Date of Report: 09/27/2021

FRENCH 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: French

B. Fire Number: CA-CND-002796

C. State: California

D. County: Kern County

E. Region: R5 Pacific Southwest Region

F. Forest: Sequoia NF

G. District: Kern River RD

H. Fire Incident Job Code: PDN8RA (1522)

I. Date Fire Started: 08/18/2021

J. Date Fire Contained: 98% on 9/27/2021

K. Suppression Cost: $49,400,000 on 9/25/2021

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

1. **Fireline repaired (miles):** 24.7 miles completed
2. **Other:** 2.65 miles need inspection
3. **Other:** 0.88 miles repair in progress

M. Watershed Numbers:

Table 1: Acres Burned by Watershed - Low, moderate, and high soil burn severity are included in the acres burned

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
180300010607	Isabella Lake-Kern River	30,431	5,897	19.4%
180300040103	Lower Cedar Creek	13,539	3,156	23.3%
180300010606	French Gulch	11,701	10,012	85.6%
180300040201	Little Poso Creek	17,336	1,104	6.3%
180300040102	Upper Cedar Creek	23,588	6,894	29.2%

N. Total Acres Burned:

Table 2: Total Acres Burned by Ownership

OWNERSHIP	ACRES
NFS	19,864.6
BLM	3034.9
STATE	0
PRIVATE	4385.7
TOTAL	27,285.2

O. Vegetation Types:

The BAER Team utilized the California Wildlife Habitat Relationships (CWHR) type data to determine vegetative composition on USFS lands within the French Fire perimeter. There was no vegetation data available for the other ownerships.

Historic photos depict the higher elevations dominated by scattered large pine, cedar, and oaks; these stands were harvested in late 1800-early 1900s (Steve Anderson, pers. comm.). Mixed conifer stands include Jeffrey and ponderosa pines, incense cedar, and white fir (which is a minor component). Black, blue, limited Brewer's, and canyon live oaks were dispersed throughout most of the fire. The ridge north of Rancheria Road is known ask "Oak Ridge".

With the drop in elevation, there was a shift to oak woodland and shrub dominated plant associations; the presence and density of manzanita mirrored the change between low and moderate burn severities (when the denser clumps burned, the soils exhibited moderate burn severity). Annual grasslands were present at the lowest elevations. The Tillie Creek drainage, an area of high interest, was dominated by shrublands with stringers of conifer. These coniferous stands often sustained 100 percent tree mortality leading to the subsequent high soil burn severity present in that watershed.

Table 3: California Wildlife Habitat Relationships Types on USFS lands

CWHR Types	**Acres**
Annual/Perennial Grasslands	696
Barren	161
Blue Oak Grey Pine	219
Blue Oak/Valley Woodland	228
Jeffrey and Ponderosa Pine	1,559
Mixed and Montane Chaparral	4,083
Montane Hardwood Conifer	2,890
Montane Hardwood	6,529
Riparian	4
Sierran Mixed Conifer	5,810
White Fir	51
Grand Total	**22,230**

P. Dominant Soils:

The bulk of the soils in the French Fire had limited development (e.g. Xerochrepts and Xerorthents). In the more severely burned moderate as well as the high soil burn severities, the granular surface structure readily degraded into single grain. Without the vegetative cover and fine roots to serve as a mechanism for retaining the soil on site, it is anticipated that many of these soils will erode leading to a further loss in soil productivity and increased sedimentation into drainages.

Table 4: French BAER Analysis Area Soils

Taxonomic Name	**Acres**
Dystric Xerochrepts, Coarse-Loamy, Mixed, Mesic	4,992
Loamy, Mixed, Nonacid, Thermic, Shallow Typic Xerorthents	3,661
Coarse-Loamy, Mixed, Mesic Dystric Xerochrepts	2,860
Loamy-Skeletal, Mixed, Mesic Pachic Ultic Haploxerolls	2,779
Fine-Loamy, Mixed, Superactive, Mesic Typic Argixerolls	2,248
Typic Argixerolls, Fine-Loamy, Mixed, Thermic	1,906
Loamy, Mixed, Superactive, Mesic, Shallow Entic Haploxerolls	1,858
Ultic Haploxeralfs, Fine-Loamy, Mixed, Thermic	1,582
Coarse-Loamy, Mixed, Superactive, Mesic Typic Argixerolls	1,518
Ultic Haploxerolls, Coarse-Loamy, Mixed, Mesic	1,181
Pachic Xerumbrepts, Coarse-Loamy, Mixed, Mesic	929
Fine-Loamy, Mixed, Superactive, Mesic Pachic Argixerolls	550
Ultic Haploxeralfs, Fine-Loamy, Mixed, Mesic	498
Loamy-Skeletal, Mixed, Superactive, Thermic Lithic Mollic Haploxeralfs	298
Mixed, Thermic, Shallow Typic Xeropsamments	286
Typic Haploxerolls, Loamy-Skeletal, Mixed, Thermic	112
Coarse-Loamy, Mixed, Superactive, Thermic Cumulic Endoaquolls	34

Taxonomic Name	Acres
Grand Total	**27,290**

Q. Geologic Types:

Table 5: French BAER Analysis Area Geologic Types

Geologic Types	Acres
Residuum weathered from granite	12,563
Residuum weathered from granitoid	3,869
(blank)	3,661
Residuum weathered from metasedimentary rock	2,891
Residuum weathered from granitoid and/or residuum weathered from mica schist	1,622
Residuum weathered from granite and/or residuum weathered from metasedimentary rock and/or residuum weathered from metamorphic rock	1,181
Residuum weathered from granitoid and/or residuum weathered from schist	516
Residuum weathered from mica schist and/or residuum weathered from granitoid	418
Residuum weathered from schist and/or residuum weathered from metamorphic rock	298
Residuum weathered from metasedimentary rock and/or residuum weathered from metamorphic rock	204
Alluvium derived from granitoid	34
Residuum weathered from schist and/or residuum weathered from granitoid	33
Grand Total	**27,290**

R. Miles of Stream Channels by Order or Class:

Table 6: Miles of Stream Channels by Order or Class

STREAM TYPE	MILES OF STREAM
PERENNIAL	45
INTERMITTENT	39
EPHEMERAL	315
OTHER (DEFINE)	N/A

S. **Transportation System:**

Trails: *National Forest (miles):* 16.5 *Other (miles):* 4.5

Roads: *National Forest (miles):* 62.6 *Other (miles):* 15.4

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Table 7: Burn Severity Acres by Ownership

Soil Burn Severity	NFS	BLM	State	Private	Total	% within the Fire Perimeter
Unburned	1381.19	73.42	0	612.87	2067.48	7.6%
Low	8285.82	2391.23	0	2066.48	12743.52	46.7%
Moderate	8747.18	564.01	0	1463.19	10774.38	39.5%
High	1450.39	6.27	0	243.13	1699.79	6.2%
Total	19864.57	3034.92	0	4385.67	27285.17	100%

B. Water-Repellent Soil (acres):

The extent of water repellent soils is estimated to be at least 6,237 acres or 50% of the moderate and high burn severity areas. Observations indicated strong repellency frequently occurred directly below the layer of fire impacted soil in both forest and shrub dominated areas. Fire impacted soil was often measured to be approximately one inch deep but was variable. The pattern of water repellent soils appears to be generally uniform.

C. Soil Erosion Hazard Rating:

Table 8: Soil Erosion Hazard Ratings

Erosion Hazard Rating	Acres
Slight	4,291
Moderate	14,504
Severe	4,833
Not rated	3,661
Grand Total	**27,290**

D. Erosion Potential:

ERMiT Model Outputs for Hill-slopes in the Tillie Creek Watershed

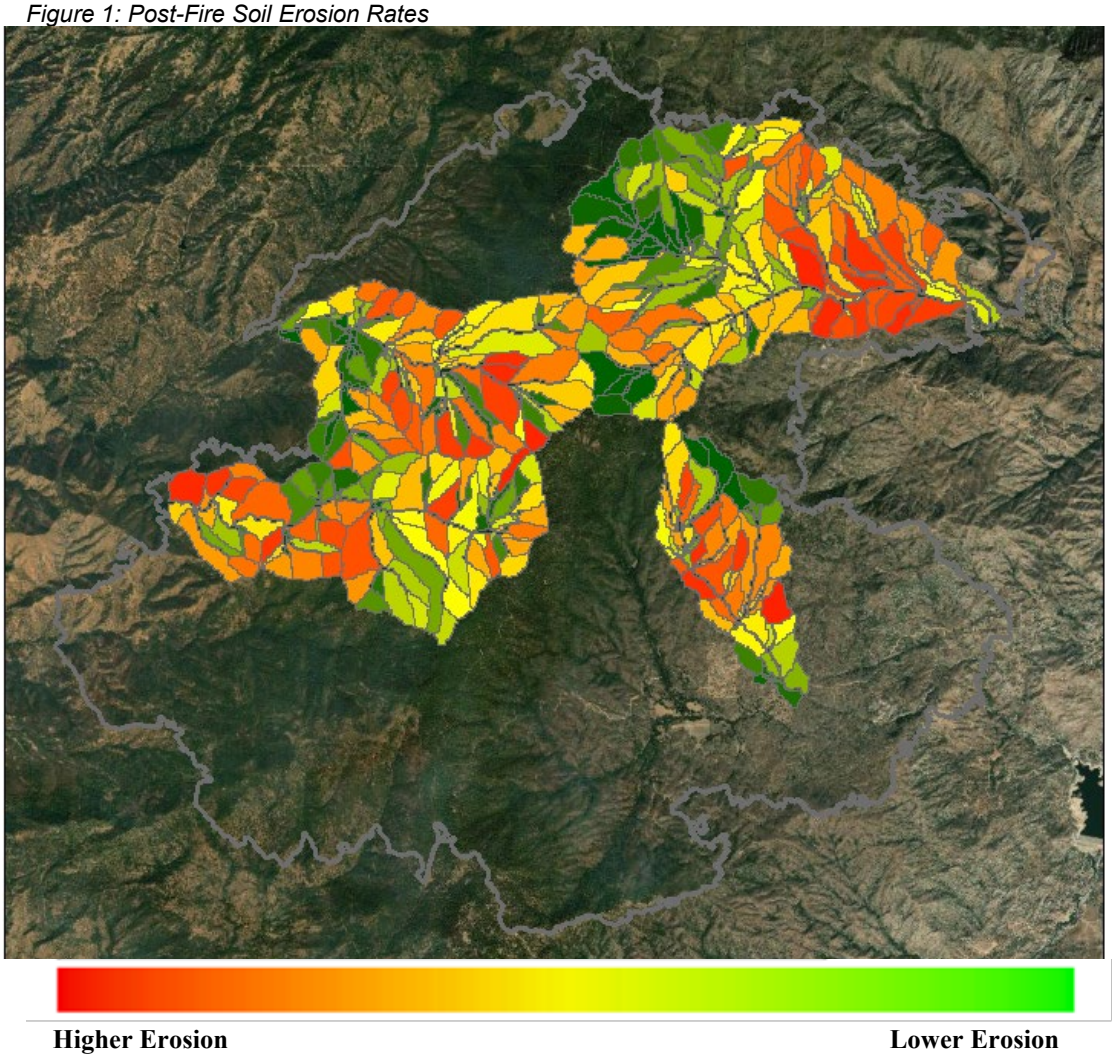
ERMiT allows users to predict the probability of a given amount of sediment delivery to the base of a hillslope following variable burns on forest, rangeland, and chaparral conditions in each of five years following wildfire. The ERMiT model can be accessed at http://forest.moscowfsl.wsu.edu/fswepp/. For this fire, input data for Batch ERMiT was exported from the WEPP-PEP tool.

Table 9: Summary of Representative ERMiT Model Results (Tillie Creek Watershed – 179 Hillslopes) - Overall Year 1 Sediment Delivery Rate Statistics For Different Target Probabilities

Probability	Average (tons/acre)	Minimum (tons/acre)	Maximum (tons/acre)
10	12	0	38
30	4	0	20
50	1	0	11
75	0	0	5

The ERMiT results indicate that rates of erosion are very low (generally close to zero) in unburned densely forested areas. Rate of erosion will increase significantly to on steep forested and shrub dominated hillslopes that were mapped at moderate or high soil burn severity. Extensive removal of forest floor ground cover occurred in these areas. The results also show that recovery of these areas is likely to occur within 2-3 years following the burn.

Figure 1: Post-Fire Soil Erosion Rates



E. Sediment Potential: 1,280 cubic yards per square mile

F. Estimated Vegetative Recovery Period (years): 3-5 years for shrubs and forest understory, 20 years for forest overstory.

G. Estimated Hydrologic Response (brief description):

Hydrologic response is estimated by assuming an increased runoff commensurate with soil burn severity in terms of recurrence interval. This recurrence interval estimates the response of the newly burned landscape to the design storm of interest. The French Fire is expected to respond to an average rainfall event differently for the unburned, low, moderate, and high soil severity burned areas.

For hydrologic response analysis purposes, the burned area was separated into 19 pour points. Pour points are established to facilitate a more detailed analysis of stream discharge in un-gaged drainages. The watershed above each pour point is delineated and pre-fire and post-fire flows are calculated and compared. The risk of threats such as flooding can be determined by using modeling results in combination with field review of floodplain elevation, channel morphology, and flood history. Figure 2 shows the location of each modeled pour point.

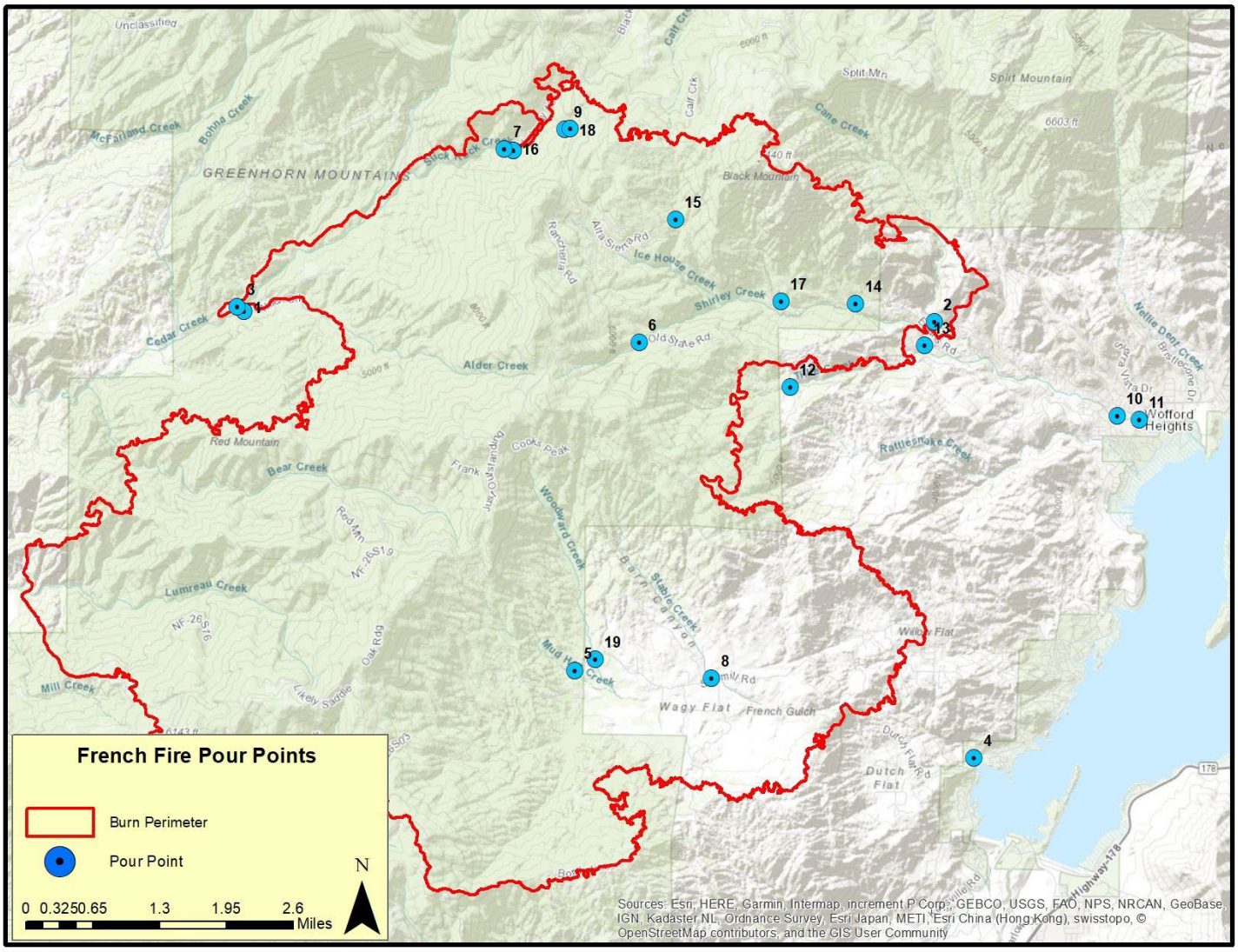


Figure 2. Locations of pour points used to model runoff response for the French Fire.

A 2-year return interval peak flow (Q2) was used as a conservative estimate of a peak flow magnitude that could be potentially damaging and has a high likelihood of occurrence within the next 1-4 years, when the watersheds are most susceptible to elevated peak flows and erosion. A 2-year peak flow event has a 50% probability of occurrence in any given year and a 94% probability of occurring at least once over the next 4 consecutive years. Modeling pre- and post-fire peak flow involves uncertainty; modeled flows should be considered estimates of the relative expected change in post-fire hydrologic response which are used to help identify areas of concern and prioritize treatment. Design flow estimates for the French Fire have been based on the U.S. Geological Survey regression equations developed for the Sierra Nevada (Gotvald, et al., 2012).

Adjusted design flow is calculated using the same relationships as design flow; however, runoff response is estimated by assuming an increased runoff commensurate with soil burn severity in terms of recurrence interval. This recurrence interval estimates the response of the newly burned landscape to the design storm of interest. The French Fire is expected to respond to an average rainfall event differently for the unburned, low, moderate, and high soil severity burned areas. Post fire Q2 hydrologic modeling was conducted based on the assumption that areas of low SBS would remain unchanged, areas of moderate SBS would respond according to the pre-fire Q5, and areas of high SBS would responding according to pre-fire Q10. The cfs/sq mi for each flood event was aggregated based on observed burn severity in the modeled drainage, with the end result being an expected percent increase in post-fire Q2 discharge (Table 10).

The greatest modeled increases in post-fire runoff (≥150%) related to flood risk were at pour points 19 (Woodward Creek at Sawmill Rd.), 17 (Unnamed Creek below Black Mtn. at Hwy 155), 14 (Unnamed Creek at Hwy 155), and 5 (Mud Hen Creek at Sawmill Rd.), It is important to note that, although the increases are high relative to normal Q2 discharge, none of the pour points modeled reached the pre-burn Q5 discharge. Stream channels measured in the vicinity of areas of interest during field review showed that most channels were incised, and flows would be confined during >Q50 (and in many cases >Q100) flood events. As such, risks from clear water flooding alone are generally considered low for a 2-year flood event. Debris flows, on the other hand, pose a much greater threat in areas of steep terrain and moderate to high soil burn severity.

Table 10: Modeled 2-year flood event discharge values

Modeled Watershed		Discharge by Watershed (cfs)		Discharge by Watershed (cfs/mi^2)		Percent Increase Water Yield
Pour Point Watershed	Affected WS Area (mi^2)	Pre-fire	Post-fire	Pre-fire	Post-fire	
(PP1) Alder Creek at Alder Creek CG	3.8	117	177.6	30.8	46.75	51.8
(PP2) Cane Creek at Wofford Heights	3.1	16	17.5	5.2	5.65	9.4
(PP3) Cedar Creek at 25S04	10.0	281	333.3	28.1	33.3	18.6
(PP4) French Gulch at Hwy155	17.8	100	198.4	5.6	11.1	98.4
(PP5) Mud Hen Creek at Sawmill Rd.	1.1	9.3	23.3	8.5	21.2	150.1
(PP6) Shirley Creek at Old State Rd.	0.7	7.75	13.8	10.6	18.9	78.1
(PP7) Slick Rock Creek at Rec Res Tract	1.0	40.7	68.8	40.7	68.8	69.1
(PP8) Stable Creek at Sawmill rd.	1.9	13.5	33.5	7.1	17.6	147.8
(PP9) Summit Tract	0.1	5.67	12.2	56.7	121.6	114.6
(PP10) Tillie Creek at Diversion	16.0	80.9	127.7	5.1	8.0	57.8
(PP11) Tillie Creek at Hwy 155	16.1	80.8	127.4	5.0	7.91	57.7
(PP12) Tillie Creek at Old State Rd.	1.2	8.2	12.1	6.8	10.1	48.0
(PP13) Tillie Creek at Wofford Heights	6.8	51.1	108.6	7.5	16.0	112.6
(PP14) Unnamed Creek at Hwy 155	0.4	2.45	6.42	6.1	16.1	162.1
(PP15) Unnamed Creek near Alta Sierra at Hwy 155	0.62	6.78	15.8	10.9	25.3	131.1
(PP16) Unnamed Creek near Slick Rock Tract	0.1	5.8	8.76	58.0	87.6	51.0
(PP17) Unnamed Creek below Black Mtn. at Hwy 155	0.6	4.92	12.7	8.2	21.2	158.2
(PP18) Weeping Springs Tract	0.1	5.54	12.2	55.4	122	120.2
(PP19) Woodward Creek at Sawmill Rd.	2.0	18.3	51.4	9.2	25.7	181.0

The USGS provides estimates of debris-flow likelihood, volume, and combined hazard for several design storms with a range of peak 15-minute intensities. Peak 15-minute intensities range from 12 mm/h to 40 mmh^{-1} in 4 mmh^{-1} increments. Estimates that can be used to guide the initial establishment of rainfall intensity-

duration thresholds for storm peak intensities of 15-, 30-, and 60-minute durations are also provided. A peak 15-minute intensity of 28 mm/h was used for this BAER assessment.

The model estimates a moderate level of debris-flow hazard for most of the area burned by the French fire (Figure 3). Most stream reaches and drainage basins have less than 40% likelihood of debris-flow occurrence at the modeled rainfall intensity. However, stream reaches and drainages with a high (60-80% likelihood) to very high (>80% likelihood) likelihood of debris flows are locally common. These high hazard areas occur in some areas above Bear and Shirley Creeks, and in the vicinity of French Gulch. A few drainages above State Highway 155 have a high to very high likelihood of debris flows at the modeled rainfall intensity. Most of the burn area requires rainfall rates greater than 28 mm/h to exceed a 50% likelihood of debris-flow occurrence. Higher hazard areas require much more modest rainfall rates between 12 and 24 mm/h to exceed a 50% likelihood of debris flow occurrence. Most watersheds are estimated to produce volumes between 10,000-100,000 m^3, resulting in a moderate combined debris-flow hazard for most of the burn area.

Certain local conditions not represented by the input data may significantly impact site-specific debris-flow hazard. In addition, the models only consider debris flows, floods (including sediment-laden flashfloods) are not considered in the model. Flooding is far more of a concern in drainage basins exceeding 8 square kilometers in contributing area. Streams that exceed an upslope area of 8 square kilometers yet are still susceptible to flood and possibly debris-flow hazards, are included as “watch streams.”

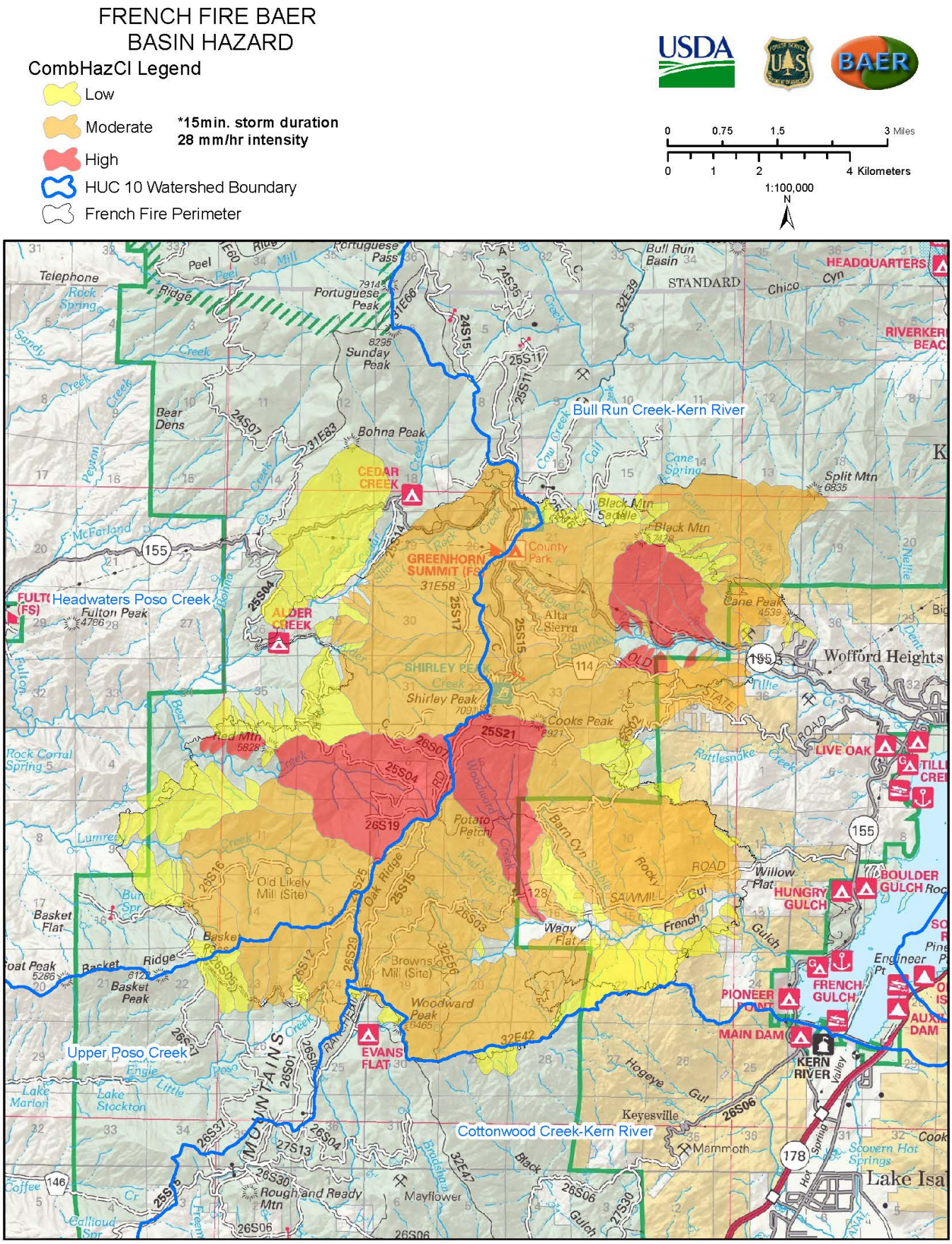


Figure 3: Debris Flow Combined Hazard Rating (DF Volume and probability)

PART V - SUMMARY OF ANALYSIS

Introduction/Background

The French Fire was first detected on the afternoon of Wednesday August 18th, 2021. The point of origin was located on private land in the Wagy Flat area approximately 5 miles WSW of Wofford Heights, CA on the West side of Lake Isabella. The cause of the fire is currently under investigation. By August 21st, the fire had grown to approximately 12,000 acres. Modest growth occurred daily through the end of August, when the fire was mapped at approximately 25,500 acres. The 27,290 acre BAER analysis perimeter was created by the US Forest Service Geospatial Technology and Applications Center using the incident perimeter and modifying it slightly to more accurately reflect the extent of the burned vegetation as observed by the Sentinel2 satellite.

The USFS BAER team began its assessment of the burnscar on September 20th. Soil Burn Severity (SBS) mapping was accomplished by ground truthing and adjusting an initial Burned Area Reflectance Classification (BARC) map using the methods outlined in RMRS-GTR-24, resulting in a final field validated soil burn severity map. Additional field review and identification of watershed response threats, hazards to human life and safety, threats to the NFS trail system, threats to soils and water quality, threats native vegetation communities, and threats to cultural resources and were identified by the BAER field survey team. The NFS road system affected by the fire was not assessed to a lack of available BAER roads engineers. Assessment of the road network will be completed when engineering resources are expected to become available in early October.

The SBS data set and the results of the USGS Post-Fire Debris Flow Hazard Assessment have been shared the CALFIRE Watershed Emergency Response Team (WERT) who are currently completing an assessment of risks to private lands and infrastructure within the CALFIRE Direct Protection Area affected by the burnscar.

The USFS BAER Team and WERT will be working together to provide emergency assessment information to the affected cooperating agencies, which include Cal OES, Kern County, Cal Trans, USACE, USDA NRCS, USDOI BLM, CAL WATER, NOAA NWS, and the California State Water Resources Control Board.

The remainder of this report will focus on threats to Critical BAER values identified in FSM 2523 – Emergency Stabilization – Burned Area Emergency Response.

A. Describe Critical Values/Resources and Threats (narrative): The following narratives represent a summary of threats and risks identified by the BAER survey team. Detailed information for each critical value threat is contained within the French BAER Critical Value spreadsheet, located in the BAER project record.

Table 11: Critical Value Matrix

Probability of Damage or Loss	**Magnitude of Consequences**		
	Major	Moderate	Minor
	RISK		
Very Likely	**Very High**	**Very High**	**Low**
Likely	**Very High**	**High**	**Low**
Possible	**High**	**Intermediate**	**Low**
Unlikely	**Intermediate**	**Low**	**Very Low**

1. Human Life and Safety (HLS):

a. Human life and safety of Forest visitors and employees traveling on NFS trails, traveling cross country, or dispersed camping in the burn scar is threatened due to the potential for injury or loss of life from hazard tree strikes, falling rocks, flash floods, debris flows, and other burned area hazards. The probability of damage or loss is **possible** as the NFS transportation system contains many motorized and non-motorized routes adjacent to and through the burned area. The magnitude of consequence is **major** since an overhead

hazard strike, entrapment in a flood or debris flow, or motorized vehicle collision with downed trees or fallen rocks could result in serious injury or loss of life. The risk level is **high**. Additional BAER survey of the transportation system is required to determine the need for closure devices and/or road safety signs. Administrative closures and treatments are recommended. See treatments P1b.

b. Human life and safety of recreation residence permittees in the Summit, Weeping Springs, and El Monte tracts is threatened by the potential exposure to airborne contaminants from burned debris, exposure to heavy metal contaminated soil and ash at burned cabin sites, and exposure to broken asbestos (transite siding and pipe insulation) that may become friable and airborne. The probability of damage or loss is **likely** because the broken, exposed asbestos at the sites may become friable. Fibers from friable asbestos become airborne in windy conditions. The magnitude of consequence is **major** because exposure to the hazardous materials could result in illness, injury, or death. The risk level is **very high**. Administrative restriction on use of lots within the area of the burned structures is recommended until permittees complete required cleanup of hazardous materials. Additional BAER treatments are not recommended as the restriction on use will mitigate the risk associated with the threat.

c. Human life and safety of recreation residence permittees in the Summit and Weeping Springs recreation residence tracts is threatened by potential for injury or loss of life during flash flood and debris flow events. The probability of damage or loss is **possible** because postfire runoff modelling indicates the potential for a 120% increase in flood magnitude and the debris flow hazard results indicate a moderate threat level. The magnitude of consequence is **major** given the potential for serious injury of loss of life. The risk level is **high**. Administrative closure of the tracts is recommended. BAER treatments are not recommended.

d. Human life and safety of forest visitors at the Tillie Creek CG is threatened by the potential for injury or loss of life at low lying campsites during flashfloods and debris flow events. The probability of damage or loss is **possible** because post-fire watershed response modeling indicates a potential for sites on the alluvial fan to be impacted following high intensity precipitation events. The magnitude of consequence is **major** because injury or loss of life could occur. The risk level is **high**. Administrative closure of the CG is recommended. The duration of the closure should last through the first winter season and be reevaluated by Forest Watershed specialists annually. Additional BAER treatments are not recommended as the restriction on use will mitigate the risk associated with the threat.

2. Property (P):

a. The NFS road network within and downslope/downstream of the burn scar is threatened by expected increases in postfire runoff following high intensity precipitation events. Evaluation of the transportation system will occur when BAER roads engineers are released from other BAER assessments and assigned to the French BAER incident. BAER treatments will most likely be recommended in an interim report.

b. Campground infrastructure at the Tillie Creek CG is threatened by the potential for flash flooding and damage from sediment laden floods that may impact the site following high intensity precipitation events. The probability of damage or loss is **possible** because the site is located on an alluvial fan feature that may become activated during high runoff events. The magnitude of consequence is **moderate** as any material deposited in the site is expected to be finer grained and not capable of causing substantial damage to the property. The risk rating is **intermediate**. BAER treatments are not recommended.

c. The trail prisms for NFS Trail 32E46 Potato Patch (Just Outstanding) and NFS Trail 32E56 (Browns Mill 4WD) are threatened by expected increases in postfire runoff. The probability of damage or loss is **very likely** given trail's slope position relative to areas of high and moderate SBS which are expected to produce significantly increased runoff, resulting in loss of control of water and erosion of the prism. The magnitude of consequence is **major** because substantial damage to the trails is expected as the existing drainage structures are inadequate to handle the increased post-fire runoff. The risk rating is **very high.** Treatments are recommended. See treatments RT13 and RT2.

d. The trail prisms for NFS Trail 31E68 (Unal), NFS Trail 32E31 (Mud Hen), and NFS Trail 32E59 (Black Mtn Saddle) are threatened by expected increases in postfire runoff. The probability of damage or loss is **likely** given trail's slope position relative to areas of high and moderate SBS which are expected to produce significantly increased runoff, resulting in loss of control of water and erosion of the prism. The magnitude of consequence is **moderate** because moderate damage to the trails is expected as the existing drainage structures are inadequate to handle the increased post-fire runoff. The risk rating for these trails is **high.** Treatments are recommended. See treatments RT13 and RT2.

e. The trail prism for NFS Trail 32E42 (Borderline 4 Wheel) is threatened by expected increases in postfire runoff. The probability of damage or loss is **possible** because of the trail's proximity to areas of moderate SBS. The magnitude of consequence is **moderate** because the potential economic loses from the damage are expected to be relatively moderate when compared to the trail's value. The risk rating is **intermediate**. Treatments are not recommended.

3. Natural Resources (NR):

a. Water on NFS lands that is used for municipal, domestic, and agricultural supply and the soil productivity of uncontaminated soils on NFS lands is threatened by the potential for contamination from hazardous materials at burned recreation residences. The probability of damage or loss is **very likely** because hazardous materials are present at the burned structures which are adjacent to perennial water bodies. Runoff producing storms are expected to transport contaminants into the water bodies. The magnitude of consequence is **moderate** because damage to soil and water from hazardous materials would result in long term environmental degradation with substantial impacts to water and soil quality. The risk rating is **very high**. Administrative actions (notifying permittees to initiate clean up) and BAER treatments are recommended. See treatment P5.

b. Water on NFS lands that is used for municipal, domestic, and agricultural supply is threatened by potential water quality degradation following storm events that are expected to transport ash, soil, nutrients, and other non-point source pollutants from burned hillslopes into the receiving water bodies. The probability of damage or loss is **likely** because peak flow and debris flow threat analyses demonstrate that there is high probability of increased watershed response to high intensity rainstorms within the burned watersheds. The magnitude of consequence is **minor** because impacts to water quality that could temporarily impair beneficial uses are expected to be localized and recoverable events in this fire adapted ecosystem. The risk rating is **low.** BAER treatments are not recommended.

c. Soil productivity and hydrologic function on NFS lands are threatened by increased runoff and erosion. While a proportion of eroded soil will remain on the hillslope, delivery of eroded soil to stream channels could occur. The probability of damage of loss is **likely** because consumption of ground cover by the fire was extensive within the moderate and high soil burn severity areas, rendering the soils vulnerable to high rates of post fire erosion. The magnitude of consequence is **minor** because any soil damage is expected to be recoverable and localized. Although impacted by soil heating and erosion, soil productivity

and hydrologic function are expected to recover and support the fire adapted ecosystem. The risk rating is **low**. BAER treatments are not recommended.

d. Habitat for the endangered Pacific Fisher is threatened by post fire habitat alteration which includes a loss of connectivity in riparian areas affected by flash flooding and debris flow, displacement of key habitat structures due to loss of high quality snags and log rest sites, and impacts to habitat resiliency and recovery from soil productivity degradation. The probability of damage or loss is **possible** because flooding could impact riparian areas, debris flow could result in habitat structure loss, and increased soil erosion could result in loss of soil productivity. The magnitude of consequence is **minor** because post-fire effects to habitat will be localized and temporally limited. The risk rating is **low**. BAER treatments are not recommended.

e. Native or naturalized communities on NFS lands where invasive species or noxious weeds are absent or present in only minor amounts are threatened by the potential for introduction of weeds (Italian Thistle, Himalayan Blackberry,) in areas disturbed by suppression activities. The probability of damage or loss is **very likely** because newly disturbed areas are susceptible to weed invasion and there was a lack of weed mitigation tactics in place for arriving resources. The suppression equipment was utilized in areas of known infestations (Shirley Meadows) before being used in native communities that were not infested. The magnitude of consequence is **moderate** because the long-term effects of weed invasion will result in loss of existing intact native plant communities. The risk rating is **very high**. BAER treatments recommended. See treatment L1b.

4. Cultural and Heritage Resources:

a. Artifacts at multiple NRHP eligible sites are threatened by looting and vandalism due to the loss of vegetation and ground cover that were consumed during the fire. The probability of damage or loss is **possible** because the lack of covering vegetation may lead to casual collection, looting, or vandalism of archaeological sites where those sites are close to public access points (e.g. roadsides, parking areas, trailheads, etc.). The magnitude of consequences is **major** because removal or defacement of artifacts and features would degrade integrity values of location, association, design, materials, and workmanship--all of which would irreversibly damage the National Register Criterion D eligibility of these sites. The risk rating is **high**. Treatments are recommended. See treatment L5b.

b. Artifacts at multiple NRHP eligible sites are threatened by erosion, deposition, and channel scour during flash flooding and debris flow events. The probability of damage or loss is **likely** given the expected post fire watershed response to precipitation events and the landscape position of the sites. The magnitude of consequences is **major** because this threat can lead to loss of characteristics that make a site eligible for the National Register of Historic Places and loss of a site's ability to contribute to future research. The risk rating is **very high.** Given the nature of the sites and artifacts, proven treatments to reduce the risk do not exist. BAER treatments are not recommended, however detailed data collection including photographic documentation is advised.

B. Emergency Treatment Objectives: Raise awareness of postfire hazards throughout the burned area, minimize postfire damage to NFS trails, reduce the risk of soil and water contamination from hazardous materials, minimize the establishment of invasive plants and noxious weeds, protect NRHP eligible sites from looting and vandalism.

C. Probability of Completing Treatment Prior to Damaging Storm or Event:
Land: 80%
Channel: N/A
Roads/Trails: 75%

Protection/Safety: 95%

D. Probability of Treatment Success

Table 12: Probability of Treatment Success

	1 year after treatment	3 years after treatment	5 years after treatment
Land	85%	90%	90%
Channel	N/A	N/A	N/A
Roads/Trails	80%	90%	90%
Protection/Safety	90%	80%	70%

E. Cost of No-Action (Including Loss): $431,700 Assumes an 80% chance of loss of the 6.9 miles of Class 3 NFS Trail that are threatened (valued at $50,000/mile); 3 years of mechanical weed treatment on 173 acres of suppression disturbed areas at $300/acre in CYs 2023-2025.

The costs of taking no action to prevent environmental degradation from hazmat contamination are difficult to estimate, however state and local governments would most likely issue penalties against the USFS for violating environmental protection laws if the materials are not contained to the disturbed site. As such it is within the Agency's best interest to minimize the potential damage to natural resources by containing contaminants to permittee's lots until the permittees can remove the materials from NFS lands.

Similarly, the cost of taking no action to protect cultural sites from looting and vandalism cannot be calculated as the loss of artifacts and historical information does not have a monetary value.

Injury or loss of human life that may result from taking no action to minimize risk to Forest visitors in the form of the protection and safety treatments does not have a monetary value.

F. Cost of Selected Alternative (Including Loss): $183,100 Assumes a 20% chance of loss of the 6.9 miles of class 3 NFS trail; the cost of the trail drainage stabilization treatments which will reduce the chance of loss from 80% to 20%; 3 years of mechanical weed treatment on 173 acres of suppression disturbed areas at $150/acre in CYs 2023-2025, the final two of which would be funded with non-BAER funds.

G. Skills Represented on Burned-Area Survey Team:

☒ Soils ☒ Hydrology ☐ Engineering ☒ GIS ☒ Archaeology
☒ Weeds ☒ Recreation ☐ Fisheries ☒ Wildlife
☒ Haz Mat

Team Leader: Brendan Waterman
Email: brendan.waterman@usda.gov **Phone(s):** 385-377-4338

Forest BAER Coordinator: Andy Stone
Email: keith.stone@usda.gov **Phone(s):** 760-376-3781 x683

Team Members: *Table 13: BAER Team Members by Skill*

Skill	Team Member Name
Team Lead(s)	Brendan Waterman
Soils	Eric Schroder, Mary Flores
Hydrology	Andy Stone
Engineering	Unstaffed
GIS	Wendy Rannals-Sarubbi
Archaeology	Tim Kelly
Weeds	Mary Flores, Maryjane Heckle
Recreation	Evan Topal
Haz Mat	Belinda Walker
Wildlife	Maryjane Heckle

H. Treatment Narrative: The following narratives summarize the response actions recommended to decrease risks to BAER Critical Values. Detailed specifications, cost estimates, and maps identifying the spatial location for the treatments are located in the French BAER Assessment project record. The documents can be obtained by contacting the Sequoia National Forest BAER Coordinator. All treatment costs were estimated based on the assumption that off-forest Agency personnel or contract crews would be implementing the authorized treatments without the use of local unit NFSE salary funding. If personnel from the local unit are identified for implementation, current BAER salary and expense guidance regarding the use of H-funds would be adhered to. Project budgets represent the best estimate of the BAER assessment team and may be adjusted with interim funding authorization requests to reflect current market values at the time of contracting and implementation.

Land Treatments:

L1b. Early Detection Rapid Response (EDRR) Suppression: Early Detection Rapid Response (EDDR) surveys and treatments will be conducted in 2022 for Sequoia NF target invasive plant species. EDRR is a strategy developed to increase efficiency of weed work by combining surveying and immediate treatment of new weed populations as they are discovered.

Treat invasive plants that threaten native and naturalized ecosystems by controlling the expected invasion of noxious weeds within area where unmitigated suppression activities disturbed the soil. EDRR activities that extend beyond the first year will be accomplished through non-BAER funding sources.

Although pre-existing roads can be major pathways for weed spread, they are not proposed for treatments unless further disturbed or expanded by suppression activities. The risk of roadside weed spread was a pre-existing condition not directly related to the fire. Roads that were not widened beyond the pre-fire width to facilitate passage of suppression equipment have been excluded from this treatment.

Infestations will be inventoried, mapped with a GPS, photographed, and flagged with noxious weed tape. Data collected will be entered into the Forest Service NRIS databases. Where feasible, new or isolated infestations of invasive plant species may be treated by hand during the same visit as the surveys. Small populations of Italian Thistle and Himalayan Blackberry can be effectively treated by hand and should be prioritized early before they become established. All survey and treatment actions will occur in spring and early summer of 2022 when invasive plants are detectable but early enough to treat effectively (prior to maturation and dispersal of seed). Care should be taken to completely remove the Himalayan Blackberry roots to prevent resprouting.

EDRR Suppression efforts will only occur on NFS lands, along areas that were disturbed by unmitigated suppression activities and suppression repair. These areas were delineated by the BAER Weeds Specialist using suppression disturbance lines and points provided by the IMT. If an effort to accurately capture the actual size of the on the ground disturbance, the points and lines were buffered into polygons that most accurately represent the actual disturbed area. The buffer assigned to the GIS line and point features varied by feature type. Dozer clearings (safety zones) were assumed to be 50’x100’. Dozer lines were assumed to be 25’ wide. Handlines were assumed to be 4’ wide, improved roads were assumed to be expanded by 13’ (6.5’ on either side of the preexisting road).

Table 14: L1b. EDRR Suppression Treatment Cost

Item	UOM	Unit Cost	# of Units	Total Cost
L1b EDRR – Suppression	acre	$150	173	$25,950

L5b. Cultural Resource Mulching: To mitigate the possibility of looting, vandalism, and casual collecting, wood chips and/or other vegetative materials should be scattered across the following sites: 05135400022, 05135400177, 05135400178 and 05135400179. Photo-documentation of the sites prior to application of chips, archaeological monitoring of that application and a one-year program of site visits to assess condition (six site visits) is stipulated to gauge the effectiveness of treatments for these sites.

Table 15: L5b Cultural Resource Mulching Cost

Item	UOM	Unit Cost	# of Units	Total Cost
Type 2 fire crew (spreading wood chips)	Days	$5000	2	$10,000
GS-9 Archaeologist	Days	$350	5	$1,750
L5b Treatment Total Cost				**$11,750**

Channel Treatments: None recommended.

Roads and Trail Treatments:

RT13 Trail Drainage/Tread Stabilization: Trail storm-proofing and grade stabilization of 6.9 miles of identified trails is needed to prevent loss of trail tread, trail drainage structures, and to reduce soil erosion on slopes. Trail storm-proofing involves cleaning or armoring of existing drainage structures to help ensure they perform optimally, as well as the installation of additional drainage features (out sloping, rolling grade dips, water bars).

Prior to implementation of treatments, trail specialists will need to perform specific trail surveys on identified trails. The results of the surveys will dictate subsequent detailed storm proofing treatment recommendations as well as identification of hazard trees in need of removal for crew safety. A trail dozer will be the most effective tool for most of the trail segments identified. While trail clearing is not normally included as a BAER treatment, it will be necessary to provide trail dozer access.

Ideally treatment would occur after some precipitation has added moisture to the soil but before major potentially damaging winter storms occur. This may be a difficult needle to thread so the trails will need to be monitored following storm events to determine how the trails are responding and what additional treatments are necessary.

Trails identified at very high risk should remain closed through at least the winter/spring. 32E46 should remain closed until treatment is completed.

The majority of identified trails are old logging roads converted to class 3 trails. Trail treatments to stabilize these trails will be greater than costs for typical trail stabilization. A trail dozer will need to be utilized, requiring a skilled operator, and drainage features may need to be significantly upgraded to handle increased post-fire runoff. Complete loss of the trail may occur in some sections and reconstruction would be costly. Cost estimates for trail rebuilding is $50,000 per mile for Class 3 trails and $25,000 per mile for Class 2 trails, making treatment cost effective.

Table 16: RT13 Trail Drainage/Tread Stabilization Cost

Item	UOM	Unit Cost	# of Units	Total Cost
FS System Non-Motorized Trails – Implementation layout, Storm proofing - trail stabilization treatments.	Miles	$5000	6.9	$34,500

GS-9 Archaeologist	Days	$350	5	$1,750
RT13 Treatment Total Cost				**$36,250**

RT2 Trail Treatment Storm Inspection and Response: Storm inspection and response keeps drainage features treated under RT13 functional by removing accumulated sediment and debris between or during storm events. Following heavy rains and significant spring snowmelt the inspection will involve identification of drainage hazards such as accumulated debris, sediment, and plugged culverts that are limiting functionality of the trail drainage features. Problems will be corrected before they worsen or jeopardize the trail drainage features.

Table 17: RT2 Trail Treatment Storm Inspection and Response Costs

Item	UOM	Unit Cost	# of Units	Total Cost
Storm Inspection and Response	Miles	$1000	6.9	$6,900
RT2 Treatment Total Cost				**$6,900**

Protection/Safety Treatments:

P1b Burned Area Closure and Warning Signs: The purpose of the Burned Area Closure and Warning signs is to reduce risks to human life and safety and to inform forest visitors of potential dangers and/or hazards when entering burned areas on NFS lands. Entering burned areas presents a high risk to human life and safety, with increased threats from post-fire effects such as falling trees, rolling rocks, flash floods, and debris flows. It is necessary to inform the public of burned-area hazards that are a direct result of wildfire; hazards which are substantially different compared to unburned forest setting and with which many forest visitors may be unfamiliar. Burned area warning signs will be installed to inform the public of the possible dangers associated with a burned area on major entry points into the burned area.

Table 18: P1b Burned Area Closure and Warning Signs Costs

Item	UOM	Unit Cost	# of Units	Total Cost
Labor - GS-7 Recreation Technician (OT rate)	Days	$375	3	$1125
Hazard signs (18” x 24”)	Each	$55	20	$1100
Area closure signs (18” x 24”)	Each	$55	20	$1100
Posts and hardware	Each	$30	20	$600
P1b Treatment Total Cost				**$3,925**

P5 Hazardous Materials Stabilization: Eight structures (6 cabins and 2 outbuildings) located on Forest lands burned in the French Fire. The burned cabins and outbuildings were located at various recreation residence tracts under special use authority. Most of the burned cabins and outbuildings are within proximity to perennial streams located on adjacent slopes and a high to very high risk of soil and water contamination exists if stabilization treatments are not applied in a timely manner.

Proposed treatments include applying a biodegradable, weed free, non-toxic hydro-mulch to immobilize contaminated ash in the immediate vicinity of the cabin footprints, installation of straw wattle rolls, reinforced silt fencing, chemical absorbent sock and sandbag stabilization treatments downstream of burned cabins to deflect water runoff from burned slopes, trap migrating sediments, reduce the likelihood of erosion and prevent the contamination/debris from

being transported off site and into the river below the burned area during heavy rainfall events. These treatments are necessary as final cleanup and refuse removal actions by permit holders may be delayed or not be completed before runoff producing storms occur.

Sites proposed for treatment include: Recreation Residence Tracts Summit, Whispering Springs, and El Monte.

All hazmat containment and stabilization treatments will be implemented via the current Region 5 IDIQ Environmental Service contract and an administered by a Forest Service Contracting Officer and Contracting Officer Representative (COR).

Table 19: P5 Hazardous Materials Stabilization Costs

Item	Units	Unit Cost	# of Units	Total Cost
Program Manager	Hour	170	8	1360
Project Manager	Hour	140	16	2240
Administrative Contract	Hour	82	6	492
Environmental Technicians	Hour	88	80	7040
Vehicles	Days	300	5	1500
Mobilization/Demobilization	Lump Sum	7500	1	7500
Hydro Mulch Equipment	Lump Sum	3000	1	3000
Stabilization Materials	Lump Sum	10816	1	10816
Subtotal				**33948**
Overhead 15%				**5092**
Contract Total				**39040**
FS Project Manager	Days	500	5	2500
FS Archaeologist	Days	350	2	700
P5 Total Treatment Cost				**$42,240**

I. Monitoring Narrative: Forest personnel will periodically review trail safety signs to ensure they are not being vandalized. Trail drainage stabilization treatments will be monitored through implantation of the storm inspection and response plan. Hazmat stabilization treatments will be reviewed by Forest personnel and/or IDIQ contractors to ensure efficacy until material can be removed from NFS lands. EDRR treatments will be monitored during follow up early detection surveys to ensure new weed infestation expansion is minimized. Archaeologists will monitor the effectiveness of the heritage site mulching treatment to ensure sites are not being looted or vandalized.

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										
L1a. EDRR Suppression	acre	150	173	$25,950	$0		$0		$0	$25,950
L1b. Cutlural Site Mulch	site	2,938	4	$11,750	$0		$0		$0	$11,750
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$37,700	$0		$0		$0	$37,700
B. Channel Treatments										
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Channel Treatments				$0	$0		$0		$0	$0
C. Road and Trails										
RT13 Trail Drainage	miles	5,254	7	$36,250	$0		$0		$0	$36,250
RT2 Trail SIR	miles	1,000	7	$6,900	$0		$0		$0	$6,900
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road and Trails				$43,150	$0		$0		$0	$43,150
D. Protection/Safety										
P1b Burned Area Trail Signs	each	98	40	$3,925	$0		$0		$0	$3,925
P5 Hazmat Stabilization	site	5,280	8	$42,240	$0		$0		$0	$42,240
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Protection/Safety				$46,165	$0		$0		$0	$46,165
E. BAER Evaluation										
Initial Assessment	Report			---	$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				$127,015	$0		**$0**		**$0**	**$127,015**
Previously approved										
Total for this request				**$127,015**						

PART VII - APPROVALS

1. Alfred Watson 10/4/2021

Agency Administrator for Forest Supervisor Date

FRENCH FIRE BAER ASSESSMENT

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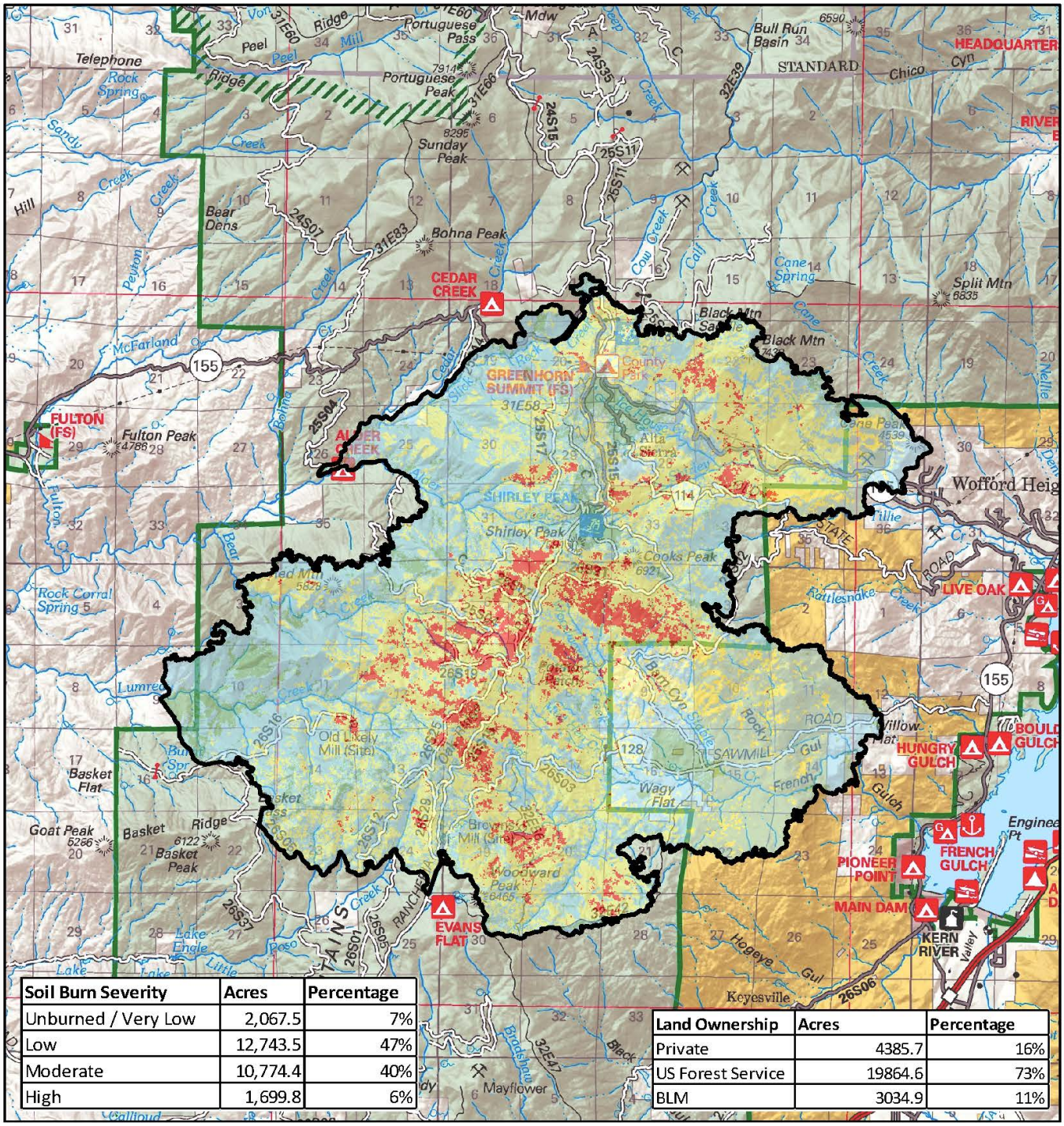
Map Produced 9/23/2021

Soil Burn Severity

- Unburned / Very Low
- Low
- Moderate
- High
- French Fire Perimeter

0 0.75 1.5 3 Miles
0 1 2 4 Kilometers
1:100,000
N



Soil Burn Severity	Acres	Percentage
Unburned / Very Low	2,067.5	7%
Low	12,743.5	47%
Moderate	10,774.4	40%
High	1,699.8	6%

Land Ownership	Acres	Percentage
Private	4385.7	16%
US Forest Service	19864.6	73%
BLM	3034.9	11%

Figure 4: French BAER Soil Burn Severity