

Sequoia Complex Fire 2020



Picture of the Middle Fork Tule River/Camp Nelson Area

Date of Report: October 23, 2020**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:** SQF Complex**B. Fire Number:** CA-SQF-002541**C. State:** CA**D. County:** Tulare**E. Region:** Pacific Southwest**F. Forest:** Sequoia and Inyo**G. District:** Kern River, Western Divide, and Mount Whitney Ranger Districts**H. Fire Incident Job Code:** P5NG2P (0513)**I. Date Fire Started:** August 19, 2020**J. Date Fire Contained:** November 1, 2020 (estimated)**K. Suppression Cost:** \$144,000,000 (estimated)**L. Fire Suppression Damages Repaired with Suppression Funds (estimates):**

1. **Fireline repaired (miles):** As of 10/21 no repair data, 133 miles of dozer line needed repair
2. **Other (identify):**

M. Watershed Numbers:*Table 1: Acres Burned by Watershed*

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
180300010301	Alpine Creek	17,352	11,278	35.0%
180300060203	Bear Creek	16,345	7,675	53.0%
180300010402	Coyote Creek-Kern River	33,002	19,153	42.0%
180300010501	Freeman Creek-Kern River	18,754	1,870	90.0%
180300070201	Horse Creek	15,754	15,364	2.5%
180300060103	Long Canyon-Middle Fork Tule River	15,299	15,270	0.2%
180300070203	Lower East Fork Kaweah River	17,352	11,278	35.0%
180300010301	Lower Little Kern River	16,345	7,675	53.0%

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
180300060102	Middle North Fork Tule River	33,002	19,153	42.0%
180300070502	Middle South Fork Kaweah River	18,754	1,870	90.0%
180300010401	Ninemile Creek	15,754	15,364	2.5%
180300060202	North Fork Middle Fork Tule River	15,299	15,270	0.2%
180300010502	Peppermint Creek-Kern River	20,946	20,894	0.3%
180300010403	Rattlesnake Creek	30,517	6,735	77.9%
180300060102	Soda Creek-Kern River	11,725	11,642	0.7%
180300060101	South Fork Middle Fork Tule River	23,090	16,253	29.6%
180300070203	Upper Little Kern River	31,574	25,827	18.2%
180300060201	Upper North Fork Tule River	26,686	9,335	65.0%
180300070501	Upper South Fork Kaweah River	33,807	27,748	17.9%
180300060301	Upper South Fork Tule River	35,501	30,254	14.8%

N. Total Acres Burned: 172,177

Table 2: Total Acres Burned by Ownership

OWNERSHIP	ACRES
NFS	12,508 INF 131,928 SQF
OTHER FEDERAL (LIST AGENCY AND ACRES)	17,014 NPS 736 BLM
STATE	4,017
PRIVATE	5,974
TOTAL	172,177

O. Vegetation Types:

The east flank of the fire includes the Kern and Little Kern River Valleys of the Golden Trout Wilderness which support lower elevation communities (4,000-7,000 ft) that transition quickly from young lower to upper montane chaparral on steep slopes and ridges with yellow pine forests dominating the valley bottoms. Chaparral gives way to scrub oak and towards the interior of the fire wet and dry mixed conifer, lodgepole pine, and red fir forests dominate the mid elevations (6,500 – 9,500 ft) with limited contemporary fire history but extensively stricken with recent warm drought related mortality. Ten giant sequoia (*Sequoiadendron giganteum*) groves are named within the fire and grow between 5,400 – 7,900 ft on well drained mesic soils in a matrix of mixed conifer stands. These stands were historically maintained by frequent fires, limiting competition from other conifers and ladder fuels while providing favorable bare mineral soil conditions for seed germination and establishment.

P. Dominant Soils:

The majority of the soils within the fire perimeter are formed from granitic parent material. Basalt flows and finer textured soils are present near the Little Kern River in the Southeastern portion of the fire area. Approximately 60 percent of the soils are coarser textured sandy loams with 12 percent gravelly sandy loams present. Bedrock is commonly a component in many of the soil map units across the fire area and makes up about 18 percent of the area overall. Within the Sequoia National Forest the Chawanakee-Rock Outcrop complex soils, the Chaix-Dome-Rock Outcrop complex soils, the Cannell-Sirretta-Nanny family complex soils, the Woostalf-Hotaw variant-rock outcrop complex and rock outcrops are the top soils found. Generally slopes are between 30 and 50 percent (68 percent of area) with steeper slopes occurring on only 32 percent of the fire area within the Sequoia National

Forest. Within the Inyo National Forest, the majority of the slopes are very steep with the Sirretta-rock outcrop complex (50-75 % slopes) and the Cagwin-Toem-rock outcrop complex (50-75% slopes) dominating this portion of the fire. Within Sequoia National Park, slopes range from 5 to 75 percent and the two dominant soil series present are the Rock-outcrop-Lumberly-Gerle complex and the Sheephead-Holland-Crouch complex.

Q. Geologic Types:

Consistent with the broader Sierra Nevada range, Mesozoic era granitic formations are the dominant geologic types in the Sequoia National Forest. With such an origin, granitic rocks such as granite, diorite and monzonite are common throughout the region. Additionally, eroded remnants known as roof pendants are found sporadically throughout the range. These pendants are the remains of metamorphosed sedimentary rock that once covered the magma chambers of the Sierra Nevada granitic batholith. As such, they are among the oldest formations found here, dating back to the Cambrian period. Finer grained extrusive igneous rocks such as basalt occur in the Sierras as well, revealing the ancient volcanism that also contributed to the modern landscape. With this broad range of geologic types, soil parent material is of a wide variety including alluvium, colluvium and residuum derived from igneous, metamorphic and metasedimentary rocks.

R. Miles of Stream Channels by Order or Class:

Table 3: Miles of Stream Channels by Order or Class

STREAM TYPE	MILES OF STREAM
PERENNIAL	279
INTERMITTENT	112
EPHEMERAL	1,094
OTHER (DEFINE)	26 (ditch, connector, etc.)

S. Transportation System:

Trails: National Forest (miles): 168.23 Other (miles):
 Roads: National Forest (miles): 175.3 Other (miles):

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Table 4: Burn Severity Acres by Ownership

Soil Burn Severity	NFS	NPS	BLM	State	Private	Total	% within the Fire Perimeter
Unburned	26,019	7,169	393	658	2,876	37,115	21%
Low	33,567	4,991	263	825	1,268	40,914	24%
Moderate	75,726	4,319	76	2,360	1,507	83,987	49%
High	9,124	535	4	175	322	10,160	6%
Total	144,436	17,014	736	4,017	5,974	172,177	100%

B. Water-Repellent Soil (acres): 62,720 acres (36% of the fire):

Water repellent soil was widespread in high soil burn severity, found at 80% of the sampled locations. In moderate severity, water repellent soils were more varied in strength, and found at 75% of sampled locations. The layer was typically 4 cm thick, but ranged from 2-15cm deep. Repellency was found in low burn severity, but it was highly variable, and likely similar to background levels (not fire induced).

C. Soil Erosion Hazard Rating:

Very Severe: 22 % Severe: 15% Moderate: 21% Low: 36% Not Rated (Riverwash/Rock Outcrop): 6%.

Soil survey data information on Erosion Hazard ratings is not available within Sequoia and Kings Canyon National Parks, so that acreage is not reported here.

D. Erosion Potential: 17.2 (tons/acre/year):

WEPP Cloud, post-fire erosion prediction (PeP) was used to model erosion and sediment potential on selected pourpoint watersheds. Watersheds were chosen based on critical values present, and watershed size, because WEPP PeP is scale-limited to ~6,000 acres. Pre fire erosion rates are less than 1 ton/acre across the fire area. The average post-fire erosion rate for all modeled pourpoints is 17.2 tons/acre annually, and ranges from 1 to nearly 50 tons/acre. Modeling is based on average annual erosion, taking rate for the whole year, as opposed to storm-based modeling. Erosion rates were highest in forks of the Tule river where the largest patches of high soil burn severity occurred, and on very steep canyon slopes of the Kern River (Table 5).

Table 5: Erosion Modeling by Pourpoint

Pourpoint Modeled	Pre-fire Hillslope Erosion Potential (tons/acre/yr)	Post-fire Hillslope Erosion Potential (tons/acre/yr)
1. Balch Park	0.00	5.5
2. Belknap Campground	0.43	35.5
7. Coy Flat Bear Creek	0.31	23
9. Freeman Grove Footbridge	0.03	38
10. Grey Meadow Cabin	0.10	15.5
12. Lloyd Mdw Rd Freeman Creek	0.01	16.5
15. Moses Gulch Campground	0.32	20.5
16. Mountain Home	0.17	19
17. Ponderosa	0.00	7.5
19. Quaking Aspen Campground Org Camp	0.00	15
21. SR190 Boulder Creek	0.01	16.5
24. Cedar Slope	0.01	24.5
25. SR190 McIntyre Creek	0.05	45.5
26. Trout Meadow Cabin	0.13	18.5
WLF 1. Leggett Creek MYLF	0.10	4.55
WLF 3. Hell For Sure Creek MYLF	0.03	1.6
WLF 5. Trout Meadow Creek Golden Trout	0.06	3.8
WLF 7. Fish Creek Golden Trout	0.08	13
SQ02. Dillonwood	0.27	13.5
SQ05. Middle Tule	0.47	26
SQ15. Alder Creek	0.09	49
SOL1. Deadman Canyon	0.01	8

Post-fire hillslope erosion potential within the Sequoia Groves ranges from 13 to 49 tons/acre/year. Within two of the modeled groves (See table above, SQ05 and SQ15), potential erosion rates were higher than the overall average erosion rates across the fire. This is likely due to the soil burn severity within the Sequoia Groves overall. A large portion of the Belknap and Freeman Sequoia Groves burned at moderate to high soil burn severity and the overall loss of cover in these groves was significant. On steeper slopes in these areas with moderate to high soil burn severity, erosion will be likely.

E. Sediment Potential: 16,950 (cubic yards / square mile):

WEPP PeP sediment discharge outputs are still under development, but are reported for general info. The model predicts hillslope erosion and deposition, channel erosion, and total sediment discharge for a catchment. Sediment potential was averaged from representative pour points. On average, across the burn area, annual sediment delivery is estimated at 16,950 cubic yards per square mile. Pre fire sediment potential was averaged to only 22.6 yd³/mi, and may not be useful for comparing times increase post-fire.

F. Estimated Vegetative Recovery Period (years):

The estimated vegetative recovery for watersheds affected by the Sequoia Complex is expected within 3 to 5 years as observed in other watersheds within the Sequoia National Forest.

G. Estimated Hydrologic Response (brief description):

Damaging Storms: The mean annual precipitation in the burned area is approximately 35 inches per year. (NOAA) Precipitation in the burn area comes in the form of snow in winter months, typically December through

March and summer thunder storms between July and August. The climate is characterized by cool, moist winters followed by warm, dry summers. Runoff during the winter and spring occur as snow melts, or when rain-on-snow events (also called the Pineapple Express) occur. During the late summer, runoff may also occur due to thunderstorms. Rain-on-snow events have been responsible for catastrophic flooding. However, these storms in the burned area have a recurrence interval as low as 25 years and thus have a lower probability of occurring. (NOAA) Summer thunder storms are usually localized and short in duration. They can produce up to two inches or more of precipitation in an hour and occur on the average of every two years.

Relief within the burn area ranges from approximately 2,303 feet along the Middle Fork Tule River near Springville to 10,561 feet along the Western Divide in the Golden Trout Wilderness. Foothill areas (<4,000 feet) are characterized by mild winters and hot dry summers from mid-January to mid-May, with an average annual rainfall of 15 inches. Middle to higher elevations (>4,000 feet) receive approximately 38 inches of annual precipitation from December to May, with snow dominating the higher elevations.

Watershed Response: The primary watershed responses of the Sequoia Complex are expected to include: 1) an initial flush of ash, 2) rill and gully erosion in drainages and on steep slopes within the burned area, 3) floods with increased peak flows and sediment deposition, and 4) possible debris flows during precipitation events.

Initial erosion of ash and surface soil during the first storm events will reduce slope roughness by filling depressions above rocks, logs, and remaining vegetation. The ability of the burned slopes to detain water and sediment will be reduced accordingly. This will aid in the potential for floods and will increase the distance that eroded materials are transported. The major concern for vegetative recovery and in turn hydrologic recovery is in the high severity burn areas. These responses are expected to be greatest in initial storm events, and will become less evident as vegetation is reestablished, providing ground cover, increasing surface roughness, and stabilizing and improving the infiltration capacity of the soils.

Water Quality: Wildfires primarily affect water quality through increased sedimentation. As a result, the primary water quality constituents or characteristics affected by this fire include color, sediment, settleable material, suspended material, and turbidity. Floods and debris flows can entrain large material, which can physically damage infrastructure associated with the beneficial utilization of water (e.g., water conveyance structures; hydropower structures; transportation networks). The loss of riparian shading and the sedimentation of channels by floods and debris flows may increase stream temperature. Fire-induced increases in mass wasting along with extensive tree mortality can result in increases in floating material – primarily in the form of large woody debris. Post-fire delivery of organic debris to stream channels can potentially decrease dissolved oxygen concentrations in streams. Fire-derived ash inputs can increase pH, alkalinity, conductivity, and nutrient flux (e.g. ammonium, nitrate, phosphate, and potassium), although these changes are generally short lived. Post-fire increases in runoff and sedimentation within the urban interface and burned structures and equipment within the fire perimeter may also lead to increases in chemical constituents, oil/grease, and pesticides.

Debris Flow Potential: USGS models estimate a low to moderate level of debris-flow hazard in most of the area burned by the SQF Complex Fire. A few small watersheds and stream reaches have a high to very high level of debris-hazard. These high hazard basins occur along the South Fork of the Kaweah River, west of Hocket Lakes, along some stretches of the North and South Forks Middle Fork Tule River near the southern edge of the burn perimeter in the vicinity of Camp Wishon, Camp Nelson, and Wheel Meadow, and above Freeman Creek near Pyles Camp. Most of the burn area requires 15-minute rainfall rates that exceed 28 mmhr⁻¹ to have a greater than 50% likelihood of producing debris flows. A few higher hazard basins have a 50% likelihood of debris flow occurrence at more modest 15-minute rainfall intensities between 12 and 24 mmhr⁻¹. Most watersheds are estimated to produce volumes between 10,000 – 100,000 m³, which results in a moderate combined debris-flow hazard for most of the burn area.

PART V - SUMMARY OF ANALYSIS

Introduction/Background

The Castle Fire is a lightning caused fire that was discovered the morning of August 19th. It began in steep terrain within the Golden Trout Wilderness of the Sequoia National Forest. It is part of the Sequoia Complex that included the Shotgun Fire (which did not pose a threat), also located on the Sequoia National Forest that started during the same lightning event. The Castle Fire (171,336 acres) and Shotgun Fire (841 acres) began management as the SQF Complex on August 23, 2020. As of October 21st, the fire was 73% contained.

Extreme fire behavior was observed due to shifting winds, unstable conditions, and low relative humidity. The fire burned in extremely rough, inaccessible terrain. Due to numerous fires burning throughout the west, Preparedness Levels peaked at 5 and acquisition of suppression resources was challenging. Evacuations included the communities of Ponderosa, Camp Nelson, Cedar Slope, Pyles Camp, Doyle Springs, Sequoia Crest, Alpine Village, Redwood Drive, Pierpoint, Mountain Aire, Quaking Meadows, Silver City, Mineral King, and Coy Flat. Residential structures were lost in the fire in the communities of Sequoia Crest, Alpine Village, Cedar Slope, and Doyle Springs.

Land ownership within the fire perimeter includes Inyo and Sequoia National Forests (Forest Service), Mountain Home State Park (CalFire), private communities (Tulare County), Sequoia and Kings Canyon National Parks (National Park Service), and Tule River Reservation (Bureau of Land Management and Bureau of Indian Affairs).

Due to presence of smoke on the north portion of the fire, the accuracy of the BARC mapping is uncertain.

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

A BAER team began assessing the area for post-fire emergencies on October 14, 2020. In that time the team has identified the following critical values and post-fire threats. The full list of Critical Values analyzed and risk determinations is included in Appendix 3. The Critical Values described below are included within the report as these values were brought forward with proposed treatments later in the report.

Interim reports may be submitted as additional assessments are completed.

The risk matrix below (Table 6), Exhibit 2 of Directive No.: 2500-2020-1 was used to evaluate the Risk Level for each value identified during Assessment.

Table 6: 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):

General Burned Area Safety

Based on the potential for debris flows, flooding, rock falls, etc., the BAER team identified a serious risk to the public, employees, special use permittees, and cooperators in the Sequoia Complex Fire area. Risk of flooding, sediment laden flows, debris flows, and rock fall occurring will be exacerbated by the fire. These post-fire watershed responses may not threaten all infrastructure downstream and downslope of the burn area; however, it is **very likely** to impact ACCESS roads. Impacts to access could leave forest users stranded, possibly exposed to poor weather, in areas with poor cell coverage, and/or areas subject to rockfall, flooding, and debris flows, especially if they try to evacuate or pass through during storms. Impacts from the post-fire environment on human

life and safety is considered **very likely** with **major** consequences. This results in a **very high** risk to human life and safety from post-fire threats.

Recreation Site Safety

Jerky Trailhead infrastructure did not sustain damage in the fire, but a hazard tree over its toilet that the Incident Management Team was unable to mitigate is **likely** to fall. This could result in injury/death if people are present and is considered a **major** consequence. Overall Risk: **very high**.

Wishon Campground and Cabin, Belknap Campground, Jordan Peak Lookout, Summit Trailhead, Grey Meadow Cabin, Trout Meadow Cabin, Mountain Home Cabin, Golden Trout Pack Station, Quaker Meadow Christian Camp are all recreational locations where hazard trees pose a **possible** threat of a **major** magnitude to human safety. Overall Risk: **high**.

Upper and Lower Coffee Camps are outside the burn area with no potential for flooding or debris flow impacts to infrastructure (which are elevated above the riverbed), but both pose a **likely** threat of **major** magnitude to human safety for those recreating in the Tule River. Overall Risk: **very high**.

Hazmat

The Castle Fire burned onto the Sequoia National Forest and resulted in the: (1) destruction of a lookout (used as a communication tower), cabins, a recreational residence rental, a trail bridge, outhouses, pack station buildings, a community services training camp and tractor trailer truck; (2) misapplication of aerially applied retardant; and (3) contamination of an unnamed drainage above Middle Fork Tule River. Loss of infrastructure was not reported on the Inyo National Forest. The purpose of this assessment is the identification and assessment of potential hazardous material contamination created or exposed by the fire. The information obtained via the assessment is used to eliminate or reduce the threat to human health and prevent the unacceptable degradation to the environment. (Note: This hazmat assessment report addresses the Forest Service Critical Values that were accessible and included on a list of potentially damaged Forest Service facilities provided by the Forest Engineer. The BAER Assessment Team was unable to access the following sites: Trout Meadow Cabin; Needles Lookout Trailhead; Needles Lookout Stairs and Historic Toilet Freeman Creek Trail third wooden trail bridge; Little Kern Suspension Trail Bridge; Kern Flat Trail Bridge; Little Kern Lake Trail Bridge. It's highly likely that the inaccessible facilities on the Forests Engineer's list burned and contain hazmat that is near surface water (creeks, streams, drainages etc.).

The hazmat observed in the seventeen burned locations has been burned and is not useable. The burned hazmat has been unevenly distributed over the burned areas. Some of the containers of hazardous materials are bulging indicating that the container is over pressurized, and some have simply exploded spilling their contents onto the ground next to the burned structures. The structures at all of these locations are contaminated by the hazardous materials ash and debris as well as a host of partially empty and full containers of solidified hazardous materials.

A variety of different types of facilities at Forest Service and Special Use Permit locations were destroyed or partially destroyed during the Castle Fire. The breakdown of the numbers of Forest Service and Special Uses owned facilities that were burned are shown below (Table 7).

Table 7: Hazmat Facilities Identified for the Sequoia Complex Burn Area

Type of Facilities	Total Number of Burned Facilities	FS Owned Facility	Permittee Owned Facility
Lookout	1	1	
Cabins	3	3	
Recreation Rental Unit w/Garage	1	1	
Trail Bridge	1	1	
Outhouse	4	3	1
Pack Station Buildings	4		4
Community Services Training Camp	1		1

In addition to the burned facilities listed in the table shown above, a burned tractor trailer truck, aerial misapplication of fire retardant in several locations and a release from a hazardous material container located in an unnamed drainage above Middle Fork Tule River contributed to the hazardous material contamination identified in the hazmat assessment.

Hazardous materials contamination created by the fire in the seventeen accessible locations include an assortment of burned hazardous materials (small and large propane tanks, lead acid batteries, asbestos from siding, insulation and piping, lead from lead based paint, polychlorinated biphenyls from fluorescent light fixtures/tubes, aerosol cans, small and large containers of hazardous materials, damaged building wrap that contains fiberglass fifty five gallon drums, gasoline cans, propane bottles etc); hazardous materials releases resulting from an automotive fire (burned tractor trailer) and hazardous material container in an unnamed drainage; and misapplied fire retardant.

The structures burned during the Castle Fire and included in this hazardous materials assessment were identified as Forest Service and Special Use Permitted facilities. The field review and hazardous materials assessment of the burned structures included in this document occurred during the week of October 12, 2020. All structures were either fully or partially burned. The burned debris associated with each structure was for the most part consolidated into the structure's footprint, making it difficult to fully identify all hazardous materials contained in the burned debris in each location. The results of the field review (visual inspection) and analysis of photographs taken during the field review as well as the sampling and analysis strategy are discussed in the sections that follow. Representative photographs taken during the field review (visual inspection) are included in the hazmat assessment.

The highly toxic nature of exposed hazardous materials (lead, sulfuric acid, polychlorinated biphenyl and asbestos to name a few) highlights the potential for impacts to human health and soil contamination as a result of the burned structures and hazardous material contamination created by the fire. The proximity to surface water (creeks, drainages, tributaries etc.) highlights the potential for water quality deterioration as a result of the burned structures and hazardous material contamination created by the fire. Runoff (caused by erosion and heavy rainfall) from the burned areas will affect downstream water quality. The burned hazardous materials and exposed pit toilets are in locations that pose air, soil and water quality risks to Forest Service employees and the public.

It is **very likely** that the structural integrity of the Jordan Peak Lookout is compromised and will cause a hazmat release due to the large quantity of highly toxic hazardous materials resting on and underneath damaged infrastructure. The hazardous materials will be carried off site by high wind or heavy rainfall events and potentially impact downstream water quality. The magnitude of the consequence is **major** because of the potential harm (injury or death) to the public and soil/water quality. Therefore, a **very high risk** to water and soil quality and public safety exists in the burned area.

It is **likely** that a release of hazardous material from the Grey Meadow cabin will occur because of the proximity of burned hazardous materials to a waterbody. The magnitude of the consequence is **moderate** because of the gradient to the waterbody. Therefore, a **high risk** to water and soil quality and public safety exists in the burned area.

It is **likely** that a release of hazardous materials will occur from the Mountain Home Guard Station Recreation Rental because of the proximity to drainages below the burned recreation rental. The magnitude of the consequence is **major** because of the toxic hazardous materials present at the site and the steep slopes on either side of the burned area. Therefore, a **very high risk** to water and soil quality and public safety exists in the burned area.

It is **very likely** that a release of hazardous materials will occur from the Freeman Creek Trail Bridge because the burned material is in the creek. The magnitude of the consequence is **moderate** because of the potential use of toxic hazardous materials in the wood used to construct the bridge. Therefore, a **very high risk** to water and soil quality and public safety exists in the burned area.

It is **likely** that a release of asbestos fibers from the burned Golden Trout Pack station will occur because of the burned and broken asbestos siding and floor tile inside of the pack station foundation and on the ground near the burned pack station. The magnitude of the consequence is **moderate** because of the potential harm (injury or death) to humans caused by the inhalation of airborne asbestos fibers. Therefore, a **high risk** to water and soil quality and public safety exists in the burned area.

It is **likely** that a release of hazardous material will occur from the CSET Camp due to the proximity to water. The magnitude of the consequence is **moderate** because some of the toxic hazardous materials on the site are in a burned metal connex box. Therefore, **high risk** to water and soil quality and public safety exists in the burned area.

It is **likely** that a release of hazardous materials will occur from the McIntyre Summer Home Camp Bathroom because of the exposed wastewater system. The magnitude of the consequence is **moderate** because rainfall events will transport sewage contaminated runoff downslope to the McIntyre Summer Homes. Therefore, a **high risk** to water and soil quality and public safety exists in the burned area.

It is **very likely** that a release of hazardous materials will occur from the aerial misapplication of retardant in streambeds for the Middle Fork Tule River; Bear Creek near Coy Flat area and the Western Divide Ranger District (Camp Nelson and Ponderosa/Golden Trout Wilderness Area) in streambeds. The magnitude of the consequence is **major** because retardant is persistent in the environment for a season. Therefore, a **very high risk** to water and soil quality and public safety exists in the burned area.

It is **very likely** that a release of hazardous materials from Cedar Slope cabin will occur because the cabin is located in very close proximity to a large perennial tributary. The magnitude of the consequence is **major** due to the large amount of hazardous materials present in the ash and debris located inside and outside of the footprint of the burned cabin. Therefore, a **very high risk** to water and soil quality and public safety exist in the burned area.

It is **possible** that a release of hazardous materials will occur from the burnt-out truck and trailer off Lloyd Meadow Road due to the hazardous materials present in automotive equipment. The magnitude of the consequence is **minor** because the burned truck and trailer are sitting on level ground and a small amount of burned ash and debris are visible. Therefore, a **low risk** to water and soil quality and public safety exists in the burned area.

Hazmat Sites Identified:

- Jordan Peak Lookout (Presence of Highly Toxic Hazardous Materials/Building Wrap)
- Grey Meadow Cabin (Presence of Hazardous Materials/Building Wrap)
- Mountain Home Guard Station Recreation Rental (Presence of Hazardous Materials)
- Freemont Creek Trail Bridge (Hazardous Materials in Creek)
- Golden Trout Pack Station (Presence of Hazardous Materials /Large Pieces of Friable Asbestos Flooring and Siding)
- CSET Camp (Presence of Hazardous Materials)
- McIntyre Summer Home Camp Bathroom (Exposed Wastewater System)
- Retardant Aerial Misapplication (Bear Creek near Coy Flat; Middle Fork Tule River; Western Divide Ranger District (Camp Nelson and Ponderosa/Golden Trout Wilderness Area)) (Presence of Retardant in Streambeds)
- Cedar Slope Cabin (Presence of Hazardous Materials)
- Burnt-out Truck and Trailer on Lloyd Meadow Road (Minor Presence of Hazardous Materials)
- Catch Basin Unnamed Drainage Above Middle Fork Tule River (Hazardous Materials in River)

2. Property (P):

Roads

There are approximately 175 miles of National Forest Transportation System Roads (NFSR) within the burn perimeter. NFSR roads are classified into five maintenance level classifications (ML). ML 1 roads are

administratively closed roads. ML 2 roads are maintained for high clearance vehicles. ML 3-5 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 flows. See table 8 for a summary of NFSR Roads within the burn perimeter.

Table 8 Summary of Roads within the Burn Perimeter

Road Maintenance level	Burn Severity				
	High	Low	Moderate	Very Low/ Unburned	Grand Total
1 - BASIC CUSTODIAL CARE (CLOSED)	1.31	2.93	11.04	0.60	15.88
2 - HIGH CLEARANCE VEHICLES	8.39	19.38	36.68	11.48	75.94
3 - SUITABLE FOR PASSENGER CARS	2.07	6.01	15.03	4.21	27.32
4 - MODERATE DEGREE OF USER COMFORT	0.01	0.60	0.57	1.08	2.26
5 - HIGH DEGREE OF USER COMFORT	0.06	1.46	5.31	0.82	7.66
(blank)	0.97	14.81	19.62	10.84	46.24
Grand Total	12.81	45.19	88.26	29.04	175.30

Risk to road improvements, loss of road function, and lost access to forest service roads which serve private property owners, permittees, and forest users varies depending on burn severity and location. Roads that were determined to have a **high to very high** risk were considered 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 SQF Complex Fire Critical Values table (Appendix 3), for roads that were considered for treatment.

Trails

There are approximately 168 miles of system trails within the burn perimeter. The trail sections selected for treatment are located within high and moderate burn severity areas in steep terrain with little to no ground cover or vegetation remaining after the fire. Treatment is necessary to protect the trail asset by diverting anticipated increases in surface runoff off the trail. Trails currently have sections that are incised and conducive to channelization of runoff furthering erosion and increasing the need for additional drainage features to be installed. Complete loss of the trail may occur on these sections of trail and reconstruction would be hazardous and costly. Trail failure can also contribute to failure of infrastructure downstream and increase soil erosion on slopes and post-fire watershed response.

Risk Assessment: A 2-year storm event is likely to result in loss of water control, soil erosion, rockfall, flooding, debris flow, fallen trees, and loss of trail tread. The probability of such a storm event is considered **likely**. These damages would result in **major** loss of trail infrastructure. Overall Risk: **Very High**.

Developed Recreation Sites

Losses to developed recreation infrastructure as a result of the fire were minimal. The most imminent threats to property are hazard trees.

Jerky Trailhead infrastructure did not sustain damage in the fire, but a hazard tree over its toilet that the Incident Management Team was unable to mitigate is **likely** to fall. The replacement cost of the toilet is estimated to be \$35,000. This could result in **moderate** loss of infrastructure. Overall Risk: **high**.

3. Natural Resources (NR):

Hydrologic Function

There is a **very likely** impact to hydrologic function due to loss of cover, reduced infiltration, increased erosion & runoff. Fire impacts proper functioning of hydrologic processes with the greatest and longest lasting impacts occurring from high soil burn severity and anthropogenic activities (such as failure of drainage control on roads). The magnitude of this consequence is considered **moderate** due to the recoverable state. Fire impacts within moderate, low, and very low burn areas are recoverable and expected to diminish as vegetation reestablishes. The greatest threats to recovery are threats from mass wasting, OHV incursion, and failure of infrastructure to control drainage (including roads and trails). Slope failure, increased sediment delivery, and mobilization of woody debris increase the risk of channel diversions down roads and ditches. Channel diversion could lead to complete road prism (or infrastructure) loss and irrecoverable damage to hillslopes.

Soil Productivity

Runoff, erosion, sedimentation and flooding are **likely** because of steep slopes, lack of cover and high modeled erosion rates in 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 risk is **high**.

While a threat to soil productivity exists in portions of the SQF Complex fire, hillslope stabilization treatments are not being proposed. Erosion rates high enough to threaten soil productivity (e.g. exceeding 40 tons/acre annually) are not widespread, and where they do occur are often on slopes steeper than 60% where hillslope treatments would not be effective.

Botany

Springville Clarkia (*Clarkia springvillensis*) (Federally-threatened)

The proximity of existing infestations of yellow star thistle and construction of suppression features near occupied habitat make it **likely** that new infestations will establish in the vicinity of clarkia populations. The effects of non-native plant invasion would have **moderate** consequences to habitat with considerable long-term effects resulting in **high** risk.

Vegetation Recovery in Burned Area

Native vegetation communities were highly departed from natural fire regimes and this fire resulted in uncharacteristic effects to almost every community. The severity of the fire and reburn in some locations will slow native vegetation recovery. Existing infestations previously contained to isolated areas by intact forests and shrublands are **very likely** to spread in the burned area. The consequences of new introductions or spread of existing infestations will result in high density of invasives and/or type conversion, causing **major** irreversible consequences and putting native plant communities at **very high** risk.

Vegetation Recovery on Suppression Features

No equipment washing occurred during fire suppression operations and equipment intersected known invasive plant infestations. It is **very likely** that fire suppression activities spread existing and introduced new weed species and that these species could cause permanent impacts to high value plant communities and occupied threatened plant habitat. The magnitude of weed threats is **major** because communities are vulnerable to type conversion and associated degradation of ecosystem structure and function, biodiversity loss, and altered fire regimes. The risk to vegetative recovery is **very high** where suppression activities occurred.

Wildlife

Mountain Yellow-legged Frog (Federally-endangered)

The fire burned about 30 percent of critical habitat of mountain yellow-legged frog, totaling about 4,470 acres at a very low/low with some moderate soil burn severity. Notably the fire burned through much of Grasshopper

Creek, Little Kern Lake Creek, Leggett Creek, and Hell For Sure Creek drainages. Results of post-fire hydrology modeling show moderate increases in flow as a result of the fire (generally twice the average). The post-fire discharge for affected watersheds modeled do not surpass the 5-year return interval (Q5). Reason for this may be primarily due to the small percentages of high burn severity.

It is **possible** that post-fire storm events and ensuing runoff can deposit sediment and modify habitat (through scouring, pool filling and sequential vegetation loss used for escape cover) and displace individuals. The magnitude of consequences is **minor** for mountain-yellow legged because sediment deposit is expected to be minimal, resulting in a **low** risk to existing riparian vegetation and pool habitat.

Little Kern Golden Trout (Federally-threatened)

The fire burned about 40 percent of Little Kern golden trout critical habitat, totaling 28,201 acres at a low to moderate soil burn severity. There are several reaches with unhybridized populations of Little Kern golden trout that are of special interest for post fire effects (Clicks Creek, Fish Creek and Trout Meadow Creek), in which the fire burned close to 100 percent of the drainage area. Results of post-fire hydrology modeling show moderate increases in flow as a result of the fire (generally twice the average) for two years after fire. The post-fire discharge for affected watersheds modeled do not surpass the 5-year return interval (Q5). Reason for this may be primarily due to the small percentages of high burn severity.

It is **possible** that post-fire storm events and ensuing runoff can deposit sediment and modify habitat (through scouring and pool filling) for Little Kern golden trout and displace individuals. The magnitude of consequences is **moderate** for because sediment deposit is expected to be considerable, resulting in an **intermediate** risk to the quality of spawning beds and sequential successful fry populations.

Pacific Fisher (Federally-endangered)

The fire burned within pacific fisher suitable habitat, totaling a preliminary estimate of 63,790 acres. High burn severity is estimated at 5,370 acres. The fire burned at moderate to high intensity, critically degrading some areas that represent quality fisher habitat; 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.

It is **unlikely** that post-fire storm events will alter the current status of fisher habitat within the burn area. The magnitude of consequences is **minor**, because while a loss of soil productivity (through mass wasting) in higher burn severity areas can delay long term development of late-successional forests, alterations to current habitat status would not occur. Therefore, there is **very low** risk to current habitat quality.

Sierra Nevada Bighorn Sheep (Federally-endangered)

Fire burned within and bighorn sheep critical habitat (totaling about 452 acres) generally at a low soil burn severity, consuming some trees and shrubs. Bighorn Sheep habitat includes terrain that is rough, rocky and steep; trees and shrubs can provide escape cover from predators.

It is **unlikely** that post-fire storm events will alter the current status of habitat quality of Bighorn sheep within the burn area. The magnitude of consequences is **minor** because while a loss of soil productivity during storm events can delay long term development of tree and understory shrubs used as escape cover, alterations to the current post-fire seral communities is unlikely. Therefore, there is **very low** risk to current post-fire habitat quality.

4. Cultural and Heritage Resources:

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.

The Sequoia Complex burned over a total of 229 archaeological sites. Fire intensity over these sites ranged from High to low with 50% being low, 42% Moderate, and 9% high. 45 sites were determined to be at risk based on burn severity and their sensitivity to post fire effects.

It is **possible** that a lack of covering vegetation due to wildfire will lead to casual collection, looting, or vandalism of archaeological sites. The magnitude of consequence is **major** because removal or defacement of artifacts and features leads 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, there is a **high** risk to cultural resources.

Sites on the Western Divide Ranger District:

It is **unlikely** that a lack of covering vegetation in and around sites due to wildfire will lead to erosion, flooding, and or debris flow. The magnitude of consequence 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, there is an **intermediate** risk to cultural resources.

Sites on the Kern River Ranger District:

It is **possible** that a lack of covering vegetation in and around sites due to wildfire will lead to erosion, flooding, and or debris flow. The magnitude of consequence 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, there is a **high** risk to cultural resources.

B. Emergency Treatment Objectives:

- Protection of public safety
- Mitigate risks to life and safety and the invested Sequoia National Forest road improvements. Threats to transportation infrastructure include the following: loss of water control, soil erosion, rockfall, flooding, debris flow, fallen trees, loss of road tread, failure of road prism, and failure of fill slopes.
- Protection of downstream water quality
- Removal of Hazmat threats to air, soil and water quality
- Prevent loss of ecosystem structure and function as a result of invasive plant introduction and spread in the burn area and associated with fire suppression features
- Detect, map, and treat invasive plant infestations when they are small (extent and cover) and the soil seedbank is not yet established.
- Detour looting, vandalism, and casual collecting

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

Land: 80

Channel: N/A

Roads/Trails: 60

Protection/Safety: 80

D. Probability of Treatment Success

Table 9: Probability of Treatment Success

	1 year after treatment	3 years after treatment	5 years after treatment
Land	80	90	100
Channel	N/A	N/A	N/A
Roads/Trails	70	80	80
Protection/Safety	90	90	100

E. Cost of No-Action (Including Loss): \$6,703,343 Potential lost market value plus assessment costs (see Cost-Risk Assessments in the BAER assessment record or the value, cost risk assessment tool summary in Appendix 2 for more information). This does not include a monetary value on loss or harm to human life.

F. Cost of Selected Alternative (Including Loss): \$1,029,593 Potential lost market value plus assessment costs plus treatment costs (see Cost-Risk Assessments in the BAER assessment record or the value, cost risk assessment tool summary in Appendix 2 for more information). This does not include a monetary value on loss or harm to human life.

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader:

Email: christopher.s.stewart@usda.gov **Phone(s):** (360) 746-4251

Forest BAER Coordinator:

Email: Keith Andrew Stone **Phone(s):** (760) 376-3781 x683

Team Members: Table 10: BAER Team Members by Skill

Skill	Team Member Name
<i>Team Lead(s)</i>	Chris Stewart
<i>Soils</i>	Curtis Kvamme Tricia Prentice Tom Giambra
<i>Hydrology</i>	Keith Andrew Stone Kristin Richardson Hilda Kwan Rebecca McCracken (T)
<i>Engineering</i>	Greg Cox
<i>GIS</i>	Celia Yamagiwa Elaine Elliott
<i>Archaeology</i>	Alex Verdugo
<i>Weeds/Botany</i>	Blake Engelhardt Emma Williams
<i>Wildlife</i>	Chris Sanders (T)
<i>PIO</i>	Cathleen Thompson
<i>Recreation</i>	Evan Topal
<i>Hazmat</i>	Belinda Walker
<i>Logistics</i>	Kim Boss

H. Treatment Narrative:

Land Treatments:

Land Treatment #1: Heritage Site Protection

To mitigate the possibility of looting, vandalism, and casual collecting the following treatments will be applied: 28 signs will be placed at targeted locations, the existing gate to Forest Service Road 20S42 will be closed until sufficient vegetation returns to obscure site features, vegetation gathered from other areas will be scattered over sites to obscure visibility, and a program of monitoring will be enacted over a one year period. Monitoring will occur at regular intervals over a period of one year when weather permits. Frequency of site visits will be determined based on need but will not exceed 24 days. **Total request is for \$43,320.**

Land Treatment #1: Heritage Site Protection				
Item	Units	Unit Cost	# of Units	Total Cost
Carsonite Sticker	Each	\$13.00	20	\$260

Carsonite Post	Each	\$18.00	20	\$360
Warning Signs	Each	\$50.00	8	\$400.00
GS-9 Archaeologist Time (Monitor)	Days	\$350.00	24	\$8,400
GS-9 Archaeologist Time (Supervision of Crews and Planning)	Days	\$350	6	\$2,100
Scattering Vegetation Over Archaeological Sites (Crew Time)	Days	5,300	6	\$31,800
Total				\$43,320

Land Treatment #2: Recreation Site Protection

To mitigate the hazard tree at risk of hitting the CXT toilet at the Jerky Trailhead. **Total request is for \$7,232.**

Land Treatment #2: Hazard Tree Removal				
Item	Unit	Unit Cost	# of Units	Cost
Fire Crew Overtime (Hazard Tree Felling)	Lump Sum	\$3,500	2	\$7,000
Vehicle gas mileage	Miles	\$0.58	400	\$232
Total Cost				\$7,232

Land Treatment #3: Early Detection Rapid Response (EDRR)

Early detection dramatically increases the likelihood of successful treatment. Suppression repair and burned area detection surveys are recommended to begin in early spring of 2021 during the flowering periods of invasive species. Where feasible, new or isolated infestations will be treated by hand during the same visit as the surveys. All treatments, including herbicide if needed, will be conducted in accordance with approved methods/decisions on each forest. If extensive control is warranted, a supplemental request for BAER funds may be made. Documentation of infestations includes mapping perimeter, collecting descriptive data on population and habitat, and entering data into USFS NRIS database. When treatment occurs, documentation includes mapping treated area, collecting data on treatment method and effort, and entering data into USFS FACTS database. Surveys and treatments will be for one year only per BAER regulations.

Land Treatment #3a: EDRR - Fire Suppression Features

EDRR surveys are proposed to determine whether ground disturbing activities related to fire suppression have resulted in new introductions or spread of invasive plant infestations on approximately 127 miles of dozer lines, 28 miles of road as line, 14 miles of handline, and at 85 point features (drop points, helispots, safety zones, staging areas, dozer pushes, and spike camps. The number and size of features will potentially change as mapping continues until the fire is completely contained and suppression repair is complete. Features created by unwashed heavy equipment, particularly dozer lines, would be prioritized. All features are located on the Sequoia NF. Currently, there is no Forest Botanist on the SQF and force account botany technicians are very unlikely to be available for treatment implementation. As such, the proposed costs are to utilize contract or partner resources.

Based on local terrain and travel times for this particular area, the time estimate is based on each two-person crew covering ~3 miles of dozer line per day, while rolling in time for surveying at nearby point features and time for treatment revisits if needed. This time estimate is in line with previous BAER requests and actual implementation on past BAER treatments. The request is also commensurate with the large size of this fire and the large number of miles of dozer created suppression features. **Total request is for \$136,700.**

Land Treatment #3a: EDRR – Related to Fire Suppression				
Item	Unit	Unit Cost	# of Units (SQF)	Cost
6 Contract or Partner Weed Technicians	Days	\$3,200	41	\$131,200

1 GS-11 Botanist	Days	\$400	10	\$4,000
Supplies	Each	\$1,500	1	\$1,500
Total Cost				\$136,700

Land Treatment #3b: EDRR- Burned Area

EDRR surveys are proposed to determine whether post-fire conditions in the burned area have facilitated spread of invasive plants, due to seed bank stimulation and lack of competition. These surveys will focus on existing infestations and susceptible high value habitat (Figure 3, Appendix A). Infestations which were being treated prior to the fire, or those that are located near high value habitat (e.g. TES habitat, sequoia groves, SIAs and RNAs) would be prioritized. There are 12 infestations of five species of invasive plants to visit- yellow starthistle, milk thistle, bull thistle, and velvetgrass on the Sequoia and perennial pepperweed on the Inyo. Infestations/areas to visit are located on both the Sequoia and Inyo NFs. **Total request is for \$56,200.**

Land Treatment #3b: EDRR – Related to Vectors in Burned Area					
Item	Unit	Unit Cost	# of Units (SQF)	# of Units (INF)	Cost
6 Contract or Partner Weed Technicians	Days	\$3,200	15	1	\$51,200
1 GS-11 Botanist	Days	\$400	5	5	\$4,000
Supplies	Each	\$500	1	1	\$1,000
Total Cost			\$50,500	\$5,700	\$56,200

Channel Treatments: None Proposed

Road and Trail Treatments:

Road and Trail Treatment #1: Road Storm Proofing and Drainage Improvements

Most construction estimators put a standard 10% mobilization cost on top of direct cost to cover all costs to get the work out there which includes low boys and crew trucks. Many roads are difficult to access and/or are long distances away from individual work locations. Thus, a 10% for mobilization cost is considered reasonable for this large of an effort and is typical of construction contracts on R5 National Forests.

In addition to a 10% mobilization cost, construction contractors typically charge 20% for overhead, profit, and bonding on federal construction contracts.

Road treatments will include the following activities. Additional details and itemization of these treatments are provided in the Roads Specialist Report.

- Install Drainage Armor (class 2).
- 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).
- Install hazard warning signs and a gate

Storm Proofing Locations: 20S02 McIntyre, 20S03B Wishon CG, 20S40, 20S40A Castle ,20S54 Transfer Station,20S71, 20S71A, Jordan Peak L.O., 20S75 Deep Meadow, 21S05 Needles L.O., 21S50 North Road, 22S82 Lloyd Meadow, 22S82B Jerky Trailhead, 20S12 Belnap Cr. Road, 20S11,20S11A,B Nelson Creek Rd., 20S74, 20S74A Garland Rd., 20S86 Castle Rd., 20S90, 20S73 Smith Failing Meadow, 20S51B North Road, 20S49, 20S49A Izzy Rd., 20S60 Lloyd Meadow North

Drainage Improvements Locations: 20S02 McIntyre, 20S03B Wishon CG ,20S71, 20S71A, Jordan Peak L.O., 20S75 Deep Meadow, 21S05 Needles L.O., 21S50 North Road, 22S82 Lloyd Meadow, 20S74, 20S74A Garland Rd., 20S86 Castle Rd.

Total request is for \$345,116.

Road and Trail Treatment #1: Road Storm Proofing and Drainage Instructions							
Treatment	Units	Unit Cost	# of Units	Subtotal	OH/Profit 20%	Mobilization 10%	Totals
Gates	LS	\$10,500	1	\$10,500	\$2,100.00	1,050	\$13,650
Road Hazard Warning Signs	LS	\$5,250	1	\$5,250	\$1,050.00	525	\$6,825
Hazard Trees	LS	\$11,542	1	\$11,542	\$2,308.40	1,154	\$15,005
Install metal OSD (little mac)	EA	\$500	38	\$19,000	\$3,800.00	1,900	\$24,700
Install Flume	LF	\$25	590	\$14,750	\$2,950.00	1,475	\$19,175
Install Rolling Dip	EA	\$500	3	\$1,500	\$300.00	150	\$1,950
Install FES 18"	EA	\$425	22	\$9,350	\$1,870.00	935	\$12,155
Install FES 24"	EA	\$550	13	\$7,150	\$1,430.00	715	\$9,295
Install FES 36"	EA	\$625	2	\$1,250	\$250.00	125	\$1,625
Install Metal lid 36" D.I	EA	\$500	2	\$1,000	\$200.00	100	\$1,300
Upgrade 12" CMP to 18"	LS	\$1,750	1	\$1,750	\$350.00	175	\$2,275
Repair 18" CMP Inlet 5'	LS	\$500	1	\$500	\$100.00	50	\$650
Restore Drainage	Mile	\$3,700	26.68	\$98,716	\$19,743.20	9,872	\$128,331
Restore Drainage (Roads evaluated by SBS)	Mile	\$4,200	9.65	\$40,530	\$8,106.00	4,053	\$52,689
Arch Clearance	Day	\$500	12.5	\$6,250	N/A	N/A	\$6,250
Aquatics Clearance	Day	\$500	12.5	\$6,250	N/A	N/A	\$6,250
Wildlife Clearance	Day	\$500	12.5	\$6,250	N/A	N/A	\$6,250
Contract prep and admin; 10% of total property cost = \$36,741	LS	\$36,741	1	\$36,741	N/A	N/A	\$36,741
Total							\$345,116

Road and Trail Treatment #2: Road Storm Inspection and Response

Storm inspection/response will keep culvert and drainage features functional by cleaning sediment and debris from in and around features between or during storms to help protect against loss of water control, soil erosion, and loss of road tread. This work also includes post-winter inspections for 20S02 McIntyre, 20S03B Wishon CG, 20S40, 20S40A Castle ,20S54 Transfer Station,20S71, 20S71A, Jordan Peak L.O., 20S75 Deep Meadow, 21S05 Needles L.O., 21S50 North Road, 22S82 Lloyd Meadow, 22S82B Jerky Trailhead, 20S12 Belnap Cr. Road, 20S11,20S11A,B Nelson Creek Rd., 20S74, 20S74A Garland Rd., 20S86 Castle Rd., 20S90, 20S73 Smith Failing Meadow, 20S51B North Road, 20S49, 20S49A Izzy Rd. ,20S60 Lloyd Meadow North and other roads that may be too hazardous to inspect during the rainy season. This work will be accomplished through force account workforce (if available) or contractor equipment and labor. **Total request is for \$57,875.**

Road and Trail Treatment #2: Road Storm Inspection and Response							
Treatment	Units	Unit Cost	# of Units	Subtotal	OH/Profit 20%	Mobilization 10%	Total Cost
Storm Response	Days	\$1,550	25	\$38,750	\$7,750	\$3,875	\$50,375
GS-7 Tech Storm Inspection	Days	\$300	25	\$7,500	N/A	N/A	\$7,500
Total							\$57,875

Road and Trail Treatment #3: Trail Storm Proofing

Trail storm proofing and grade stabilization of 46.7 miles of the selected trails have been identified to prevent loss of trail tread and trail structures and to reduce soil erosion on slopes. Trails are located mostly in designated wilderness on the Inyo NF and partially on the Sequoia NF (Golden Trout Wilderness). Prior to implementation of treatments, trail specialists will perform specific trail surveys on identified trails. The results of the surveys will dictate subsequent detailed storm proofing treatment recommendations and identification of hazard trees in need of removal for crew safety. Trail treatment work will include the installation of drainage features (out sloping, rolling grade dips, water bars). The trails will be monitored post-implementation after winter rainy season to determine effectiveness and maintenance needs, and if additional treatments are necessary.

Trail stormproofing involves cleaning or armoring of existing drainage structures to help ensure trail drainage infrastructure performs optimally. This work will be accomplished through contractor equipment and labor. In addition, this treatment includes felling of hazard trees in forested areas that pose a threat to crews. Identified trails are listed on tables above. **Total request is for \$112,890.**

Road and Trail Treatment #3a: Trail Storm-Proofing Sequoia NF				
Item	Unit	Unit Cost	# of Units	Cost
FS System Non-Motorized Trails – Implementation layout, Storm proofing - trail stabilization treatments.	Miles	\$2,000	43.4	\$86,800
Contract administration (GS-11 Engineer)	Day	\$450	5	\$2,250
Fire Crew Overtime (Hazard Tree Felling)	Lump Sum	\$3,500	1	\$3,500
Mobilization – 10% - standard for this area	Lump Sum	\$ 8,680	1	\$8,680
Total				\$101,230

Road and Trail Treatment #3b: Trail Storm-Proofing Inyo NF				
Item	Unit	Unit Cost	# of Units	Cost
Trails included in Table 1, – Implementation layout, Storm proofing - trail stabilization treatments.	Miles	\$2,000	3.3	\$6,600
Contract administration (GS-11 Engineer)	Day	\$450	2	\$900
Fire Crew Overtime (Hazard Tree Felling)	Lump Sum	\$3,500	1	\$3,500
Mobilization – 10% - standard for this area	Lump Sum	\$660	1	\$660
Total				\$11,660

Road and Trail Treatment #4: Trail Storm Patrol and

Response

Storm inspection/response of treated trails will keep drainage features on trails functional by cleaning sediment and debris from in and around features between or during storms. This work will be accomplished through force account. **Total request is for \$8,000.**

Road and Trail Treatment #4a: Trail Storm Inspection/Response, Sequoia NF				
Item	Unit	Unit Cost	# of Units	Cost
Storm Inspection and Response – GS-7 Trails	Days	\$ 250	28	\$7,000
Total				\$7,000

Road and Trail Treatment #4b: Trail Storm Inspection/Response, Inyo NF				
Item	Unit	Unit Cost	# of Units	Cost
Storm Inspection and Response – GS-7 Trails	Days	\$ 250	4	\$1,000
Total				\$1,000

Protection/Safety Treatments:

Protection/Safety Treatment #1: Human Life and Safety (and Resource) Protection – Closure and Hazard Warning Signage

To ensure safety for Forest visitors and protection to Forest resources during the natural recovery period, area closure and hazard warning signs will be placed at trailhead, campground, and day use area locations adjacent to and within the fire perimeter to warn visitors of potential hazards. Given the typical amount of vandalism on the SQF, it is likely signs will need to be checked and replaced periodically within the first year; the cost estimate includes extra signs and personnel time for sign replacement. Forest staff will provide oversight for sign installations and implementation. Warning signs for the Inyo NF will be focused on the fire area within the Golden Trout Wilderness.

Closure of roads, trails, and trailheads within the burn area for the first winter season, Belknap Campground, and McIntyre Recreation Residence tract is recommended to prevent long-term exposure to risk and protect life and safety. Closure of the Jerky Creek Trailhead restroom will also be implemented until the hazard tree can be mitigated. Installation of burned area warning signs is recommended to warn users passing through the area on main roads of the potential hazard. Risks associated within the burn scar should be re-evaluated prior to lifting the closure. Interagency Coordination is also recommended for the State and Private land within and directly downstream of burnt areas.

Resources may also be vulnerable to trampling due to visitation of areas with damaged trails. Signage warning visitors about hazards to their safety would be combined with messaging about the fragility of soil and vegetation post fire, particularly in Sequoia groves where trampling and soil compaction can destroy or impede seedling establishment. **Total request is for \$11,865.**

Protection/Safety Treatment #1: Closure and Warning Signage				
Item	Unit	Unit Cost	# of Units	Cost
Sequoia NF				
GS-11 Recreation Officer/Road Engineer	Day	\$425	1	\$425
Labor - GS-7 Recreation Technician	Days	\$250	6	\$1500
Hazard signs (14" x 20")	Each	\$50	40	\$2000
Area closure signs (14" x 20")	Each	\$50	40	\$2000
Posts and hardware	Each	\$25	80	\$2000
Vehicle mileage	Miles	\$.55	1500	\$825
Total Cost – Sequoia NF				\$8,750
Inyo NF				
GS-11 Recreation Officer	Day	\$425	1	\$425
Labor - GS-7 Recreation Technician	Days	\$250	3	\$750
Hazard Signs (14" x 20")	Each	\$50	10	\$500
Area Closure Signs (14" x 20")	Each	\$50	10	\$500
Posts and hardware	Each	\$25	20	\$500
Vehicle mileage	Miles	\$.55	800	\$440
Total Cost - Inyo NF				\$3,115
Grand Total for Road and Trail Closure & Warning Signage				\$11,865

Protection/Safety Treatment #2: McIntyre Recreation Residences and Belknap Campground Closure, Enforcement, and Signage

To ensure safety for forest visitors and recreation residence permittees and protection to Forest resources during the natural recovery period within the area of the McIntyre Recreation Residences and Belknap Campground area, an area closure will be in effect and area closure and hazard warning signs will be placed at the main access road, campground, and recreation residence locations to warn visitors of potential hazards and to notify them of the closure area. Development of Forest Closure Order by staff will need to be conducted. Recreation Staff Officer will provide oversight for sign installations and patrolling of closed areas. Special Uses staff notify permittee holders (e.g., recreation residence tracts) of closure and associated impacts to occupancy and access. Recreation technicians will patrol the closure area to ensure forest visitors and permittees do not violate closure of the burned area and downstream lands. All work will be accomplished by Force Account.

Total request is for \$8,100.

Protection/Safety Treatment #3: McIntyre Recreation Residence and Belknap Campground Closures, Enforcement, and Signage				
Item	Units	Unit Cost	# of Units	Total Cost
GS-12 Resources	Days	\$500	1	\$500
GS-11 Recreation Officer	Days	\$450	2	\$900
GS-9 Special Uses Administrator	Days	\$300	10	\$3000
Labor - GS-4 Recreation Technician	Days	\$200	15	\$3000
Hazard signs (14" x 20")	Each	\$50	5	\$250
Area closure signs (14" x 20")	Each	\$50	5	\$250
Posts and hardware	Each	\$25	8	\$200
Total				\$8,100

Protection/Safety Treatment #3: Hazmat:

Remove and dispose of hazardous material and building wrap present at Jordan Peak Lookout and Grey Meadow Cabin to prevent the contamination/building wrap from being transported off site and into the drainages below the burned area during heavy rainfall events. Removal and disposal of the hazardous materials contamination/burned building wrap will eliminate continued employee/public exposure to toxic hazardous materials (especially sulfuric acid residue from the burned repeater batteries) and asbestos particles associated with burned asbestos vent pipes, flooring, siding and insulation. The lead and asbestos on site are likely to become airborne if disturbed by untrained personnel or members of the public.

Remove and dispose of hazardous material present at Mountain Home Guard Station Recreation Rental and Cedar Slope Cabin to prevent the contamination/debris from being transported off site and into the drainages below the burned area during heavy rainfall events. Removal and disposal of the hazardous materials contamination will eliminate continued employee/public exposure to toxic hazardous materials and asbestos particles associated with burned asbestos vent pipes, flooring, siding and insulation. The lead and asbestos are likely to become airborne if disturbed by untrained personnel or members of the public.

Remove and dispose of hazardous material present at Golden Trout Pack Station and CSET Camp to prevent the contamination/debris from being transported off site and into the drainages below the burned area during heavy rainfall events. Removal and disposal of the hazardous materials contamination/burned building wrap will eliminate continued employee/public exposure to toxic hazardous materials and asbestos particles associated with burned asbestos vent pipes, flooring, siding and insulation. The lead and asbestos are likely to become airborne if disturbed by untrained personnel or members of the public.

Close in place the open wastewater system at McIntyre Summer Home Camp Bathroom to eliminate continued threats to soil and water quality. Failure to do so will allow wastewater system to exist that may contaminate drinking water sources and impact the health of employees/public. Remove and dispose of hazardous material present at Freemont Creek Trail Bridge to prevent the contamination/debris from being transported further downstream in the creek during heavy rainfall events.

Removal and disposal of the hazardous materials contamination will eliminate continued employee/public exposure to potentially hazardous materials used to construct the wooden bridge.

Field verify aerial misapplication of retardant and follow up with Regional Water Quality Control Board – Central Region.

Field verify and evaluate the release of hazardous material in the Catch Basin Unnamed Drainage Above Middle Fork Tule River.

Work will be performed via Contract.

Total initial request is for **\$127,250 (Does not include Non-FS Costs Shown on Table).**

Item	Units	Unit Cost	# of Units	Total Cost
Mobilization	Each	10000	1	\$10000
Health and Safety Plan	Each	8500	1	\$8500
Remove/Dispose HazMat (FS Costs)	Lump Sum	75000	1	\$75000
Removal/Dispose HazMat (Non-FS costs)	Lump Sum	30000	1	\$30000
In Place Closure Wastewater System (Non-FS Costs)	Each	1000	1	\$1000
Hazard tree removal	Lump Sum	7500	1	\$7500
GS 11/12 Arch (40 HR Hazardous Waste Operations Certified), (Assumed Arch on Unit)	Day	750	15	\$11250
GS 11/12 COR (40 HR Hazardous Waste Operations Certified), (Assumed COR on Unit)	Day	750	20	\$15000
Total (Does Not Include Non-FS Costs Shown on Table)				\$127,250

Protection/Safety Treatment #4: Interagency Coordination - Private Property and Other Jurisdictions:

Federal, State, and private landownership are checkerboarded throughout the fire area. The fire burned in, around, and adjacent to the communities of Camp Nelson, Cedar Slope, Ponderosa, Alpine, as well as Mountain Home State Forest and state highway 190 and a handful of county roads. The McIntyre and Soda Springs Forest Service Recreation Residence Tracks are also within or near the burn area. All above listed communities/recreation tracks are down stream of the fire area.

The BAER Team shared information on watershed response and potential threats to non-Forest assets with affected entities and responsible agencies such as Tulare County, Cal Trans, Natural Resources Conservation Service, National Weather Service and Park Service. Non-Forest assets are addressed by the respective responsible agencies. are addressed by the respective responsible agency. Total treatment cost **\$5,000.**

Item	Unit	Unit Cost	# of Units	Cost
GS-12 BAER Coordinator/Forest Hydrologist	Days	\$500	10	\$5,000
Total				\$5,000

Monitoring

I. Monitoring Narrative: No monitoring is proposed

PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS

Sequoia National Forest

Line Items	Units	Unit Cost	# of Units	BAER \$	Other \$	# of units	Fed \$	# of Units	Non Fed \$	Total \$
A. Land Treatments										
Heritage Site Protection	Each	43,320	1	\$43,320	\$0		\$0		\$0	\$43,320
Rec Site Protection	Each	7,232	1	\$7,232	\$0		\$0		\$0	\$7,232
EDRR Suppression	Each	136,700	1	\$136,700	\$0		\$0		\$0	\$136,700
EDRR Burn Area	Each	50,500	1	\$50,500	\$0		\$0		\$0	\$50,500
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Land Treatments</i>				\$237,752	\$0		\$0		\$0	\$237,752
B. Channel Treatments										
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Channel Treatments</i>				\$0	\$0		\$0		\$0	\$0
C. Road and Trails										
Road Storm Proofing	Each	345,116	1	\$345,116	\$0		\$0		\$0	\$345,116
Road Storm Patrol	Each	57,875	1	\$57,875	\$0		\$0		\$0	\$57,875
Trail Storm Proofing	Each	101,230	1	\$101,230	\$0		\$0		\$0	\$101,230
Trail Storm Patrol	Each	7,000	1	\$7,000	\$0		\$0		\$0	\$7,000
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Road and Trails</i>				\$511,221	\$0		\$0		\$0	\$511,221
D. Protection/Safety										
Warning Signs	Each	8,750	1	\$8,750	\$0		\$0		\$0	\$8,750
Belknap Area Closure	Each	8,100	1	\$8,100	\$0		\$0		\$0	\$8,100
Hazmat	Each	127,250	1	\$127,250	\$0		\$0		\$0	\$127,250
Interagency Coordination	Each	5,000	1	\$5,000	\$0		\$0		\$0	\$5,000
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Protection/Safety</i>				\$149,100	\$0		\$0		\$0	\$149,100
E. BAER Evaluation										
Initial Assessment	Report	\$110,045		---	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				---	\$0		\$0		\$0	\$0
<i>Subtotal Evaluation</i>				\$0	\$0		\$0		\$0	\$0
F. Monitoring										
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Monitoring</i>				\$0	\$0		\$0		\$0	\$0
G. Totals										
Previously approved				\$898,073	\$0		\$0		\$0	\$898,073

PART VII - APPROVALS

1. Teresa Benson
Sequoia National Forest Supervisor

10/29/2020
Date

Inyo National Forest

Line Items	Units	Unit Cost	# of Units	BAER \$	Other \$	# of units	Fed \$	# of Units	Non Fed \$	Total \$
A. Land Treatments										
EDRR Burn Area	Each	5,700	1	\$5,700	\$0		\$0		\$0	\$5,700
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Land Treatments</i>				\$5,700	\$0		\$0		\$0	\$5,700
B. Channel Treatments										
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Channel Treatments</i>				\$0	\$0		\$0		\$0	\$0
C. Road and Trails										
Trail Storm Proofing	Each	11,660	1	\$11,660	\$0		\$0		\$0	\$11,660
Trail Storm Patrol	Each	1,000	1	\$1,000	\$0		\$0		\$0	\$1,000
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Road and Trails</i>				\$12,660	\$0		\$0		\$0	\$12,660
D. Protection/Safety										
Warning Signs	Each	3,115	1	\$3,115	\$0		\$0		\$0	\$3,115
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Protection/Safety</i>				\$3,115	\$0		\$0		\$0	\$3,115
E. BAER Evaluation										
Initial Assessment	Report			---	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				---	\$0		\$0		\$0	\$0
<i>Subtotal Evaluation</i>				\$0	\$0		\$0		\$0	\$0
F. Monitoring										
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Monitoring</i>				\$0	\$0		\$0		\$0	\$0
G. Totals										
Previously approved				\$21,475	\$0		\$0		\$0	\$21,475
Total for this request				\$21,475						

PART VII - APPROVALS

1. _____
 Inyo National Forest Supervisor Date

Appendix 1: Maps and Figures

Figure 1: Sequoia Complex Soil Burn Severity Map

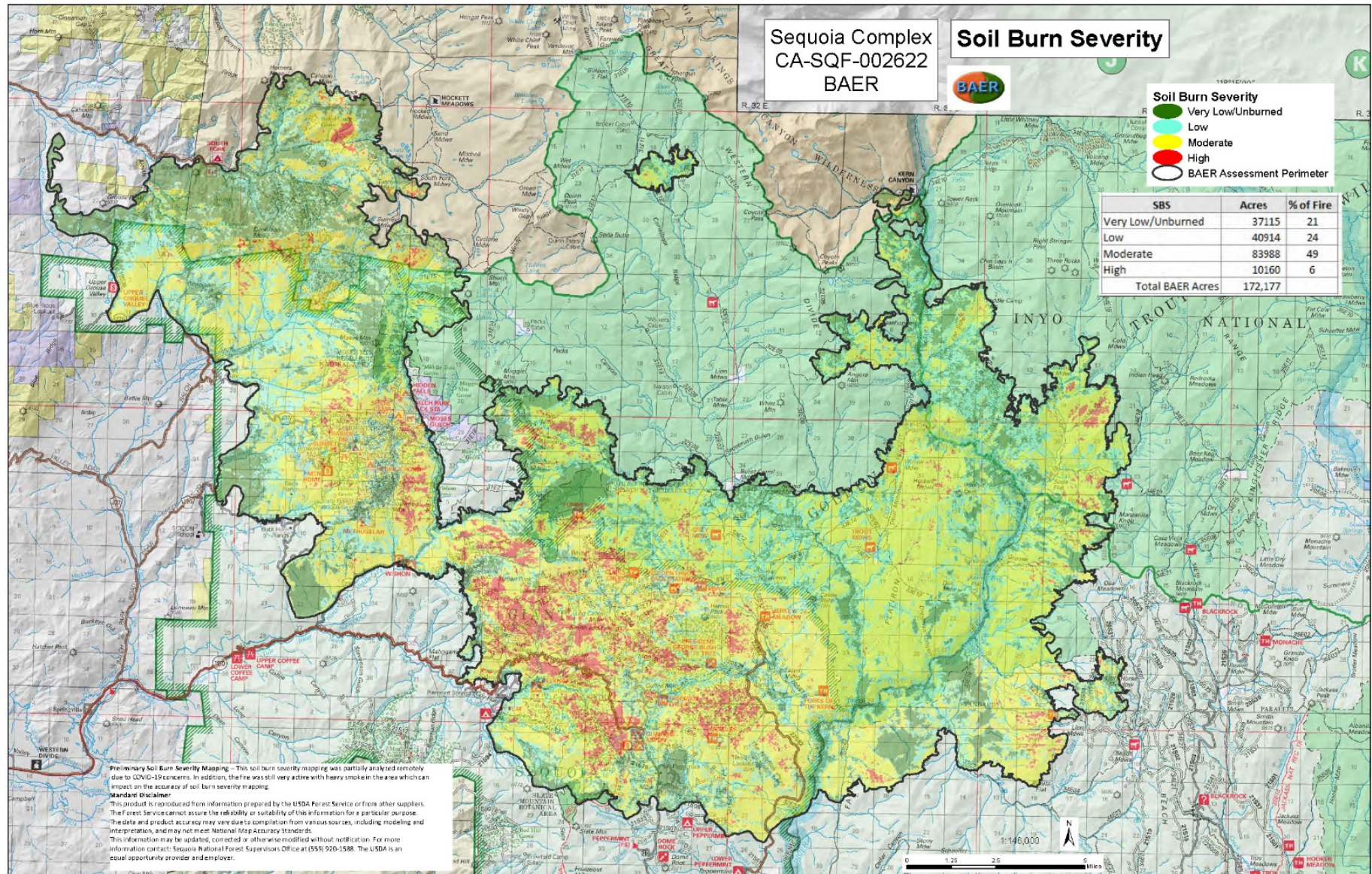
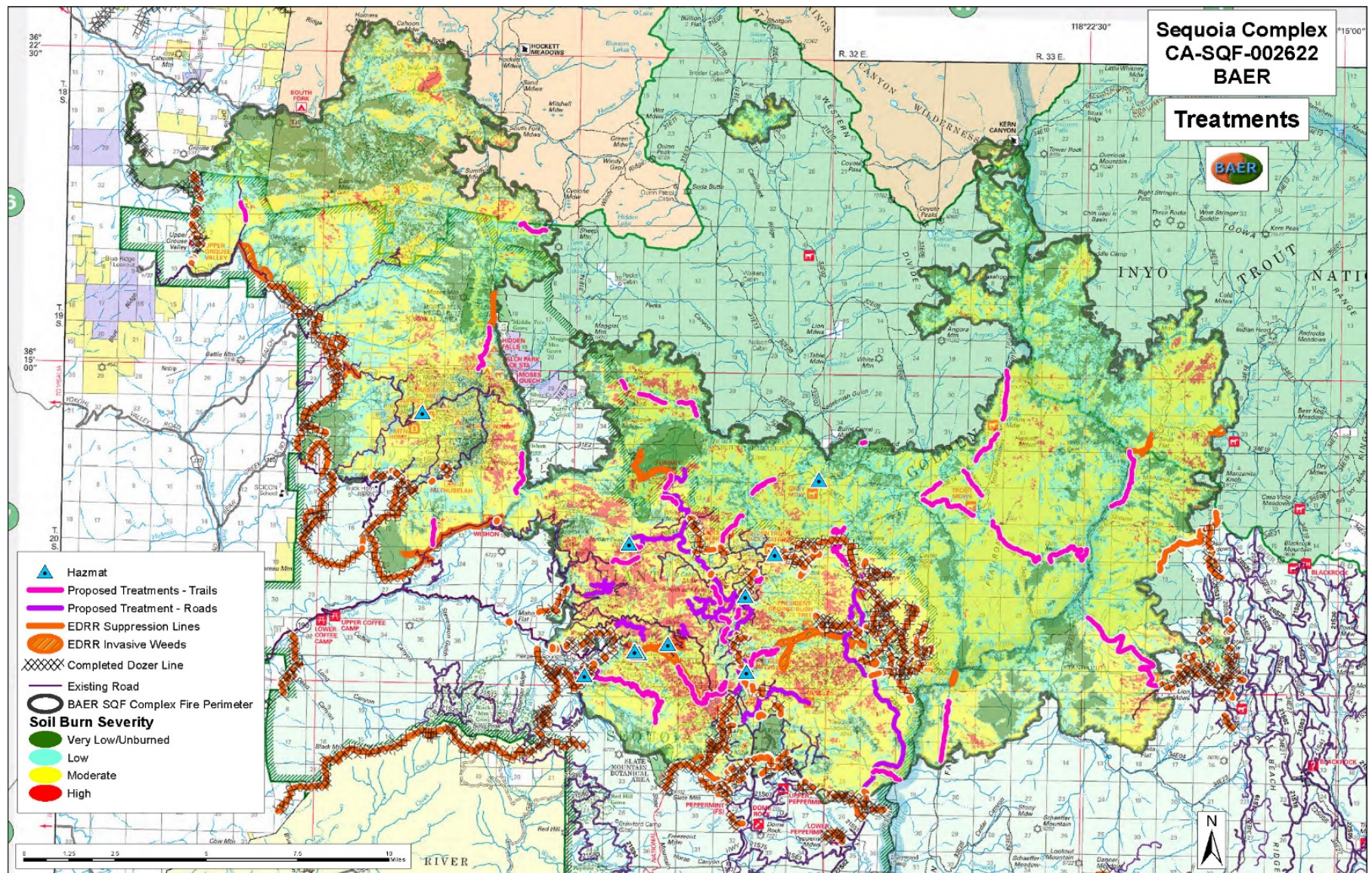


Figure 2: Sequoia Complex Proposed Treatments Map



Appendix 2: Sequoia Complex BAER Economic Summary

Sequoia Complex Fire	Oct 21, 2020				
BAER Economics Summary					
Excel Workbook	Map Zone Tab	Total Cost	B/C	IMV	IMV Justification
VARWorksheet_Snow.xlsm	Map Zone A-LandTreatments	\$243,452	0.0		Yes
	Map Zone B-RoadTrails	\$523,881	10.4	Justified	
	Map Zone C-LifeSafety	\$152,215	0.0		Yes
TOTAL		\$919,548			

Appendix 3: Critical Values Identified within or downstream of the Sequoia Complex Fire. Attached.