the intersection with FS Road 6N06 there are tension cracks and slumping with about 1-2 feet of vertical displacement above the road. These features appear to have existed pre-fire. The chaparral that covered the hillslope above the road was subjected to moderate to high burn severity and will no longer provide any ground cover to reduce the effects of rain runoff. During the next heavy rainstorm it is highly likely that the embankment above the road will fail and cover, and possibly damage, the road. The probability of damage or loss is **likely.** There are at least two other such features along this section of road. The magnitude of consequences are **moderate** due to multiple locations along the stretch of road experiencing the same issues. The risk rating is **High.**

- BAER funds are requested to treat these risks (*Treatments RD-1*).

3. Natural Resources:*Native and naturalized plant communities where invasive noxious weeds were absent or in trace amounts.*

Fire Suppression Activities

The threat to the critical value at risk is increase of existing weeds and introduction of new weeds resulting from suppression impacts (dozer lines, hand lines, drop points, helispots, camps, hazard tree removal, and other areas damaged by suppression and repair).The probability of damage or loss is **likely** that invasive species were spread into un-infested, native plant communities through: (1) the use of equipment and personnel staged within known infestations in multiple districts and wilderness areas, (2) the disturbance of known noxious weeds adjacent to the burn area and along the transportation corridors, and (3) the exposure of open, bare ground that is now vulnerable to invasion. The magnitude of consequences are **moderate** because spread and introduction of noxious weeds would cause long-term damage to the critical natural resource values associated with native plant communities and endemic, sensitive plant habitat. The resulting risk rating is **High.**

- BAER funds are requested to treat these risks (*Treatments LD-1*).

Non-Suppression Activities (BAER-Specific)

Spread of noxious weeds populations extensively on roads within the burned area. It is possible that invasive species were spread into un-infested, native plant communities as these diverse habitats did have small portions that have moderate and high burn soil severity. As such, the probability of damage or loss is considered **possible**. The magnitude of consequences are **moderate** because spread and introduction of noxious weeds, specifically starthistle and scotchbroom which are a flashy fuel located along most roads in the fire. This would cause long-term damage to the critical natural resource values associated with native plant communities by increasing the potential of future fire starts carried into wildlands. Natural Recover is recommended for the native plant communities and for roadside noxious weed treatments performed on the forest but do not qualify through BAER due to the majority of the very having 66% low and very low SBS. The resulting risk is **low.**

- BAER funds are NOT requested to treat these risks. Forest staff will assess in the spring and summer following the fire.

- *Natural Resources Soil and Water*

There is a threat of impacts to water quality from increased sediment/nutrient loading following high intensity rain events. Likewise, there is the threat of the loss of soil productivity and reduced hydrological function. The probability of damage or loss to water quality and agricultural supply water on NFS lands is considered **likely**, as erosion and transport of sediment, ash, and nutrients are expected to occur. The probability of damage or loss to soil productivity is considered **possible**, as there is only a small percentage of high soil burn severity. Within the fire perimeter high percent of fire is unburned/very low to low SBS, and high potential for recovery within a year. Gentle slopes where the fire burned at high and moderate SBS. High accumulations of needle cast, and litter observed to protect soils from erosion. For water quality, the magnitude of consequences is **minor**, as water quality would be tied to rain events and have a short-duration recovery. The magnitude of consequences for soil productivity is considered **minor**, as only a small area of the burn is high soil burn severity which would result in minimal or localized effects to soil productivity.
The resulting risk to water quality is **low.** The resulting risk to soil productivity is **low**.

- BAER funds are NOT requested to treat these risks. Natural Recovery is recommended.

- *Steelhead, chinook and coho salmon critical habitat*

The values at risk considered were steelhead, chinook and coho salmon critical habitat and effects of increased sediment, debris and ash (water quality) on fish populations in the south fork Trinity River. The fire perimeter was contained to ephemeral tributary streams to the south fork Trinity River which supports the critical habitat for these species.

Post-fire threats to these species' habitat includes compromised water quality and changes in water chemistry due to ash delivery and inputs of ammonium, nitrate, phosphate, potassium and increased alkalinity. Additionally, increased solar radiation and water temperature due to reduced riparian cover, increased sedimentation, loss of woody debris and complex substrates, scouring of riparian/aquatic vegetation, and changes in streambed/pool habitat due to geomorphic movement (debris flows), and extirpation of fish are also concerning. Ephemeral Class III/IV streams found within the fire perimeter have limited ability to transport sediment and debris. Therefore, the probability of damage or loss to fish habitat is **unlikely**. The magnitude of consequences is **minor** for the Trinity River**.** Soil burn severity within the Knob Fire perimeter is predominately low, especially in low-lying stream systems. The intact riparian vegetation along these tributary streams will help alleviate some of the sedimentation, ash run-off and debris flow coming from the headwaters and hill slopes. The resulting risk is **very low.**

- BAER funds are NOT requested to treat these risks. However, road treatments will reduce sedimentation into critical habitat. Natural Recovery is recommended.

4. Cultural and Heritage Resources:*Erosion and sedimentation.*

There is a threat to the cultural resources eligible or potentially eligible from listing in the NRHP from increased runoff, erosion, and debris flows. The probability of damage or loss is **possible**. Field observation and burn severity models reflect few areas within the fire perimeter are at risk of erosion/sedimentation due to vegetation loss and landscape position. Landscape variables and observed past erosion support the likely probability (50-89%) of damage to cultural resources that, while it may not result in large scale obliteration of all sites within the fire area, could damage certain features and destroy the context of certain site types. The magnitude of consequences is **moderate**. In most cases, damage to cultural resource sites represents an irretrievable loss of traces of the past. Cultural resources are non-renewable. The remaining integrity of cultural resources is at risk from increased post-fire erosion and would represent damage to critical resources with considerable and long-term effects. The resulting risk is **intermediate.**

- BAER funds are NOT requested to treat these risks.

- *Hazard trees*.
  There is a threat of damage or destruction to historic features present within cultural resource sites eligible or potentially eligible for listing in the National Register of Historic Places (NRHP) due to the potential of hazard trees falling on these features. The probability of damage or loss is **possible**, because fire has affected trees on sites increasing the possibility for them to fall and impact features. The magnitude of consequences is **moderate** as trees can cause standing features to fall over or other features to break from impact. Damage to these features would be an irretrievable loss of traces of the past. Cultural resources are non-renewable. The resulting risk is **Intermediate**. The Heritage team will work with a local fire crew to remove the hazards/threats within the site.

  - BAER funds are NOT requested to treat these risks.

- *Unauthorized artifact collection or feature degradation.*
  There is a threat of loss of historic context and contents due to unauthorized artifact collection or feature degradation at cultural resources eligible or potentially eligible for listing in the National Register of Historic Places (NRHP). The probability of damage or loss is **very likely**, because archaeological and historic sites are vulnerable to metal detectorists, artifact collectors, and recreation activity in the area. The fire has exposed several known cultural sites. This exposure makes artifacts and features susceptible to damage from unauthorized collection. The magnitude of consequences is **moderate**. In most cases, damage to cultural resource sites represents an irretrievable loss of traces of the past. Cultural resources are non-renewable. Removed artifacts from historic contexts degrade the meaning of historic sites and features and their potential to provide important information about the past to this and future generations. The nature of unauthorized collection means that impacts resulting in total irretrievable loss of a site or feature are expected but unpredictable and are likely to occur over time. On particularly sensitive sites, the exposure of features resulting from consumed vegetation can lead to irretrievable loss of site integrity by exposing sensitive site features to recreation activities. Additionally, certain site features require yearly vegetation growth to serve as a stabilization method. A major consequence rating appropriately addresses the likelihood of these types of damage based on their nature and potential for significant impact. The resulting risk is **Very High.**

  - BAER funds are requested to treat these risks. (CR-1)

B. Emergency Treatment Objectives:

- Mitigate and protect, to the extent possible, threats to personal injury or human life of forest visitors and Forest Service employees by raising awareness through posting hazard warning signs on roads, communicate hazard of flooding, and debris flows. Communicate to cooperating agencies and community groups.

- Protect or mitigate potential post-fire impacts to critical cultural resources within the burned area.

- Treat invasive plants that are a threat to native and naturalized ecosystems by minimizing the expansion of existing populations in the burned area and control of expected invasion of noxious weeds within and adjacent to the area where soils/vegetation was disturbed as a result of the fire and fire suppression activities.

- Assist cooperators, other local, State, and Federal agencies with the interpretation of the assessment findings to identify potential post-fire impacts to communities and residences, domestic water supplies, public utilities, and other infrastructure.

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

*Land **90** % Channel **na** % Roads/Trails **90** % Protection/Safety **100** %
*Cultural Resource protection only. EDRR treatments would be conducted in the spring/summer 2022.

D. Probability of Treatment Success

	1 year after treatment	3 years after treatment	5 years after treatment
Land	80	50	35
Channel	N/A	N/A	N/A
Roads/Trails	75	90	100
Protection/Safety	85	95	100

E. Cost of No-Action (Including Loss):

Human Health and Safety: Human Life and Safety do not have a market value, but an injury would exceed $1,000,000, providing a substantial benefit/cost ratio.

Property (Roads): The cost to rebuild sections of the road after they are washed out, eroded, or buried includes estimates to bring in material to build up the damaged roads. The cost of not restoring the 0.38 miles of ML–3 road within the burn area is approximately $9,500. This does not include the lost value to project management, fire suppression, and recreation.

Land Treatments - Native and Naturalized Plant Communities: Deferring EDRR treatments along suppression disturbed sites could result in approximate $76,500, assuming a 10% loss. As such, the benefit/cost ratio exceeds 15%.

Cultural and Heritage Resources: Economic values can not be placed on the loss of cultural and heritage resources. The cultural or historic resource at risk is eligible, or potentially eligible, for listing on the National Register of Historic Places (NRHP). Delaying emergency treatment could permanently remove the cultural significance of sites.

F. Cost of Selected Alternative (Including Loss):

Human Health and Safety Treatments:
Total human health and safety treatment costs: **$1,400**

PS-1: Hazard Warning Signs Cost Estimate

Item	Unit	Unit cost	# of units	Total Cost
Hazard Warning Signs (Roads)	Each	700	2	$1,400
Crew OT for Sign Placement	Built into costs above			
			Total Cost:	**$1,400**

Property:
Total cost of 0.38 miles of road treatment**: $209**

RD-1: NFS Road Treatment Cost Estimate

NFSR by Priority	Unit	Unit Cost	# of units	Total Cost
06N06	Mile	$550	0.38	$209

Native and Naturalized Plant Communities:
LD-1: Total native and naturalized plant community costs: **$5,000**

Treatments	Unit	Unit Cost	# of Units	Cost

EDRR surveys (agreement) Dozer Lines	Miles	1000	4	$4,000
EDRR surveys (agreement) Drop points, safety zones	Acres	1000	1	$1,000
			Total Treatment Costs:	$5,000

BAER-Specific EDRR - No Treatment Costs

Cultural and Heritage Resources:

Total Cultural and Heritage Resource Protection Costs: **$6,294.40**

CR-1 Cultural Resource Inspections/Patrols

Personnel Services (Lop and scatter):	**Cost**
One GS-11 (Archaeologist) or equivalent @ $60/hr (OT Rate) x 10 hours	$600
Five GS-5 (Forestry Technician) or equivalent @ $30/hr (OT Rate) x 10 hours	$1,500
Personnel Services (Protection barriers):	**Cost**
One GS-11 (Archaeologist) or equivalent @ $60/hr (OT Rate) x 5 hours	$300
Purchase, transport, and placement of boulders on site. $300/ boulder x 8 boulders	$2,400.00
Personnel Services (SHPO/ Tribal Consultation):	**Cost**
One GS-12 (Archaeologist) or equivalent @ $60/hr (OT Rate) x 40 hours	$2,400
Total Treatment Costs:	**$7,200**

F. Skills Represented on Burned-Area Survey Team:

☒ Soils ☒ Hydrology ☒ Engineering ☒ GIS ☒ Archaeology
☒ Weeds ☒ Recreation/Trails ☒ Fisheries ☒ Logistics
☒ Public Information Officer

Team Leader(s): Kendal Young & Meagan Carter (T)
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Forest BAER Coordinator: Aaron Donnell
Email: aaron.donnell@usda.gov **Phone(s):** 707-599-0326

Team Members: *BAER Team Members by Skill*

Skill	Team Member Name
Team Lead(s)	Kendal Young
	Meagan Carter
Soils	Anna Plumb
	Brad Rust
	Lizeth Ochoa
	Leslee Crawford
Hydrology	John Kelley
	Jesse Merrifield
	Rebecca Biglow
Geology	Dennis Veich
Engineering	Molly Breitmun
	Benjamin Molitor
	Micah Kittel
	Samuel Marano

	Lawrence Arrington
GIS	Elaine Elliot
Archaeology	Robin Hopkins
	Jacob Batisky
	James Moak
Botany/Weeds	Lusetta Sims
Recreation	Patrick McGervey
Fisheries	Pete Schneider
Public Information	Cathleen Thompson
Logistics	Cathy Carlock

G: Treatment Narrative:

Human Health and Safety:

Entering Burn Area Warning Signs

"Entering Burned Area" signs are needed to alert the public of possible threats to their life and safety that exist within or downstream of a burned area. The signs contain language specifying items to be aware of when entering a burn area such as falling trees and limbs, rolling rocks, and flash floods. Signs are placed in entry points that are expected to receive high use, either around residential areas or popular roads used for recreation.

Property:

Roads Treatments:

Storm inspection and response will be needed on 0.38 miles of NFS road 06N06 in High/Moderate Soil Burn Severity to identify the sections of the road that will need to be cleared once the embankment falls into the road from above.

Land Treatments:

Native and Naturalized Plant Communities:

EDRR surveys on 4 miles and 1 acre of National Forest lands based on values at risk, areas that were disturbed by suppression activities, and the risk of plant incursion, resulting in unacceptable risks to natural resources. The weed risk to native plant community recovery can be mitigated at low cost by implementing EDRR within the first year after the fire. New, small weed infestations located during EDRR surveys will be manually treated upon discovery. Existing infestations found to be expanding due to the fire or fire suppression activities would be re-mapped and evaluated for treatment.

Cultural Resources:

Exposure of cultural resources from vegetation loss, resultant looting and vandalism, and erosion and sedimentation causing data loss are the highest observed threats to cultural resources eligible or potentially eligible for listing in the NRHP. Cultural resources of particular concern are one site that is being addressed in this assessment, specifically for increased looting potential. Site visits would occur to document changes to the sites in terms of artifact and feature composition that indicate archaeological looting is taking place. While BAER funds have recently not been authorized for these patrol activities, we believe this risk needs to be addressed. The results of visits will be used to determine if additional management action is required to protect these sites. These visits may be designed to incorporate tribal consultation to address specific tribal values in the fire area. Emergency stabilization activities implemented to manage risk to any BAER Critical Values require consideration, avoidance or mitigation of potential effects to cultural resources prior to implementation (FSM 2523.2.2.d; Section 106 of the National Historic Preservation Act (NHPA) as implemented with programmatic agreements or standard procedures under 36CFR800). BAER treatments are not exempt from Section 106 of NHPA. One of the first requirements for BAER team Heritage personnel is to address the provisions of 36CFR800.12. These provisions are designed to enable NHPA compliance to proceed and be completed in an expedited fashion.

The costs for compliance with Section 106 of the National Historic Preservation Act can be covered for all authorized treatments. Section 106 compliance includes the minimum required documentation to implement the approved treatments. Although BAER treatments are considered “emergency undertakings” according to the provisions of the National Historic Preservation Act [36CFR800.12(d)], a reasonable effort shall be made to inventory ground-disturbing project areas for previously unknown cultural resources. Impacts to cultural resources shall be avoided whenever possible.

Channel Treatments: None

G. Monitoring Narrative: N/A

H. Knob BAER Treatment Map

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										
LD-1 EDRR - Suppression	Project			5,000	0		0		0	$ 5,000
CR-1 Cultural Resouce Protection	Project			7,200	0		0		0	$ 7,200
					0		0		0	$ -
Subtotal Land Treatments				12,200	0		0		0	$ 12,200
C. Road and Trails										
RD-1 Storm Inspection and Response	Project			209	0		0		0	$209
Subtotal Road and Trails				209	0		0		0	$209
D. Protection/Safety										
PS-1 Hazard Warning	Project			1,400			0		0	$1,400
Subtotal Protection/Safety				1,400	0		0		0	$1,400
E. BAER Evaluation										
Initial Assessment	Report			1,687	0		0		0	$1,687
Subtotal Evaluation				1,687	0		0		0	$1,687
F. Monitoring										
Subtotal Monitoring				-	0		0		0	$0
G. Totals				13,809						**$13,809**
Previously approved										
Total for this request				**13,809**						

PART VII - APPROVALS

1.

Forest Supervisor

Date 10/13/21