Date of Report: 10/27/2021

WINDY 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: WINDY

B. FIRE NUMBER: CA-TIA-003058

C. STATE: CA

D. COUNTY: TULARE

E. REGION: PACIFIC SOUTHWEST

F. FOREST: SEQUOIA

G. DISTRICTS: WESTERN DIVIDE – 72,105 ACRES
KERNVILLE – 3,170 ACRES

H. FIRE INCIDENT JOB CODE: PAN9QV (1522)

I. DATE FIRE STARTED: SEPTEMBER 9, 2021

J. DATE FIRE CONTAINED: EXPECTED NOVEMBER 15, 2021

K. SUPPRESSION COST: $75,000,000

L. FIRE SUPPRESSION DAMAGES REPAIRED WITH SUPPRESSION FUNDS (ESTIMATES):

1. Fireline repaired (miles): Dozerline = 49 miles, Handline = 34 miles, Mileage Repaired = Unavailable.
2. Other (identify):

M. WATERSHED NUMBERS:

TABLE 1. BURNED ACRES BY WATERSHED

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
180300010503	Dry Meadow Creek	23,088	18,201	79%
180300010505	Tobias Creek	13,395	9,519	71%
180300050101	Tyler Creek	10,498	6,366	61%
180300050102	Headwaters Deer Creek	12,456	6,551	53%
180300060301	Upper South Fork Tule River	25,267	20,663	82%
180300050103	Gordon Creek - Deer Creek	21,861	6,211	28%
180300010502	Peppermint Creek - Kern River	33,807	3,877	11%
180300010603	Bull Run Creek	21,114	965	5%
180300050201	Headwaters White River	13,101	1,375	10%
180300060302	Middle South Fork Tule River	39,157	5,012	13%
180300010604	Corral Creek - Kern River	35,914	406	1%
180300060101	South Fork - Middle Fork Tule River	28,327	657	2%
180300010504	South Creek	14,672	11,663	79%

N. TOTAL ACRES BURNED: 97,456

TABLE 2. TOTAL ACRES OWNERSHIP	
Ownership	**Acres**
U.S. Forest Service	75,275
Bureau of Indian Affairs	19,401
Bureau of Land Management	1,006
Private/Other	1,774
Total	**97,456**

O. VEGETATION TYPES:
Dominant vegetation communities within the burn perimeter are as follows, in descending order of prevalence: Sierran mixed conifer, montane hardwood, montane chapparal, red fire, montane hardwood-conifer, ponderosa pine, mixed chaparral, Jeffery pine, lodgepole pine, wet meadow, annual grassland, white fir, valley oak woodland, bule oak-foothill pine, montane riparian, blue oak woodland, perennial grassland, and subalpine conifer.

P. DOMINANT SOILS:
Granitic formations are the most dominant geologic types in the Sequoia National Forest and have generally yielded the coarse textured sandy loam soils that underlie approximately 85 percent of the burned area. Areas of finer textured soils weathered from metasedimentary rocks are present in the northern portion of the fire area near the Peppermint Work Center, near Johnsondale and as small inclusions (approximately three percent of the fire area). These finer textured soils are more susceptible to erosion. Most of the soils throughout the fire area have low coarse fragment content, increasing the potential for erosion. Bedrock is commonly a component of many of the soil map units comprising approximately 12 percent of the burned area but is a component of the majority of the dominant soil map units across the fire area. Alluvial soils are also present in depositional areas and flood plains. The most dominant soil map units are: Chawanakee-Rock outcrop complex, 20 to 50 percent slopes, Chaix-Rock outcrop-Chawanakee complex 30 to 75 percent slopes and Chaix-Dome-Rock outcrop complex, 30 to 50 percent slopes.

Q. GEOLOGIC TYPES:
The Windy Fire is located in the Sequoia National Forest at the southern end of the Sierra Nevada Physiographic Province. The Sierra Nevada is a tilted fault block nearly 400 miles long. Its east face is steep and rugged with multiple fault scarps, contrasting with the gentle western slope that disappears under sediments of the Great Valley. The southern boundary of the Sierra Nevada is the Tehachapi Pass.

Elevations within the burn area range from 2,640 feet above sea level in westward-flowing river gorges, to 9,160 ft above sea level approaching Slate Mountain. Most of the burn area is underlain by Cretaceous-aged massive, medium-grained granites and granodiorites. The geology to the northwest of the burn includes Cretaceous metasedimentary and metavolcanic belts. Burn area is just west of the Kern Canyon fault, an active strike-slip fault.

R. MILES OF STREAM CHANNELS BY ORDER OR CLASS:

TABLE 3. MILES OF STREAM CHANNEL BY CLASS			
Stream Type	**Ownership**		**Total**
	USFS	**non-USFS**	
Ephemeral	25	87	112

Intermittent	63	3	66
Perennial	132	49	181
Grand Total	220	139	359

S. TRANSPORTATION SYSTEM:
There are approximately 258 miles of National Forest Transportation System Roads (NFSR) within the burn perimeter. NFSR roads are classified into five maintenance classifications (ML). ML 1 roads are administratively closed roads. ML 2 roads are maintained for high clearance vehicles. ML3-5 are maintained for standard passenger vehicles and are subject to signage in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). Many of the roads are multi-jurisdictional roads with a variety of cooperators and stakeholders. Road designs are both in-slope and out-slope with multi drainage and surface types. The majority of the NFSR Roads throughout the burned watersheds are likely to be impacted by runoff, sediment, and debris. See **Table 4** for a summary of NFSR Roads within the burn perimeter.

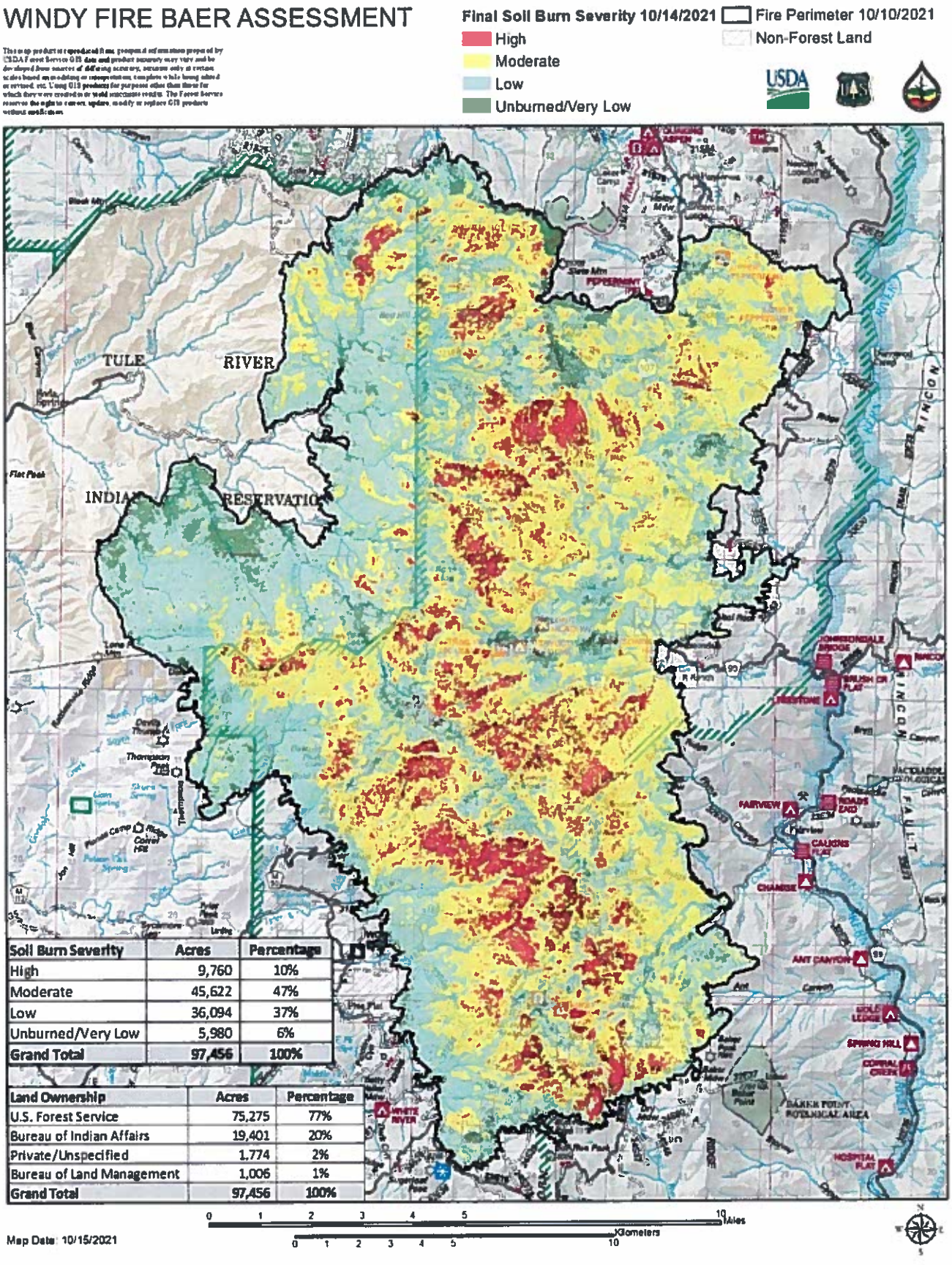
TABLE 4. MILES OF ROAD AND TRAIL	
Roads	
Maintenance Level	**Miles**
1 - Basic Custodial Care (Closed)	13
2 - High Clearance Vehicles	162
3 - Suitable for Passenger Cars	35
4 - Moderate Degree of User Comfort	18
5 - High Degree of User Comfort	6
Other	25
Forest Service TOTAL:	**258**
Non-Forest Service TOTAL:	**74**
Trails	
Type	**Miles**
Motorized	2
Non-Motorized	43
Trails TOTAL:	**45**

PART III - WATERSHED CONDITION

A. BURN SEVERITY (ACRES): 97,456
Table 5 provides a summary of soil burn severity by ownership. **Figure 1** displays the soil burn severity within the Windy Fire perimeter.

TABLE 5. SUMMARY OF SOIL BURN SEVERITY BY OWNERSHIP					
Ownership	**SOIL BURN SEVERITY (Acres)**				
	Unburned/ Very Low	**Low**	**Moderate**	**High**	**Total**
Bureau of Indian Affairs	2,273	12,530	4,111	487	19,401
Bureau of Land Management	177	775	54	-	1,006
Private/Other	222	899	593	60	1,774
U.S. Forest Service	3,308	21,890	40,864	9,213	75,275
Grand Total	**5,980**	**36,094**	**45,622**	**9,760**	**97,456**

Figure 1. Soil Burn Severity – Windy Fire



B. WATER-REPELLENT SOIL (ACRES):
Water repellent soil was not common in the Windy fire. In high soil burn severity, it was present in 1/3 of the sampled locations and was weak in strength. In moderate burn severity, water repellency was found in about half the sampled locations and was also weak in strength. Generally, the hydrophobic layer was close to the surface, 1-3 cm in depth, and rarely below 4 cm. Repellency was not noted at low burn severity sites. Most of the water-repellent sampling was completed after a wetting rain and likely reduced the water repellency of the soil overall in the high and moderate soil burn severity areas.

C. SOIL EROSION HAZARD RATING:
Erosion Hazard Rating information is not available for the Bureau of Indian Affairs, Bureau of Land Management or private/other lands so is not reported (22,181 acres, 23 percent of the fire area).

TABLE 6. SOIL EROSION HAZARD RATING

Rating	Acres	Percent of Fire Area
Severe	11,271	14.8
Moderate	17,074	22.5
Low	20,707	27.2
Not Rated (Riverwash, Rock Outcrop or data NA)	26,983	35.5

D. EROSION POTENTIAL: 2.29 (tons/acre)
The Erosion Risk Management Tool (ERMiT) was used to model erosion and sediment potential on selected pourpoint watersheds and across the entire fire perimeter. This model is a storm-based erosion potential model and 2-year (50 percent probability) and 5-year (20 percent probability) runoff events were modeled. Watersheds were chosen based on critical values present. Pre fire erosion rates are less than 1 ton/acre across the fire area (average 0.1 tons/acre). The post-fire erosion rates for all modeled pourpoints from a 2-year storm event average 2.4 tons/acre and ranged from 2.2 to 2.9 tons/acre. This closely follows the overall fire erosion rates of 2.3 tons/acre. Rates from a 5-year storm ranged from 4.9 to 7 tons/acre and average 5.6 across the modeled watersheds. Both 2 and 5-year rates are displayed by pourpoint in the table below.

The overall erosion rates are moderate to high across the fire area which is likely due to the extent of moderate and high soil burn severity, the steep slopes and in portions the erosive granitic soils. The erosion rates within the forested areas follow closely with the soil burn severity, where the high soil burn severity areas have greater erosion rates. In the higher elevation forested areas, precipitation is more likely to fall as snow, potentially decreasing erosion rates. Within the eastern third of the fire area where chaparral and shrub vegetation dominates, the erosion rates are high where soil burn severity is mostly moderate. This is evident in the Peppermint Creek area, the Mill Creek and South Creek drainages near Johnsondale Bridge, Meadow Creek drainage and in the Tobias Creek area. Vegetation burn severity is higher in these areas and soil cover and potential cover are low. Rain on snow events is more likely to occur in these areas, potentially increasing erosion. The slopes are steep, and the granitic soils are loose, dry ravel is occurring in these areas and soil movement is more likely where vegetation has been lost.

It is possible actual erosion rates will exceed these modeled values in intense thunderstorms, in this scenario the erosion rate maps in the Soil report can be used to show relative risk of erosion across the fire.

TABLE 7. MODELED EROSION RATES FOR 2-YEAR AND 5-YEAR STORM EVENTS

Modeled Catchments	Erosion Rates (tons/acre)		Percentage Soil Burn Severity by Watershed (%)				Area
	2-year event	5-year event	Unburned/V. Low	Low	Moderate	High	
California Hot Springs	2.3	5.6	0.7	16.7	65.9	16.7	6677
Camp Whitsett BSA	2.4	5.7	1.8	30.2	51.6	16.5	10348

Dispersed Camping at Bone Creek	2.3	5.3	1.9	19.8	62.2	16.0	3815
Dispersed Camping Nobel Young Creek	2.4	5.6	4.5	26.7	58.1	10.6	2201
Dry Meadow Creek At Kern River	2.4	5.7	1.7	18.8	56.3	23.2	19087
Horse Meadow	2.3	5.1	1.5	14.5	64.3	19.7	883
Johnsondale Bridge	2.6	5.7	1.8	30.2	51.6	16.5	6857
Lower Peppermint Campground	2.2	5.7	10.2	32.4	56.1	1.2	3547
Parker Meadow Creek at Johnsondale	2.3	5.1	0.1	6.6	56.9	36.5	4838
Peyrone Grove	2.3	5.6	6.1	31.3	50.3	12.3	2510
Peyrone Grove 1	2.8	6.3	4.1	61.9	33.4	0.6	436
South Peyrone Grove	2.9	7.0	4.5	40.3	47.1	8.1	448
Thompson Camp Site	2.2	4.9	0.9	9.7	57.4	32.0	5032
Tyler Creek at M50	2.5	5.4	2.0	17.6	59.5	20.9	5973
White River Summer Home Tract	2.4	6.0	1.3	18.2	53.1	27.4	1604
Fire Perimeter	2.3	5.5	16.0	59.5	23.0	1.4	97457

E. SEDIMENT POTENTIAL: 1,270 (cubic yards / square mile) Total Sediment Tons: 276,279 (2-year runoff event)

In high and moderately burned areas, erosion potential estimates from ERMiT are used as a surrogate for sediment potential, because streamside riparian vegetation is consumed, thus reducing its role as a sediment trap, allowing hillslope erosion to reach the channels. In low burn severity areas, more ground cover remains to filter sediment, and less eroded material is likely to make it to channels.

F. ESTIMATED VEGETATIVE RECOVERY PERIOD (YEARS):
Recovery of early successional herbs and shrubs will be within the first few years even in areas of high severity. For areas of low burn severity, estimated full return of soil cover and vegetation structure should be 2-15 years. Moderate and high burn severity areas will take 50-100 years to return to mature forest stands, provided invasive plant colonization and drought years are minimal.

G. ESTIMATED HYDROLOGIC RESPONSE (BRIEF DESCRIPTION):

Watershed Response: The Windy Fire burned 97,456 acres in the Southern Sierra on the Sequoia National Forest. Of the 97,456 acres, 57% burned at a moderate and high soil burn severity. Elevations within the fire perimeter range from approximately 4,000ft to 9,000ft. Precipitation averages 35-inches per year, most of which occurs during the winter months as storms come in off the Pacific and hit the steep slopes of the Sierra Nevada. Rain to snow elevations start at around 6,000ft to 7,000ft, with warmer storms sometimes bringing rain to the highest elevations. These rain on snow events are the most destructive and are the most concerning for flooding issues to downstream values-at-risk (VARs).

Numerous HUC12 watersheds burned within the Windy Fire. These HUC12 watersheds range in size from 10,000 acres to 40,000 acres. Overall, 12 HUC12 watersheds overlapped the burned area, with 4 HUC12 watersheds receiving greater than 50% moderate and high soil burn severity (**Table 8**). These high response watersheds will experience the greatest amount of post-fire erosion and hyper-concentrated flows and are the areas where the most damage is likely occurred to downstream VARs.

The burned perimeter of the fire has a distinct West to East divide. The Westside of the fire is drained by a few large creeks and rivers, including the Tule River, White River, Deer Creek and Tyler Creek. All these drainages

eventually flow into the Central Valley. These rivers and creeks were all modeled except for the Tule River, which was looked at more closely by the DOI BAER team. Hydrologic modeling, which used a 2-year recurrence interval peak flow (Q2) and have a 50% chance of occurring any given year, indicate a small to large increase in post-fire flows, with White River showing 46% increase over normal, Deer Creek showing a 136% increase over normal and Tyler Creek showing a 292% increase over normal (**Table 8**). The most damaging storms will occur in the winter months, with warm rain-on-snow events being the most concerning.

The eastside of the fire drains towards the Kern River, which then flows South into Lake Isabella. This side of the fire received the highest amount of burned watersheds, with 3 out of the 4 high-response HUC12 watersheds flowing East to the Kern River. These high-response watersheds include Tobias Creek, South Creek and Dry Meadow Creek watersheds. Hydrologic modelling was done on 5 creeks that drain these watersheds with modelling showing a very large increase in post-fire flows. These 5 creeks and associated post-fire flows are: Bone Creek with a 278% increase, Nobe Young Creek with a 378% increase, Dry Meadow Creek at Kern River with a 179% increase, South Creek at Johnsondale bridge with a 304% increase and Parker Meadow Creek with a 211% increase over normal flows (**Table 8**). The large increases in post-fire flows will likely impact downstream VARs including Camp Whitsett as well as dispersed camping and high use areas along creeks. Similar to the westside of the fire, the most damaging storms are likely to occur in the winter months, however the eastside of the fire that drains into the Kern River is influenced by summer monsoon moisture. This poses a greater risk of damaging storms also occurring in the summer months during monsoon season.

Water Quality: The greatest impacts to water quality will occur in the watersheds on the eastside of the fire that drain into the Kern River. There are 4 HUC12 watersheds that encompass the eastside of the fire and 3 of these watersheds burned greater than 50% moderate and high. It is expected that large amounts of ash and sediment will be mobilized downstream into the Kern River, potentially causing a short-term spike in turbidity and a degradation of water quality. This can impact aquatic organisms and temporary cause minor issues to hydropower facilities. These impacts should abate 3 to 5 years post-fire as vegetation reestablishes and stabilizes the soil.

TABLE 8. PRE- AND POST-FIRE CHANGES IN DISCHARGE FOR A 2-YEAR 6-HOUR STORM EVENT

Values at Risk		Discharge by Watershed (cfs)		Discharge by Watershed (cfs/mi²)		Percent Increase Water Yield
Pour Point Watershed	Affected WS Area (mi²)	Pre- fire	Post- fire (bulked)	Pre-fire	Post-fire (bulked)	
M50 at Tyler Cree (PP1)	9.6	111	435	11.6	45.3	292
Deer Creek Summer Homes (PP2)	16.3	172	407	10.6	25	137
White River Summer Homes (PP3)	4.0	48	70	12.1	17.5	46
Camp Whitsett (PP4)	16.2	156	572	9.6	35.3	267
Dispersed Camping along Bone Creek (PP5)	6	65	250	10.8	41.7	285
Dispersed Camping along Nobe Young Creek (PP6)	3.44	44	210	12.8	61	378
Dry Meadow Creek at Kern River (PP7)	36.2	275	767	7.6	21.2	179
Lower Peppermint Campground (PP8)	13.3	129	206	9.7	15.5	60
Thompson Site Dispersed Camping (PP9)	7.9	85	329	10.7	41.6	289
Horse Meadow (PP10)	1.4	19.2	76	13.7	54.3	295
Bridge at Johnsondale (PP11)	10.7	103	416	9.6	38.9	304

Leavis Flat Campground (PP12)	16.7	176	409	10.5	24.5	132
Peyrone Grove (PP13)	3.9	59	159	15.1	40.8	170
Peyrone Grove 1 (PP14)	0.7	11	23	16.3	32.9	99
South Peyrone Grove (PP15)	0.7	11	51	16	72.9	352
Parker Meadow Creek at Johnsondale (PP16)	7.6	77	240	10.1	31.6	211

H. GEOLOGY AND GEOMORPHOLOGY – GEOLOGIC RESPONSE

Within the Windy Fire BAER Assessment area, rock-fall hazards along some roads were identified. In addition, several high potential debris flows/hyper-concentrated flooding hazard drainages were identified. These identifications were done based on ground observations and the aid of the USGS Debris Flow Model. The magnitude of storm that was chosen for analysis was a peak 15-minunte rainfall intensity storm of 24 mm/hr rate, since based on NOAA Atlas 14, this magnitude of storm is likely to occur in any given year in this area. Debris flow probability and volume were estimated for each basin in the burned area as well as along the upstream drainage networks, where the contributing area is greater than or equal to 0.02 km^2, with the maximum basin size of 8 km^2.

Based on USGS debris flow modeling,probabilities of debris flow initiation in the Indian Creek, Tyler Creek, Mill Creek, South Creek and Nobe Young Creek watersheds are relatively high (60-100%), while probabilities in most other watersheds in the burn area are moderate to low (0-60%), (**Figure 2**). Some other watersheds in the north part of the fire are predicted to produce debris flows with high probabilities as well, but for the most case, those creeks are not anticipated to impact any Critical Values.

Regarding predicted volumes of debris flows in these watersheds that present a high probability of debris flow initiation, in most cases, volumes predicted for these watersheds range from 1,000–100,000 cubic meters. Examining the combined hazard maps presented by the USGS debris flow model reveals that some of these same watersheds, as Tyler Creek, Deer Creek, Mill Creek and Nobe Young Creek present a high combined hazard, corresponding to areas that experienced a moderate to high soil burn severity and are steep to very steep (**Figure 3**).

Although the USGS debris flow model predicts relatively high probabilities of debris flow initiation in some drainages impacted by the fire, based on ground surveys of the burn area, it is our belief that not all drainages that are predicted to initiate debris flows in the burn area by the USGS debris flow model will end up mobilizing large debris flows. This belief is based on the lack of ground evidence of any recent debris flow deposits. In addition, our conclusion is based on the local parent material which tends to erode to small particles and lacks large rocks and boulders. To conclude, it is our belief that in some drainages that are predicted to produce post-fire debris flows with high probabilities based on the USGS debris flow model, post-fire physical conditions are indeed inducive to high flows, which might include hyper-concentrated flows (sediment laden flows) but are lacking the type of materials that constitute the major volume of large debris flows.

Figure 2. Debris Flow Probability

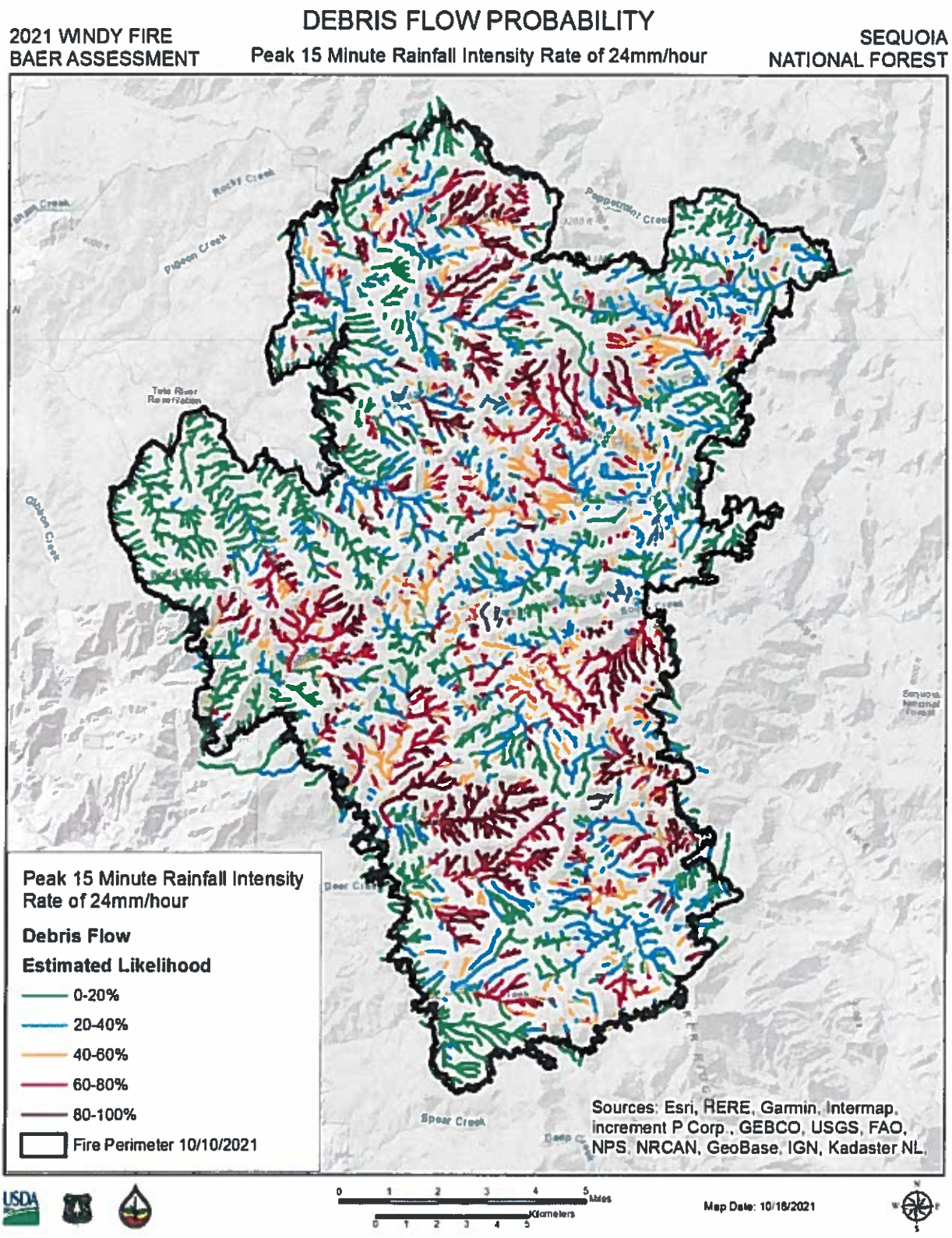
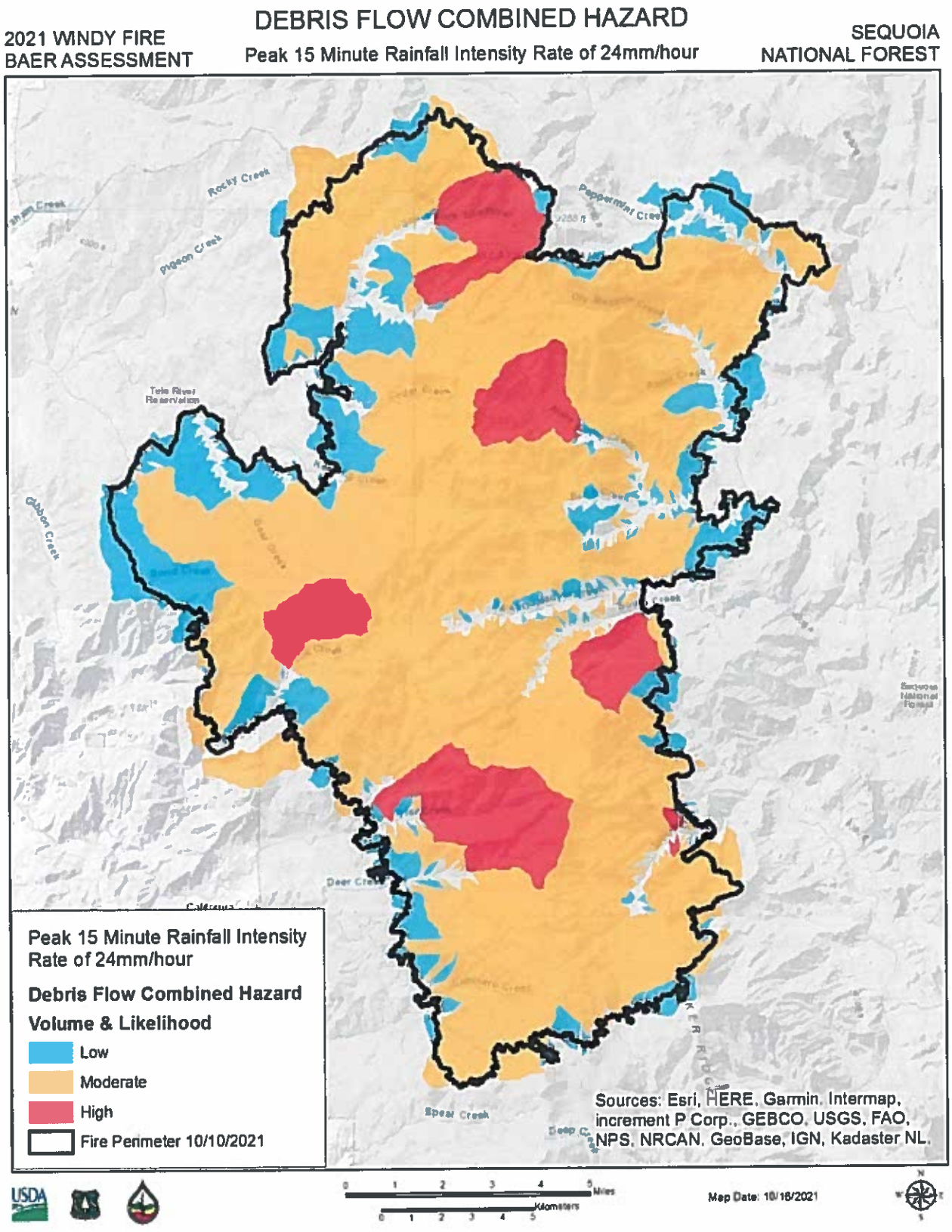


Figure 3. Debris Flow Combined Hazard



PART V - SUMMARY OF ANALYSIS

Introduction/Background
The Windy Fire started on September 9th. The fire is on the Sequoia National Forest and Tule Indian Reservation in Tulare County. The drought, combined with dry, hot weather and strong winds, resulted in very active fire behavior.

On October, 8th, 2021, a BAER team began assessing the fire. The initial team consisted of soil scientists and hydrologists focused on mapping soil burn severity and assessing imminent post-fire threats to human life and safety, property, and natural resources. Additional BAER specialists, including a geologist, road engineers, aquatic and terrestrial biologists, archaeologists, botanist, and recreation managers engaged in the following days in order to assess specific threats in more detail.

A. DESCRIPTION OF CRITICAL VALUES/RESOURCES AND THREATS:

The BAER Critical Value matrix (**Table 9**) was used to assess the overall risk for all the resources analyzed under the Windy Fire BAER process.

TABLE 9. 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:

The Windy Fire BAER Team has identified a high risk to human life and safety at several locations throughout the fire based on the threat of debris flows, landslides, flooding, rockfall, and hazard trees. Hazard trees are the most common risk to life and safety. Occupancy or use of BAER critical values such as roads, trails, campgrounds, and other developed recreation sites have post-fire threats to life/safety as well as to Forest Service property. Forest users, employees, and partners could be hit by falling trees, caught in a debris flow, landslide, or flood, or be injured or killed due to damaged travelways. A summary of the assessment follows; additional details are found in the resource specialist reports that address BAER critical values/threats and risks.

Human Life and Safety – Roads and Trails: Human life and safety of Forest visitors and employees traveling on NFS roads and 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 **likely** as the NFS transportation system contains many motorized and non-motorized routes adjacent to and through the burned area. With flooding and hazard trees being the largest threats. 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 **very high**. Administrative closures and hazard signs are recommended treatments.

Human Life and Safety – Developed/Dispersed Recreation Sites:
Human life and safety of forest visitors is threatened at Leavis Campground by the potential for injury or loss of life during flashfloods. The Campground is outside the burn perimeter but fire impacts to the watershed above it create the potential for flooding of Deer Creek. The probability of damage or loss is **possible** because post-fire watershed response modeling indicates 132% flood increase, but most of the campground is approximately five feet above the creek channel. The magnitude of consequence is **major** given the potential for serious injury or loss of life. The risk level is **high**. Closure of the site closest to the creek channel is recommended, as well as flood warning signs at the campground kiosk.

Human life and safety of forest visitors is threatened at Thompson Camp, Camps 1, 2, and 3, and the slides on Nobe Young Creek by the potential for injury or loss of life during flashfloods. Thompson Camp was heavily burned creating other significant hazards both overhead and underfoot. The probability of damage or loss is **very likely** because post-fire watershed response modeling indicates a 285% increase for flows on Bone Creek and a 378% increase in flows for Nobe Young Creek. The magnitude of consequence is **major** given the potential for serious injury or loss of life. The risk level is **very high**. Administrative and closure and hazard signs are recommended.

Human life and safety of forest visitors is threatened on Dry Meadow Creek including the recreation site known as 7 teacups, by the potential for injury or loss of life due to quickly rising water levels in steep topography. The probability of damage or loss is **likely** because post-fire watershed response modeling indicates a 179% increase inf flows for Dry Meadow Creek at the Kern River. The magnitude of consequence is **major** given the potential for serious injury or loss of life. The risk level is **very high**. Hazard warning signage is recommended.

Human life and safety of forest visitors is threatened by the potential for injury or loss of life due to the burned bridge on the 23S64 road. The probability of damage or loss is **likely** due to the 12 foot drop to the creek. The magnitude of consequence is **major** given the potential for serious injury or loss of life. The risk level is **very high**. Road closure with gates on both sides and k-rails or other barricades at the site are recommended.

Human life and safety of visitors to Trail of 100 Giants is threatened by the potential exposure to contaminants from burned debris from treated lumber used to construct the boardwalk. The probability of damage or loss is **very likely** because of the high visitor use at the site. The magnitude of consequence is **moderate** because while hazardous, incidental exposure to the materials is not likely to result in illness, injury, or death. The risk level is **very high**. Closure of the immediate area around the boardwalk and signage are recommended.

Human life and safety of Forest visitors is threatened by the potential exposure to contaminants from burned debris at the Frog Meadow Recreational Rental Cabin site. The probability of damage or loss is **likely** because of it is potential to become an attractive nuisance for visitors to the nearby campground. The magnitude of consequence is **major** because of the potential for the presence of materials like lead and asbestos. The risk level is **very high**. Closure of the cabin site and signage are recommended.

Human Life and Safety – Non-Forest Service Values: Human life and safety of visitors to Camp Whitsett Boy Scout Camp, which operates under a special use permit from the Forest, by the potential for injury or loss of life due flooding at the confluence of Bone and Nobe Young Creeks. The probability of damage or loss is **likely** because post-fire watershed response modeling indicates 266% increase at the creek confluence. The magnitude of consequence is **major** given the potential for serious injury or loss of life. The risk level is **very high**. Coordination between the Special Use Permit Administrator and the permittee to close the flood prone area to overnight use is recommended. While permittee property is their responsibility, it should be recommended to them that any infrastructure be moved out of floodplain during the winter. Communication should occur with NRCS.

Human life and safety of recreation residence permittees in the Deer Creek Summer Home Tract 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 136% increase in flood magnitude and the potential for debris flow. The magnitude of consequence is **major** given the potential for serious injury or loss of life. The risk level is **high**. Several cabins near the channel are at risk. Consideration should be given to restricting occupancy of these cabins.

Human life and safety of recreation residence permittees in the White River Summer Home Tract 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 45% increase in flood magnitude and the potential for debris flow. The magnitude of consequence is **moderate** given that the constricted channel opens within the tract which should reduce the speed and depth of water. The risk level is **intermediate**. One cabin near the channel is at risk. Consideration should be given to restricting occupancy of this cabin.

2. **Property:**

Property – Forest Service Roads: Due to the post-fire conditions there is an increased risk to road improvements and lost access to forest service roads which serve private property owners, permittees, and forest users varies depending on burn severity and location. There is an elevated risk of loss of road surfaces and road prisms due to increased storm water runoff erosion damage. Secondary consequences to the road system are to increase the adverse effects and decrease control of storm water runoff to adjacent watersheds.

Probability of damage was determined through a combination of soil burn severity mapping, on the ground engineering analysis, and communication/coordiantion with the BAER assessment team hydrologists, soil scientists, and geologists. **Table 10** illustrates the roads within the fire area by maintenance level and soil burn severity. In moderate to high burn severity locations, higher maintenance level roads (ML3-5) which fall under the highway safety act, and mission essential level 2 roads that lead to important forest infrastructure were considered for treatment.

Roads that were determined to have a **high to very high risk** were recommended for treatments to mitigate the hazard or lower the risk to an acceptable level. Roads that were determined to have an intermediate to very low risk were not considered for treatment. See the Windy Fire BAER Critical Values Table and Windy Engineering Specialist Report for details on roads risk assessments.

TABLE 10. SUMMARY OF ROADS WITHIN THE BURN PERIMETER BY SOIL BURN SEVERITY

Road Maintenance level	Burn Severity				
	High	Low	Moderate	Very Low/ Unburned	Grand Total
1 – Basic Custodial Care (Closed)	1.17	3.48	6.91	1.20	12.76
2 – High Clearance Vehicles	16.85	42.90	92.37	9.42	161.54
3 – Suitable for Passenger Cars	1.26	13.77	16.42	3.41	34.86
4 – Moderate Degree of User Comfort	0.75	5.15	10.71	1.43	18.04
5 – High Degree of User Comfort		3.86	1.93	0.21	6.00
Other	.30	12.13	10.50	2.44	25.37
Grand Total					**258.57**

Property – Forest Service Trails: The trail prisms for 8.9 miles of identified trail segments are threatened by expected increases in postfire runoff. The probability of damage or loss is **very likely** for most of these trail segments given their 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. 31E52 Lion Ridge Trail and 31E56 Frog Meadow Trail are rated as **likely** due to their slope positions, which create less opportunity for increased runoff than other trail segments. Although these trails are close to the ridgeline, their alignment on steep slopes and design features such as switchbacks will contribute to potential for damage. For example, while much of 31E52 Lion Ridge Trail rides the ridgeline, the 0.7 mile segment identified for treatment drops 600 feet in tight switchbacks in moderate to high severity burn. Increased post-fire water flows can run down steep ridgeline trail prisms and create damage without upslope erosion being a factor. 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**.

Additional trails were also determined to be a **very** high risk as shown in **Table 11**. Treatments are recommended.

The trail prisms for 8.5 miles of additional identified trail segments are threatened by expected increases in postfire runoff. The probability of damage or loss is **likely** given these trails 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. Although some of these trails are close to the ridgeline, their alignment on steep slopes and design features such as switchbacks will contribute to potential for damage. For example, while portions of 32E32 Speas Ridge Trail ride the ridgeline, the1.8 miles identified for treatment drops over 1500 feet from the ridgeline with enough upslope moderate severity burn to damage fire destabilized trail tread. While portions of the 32E34 Tobias Creek Trail Segment 2 identified for treatment ride the ridgeline, the ridgeline itself is far from flat and the trail drops approximately 1,000 feet with enough upslope moderate severity burn to damage fire destabilized trail tread. The identified segment of 31E53 Pup Meadow Trail follows the contour about 300 feet below the ridgeline in mostly moderate and high severity burn. Sufficient increased upslope runoff can be produced over this distance to damage fire destabilized tread. This trail's alignment makes it an excellent candidate for outsloping treatment. The magnitude of consequence for these trails is **moderate** because some 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** (see **Table 11**). Treatments are recommended.

TABLE 11. TRAILS AT VERY HIGH AND HIGH RISK

Trail Number	Trail Name	Trail Class	Length of Treatment
Very High Risk			
31E14	Summit National Recreation Trail Segment 2	3	0.7
31E14	Summit National Recreation Trail Segment 3	3	0.6
31E41	Peyrone Camp Trail	3	1.0
31E47	Chute Trail	1	0.3
31E48	Cold Spring Trail	3	1.0
31E50	Powderhorn Trail	3	2.5
31E52	Lion Ridge Trail	3	0.7
31E56	Frog Meadow Trail	3	1.3
31E57	Sugarloaf Trail	3	0.8
Very High Risk Total Miles			8.9
High Risk			
31E14	Summit National Recreation Trail Segment 1	3	0.3
31E43	Mule Peak Trail	3	0.4
31E53	Pup Meadow Trail	3	3.2
32E32	Speas Ridge Trail	3	1.8
32E34	Tobias Creek Trail Segments 1	2	0.8
32E34	Tobias Creek Trail Segments 2	2	2.0
High Risk Total Miles			8.5
Total At-Risk Miles			**17.4**

*Risk assessment details are available in the Recreation Specialist Report

3. **Natural Resources:**Natural Resource – Threats to Water Quality and Soil Productivity - Hazardous Materials: Fifteen structures on Forest Service system lands burned as a result of the Windy Fire. Including, Mule Peak Lookout (complete loss), 2 small sheds at Tobias Lookout, 2 large storage buildings at Johnsondale Work Center, 1 toilet building at Camp Whitsett, 1 toilet building at Upper Peppermint Creek Campground, 2 historic Forest Service Guard Stations at Long Meadow (including storage shed and corral) and Frog Meadow (including a storage building), a historic bridge on Forest Road 23S64, 1 small tent cabin at Speas Meadow, 1 small sleeping structure at Powderhorn Meadow

and a trail boardwalk structure at 100 Giants interpretive site trail. The structure burned at Camp Whitsett under Special Use Permit is owned by a permittee.

Most sites noted above are within proximity of meadows, springs and stream channels and burned structure refuse can migrate readily to these locations. If the sites are not adequately contained, stabilized, or cleaned up, burned structure refuse can migrate off site during periods of heavy storm runoff originating from nearby burned areas and slopes into sensitive resource areas resulting in soil and water contamination.

When structures burn, the ash and residual materials (refuse) are considered hazardous to humans and the environment per the State of California EPA environmental regulations (the Frog Meadow Rental Cabin and Trail of 100 Giants both contain hazardous materials and were identified as a risk to Life and Safety as described above). Several cubic yards of refuse are currently left exposed to weather and precipitation events because of the Windy Fire and burned refuse is ready to be mobilized by storm runoff to adjacent soils, streams, and meadows. This could likely impact groundwater and water quality. Most of the sites are situated along the base of steep, burned slopes that could deliver increased storm runoff directly into the burned refuse and increase the potential to move burned waste downslope offsite along with ongoing rainfall if stabilization efforts are not implemented.

Other actions needed are a bridge at Road 23S64 crossing that has moderate amounts of burned, chemically treated wood within the stream channel of Bear Creek that needs to be removed because of the imminent and ongoing threat to water quality at the site, which is currently being impacted.

There are 3 sites that have a very high risk: Johsondale Work Center, Trail of 100 Giants, and Forest Road 23S64 bridge. The storage buildings that burned at Johnsondale work center contain large amounts of burned hazmat, the site is situated along the stream banks of South Creek. Without aggressive stabilization and containment actions implemented, there is a very likely potential for toxic hazmat to enter the stream and downstream to Kern River, a domestic water source with many beneficial uses of the water. This site may need removal actions taken as the threat of off-site migration to water is very high, and stabilization may not be effective due to the proximity to water.

The Trail of 100 Giants and the 23S64 bridge both contain treated Wood Waste (TWW). TWW contains hazardous chemicals that pose a risk to human health and the environment. Arsenic, chromium, copper, creosote, and pentachlorophenol are among the chemicals added to preserve wood. These chemicals are known to be toxic or carcinogenic. Harmful exposure to these chemicals may result from dermal contact with TWW, or from inhalation or ingestion of TWW particulate (e.g., sawdust and smoke). When TWW is burned, it becomes friable and can readily release chemical components into the environment (*CA State, Department of Toxic Substances Control, 2008*).

100 Giants Interpretive Trail Boardwalk, is a section of a Level 4 (highly developed) ADA specified, asphalt paved interpretive trail. The trail is a loop that has heavy visitation and is well developed with benches, interpretive signs etc. and provides access to a grove of giant Sequoia trees. The boardwalk, or bridge span, was built over a small stream and seep area and was built on concrete footings and wood beams. The boardwalk decking was made with chemically treated 6"x 12" wood timbers. The boardwalk is approximately 100 foot in length. The burned refuse from the treated wood now resides in the stream and wet soil area below the boardwalk span, immediately releasing hazmat into the water and soil.

Forest Road 23S64 historic bridge was burned in the fire. The bridge was built with concrete abutments, chemically treated wood beams and span decking. The span is about 40 feet in length. The fire fully burned the treated wood, and the refuse is now laying in the stream channel of Bear Creek immediately releasing hazmat into the stream. When high flows occur, the refuse will be carried further downstream.

There are also 7 sites that are considered high risk, as shown in **Table 12** below. Additional details on these sites, as well as the low and very low risk sites, can be found in the Windy BAER Critical Values Table.

TABLE 12. HAZARDOUS MATERIALS HAZARDS, PROBABILITIES, MAGNITUDE OF CONSEQUENCES, AND RISK

Value-at-Risk	Probability of Damage or Loss	Magnitude of Consequence	Risk	Treatment Proposed
Hazmat: Forest Road 23S64 Burned Bridge: Soil Productivity and Water Quality.	Very Likely	Moderate	Very High	Yes
Hazmat: Camp Whitsett burned Toilet building. Water Quality and oil productivity.	Likely	Moderate	High	Yes
Hazmat: Frog Meadow burned Guard Station and outbuilding (2 structures) - Soil and Water quality	Likely	Moderate	High	Yes
Hazmat: Johnsondale Work Center (2 structures) - Water quality and Soil Productivity.	Very Likely	Moderate	Very High	Yes
Hazmat: 100 Giants Interpretive Site Trail Boardwalk - Soil Productivity and Water Quality.	Very Likely	Moderate	Very High	Yes
Hazmat: Upper Peppermint Campground burned Toilet building - Soil Productivity, Water Quality	Likely	Moderate	High	Yes
Hazmat: Long Meadow Guard Station and Storage Building (2 structures) - Water Quality and Soil Productivity	Likely	Moderate	High	Yes
Hazmat: Mule Peak Lookout - Soil Productivity.	Likely	Minor	Low	No
Hazmat: Powder Horn Meadow Burned Structure - Soil Productivity and Water Quality.	Unlikely	Minor	Very Low	No
Hazmat: Speas Dirty Camp Water Quality and Soil Productivity	Unlikely	Minor	Very Low	No
Hazmat: Tobias Peak Lookout 2 burned storage sheds (2 structures) - Soil Productivity.	Possible	Minor	Low	No

Natural Resources – Soil Productivity: Risk Assessment: Runoff, erosion, sedimentation and flooding are **likely** because of steep slopes, lack of cover and high modeled erosion rates in a 2 and a 5-year storm. The magnitude of consequences is **moderate** because the loss of surface soil could reduce productivity or delay recovery of pre-fire vegetation types but is unlikely to cause irreversible damage. The overall risk is **high**.

While a threat to soil productivity exists in portions of the Windy fire, hillslope stabilization treatments are not being proposed. Erosion rates high enough to threaten soil productivity are not widespread, and where they do occur are often on slopes steeper than 60%.

Natural Resources – Terrestrial and Aquatic Wildlife: **Table 13** contains a list of federally-listed Threatened and Endangered (T&E) species that may be present in the fire perimeter.

TABLE 13. FEDERAL T&E SPECIES WITHIN THE 2021 WINDY FIRE PERIMETER

Taxonomic Group	Species	Federal Status	Value at Risk on FS land?	Rationale
Mammal	Pacific Fisher (*Pekania pennanti)*	Endangered	Individuals & Denning Habitat	Long-term monitoring has detected family groups with potential denning habitat in the fire perimeter.
Bird	California Condor (*Gymnogyps californianus*)	Endangered, Critical Habitat	Individuals Foraging	Condors are actively monitored with GPS and infrequently forage here. One condor visited the outer perimeter on October 12-13th, searching for carrion. No active nest sites, overnight roosts or designated critical habitat.
Amphibian	Mountain Yellow-legged Frog (*Rana muscosa)*	Endangered, Critical Habitat	Historic Habitat	Two historic populations were last seen in 1979 (Brown 2014; Chellman, pers. comm. 13 October 2021), with no detections in 2008 and 2019 (Wilkinson, pers. comm. 14 October 2021)

Based on observations in NRM NRIS Wildlife and California Natural Diversity Database (CNDDB)

Southern Sierra Nevada DPS of Pacific Fisher (Pacific Fisher; Pekania pennanti)
Pacific fisher is federally listed as Endangered. They are associated with late-successional conifer or mixed-conifer-hardwood forests characterized by an abundance of dead and downed wood, dense, often multi-layered canopies, and large trees. Riparian areas are important to fishers because they provide water and travel corridors with concentrations of large rest site elements, such as broken top trees, snags, and coarse woody debris, perhaps because they persisted in the mesic riparian microtopography through historic fires.

Long-term studies have regularly detected fisher in denning habitat within the fire area. These areas burned with a mixture of severities, with less than 15% high severity overall. High severity fires can decrease quality habitat by significantly reducing canopy cover, understory vegetation, and fine roots supporting resilient vegetation, whereas low or moderate fires retain core habitat elements, reduce fuel load and understory competition, and may increase forest resiliency. All fire types can temporarily displace individuals. It is **possible** post fire storm events will wash fisher rest sites downstream, temporarily flood travel corridors in drainages, and delay development of late-successional forests. However, these **minor** temporary effects are expected to be localized to drainages that experience high SBS, with a **low risk** to fisher overall. Recommended treatment for Pacific fisher are EDRR weeds and natural recovery.

California Condor (Gymnogyps californianus)
California condors are federally listed as Endangered with a captive breeding program to increase the population (500 worldwide, 186 wild in CA). They require large territories to roam and may fly 150 miles/ day in search of food, and forage in open grasslands or oak savanna foothills that support large mammals (e.g., deer and cattle). Condors prefer to nest and roost in quiet, isolated caves, cliff crevices, and other rocky outcrops. They may also use large trees or snags. Their habitat range is large, with no active nest sites or designated critical habitat in the fire footprint.

Fire may benefit condor by creating more open, foraging habitat, and exposing large game. Micro-trash left by operations could result in injury or death with **major** consequences to individuals. However, it is **unlikely** that an individual condor will consume micro-trash specially left by operations, given their large

foraging range and infrequent visitation. The overall risk is **intermediate** and can be mitigated by suppression repair with crews removing their trash. Recommended treatments for condor are removal of micro-trash (suppression repair), EDRR weeds, and natural recovery.

Mountain Yellow Legged Frog (MYLF; Rana muscosa)
Mountain Yellow Legged Frog (MYLF) is federally listed as Endangered. MYLF are habitat generalists that prefer cold, perennial streams, ponds, and stream-meadow complexes. Stream habitats are characterized by gently sloping shorelines and margins. Resting refugia and adequate cover in the form of large rocks and coarse woody debris are required for overwintering habitat (USFWS 2012). MYLF have not been detected in the last 40 years.

Fire may affect habitat by reducing cover, decreasing shading over streams, and altering nutrient inputs to aquatic habitats. Cover could be decreased in the short term (loss of herbaceous cover) as well as the long term (potential for coarse woody debris to burn completely), which in turn changes the availability of resting refugia and overwintering habitat. Fire that burns vegetation overhanging streams and pond margins may allow for increased insolation, thereby increasing water temperatures or stimulating algae growth. Ash inputs to streams (aerial and run-off) may constitute increased nutrient inputs or settle to the substrate and reduce refugia for tadpoles. Severe fire might also burn into deeper soils where adults seek refuge in mammal burrows and crevices.

Post-fire debris flows, erosion, and sedimentation may impact MYLF historic habitat either directly or indirectly. It is **possible** flood events will wash microsites downstream, inundate meadows, and increase turbidity in streams and ponds. However, these **minor** temporary effects are expected to be localized to watershed that experience high SBS, with a **low risk** to historic habitat overall. Recommended treatment for mountain yellow-legged frog are EDRR weeds and natural recovery.

Natural Resources – Botanical Resources:

Threatened/ Endangered Plants
No federally listed threatened nor endangered plants were present on Forest Service land. On the Tule River Indian Reservation, an observation of the federally threatened Springville Clarkia (*Clarkia springvillensis*) was noted in the CNDDB database and shared with the Department of Interior for follow-up.

Threats to Vulnerable Native Plant Communities from Non-Native Invasive Plants
The Windy Fire area features an array of vegetation typical to the Southern Sierra Nevada: it is valuable for countless reasons, utilitarian, ecosystem-related, and for its beauty. On Forest Service land within the fire perimeter, there are 15 species that are either state imperiled (< 20 populations) or vulnerable (<80 populations) in California and are experiencing widespread declines. One species has special ecological, cultural, recreational, and economic importance: giant sequoia (*Sequoiadendron giganteum*).

Known infestations of weed species are limited but could encroach post-fire and outcompete native vegetation, limiting their recovery. Of the 21 known invasive species nearby, Yellow star thistle (*Centaurea solstitialis*), Cheat grass (*Bromus tectorum*), and Medusa head (*Elymus caput-medusae*) disperse the most rapidly and moderately impact native vegetative communities, degrading ecosystem structure and function, decreasing biodiversity, and altering fire regimes. Weed encroachment into meadows, sequoia groves, and other native communities disturbed by wildlife effects further limited regrowth. Areas of moderate/high soil burn severity are most at risk due to impacts to fine roots and soil seedbank. Recovery depends on native plant fire adaptability and competitiveness of weeds. Within the burned area, the probability of damage to native plants is **very likely** and the magnitude is **moderate** for an overall risk assessment of **very high**.

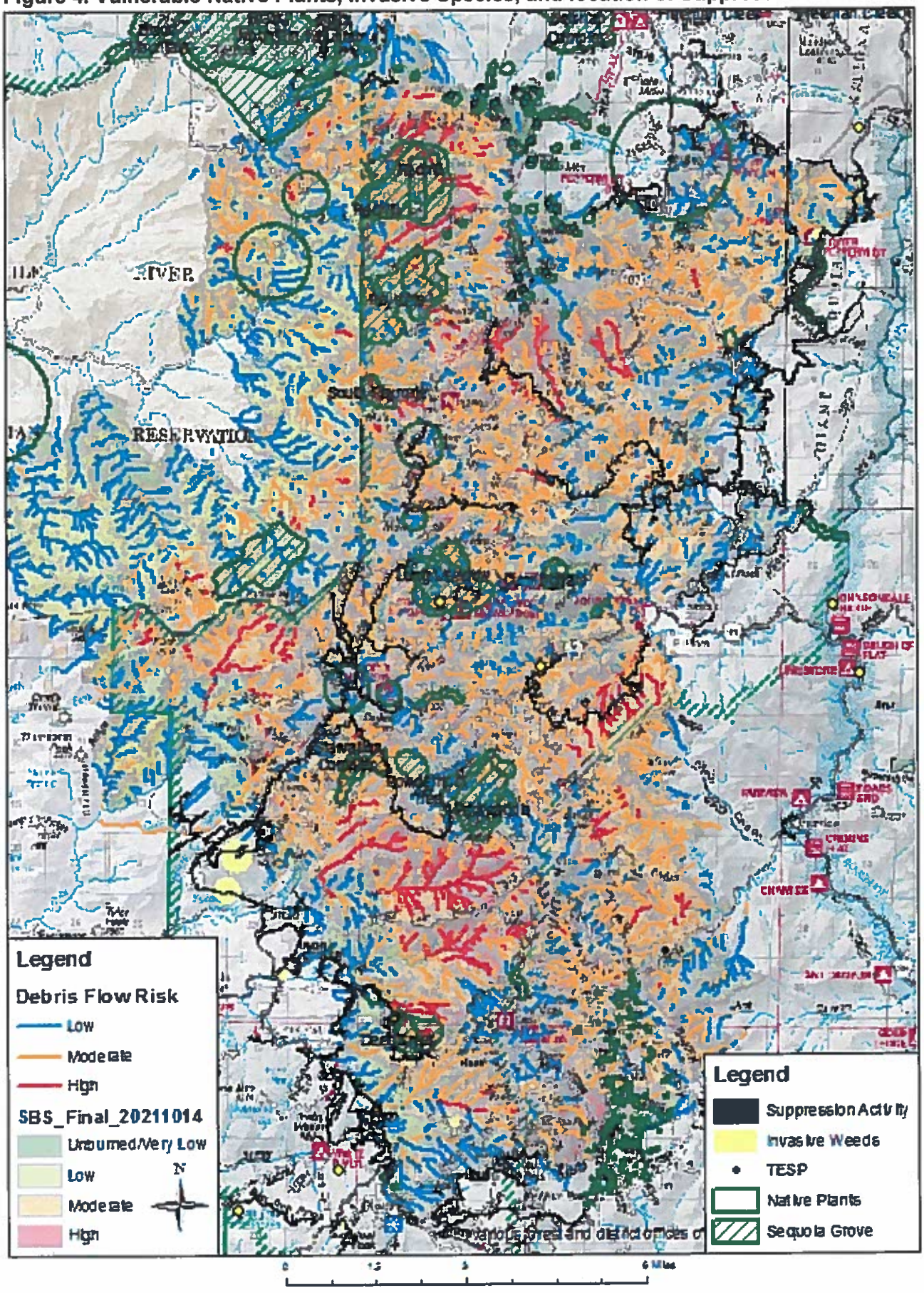
Due to fire suppression, there are 49 miles of dozer line, 34 miles of handline, 71 miles of dozer widened or repaired road, and 53 other locations where dozers created clearings or impacted streams,

for a total of 388 acres of newly disturbed ground on National Forest System lands. These constructed areas serve as weed seed dispersal corridors along the firelines as well as deep into burned areas (via firefighters, wind, water, birds, etc.). The native plant communities that experience the highest SBS are most at risk, due to reductions in soil seedbanks, fine roots, and vegetation mortality.

Dispersal of weeds from boots, fire engines, vehicles, and firefighter gear very likely occurred. In addition to dozers, other heavy equipment such as feller-bunchers, loaders, masticators, chippers, and excavators were operated at a variety of locations throughout the fire; no weed-wash was available at the start of the fire to prevent them from introducing weeds. Suppression equipment and hand tools mechanically disturbed soil through existing weed locations into native plant communities (**Figure 4**). The fire also burned through existing invasive weed infestations that are now poised to spread extremely quickly with the lack of native cover.

It is **very likely** that fire suppression resources spread invasive weed species to the burned area, both directly via ground disturbing operations, as well as indirectly, by introducing weeds into areas of moderate or high burn severity with fire-weakened native vegetation. Non-native invasive plants can aggressively establish in the exposed mineral soil, with an abundance of sunlight and reduced resource competition. The magnitude of consequences is **moderate** because vulnerable native plant communities are threatened by type conversion and associated degradation of ecosystem structure and function, biodiversity loss, and altered fire regimes. The risk is **very high.** Early Detection Rapid Response (EDRR) treatments are recommended.

Figure 4. Vulnerable Native Plants, Invasive Species, and location of Suppression Disturbances



4. Cultural and Heritage Resources:

The Windy Fire burned over a total of 247 archaeological sites located on Forest Service Lands. Fire intensity over these sites ranged from High to low with 57% being low, 38% Moderate, and 5% being high. 106 sites were determined to be at risk because they are in areas of high or moderate burn severity and have components sensitive to post-fire effects.

Cultural resources include areas of human activity where physical evidence is left behind (archaeological sites, structures, and buildings), as well as ceremonial, and sacred areas (e.g. Traditional Cultural Properties). Cultural resources are non-renewable, and wildfire has the potential to damage or destroy these resources through direct flame contact, soil erosion caused by storm precipitation, and loss of concealing vegetation leading to vandalism, looting and casual collection.

It is **possible** that a lack of covering vegetation due to wildfire will 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. Therefore, there is a **high** risk to cultural resources.

It is **likely** that loss of covering vegetation in the South Creek watershed due to wildfire will lead to a flood event. 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. Therefore, the risk posed by post-fire flooding is **very high**.

B. EMERGENCY TREATMENT OBJECTIVES:

1. Provide for public and employee safety
2. Limit loss of soil productivity
3. Protect native (particularly rare/sensitive) communities from invasive species
4. Protect investment in infrastructure from post-fire watershed response damage
5. Protect threatened and endangered species habitat
6. Protect water quality
7. Protect cultural resources

C. PROBABILITY OF COMPLETING TREATMENT PRIOR TO DAMAGING STORM OR EVENT:

Land: 85 – EDRR is completed after the first spring
Channel: N/A
Roads/Trails: 80
Protection/Safety: 80

D. PROBABILITY OF TREATMENT SUCCESS

TABLE 14. PROBABILITY OF TREATMENT SUCCESS

Type of Treatment	Time After Treatment		
	1 year	3 years	5 years
Land	85	95	100
Channel	N/A	N/A	N/A
Roads/Trails	85	90	100
Protection/Safety	90	95	100

E. COST OF NO-ACTION (INCLUDING LOSS)

Using VAR Lite Cost/Benefit tool, Risks to life and safety due to hazards on roads and trails, losses of Forest road and trail assets, impacts to native plant communities and impacts to cultural resources. Cost/Benefit spreadsheet is included in 2500-8 approval package.

TABLE 15. COST OF NO-ACTION

Total Treatment Cost	$0
Expected Benefit of Treatment	$1,235,000
Implied Minimum Value	$1,197,000

F. COST OF SELECTED ALTERNATIVE (INCLUDING LOSS):

TABLE 16. COST OF SELECTED ALTERNATIVES	
Total Treatment Cost	$730,900
Expected Benefit of Treatment	$1,235,000
Implied Minimum Value	$1,197,000

G. SKILLS REPRESENTED ON BURNED-AREA SURVEY TEAM:

TABLE 17. SKILLS ON THE BAER TEAM				
☒ Soils	☒ Hydrology	☒ Engineering	☒ GIS	☒Archaeology
☒ Weeds/Botany	☒ Recreation	☒ Fisheries/Aquatics	☒ Wildlife	
☒ PAO	☒ Geology	☒ Trails	☒ Hazmat	

TABLE 18. BAER TEAM MEMBERS BY SKILL	
Skill	**Team Member Name**
Team Lead(s)	Todd Ellsworth; todd.ellsworth@usda.gov; 760-937-2033 Jim Frazier; jfrazier108@gmail.com; 209-559-6125
Logistics/Finance	Kim Boss; kimberly.boss@usda.gov; 909-379-9330
Forest BAER Coordinator	Keith Stone; keith.stone@usda.gov; 760-376-3781
Acting Forest BAER Coordinator	Chris Sanders; christopher.sanders@usda.gov; 209-533-2802
Soils	Tricia Prentice
Hydrology	Casey Shannon, Mike Wiese, Hannah Adams
Geology	Jonathan Schwartz, Victoria Stempniewicz
GIS	Tracy Tennant
Engineering	Greg Cox, Pablo Baca, Kathryn Baker
Archaeology	Tim Kelly
Botany/Weeds	Maryjane Heckel, Norm Leonard
Recreation	Evan Topal
Wildlife	Maryjane Heckel
Hazmat	Casey Shannon, Mike Wiese, Hannah Adams,
Aquatic Wildlife	Steve Holdeman, Norm Leonard
PAO	Cathleen Thompson

H. TREATMENT NARRATIVE:

The Forest instructed the BAER team to develop costs using contracts, agreements, off Forest assistance and/or temporary housing and/or temporary time and overtime for assistance by SQF personnel; it is recognized that in-house off-forest help will also be in short supply unless using detailers, temporaries and overtime.

Land Treatment #1 – Fire Suppression-Related Early Detection, Rapid Response:

EDRR surveys are proposed to determine whether ground disturbing activities related to fire suppression have resulted in new introductions of invasive plant infestations. For the Windy Fire, suppression activities comprise approximately 207 miles. (See **Table 19**). All points were estimated at one acre, which was assumed to require an effort equivalent to one mile of line.)

TABLE 19. GROUND DISTURBING FIRE SUPPRESSION FEATURES	
Suppression Type	**Miles**
Dozer Line	49
Improved Road	71
Hand Line	34

Total Miles	**154**
Point Type	**Acres**
Dozer Push	25
Drop Point	9
Helispot	4
Road Repair	3
Stream Crossing	12
Total Acres	**53**
Total Mile Equivalents	**207**

Features created by heavy equipment, particularly dozer lines, should be prioritized. Since there is no Forest Botanist on the SQF and Enterprise botany technicians are very unlikely to be available for treatment implementation, the proposed costs are to utilize contract or partner resources and manual weed control. No pesticides will be used.

This report recommends one survey period spanning late May and early June for EDRR related to fire suppression activities because the suite of invasive species documented on the Sequoia National Forest bloom during this period (the list of weeds is available in the Botany and Weed Specialist Report).

Based on local terrain and travel times for this area, the time estimate is based on each two-person crew covering ~4.5 miles of dozer line per day. In this analysis it is assumed that each 1-acre point requires about the same amount of time as a mile of line. Specialist days were calculated at a 1:4 ratio against technician days. Calculations with partial days were rounded up to the next whole number. Supplies costs were estimated based on BAER reports for the SQF Complex and Caldor fires, which burned similar habitat with a similar set of invasive species.

TABLE 20. LAND TREATMENT #1 – FIRE SUPPRESSION EDRR				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
6 Weed Technicians (Contract or partner)	Day	$3,200	16	$51,200
1 GS-11 Botanist	Day	$400	4	$1,600
Supplies - hand tools and gloves	Lump	$750	1	$750
Supplies – vehicle lease (1 per pair of technicians)	Day	$35	16*3	$1,680
Supplies – Vehicle gas mileage	Miles	$0.58	5,000	$2,900
Total Cost				**$58,130**

Land Treatment #2 – Burned Area-related Early Detection, Rapid Response:
Invasive species are often pioneer species that are particularly competitive in landscapes that have experienced disturbance. Hot fires qualify as one such disturbance because they often burn the soil's O-horizon (duff layer) and leave exposed mineral soils in their wake. When the duff burns, the soil seedbank is also lost, so windborne seeds from invasive plants have very little competition from native species. Thus, It is possible that weeds near native plant communities will take advantage of the moderate to high soil burn severity to invade vulnerable plant communities.

Based on the available data, there were 21 known species of noxious weeds within or immediately adjacent to the fire perimeter (the list of weeds is available in the Botany and Weed Specialist Report). These invasive species pose a threat to the 10 Giant Sequoia groves, 7 areas with natural plant communities (CNDDB records), and 23 records of Forest Service sensitive plants (TESP) on SQF. Priority should be given to native plant populations located immediately adjacent to dozer suppression lines. In total, there are

46 distinct areas of botanical concern within the burned area. These areas will be surveyed to determine whether post-fire conditions in the burned area have facilitated the spread of invasive plants, due to seed bank stimulation and lack of competition.

Surveys of burned areas will be visual, and treatment will be manual. Visual surveys require technicians that are proficient with identification as some invasive species have similar looking native congenerics (e.g., some of the grasses). When weeds are encountered, they should be removed by hand; technicians should be sure to remove roots in addition to above ground parts of the plants. If the plants have seeds, take precautions to prevent the seeds from dispersing. The survey work should take place in early summer to maximize the probability of detecting target species.

The cost analysis for this recommendation comprises personnel and equipment. On average, technicians are expected to visit 2 sites per day for a total of 23 work days across all technicians. With 6 technicians working in teams of 2, the work is forecast to require 8 days. Specialist days were calculated at a 1:4 ratio against total days. Calculations with partial days were rounded up to the next whole number. Supplies costs were estimated based on BAER reports for the SQF Complex and Caldor fires, which burned similar habitat with a similar set of invasive species

TABLE 21. LAND TREATMENT #2 – BURNED AREA-RELATED EDRR				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
6 Weed Technicians (Contract or partner)	Day	$3,200	8	$25,600
1 GS-11 Botanist	Day	$400	2	$800
Supplies - hand tools and gloves	Lump Sum	$750	1	$750
Supplies – vehicle lease (1 per pair of technicians)	Day	$35	8*3	$840
Supplies – Vehicle gas mileage	Miles	$0.58	2,500	$1,450
Total Cost				**$29,440**

Land Treatment #3 – Cultural Resources Protection:

The BAER Catalog has limited options to address the threat of debris flows to cultural resources and no treatments are prescribed herein. Flood risks were identified, and a prescription made for a single site. By far the most substantial risk to cultural resources is posed by the loss of vegetation and consequent potential for increased looting and/or vandalism. The following measures are prescribed:

- Protect sites and/or deter looting, vandalism, and casual collecting by applying wood chips as ground cover across sites. Sites would be photo documented prior to chip application and an archaeological monitor would guide the work. Sites 05135300004, 05135300036, 05135300037, 05135300088, 05135300139, and 05135300222.
- Protect a site by putting in place a closure order for a small area surrounding the site to allow for vegetative cover to restore itself. Site 05135300017.
- Protect a site from flood risk by placing sandbags along a 30-foot stretch of South Creek in Johnsondale. Two days crew time is necessary because crews have to fill the sandbags off-site, transport them to the project location, hand-carry them from the road to the project site, and stack them. Based on two-thirds full sandbags (only commercially pack sandbags can achieve 100% full sandbags), the estimated amount needed is 900 bags to span a 30-foot stretch stacked 3 feet high with sufficient width (approximately 3 bags wide) to support this height. Commercially packed sandbags (which cost approximately $12 per bag) are cost-prohibitive. Site 05135300008.

TABLE 22. LAND TREATMENT #3 – CULTURAL RESOURCES PROTECTION

Item	Units	Unit Cost	# of Units	Total Cost
Brushing/chipping				
OT for seasonal Type 2 fire crew (brushing or spreading wood chips) at archaeological sites	Crew Days	$5,000	3	$15,000
OT for seasonal GS-7 Archaeologist (monitor)	Days	$450	1	$450
Area Closure				
OT for seasonal Type 2 fire crew (fencing)	Crew Days	$2,500	1	$2,500
Sandbags				
Sandbags	25 Bags	$15.09	36	$543
OT for seasonal Type 2 fire crew (filling and stacking sandbags)	Crew Days	$5,000	2	$10,000
OT for seasonal GS-7 Archaeologist (monitor)	Days	$450	1	$450
Total				**$28,943**

Road and Trails Treatment #1 – Road Drainage Stabilization:
It is recognized that BAER is NOT intended to correct past maintenance deficiencies. The changed conditions due to fire activity has created an urgency for correction and storm proofing of selected drainage features and segments along the road. Low volume road engineering practices, and lessons learned from prior incidents have yielded treatments that have shown to mitigate and/or reduce the risk to Health, Safety, and Property. The engineering field analysis of roads within the Windy Fire perimeter concluded that standard BAER road treatments could indeed mitigate/reduce the risk to the road prism and reduce erosion of the fill slope. Accepted and economical BAER road treatments are described in chapter 4 of the BAER catalog. 41.54 miles of roadway across segments of 11 NFS roads within the Windy Fire perimeter are proposed for drainage stabilization treatments (22S82, 23S16, 23S64, 23S05, 22S02, 22S10, 21S94, 24S24, 24S08, 24S02, and 22S03). Proposed road drainage stabilization treatments will include:

- Install Critical Dips.
- Install Over Side Drains (for road fill protection).
- Install Culvert Inlet Modifications (risers, Flared Metal End Sections, stone armoring).
- Restore Drainage Functions (culvert inlets and outlets, roadway ditch lines rolling dips and water bars w/ run-off-ditch, maintain cross slopes of roads in-slope & out-slope).
- Hazard tree mitigation on roads where BAER implementation crews will be working.

It has been determined that the road related emergency and consequences described above, could have potential impacts on cultural resources or T&E species adjacent to these roads. Thus, coordination with a Heritage Resource Specialist and Wildlife Biologist is recommended for mitigations to perform treatments.

TABLE 33. ROAD AND TRAILS TREATMENT #1: ROAD DRAINAGE STABILIZATION				
Item	**Units**	**Unit Cost**	**# of Units**	**Total Cost**
Road Drainage Stabilization*	Lump Sum	$264,032	1	$264,032
Hazard Tree Mitigation*	Lump Sum	$26,433	1	$26,433
Contract Prep, Administration, Engineering*	Lump Sum	$14,000	1	$14,000
Total				**$304,465**

*Itemized costs and pricing rationale are available in the Roads Specialist Report

Road and Trails Treatment #2 – Road Storm Inspection and Response:

A robust and timely storm inspection and response program may be the most effective and cost-effective solution to mitigate the risk to the roads. In general, the 258-mile road system was found to have effective drainage features. Road stabilization treatments have been proposed along 41.54 miles where drainage was found to be insufficient to handle expected post fire hydrologic response (see above treatment). Many of the drainages had relief measures for drainages that may fail during an increased hydrologic response. If these features can be cleared and open prior to a damaging storm event they could provide an effective mitigation measure to damaging storm events. Therefore, this treatment is to maintain drainage features during and between storm events.

It has been determined that the road related emergency and consequences described above, could have potential impacts on cultural resources or T&E species adjacent to these roads. Thus, coordination with a Heritage Resource Specialist and Wildlife Biologist is recommended for mitigations to perform treatments.

TABLE 44. ROAD AND TRAILS TREATMENT #2: ROAD STORM INSPECTION AND RESPONSE				
Item	**Units**	**Unit Cost**	**# of Units**	**Total Cost**
Road Storm Inspection and Response*	Lump Sum	1	$14,000	$14,000
Total				**$14,000**

*Itemized costs and pricing rationale are available in the Roads Specialist Report

Road and Trails Treatment #3 – Trail Drainage Stabilization:
Trail storm-proofing and grade stabilization of 17.4 miles of identified trails is needed to prevent loss of trail tread and trail drainage structures, as well as reduce soil erosion on slopes. Trail drainage stabilization 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).

Ideally treatment would occur after some precipitation has added moisture to the soil but before major potentially damaging winter storms occur. This is unrealistic this late in the season so the trails will need to be surveyed when access is available in the spring to determine how the trails are responding and what specific treatments are necessary to prevent worsening conditions that jeopardize trail tread and structures (as well as identification of hazard trees in need of removal for crew safety).

Most trail segments identified are easily accessible and there are few complicating factors predicted to increase treatment cost. Costs based on a temporary work force and or an agreement with Student Conservation Association (SCA). Most of the trail segments identified are Class 3 trails.

TABLE 25. ROAD AND TRAILS TREATMENT #3: TRAIL DRAINAGE STABILIZATION				
Item	**Units**	**Unit Cost**	**# of Units**	**Total Cost**
FS System Non-Motorized Trail Stabilization Treatments	Miles	$2,500	17.4	$43,500
Total				**$43,500**

Protection/Safety Treatment #1 – Recreation Burned Area Closure and Signage:
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 trails. 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 trail system entry points into the burned area.

TABLE 26. PROTECTION/SAFETY TREATMENT #1: RECREATION BURNED AREA CLOSURE AND SIGNAGE				
Item	**Units**	**Unit Cost**	**# of Units**	**Total Cost**
Labor - GS-7 Recreation Technician (Temp includes OT)	Days	$400	4	$1,600
Area closure signs (18" x 24")	Each	$65	20	$1,300
Hazard signs (18" x 24")	Each	$65	40	$2,600
Posts and hardware	Each	$35	40	$1,400
Total				**$6,900**

Protection/Safety Treatment #2 – Road Burned Area Closure Signage and Gates

Analysis of the transportation network within the burn perimeter has shown restricting access to the following locations will be the most effective treatment. The roads identified for gates are major access points that preclude public access to entire networks of routes within the burn perimeter. As these are higher maintenance level roads, a more robust traffic management gate is proposed. Lighter gauge gates were an alternative that was considered, but not recommended as the most effective barrier system due to the ease in which they could be compromised. This treatment compliments the recreation burned area closure and signage treatment above. Treatments include:

- Install Informational and Warning Signs – Roads 21S94, 23S04, 23S16, and 22S82
- Install Road Closure Signs – Roads 21S94, 23S04, 23S16, and 22S82
- Install Four Gates – Roads 21S94, 23S04, 23S16, and 22S82

TABLE 27. PROTECTION/SAFETY TREATMENT #2 – ROAD BURNED AREA CLOSURE SIGNAGE AND GATES				
Item	**Units**	**Unit Cost**	**# of Units**	**Total Cost**
Road Gates*	Each	4	$12,000	$60,000
Road Signage*	Per Road	4	$1,400	$5,600
Total				**$65,600**

*Further details on costs are available in the Roads Specialist Report

Protection/Safety Treatment #3 – Hazmat Stabilization

Stabilization and containment of hazardous materials (Hazmat) found within burned structure refuse in situ are located at Upper Peppermint Campground (1 structure), BSA Camp Whitsett (1 structure), Long Meadow and Frog Meadow Historic Guard Stations (4 structures), and Forest Service Johnsondale Work Center burned storage buildings (2 structures) is needed. A total of 8 sites need in situ stabilization and containment to prevent eventual off-site soil and water contamination when water runoff occurs.

In addition, relocation and containment of hazmat-waste from two sites with burned chemically treated wood is needed: Trail of 100 Giants and Forest Road 23S64 (see above for description of these two sites). The hazmat cannot be contained in situ as the waste is already released into water (streams) and wet soil.

Stabilization measures include installation of straw wattle rolls, reinforced silt fencing, chemical absorbent sock and sandbag stabilization treatments outside of the waste sources to contain and stabilize burned refuse on site until future removal action can be undertaken. A few sites may need deflector treatments installed to deflect runoff from burned slopes above away from the burned refuse. Stabilization treatments are necessary as final cleanup and refuse removal actions may likely be delayed or not be completed before runoff producing storms occur.

Remove and relocate to an adjacent area for containment of burned chemically treated wood waste at Forest Road 23S64 Bridge and at 100 Giants Interpretive Trail where burned treated wood is now in stream channels and seeps and water quality contamination is occurring. Transport downstream of burned refuse is likely when stream flows increase in the long term if not relocated and contained until final cleanup of waste

can be completed. Ultimately, removal and disposal of the hazardous materials at all sites will eliminate continued employee/public exposure to potentially hazardous materials and ongoing water quality impacts.

As Forest Service staff cannot handle hazardous materials, the two relocation and containment hazmat sites treatment will be implemented via the current Region 5 IDIQ Environmental Service contract and administered by a Forest Service Contracting Officer and Contracting Officer Representative (COR and COR inspectors) with oversight of a Forest Watershed Specialist. The remaining stabilization and containment hazmat sites can be implemented by using Forest Service Force Account. Oversight of hydrologic design for containment and stabilization treatment implementation with Force Account staff can be done by a Forest Service watershed specialist to ensure the treatments are completed to best protect water and soils and work is designed capture runoff driven waste effectively.

TABLE 28. PROTECTION/SAFETY TREATMENT #3 – HAZMAT STABILIZATION				
Item	Units	Unit Cost	# of Units	Total Cost
IDIQ Contract – Hazmat Relocation and Containment				
Program Manager	Hour	$170	10	$1,700
Project Manager	Hour	$140	30	$4,200
Administrative Contract	Hour	$82	16	$1,312
Environmental Technicians	Hour	$88	40	$3,520
Vehicles	Lump Sum	$1,200	1	$1,200
Mobilization/Demobilization	Lump Sum	$2,500	1	$2,500
FS Road 23S64 Bridge Burned Treated Wood Waste Relocation and Containment	Lump Sum	$3,000	1	$3,000
FS 100 Giants Interpretive Site Trail Boardwalk Waste Relocation and Containment	Lump Sum	$3,250	1	$3,250
Materials	Lump Sum	$400	1	$400
Subtotal				**$21,082**
Overhead 15%				**$3,162**
IDIQ Contract Total				***$24,244***
Force Account – IDIQ Contract Administration				
FS Contract Administration Specialist	Days	$500	3	$1,500
FS GS-11 Watershed Specialist	Days	$500	1	$500
FS COR Inspector	Days	$400	2	R800
FS Contract Administration Total				***$2,800***
Force Account – Onsite Hazmat Stabilization/Containment Implementation				
GS-11 Watershed Specialist	Days	$500	3	$1,500
FS Project Manager	Days	$500	3	$1,500
GS-9 Technician (1)	Days	$400	5	$2,000
GS-7 Technician (2)	Days	$300	10	$3,000
Stabilization Materials	Lump Sum	$9,000	1	$9,000
Force Account – Onsite Hazmat Stabilization, Total				***$17,000***
Total Initial Request				**$44,044**

Protection/Safety Treatment #4 – Implementation Team Leader and Interagency/Partner/Permittee Coordination

The suite of proposed treatments needs dedicated staff to properly guide implementation recommended by the Windy BAER Team. This request is to ensure someone is available to guide implementation and provide for continued interagency coordination for the large package of treatments in the Initial request. The lack of staffing and expertise to implement BAER treatments presents a concern to implement treatments in a timely manner. Costs reflect the need for overtime.

Many non-Forest Service entities, partners and permittees (*e.g.* Tulare County, NOAA NWS, NRCS, private landowners, etc.) that have infrastructure in the fire area are actively repairing damaged infrastructure and/or

implementing mitigations to reduce post-fire damage. The BAER team's findings were shared and will continue to be shared with those entities so that they can plan measures to protect/prepare infrastructure from post-fire watershed response events. This cost is also to get the Forest started with coordination and facilitation of emergency treatments from partners and permittees.

TABLE 29. PROTECTION/SAFETY TREATMENT #4 – IMPLEMENTATIN TEAM LEADER AND INTERAGENCY/PARTNER/PERMITTEE COORDINATION				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
Team Leader Salary - Planning, logistics, etc. (includes OT)	Days	$600	15	$9,000
Per Diem	Lump Sum	$2,000	1	$2,000
Total Cost				**$11,000**

I. MONITORING NARRATIVE:

Effectiveness Monitoring Treatment #1 – Road Stabilization Treatment Monitoring:

Monitoring will be conducted after storm events. If the monitoring shows the treatment to be ineffective at stabilizing roads and there is extensive loss of road bed or infrastructure an interim report will be submitted. A report would be completed after the site visit. The report would include photographs and a recommendation on whether additional treatments are necessary.

TABLE 30. EFFECTIVENESS MONITORING TREATMENT #1 – ROAD STABILIZATION TREATMENT MONITORING				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
GS-11 Engineer or Hydrologist (OT)	Hours	$59.00	30	$ 1,770
Total Cost				**$1,770**

Effectiveness Monitoring #2 – Trail Stabilization Treatment Monitoring:

Monitoring will be conducted after storm events. If the monitoring shows the treatment to be ineffective at stabilizing trails and if there is extensive loss of trail tread or infrastructure an interim report will be submitted. A report would be completed after the site visit. The report would include photographs and a recommendation on whether additional treatments are necessary.

TABLE 31. EFFECTIVENESS MONITORING TREATMENT #2 – TRAIL STABILIZATION TREATMENT MONITORING				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
GS-11 Trails Specialist or Hydrologist (OT)	Hours	$59.00	30	$ 1,770
Total Cost				**$1,770**

Trail/Road Treatment Effectiveness Monitoring

1) *Monitoring Questions*
   - ☐ Is the trail-tread or road bed stable?
   - ☐ Is the trail or roadbed leading to concentrating runoff leading to unacceptable off-site consequences?
   - ☐ Are their trail incursions?
2) *Measurable Indicators*
   - ☐ Rills and/or gullies forming of the trail/road
   - ☐ Loss of trail/road prism.
3) *Data Collection Techniques*
   - ☐ Photo documentation of site
   - ☐ Inspection Checklist (attached)
4) Analysis, Evaluation, And Reporting Techniques

☐ Monitoring will be conducted after storm events. If the monitoring shows the treatment to be ineffective at stabilizing road and there is extensive loss of trail tread or road prism, an interim report will be submitted. A report would be completed after the site visit. The report would include photographs and a recommendation on whether additional treatments are necessary. Monitoring should take place at key road and trail entrances into the fire area to monitor for unauthorized access and any effects to critical values at risk and assess the need for additional enforcement and/or installation of additional barriers.

The following form or similar form will be filled out to assess the roads and trails.

Trail/Road Inspection Checklist (Example)		
Date	Time	
Inspector		
Forest		
Trail/Road #/Name		
Portions of Trail/Road Inspected		
Describe locations reviewed during inspection		
Trail/Road Damage?	Yes	No
If yes, GPS coordinates of repair site		
Describe damage and cost to repair		
Photo taken of trail/road damage		
Recommended actions to repair		
Other Notes		

Effectiveness Monitoring #3 – Hazmat Treatment Monitoring:
After hazmat stabilization treatments are complete, monitoring of treatments are important to ensure treatment objectives are met and effective. The focus of the monitoring would occur after large storm and runoff events and identify weaknesses or corrective needs to maintain the treatments as intended. With this, adjustments can be made to address those needs to ensure treatments are functional.

TABLE 32. EFFECTIVENESS MONITORING TREATMENT #3 – HAZMAT STABILIZATION TREATMENT MONITORING				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
GS-7 Recreation Technicians (2) (OT or Temps	Day	$550	5	$1,650
GS -11 Hydrologist/Watershed Specialist (covered)	Hours	$59	32	N/A
Total Request				**$1,650**

Effectiveness Monitoring #4 – Cultural Resources Stabilization Treatment Monitoring:
Sequoia National Forest staff shall monitor the heritage stabilization treatments by archaeological technicians for effectiveness and potential need for adjustments to erosion control measures.

TABLE 33. EFFECTIVENESS MONITORING TREATMENT #4 – CULTURAL RESOURCES STABILIZATION TREATMENT MONITORING				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
GS-7 Archeological Technician (temp)	hours	$38	40	$1,500
GS -11 Heritage specialist (covered)	hours	$59	32	N/A
Total Request				**$1,500**

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											
1. Invasive Weed EDRR (Suppression)	LS	$58,130	1	$58,130	$0			$0		$0	$58,130
2. Invasive Weed EDRR (Burned-area)	LS	$29,440	1	$29,440	$0			$0		$0	$29,440
3. Cultural Resources Protection	LS	$28,943	1	$28,943	$0			$0		$0	$28,943
Subtotal Land Treatments				$116,513	$0			$0		$0	$116,513
B. Channel Treatments											
				$0	$0			$0		$0	$0
Subtotal Channel Treatments				$0	$0			$0		$0	$0
C. Road and Trails											
1. Road Drainage Stabilization	LS	$304,465	1	$304,465	$0			$0		$0	$304,465
2. Road Storm Inspection/Response	LS	$14,000	1	$14,000	$0			$0		$0	$14,000
3. Trail Drainage Stabilization	Mile	$2,500	17.4	$43,500	$0			$0		$0	$43,500
Subtotal Road and Trails				$361,965	$0			$0		$0	$361,965
D. Protection/Safety											
1. Rec Closure and Signage	LS	$6,900	1	$6,900	$0			$0		$0	$6,900
2. Road Closure Signage and Gates	LS	$65,600	1	$65,600				$0		$0	$65,600
3. Hazmat Stabilization	LS	$44,044	1	$44,044	$0			$0		$0	$44,044
4. Implementation Leader/Coordination	LS	$11,000	1	$11,000				$0		$0	$11,000
Subtotal Protection/Safety				$127,544	$0			$0		$0	$127,544
E. BAER Evaluation											
Initial Assessment	Report	$122,265	1	—	$122,265			$0		$0	$122,265
Subtotal Evaluation				$0	$122,265			$0		$0	$122,265
F. Monitoring											
1. Road Monitoring	LS	$1,770	1	$1,770	$0			$0		$0	$1,770
2. Trail Monitoring	LS	$1,770	1	$1,770	$0			$0		$0	$1,770
3. Hazmat Monitoring	LS	$1,650	1	$1,650	$0			$0		$0	$1,650
4. Cultural Monitoring	LS	$1,500	1	$1,500	$0			$0		$0	$1,500
Subtotal Monitoring				$6,690	$0			$0		$0	$6,690
G. Totals				$612,712	$122,265			$0		$0	$734,977
Previously approved				$0							
Total for this request				$612,712							

PART VII - APPROVALS

Teresa Benson 11/02/2021

Forest Supervisor, Sequoia National Forest — Date

Teresa Benson