

Rough Fire
Sierra National Forest
2500-8 BAER Assessment Report
September 30, 2015



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Executive Summary

On July 31 the Rough fire started by lightning on the High Sierra Ranger District within the Kings River drainage. The fire burned on the Sierra, Sequoia and Kings Canyon National Park. The BAER team delineated an analysis area on the Sierra National Forest of approximately 30,822 acres. Vegetation types in the Rough burn perimeter are predominantly mixed conifer dominated by pine (27%) and canyon live oak (22%). Plant communities varies from blue oak savanna, chaparral and live oak woodland at the lower elevations to ponderosa pine, mixed conifer forest, montane meadows, and red fir forest at the upper elevations. Various riparian plant communities are found along river, streams, and within meadows. Kings Canyon is a very steep drainage with a large elevation gain resulting in a wide variety of vegetation types and long drainage lengths. The fire resulted in 20,733 (67%) acres of unburned/low severity, 8,250 (27%) acres of moderate burn severity and 1,840 (6%) of high burn severity.

A Burn Area Emergency Response (BAER) assessment was conducted on the north side of the fire within the Sierra National Forest to determine critical BAER values at risk make an emergency determination on those values and make recommendations on reducing the risk to those values.

Identified BAER critical values and other values at risk were evaluated and assessed in the fire area. The BAER critical values that were determined to be an emergency include: 1) Threats to life and property including rock fall and increased runoff/debris and debris flows on 11S007, and 11S012; Increased runoff/debris on 11S044B, 11S045A and 12S001. 2) Increased risk of runoff impacting trail tread and drainage crossings and to a lesser degree life on Rogers Ridge, Cliff Camp, Bear Wallow, Statham, Kings River NRT hiking trails and Spanish OHV trail. 3) threats to Natural and Cultural Resource from Off Highway Vehicles (OHV's) threatening natural vegetative recovery soil productivity, heritage resources sites and invasion of noxious weeds spreading into the fire area; and 4) threats to natural vegetative recovery by invasion of noxious weeds spreading into the fire area through vectors related to fire suppression activities.

The Initial BAER assessment report recommends **REDACT** in costs and includes: work on Forest system roads and trails to control water and inform users of post-fire risks, prevention of OHV incursions from damaging critical values in high and moderate burn severity areas; and early detection and eradication of noxious weeds along areas disturbed by fire suppression (fire line construction (62.5 miles) and equipment concentration points (31.2 acres) and high and moderate burn severity near disturbed areas and other high priority areas (and high and moderate burn severity near disturbed areas).

Date of Report: 09/08/15

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

- 1. Funding request for estimated emergency stabilization funds
- 2. Accomplishment Report
- 3. No Treatment Recommendation

B. Type of Action

- 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)
- 2. Interim Report #_____:
 - Updating the initial funding request based on more accurate site data or design analysis
 - Status of accomplishments to date
- 3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTION

- | | |
|---|---|
| A. Fire Name: Rough | B. Fire Number: CA-SNF-001746 |
| C. State: CA | D. County: Fresno |
| E. Region: 5 | F. Forest: Sierra |
| G. District: High Sierra | H. Fire Incident Job Code: P5J0R9 |
| I. Date Fire Started: July 31, 2015 | J. Date Fire Contained: UNK at this time |
| K. Suppression Cost: \$119 million as of 9/30/2015 | |

L. Fire Suppression Damages Repaired with Suppression Funds

1. Fireline waterbarred (miles): 63
2. Fireline seeded (miles):
3. Other (identify):

M. Watershed Number:

- 180300100606 (Patterson Creek-North Fork Kings River)
- 180300100605 (Rancheria Creek-North Fork Kings River)
- 180300100702 (Converse Creek-Kings River)
- 180300100704 (Verplank Creek-Kings River)

Grand Total	30,822	
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D. **Erosion Potential:** 21 tons per acre

E. **Sediment Potential:** cubic yards / square mile for 5 year storm: 11,790

PART IV - HYDROLOGIC DESIGN FACTORS

A. **Estimated Vegetative Recovery Period, (years):** 3 to 15 years

B. **Design Chance of Success, (percent):** 95

C. **Equivalent Design Recurrence Interval, (years):** 2 - 100

D. **Design Storm Duration, (hours):** 6

E. **Design Storm Magnitude, (inches):** 2.2 – 4.0

F. **Design Flow, (cubic feet / second/ square mile):**

- Patterson Creek-North Fork Kings River (11.1)
- Rancheria Creek-North Fork Kings River (11.6)
- Converse Creek-Kings River (10.7)
- Verplank Creek-Kings River (12.9)

G. **Estimated Reduction in Infiltration, (percent):** 7 to 32%

H. **Adjusted Design Flow, (cfs per square mile):**

- Patterson Creek-North Fork Kings River (13.2)
- Rancheria Creek-North Fork Kings River (12.4)
- Converse Creek-Kings River (14.1)
- Verplank Creek-Kings River (15.5)

PART V - SUMMARY OF ANALYSIS

Summary of Affected Resources and Values at Risk

Road Assessment of Values at Risk: The field survey was conducted over September 4, 5, and 6, by the roads engineering team in coordination with team hydrologist, geologist and botanist.

Dominate NFS Road segments within the fire perimeter are 11S007, 11S012, and 12S001. Approximately 4.6 miles of secondary ML-2 high clearance local spur roads were surveyed for purposes of this report, some of these road segments in the high to moderate burn severity are proposed for treatments.

Consequences of the Fire on Values at Risk by Road

Risk to life and safety of road users along road 12S001 Risk to road users are considered **very likely** from rock fall and debris flows generating from the steep watershed above that burned at low to moderate severity. **Major** consequences along these road segments are considered **high** due to rock fall and debris flows resulting in denied road access and entrapment.

Risk to property damage to road 11S007 and associated secondary spur roads 11S044B and 11S45A are considered **likely** with **major** consequences to the invested road improvements, from loss of road function and denial of access.

Emergency Determination:

Life and Safety risk to road users is determined to be **very high** with **major** consequences along roads 11S012, PGE access to Balch camp and 11S012C PGE access to the after bay and penstock. 12S001 potential for rock slides and debris flows are considered to be **very likely** with **major** consequences the first winter due to the burned watershed on steep slopes above these road segments. Road 11S007 is not recommended for closure outside of Travel Management. Proposed treatments include BAER warning signs at main entry points and rock fall signs on both side of an existing rock slide area.

Property risk to invested road improvements, and loss of road functions is considered to be **likely** with **major** consequences on some road segments along road 11S007 Rogers Ridge and associated secondary spurs 11S044B and 11S045A. When uncontrolled water is diverted from road drainage courses and on to the road surface the road is degraded resulting in unacceptable erosion, loss of road function and denial of access.

Cultural and other Resources it has been determined the road related emergency and consequences described above will not affect cultural resources and other downstream values.

Trails Motorized and Non-motorized Assessment of Vales at Risk: Emergency conditions exist for specific trails and sections of trail within the burned area. These emergency conditions are based on threats associated with anticipated post wildfire impacts on trails and trail users. Threats to trails include excessive erosion of the trail tread caused by interception and diversion of runoff from steep burn hill slopes. Trails may also be impacted where they intersect with drainages and crenulations. Table 3 below outlines the amount of miles of trails per burn severity. There is a total of approximately 24 miles of hiking trails and 3.4 miles of motorized (OHV) trails within the fire area. Approximately .13 miles of systems hiking trails are in high burn severity areas with 3.6 miles in moderate burn severity areas (due to topography and post-fire conditions moderate severity is estimated to have a high watershed response). Approximately, .11 miles of the Spanish OHV trail is in high burn severity with 1 mile in moderate burn severity. Life and safety of trail users is also at risk in some areas within the burn. Specific trails and sections of trail at increased risk from post wildfire threats are the Rogers Ridge (28e05), Cliff Camp (28e04), Bear Wallow (27e43), Statham (28e40), Kings River NRT (27e40) and Spanish motorized OHV trail (28e224). This determination is based on professional judgement and field based identification of segments of trail where implementing treatments would effectively lower the risk of major trail damage, thus a favorable benefit to cost ratio was determined.

Table3. Non-motorized & motorized Trail Miles by Soil Burn Severity Class

Severity	Non-Motorized (all other trails)	Motorized (only trail 28E224, Spanish)	Total Miles
High	0.13	0.11	0.24
Moderate	3.56	1.04	4.6
Low	14.49	1.46	15.95
Unburned/Very Low	6.14	0.73	6.87
Total Miles	24.3	3.34	27.64

Probability of Damage or Loss: Likely. This determination is based on the burn severity in relationship to the trail and estimated runoff impacting the trails.

Magnitude of Consequence: Moderate. This determination is due to the potential damage to the trails compared to the level of use.

Risk Level: High

Hydrology Assessment of Vales at Risk: Hydrological analysis was conducted on four HUC12 watersheds and 19 pour points defined at Values at Risk. To capture the most probable storm type and the potential El Nino, 2, 25, 50, and 100 year design storms were used to model the post-fire watershed response. Most HUC12 watersheds and pour points showed minimal increases (<50%) in runoff from fire effects, but several drainage crossings along trail 27E40 and roads 11S12 and 11S12C showed increased runoff over 100% (Figure 2). The only VAR that rated “High” for life and property (from flood damage) includes campgrounds and dispersed camping along the South Fork of the Kings River, which is accessed by Forest Service road 12S01. The recommended treatment is seasonal closure of 12S01 from October, 2015 to April, 2015, with signage notifying the public of the relevant hazards.

Emergency Determination

Threats to Human Life and Property

Emergency determinations were conducted using the risk assessment matrix in the Forest Service Manual for the BAER program (USFS, 2012). This matrix uses a combination of the probability of damage or loss and the magnitude of consequences associated with that damage or loss to determine a level of risk. The risk level is then used to determine if an emergency exists those determinations are presented in table 2 in the Hydrology report. Below are the VAR's that are susceptible to flood hazards only. For a detailed discussion of rock fall and debris flow threats to VAR's, please refer to the geology and soils reports.

- There is a potential flood threat to human life at campgrounds and dispersed camping areas adjacent to the South Fork Kings River at the southern periphery of the burn area (Table 3). These sites include:
 - Kirch Flat Campground
 - Gravel Flat
 - Bear Wallow
 - Bay Horse
 - Hermit Hole
 - Granite Dike

The above threats will be the most acute during the first runoff-producing storms, which typically occur in November, however, with a “strong” El Nino predicted for the 2015-2016 winter season, winter precipitation could occur as early as October, lasting through April. There will be a higher level of flood risk during the next three to five years until there is sufficient vegetative recovery to mitigate increased runoff.

Threats to Water Quality: Surface waters in the fire area will be bulked by ash, debris, and other floatable and transportable material during storm events. It is likely that stream flows from the first post-fire runoff producing rain events will see high concentrations of ash and fine sediment that will cause considerable turbidity and degradation of water quality and the beneficial uses of water. Beneficial uses of water are identified and protected by the California State Water Quality Control Board by regulation as found in Basin Plans. Beneficial uses are: municipal water supply, industrial process and service supply, agriculture, groundwater re-charge, contact and non-contact recreation, wildlife habitat, warm and cold water aquatic habitat, wetland habitat, rare species habitat, and spawning.

Water Quality: The most noticeable effects on water quality will be increased sediment and ash from the burned area into the North and South Fork of the Kings River and other waterbodies in and downstream of the fire area. This material could increase the rate of pool filling by fines,

which may affect aquatic habitat. Bulking of ash, debris, and sediment can also have a detrimental effect to hydroelectric infrastructure. Turbid water and debris can clog intakes and potentially affect turbines. As such, PG&E will be notified of these potential impacts.

Geology Assessment of Values at Risk:

Debris Flow Assessment: Assessing the probability and volume of debris flows draws upon empirical models developed from research in southern California and the Intermountain Western United States (De Graff et al., 2007; Cannon et al., 2010; DeGraff and Gallegos, 2012). The assistance of Dennis Staley at the US Geological Survey (USGS) was obtained for assessing the debris flow hazard. Their ongoing research has developed empirical models for forecasting the probability of their occurrence and the likely volume of such an event. These are tied to a storm size consistent with the type of precipitation event which may occur within the first few years after the wildfire. The storm size used for this analysis is consistent with an El Niño year, as is predicted by most (25 year storm event). USGS scientists were provided the geospatial fire perimeter and soil burn severity information. USGS conducted a debris flow assessment and provided their data. The results of the debris flow assessment were analyzed for values at risk within the Rough Fire Area.

Several channel crossings on Garnet Dike Road, PG&E road off Black Rock Road, the Rodgers Ridge area, and hiking trails (Rodgers Ridge Trail, Bear Wallow Trail, and Kings River Trail) were evaluated for debris flow potential. Garnet Dike Road is used by the public for camping, hiking, and rafting access. The PG&E private road is used exclusively by PG&E to access their reservoir. Rodgers Ridge is used for camping and hunting.

Rock Fall Assessment A map was prepared showing the road and trail segments which were downslope from areas affected by moderate or higher soil burn severity on slopes inclined more than 39% (see Figure 3). Field survey consisted traveling many of these roads and observing the size and number of rocks which had rolled onto the road during or since the fire. This information was used to establish the rockfall hazard. While all the designated roads and hiking trails could not be traveled due to the need to avoid active fire operations, blockage by trees (or rocks) or general safety considerations, the primary travel routes were surveyed. Rockfall hazards occur at Rodgers Crossing and a segment on Rodgers Ridge Road. However, the burn severity is mostly low and therefore will not significantly increase as a result of the fire. However, it is recommended that rockfall hazard be included in general hazard signs posted at primary access points to the burned area.

Consequences of the fire on Values At Risk

Geologic Values-at-Risk all indicate either a **threat** of causing **injury or fatalities** to people and/or **substantial to moderate property damage**. Debris flow threat was evident from the modeled results (Table 2 of geology report), and rockfall threat was evident from hill slopes ($\geq 40\%$). However, steep hill slopes above roads and trails were mostly burned at a low severity, making rockfall an existing condition that will receive little affect from the fire.

The USGS estimates of debris flow probability and volume is a low-moderate concern for the channel crossing on Garnet Dike Road, PG&E road off Black Rock Road, and the Rodgers Ridge area Roads. The probability of a debris flow occurring within the burned area will diminish over time, but should be planned for at least 2 to 3 years. In the event of a debris flow on Garnet Dike Road the primary stream crossings have low water crossings to accommodate debris flows; however, the low water crossings will be blocking by debris. These crossings contain evidence of historic debris flows and excavation of the road after seasonal storm events. The channel crossing on the PG&E road off Black Rock Road contains a recently constructed mounded barricade to stop the advance of debris flows onto the road. The roads on Rodgers Ridge and hiking trails are susceptible to debris flows.

Botany Assessment of Values at Risk: There is an emergency related to native vegetation recovery and diversity due to the introduction and expansion of invasive weeds on at least 11,115 acres of the burned area. Native vegetation was identified as a Critical Value by the BAER team, as there are few invasive weed infestations present in the majority of the burned area. The fire created conditions conducive to the establishment and rapid spread of invasive weeds known to be within and adjacent to the fire area. Furthermore, suppression activities have likely vectored invasive weed seeds into or through the burned area. As such, disturbed native communities in the burn area are at risk of an irreversible impact to native vegetation recovery. This BAER emergency can be mitigated by promptly detecting and treating newly established infestations to dramatically limit fire-related population growth.

Heritage Assessment of Values at Risk: SNF Heritage GIS data indicated that there were 75 archaeological and historic-era cultural resource sites in and within 100 meters of the fire area. This is not a complete list of cultural resource sites in the fire area, these sites represent the known information and their distribution across the landscape provides an adequate sample for this assessment. The field review strategy was to monitor sites with priority based on the following factors:

1. Sites within high-severity burned areas or close to drainage channels downslope of slopes burned with high severity. Such soils are more likely to experience erosion in a storm event. The risk would be loss or movement of archaeological components due to storm-caused erosion. The initial Soil Burn Severity map was reviewed and compared to the archaeological site location data. Only a small area of the fire was subject to high intensity burn, largely on the steep south-facing slopes of the canyon below Rodgers Ridge, west of Garlic Spur and east of Fox Canyon. A primary area of concern would be the Kings River drainage at the base of these steep slopes.
2. Estimated potential cultural or archaeological significance of the site, based on multiple rather than single cultural features (e.g. multiple bedrock milling features, midden and flaked stone vs. single bedrock milling feature). Another aspect was number and proximity of sites, where clusters of recorded sites would be considered more significant than isolated sites. The risk would be damage or loss of cultural material on archaeologically significant sites.
3. Sites in proximity to roads, trails and recreation sites, where the fire may have removed ground cover and vegetation and exposed sensitive archaeological or cultural materials. Areas of interest were along **CR 1000**. The risk would be loss or damage to archaeological sites by illegal collection and looting by the public.
4. Safety for the BAER archaeologists was another factor, where sites that were in areas with unsafe working conditions due to the fire or slope were not considered for assessment. Seventeen sites were assessed by the BAER archaeologist (23% of the total) between Sept. 1 and Sept. 3. Reconnaissance of these sites involved relocating them, documenting any observed impacts, taking photographs, getting locational data with GPS, and assessing values at risk. The risk assessment included the burn severity on site, whether site integrity would be compromised without treatment, and identification of any immediate effects from watershed degradation. The data was recorded on an Emergency Post-Fire Site Inspection Record for each site.

Sites of Cultural Significance:

Site complex (FS 05155400025 and others) when located, was not within the burned area, and no adverse effects are anticipated from the fire.

Site (FS 05155400233) was burned with a very low intensity. There is no increase in ground visibility due to the fire, and adverse effects are not anticipated from erosion or illegal artifact collecting.

Site (FS 05155400099) was burned over, but the pictograph was protected under a rock overhang, and no adverse fire effects were observed. Other prehistoric archaeological sites along the **REDACT** were largely unburned, as most of them are between **REDACT** and the river. Sites 05155400100 and 05155400098 were burned with low intensity fire. No adverse effects were observed, and the site surface constituents were not exposed.

Mining Sites: The mine sites along **REDACT** either burned with a low intensity, including FS 05155400900, 05155400859, and 05155200132, and unburned 05155400096. Any wooden features would have been consumed. No adverse impacts are expected from post-fire erosion. A cluster of **prehistoric** archaeological sites is located in the moderate to high intensity burned area including 05155400533, 05155400534, 05155400535, 05155400536, 05155400538 and 05155400547. Three of these were assessed, and found to have very low risk of adverse effects. These sites are located on mid-slope benches with little to no slope, and are armored with rock. Adverse post-fire erosion is unlikely.

B. Emergency Treatment Objectives (narrative):

As noted above, the threats are to life and property (road infrastructure) from increased erosion and sedimentation, flooding potential, and invasive weed infestation. However given the slope steepness, vegetative recovery, and amount of potentially treatable acreage within a subwatershed there are no land treatments which could be effectively implemented to minimize or reduce the threat. However to minimize the threat to soil productivity and ecosystem stability noxious weed detection surveys are being recommended. The team did thoroughly scrutinize and identify treatments for roads and trails where the potential threat to life and property exists.

- 1) To prevent injury, loss of life, and minimize damage of property by alerting the public of hazards that result from the post-fire emergency including the potential for flooding, debris flows, and loss of access.
- 2) Reduce the likelihood of loss of infrastructure along forest roads and trails. When undertaken solely to protect the road or trail investment, the cost for emergency stabilization should be less than the cost to repair damages after they occur. (BAER Guidance Paper September 2004).
- 3) Create public awareness by posting signs at key point of ingress into the fire areas.
- 4) Maintain the ecological integrity, soil productivity and vegetative diversity of the burned area by reducing the weed risk.

Areas at risk of poor native vegetation recovery and diversity in the Rough Fire North Zone were estimated by evaluating suitable invasive weed environments (areas of fire disturbance, including fire lines, drop points), vectors and pathways (roads, trails, fire lines), source invasive weed populations, and native vegetation recovery potential. These risk factors were combined into the BAER Risk Assessment matrix (please see Rough Fire North Zone BAER Botany Report) to determine high risk areas for invasive plant incursion, where detriment of native plant reestablishment could be significant. Early detection and rapid response (EDRR) treatments for invasive plant species would be completed in locations determined to be "Very High," "High" and "Intermediate" risk areas, including fire lines, and in places of mechanical equipment concentration. EDRR is a strategy developed to increase efficiency of weed work by combining surveying, mapping, and immediate treatment of new weed populations as they are discovered

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

Land NA Channel na

Roads/Trails 80 to 95 dependate on storm cycles

Protection/Safety 95

D. Probability of Treatment Success

Table 4. Probability of Treatment Success

Years after Treatment			
	1	3	5
Land	90	95	100
Channel			
Roads/Trails	80-95	90	95
Protection/Safety	95	95	95

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

The team was used the Value at Risk Calculation Tool Version 8.0.1 (November 2010) to assess the cost benefit of all the proposed treatments. Results of that analysis showed that non-market values and market values taken together justify the proposed treatments. See attached spreadsheets for values.

F. Cost of Selected Alternative (Including Loss):

Roads: Estimated cost of the proposed road treatments related to storm proofing and storm patrol for those roads are assessed and summarized in the road systems report are estimated at **REDACT**. The loss of these roads is estimated at **\$ 2.2 million**.

Trails Increased unauthorized access to the burned area is expected cost of treatments to mitigate this impact are estimated at **REDACT**. Prior to the first damaging rain events and within the first year, storm proofing is recommended to minimize erosion of the trail tread. Storm proofing treatments and patrol costs request are estimated at **REDACT**. Hazard signs are recommended on five hiking trails and on the Spanish OHV trail to warn of risks to life and safety. The cost for this is estimated at **REDACT**. Total trail treatments are estimated at **REDACT**. Cost of loss without treatment is predicted to be **\$145,167**.

Botany The rate of weed spread has been estimated at 10-20% per year, depending on the species and site conditions, but can be as high as 60% per year. The presence of known infestations and potential seed bank in the fire and fire perimeter, the lack of weed washing fire equipment, as well as the variety of vectors during the course of the fire, invasive plants will have ample opportunities to establish seedlings within the burned area. Careful surveying, mapping and control treatments, especially of new satellite populations, will be essential to reduce this risk. Estimated cost of treatments is **REDACT**. Losses to ecosystem stability and productivity without treatment are estimated at **\$960,000**.

G. Skills Represented on Burned-Area Survey Team:

- Hydrology Soil Engineering Range Forestry GIS
- Wildlife Botany Fire Mgmt. Fisheries Ecology Geology
- Archaeology Contracting Landscape Arch Research

Team Leaders: Eric Nicita
 Todd Ellsworth
 Barbara Drake

Email: **REDACT**
 Email: **REDACT**
 Email: **REDACT**

Off-Forest Team Members

Rusty LeBlanc Transportation System

Andy Stone Hydrologist
 Mark Linton Botany
 Kendal Young Botany Trainee
 David Annis Geology
 Casey Jones Trails
Forest Team Members or Adjuct (A) Team Members
 Cliff Riley Hydrologist Trainee
 Kellen Takenaka Soil Scientist
 Marcos Rios Transportation System Trainee
 Steve Marsh (A) Archeology

H. Treatment Narrative:(Describe the emergency treatments, where and how they will be applied, and what they are intended to do. This information helps to determine qualifying treatments for the appropriate funding authorities. For seeding treatments, include species, application rates and species selection rationale.)

Land Treatments Noxious Weed Detection Surveys: Detection surveys in “Very High,” “High” and “Intermediate” risk areas (up to 1,115 acres of the 11,225 acres at risk) , would be conducted in spring (or as soon as the weed species are identifiable) to detect and control early season invasive weeds and/or in the summer to detect and control late season invasive weeds. Infestations will be mapped with GPS, photographed, and flagged with invasive weed tape. New or isolated infestations would be manually removed during survey and mapping (EDRR). For most invasive non-native species likely to occur in or near the Rough Fire North Zone area, hand pulling consists of pulling the plant up by the roots and bagging for disposal if flowers or seed heads are present.

Surveys and treatments would be conducted by a two-person crew, with the goal of timing the visits appropriately so that when possible only one visit per site is needed. However, depending on phenology, infestation size, and treatment strategy, some infestations may be treated more than once. Emergency surveys and treatments will be conducted for one year only with BAER funds per BAER policy. Survey and treatment in subsequent years may be accomplished through a combination of Forest Service program funding or coordination with other partners. EDRR surveys as described above would be conducted on fire lines, including road prisms, (62.5 miles) and equipment concentration points (31.2 acres) using methods described in the Land Treatment section.

Table 5. Cost of Noxious Weed Dectection and Rapid Response

		366 acres, including 63 miles of fire line		485 additional burned acres		265 additional burned acres	
Estimated Cost for Invasive / Noxious Weed Surveys		Priority 1 (Very High Risk)		Priority 2 (High Risk)		Priority 3 (Intermediate Risk)	
Item	Daily Rate per person	# Days (8 hr/day)	Total	# Days (8 hr/day)	Total	# Days (8 hr/day)	Total
Invasive Species Survey and Treatments							
Personnel							
GS- 11 Botanist (hiring, training, supervision, reporting)							
GS-7 Temporary Botanist (Survey and Treatments)							
Personnel Subtotal							
Materials and Supplies							
Vehicle Mileage (survey and treatment)							
Supplies & Materials (trash bags, gloves, safety items; etc.)							
Total Weed Survey and Treatment							



Funding is being requested for priorities 1 and 2.

Channel Treatments No channel treatments are recommended

Roads and Trail Treatments

Life and Safety: Treatments to mitigate the threat to life and safety in the severely burned watersheds along roads 31N13, 31N51, 31N51A, and 31N51B include install traffic control gates and BAER Warning and Information signs at the beginning of these road systems.

Property: Roads 31N13, 31N17, 31N17 A & B, 31N23 and 31N51A, are located in moderate to severely burned watersheds and are likely to be at risk of road drainage features failing due to the increased flow of water and sediment moving into culvert inlets, overside drains, roadway dips and runouts. To mitigate the risk to invested road improvements (property) install vertical riser pipes, metal end sections, rock lined relief dips with associated rock spillways, intercepting rolling dips, and storm inspection and response.

Resource Values / Water Quality: Road 31N13 is located upslope of Hayfork Creek in a severely burned watershed, Hayfork Creek is likely to receive increased water flow and sediments loads from the burnt hill slopes above, and is at risk of increased sediments loads from the large 60" culvert and associated fill slope if it should fail. Install vertical riser pipe (snorkel) on the 60" culvert, construct a rock lined relief dip on the road down grade of the culvert crossing with associated rock lined spillway on the down hill fill slope, reconnect to channel.

Road Treatments Cost Estimate

Treatments to Mitigate the Emergency

Life and Safety: proposed BAER road treatments to mitigate the emergency for Black Rock road 11S12 and Ferguson road 11S012C are to install warning signs at main entry points on road 11S12, inspect road after damaging storms for rock fall and debris flows identify problem areas respond as needed with personnel and heavy equipment. Proposed emergency treatments for the Garnet Dike road 12S001 include installing a new gate with associated road closure and information signs near the bridge at the beginning of the road, install Baer warning signs at entry points and flash flooding signs both sides at identified road crossings, inspect road after damaging storms for rock fall and debris flows identify problem areas and respond as need with personnel and heavy equipment. Proposed Baer road treatments as related to life and safety along the Rogers Ridge road 11S007 are to install Baer warning signs at main entry points and install rock fall signs on both sides of potential rock fall areas. Inspect roads after damaging storms when able and safe to access, identify problem areas respond as needed with personnel and heavy equipment.

Property road segments in high severity burned areas along the Rogers Ridge road 11S007 and associated secondary ML-2 spurs 11S044B and 11S045A are proposed for BAER road treatments, to mitigate the emergency to invested road improvements and assure access. Road treatments include installing culvert inlet modification, installing critical dips, installing drainage armor (rock), replacing culvert drop inlet covers, culvert removal, installing armored low water crossings, restoring drainage function and storm inspection and response. Deferred road maintenance of drainage features has resulted in many culverts inlets to be functioning at less than full design capacity. Although it is recognized that BAER is not intended to correct past maintenance deficiencies, the changed post fire condition has created an urgency for correction and storm proofing of some of these drainage features along the roads in the high severity burned watershed above the road.

Table 6. Cost per Road

Road #	BAER Cost
11S007	\$
11S012	\$
11S044B	\$
11S045A	\$
12S001	\$
TOTAL Estimate	\$

Estimate Includes Mob & Overhead (contract prep, administration, implementation)

Table 7. Cost Benefit Matrix

Road #	Name	Miles Treated	Treatment Cost	Cost/Mile	Road Value/Mile
11S007	RODGERS RIDGE	3.6	\$		
11S012	BLACKROCK	3.12	\$		
11S044B	SHIPROCK	0.8	\$		
11S045A	MARGIN	1.21	\$		
12S001	GARNET DIKE	7	\$		

Proposed BAER Road Treatments

- Install Gate (stockyard gate Powder River).
- Install Road Closure and Information signs.
- Install Flash Flooding signs.
- Install Rock Fall signs.
- Install Baer Warning signs.
- Install drop inlet wooden covers (replace damaged covers).
- Install culvert inlet modifications (metal end sections).
- Install low water crossing with drainage armor (class 3 rock).
- Install critical dip with drainage armor (class 2 rock).
- Restore drainage function (culvert inlets and outlets, roadway ditch lines rolling dips and run-outs, maintain cross slopes of roads).
- Remove and dispose existing 24” culvert.
- Storm Inspection and Response.

III. Treatments to mitigate the flooding emergency

To protect life and property at campgrounds and dispersed camping areas along the South Fork of the Kings River, Forest Service road 12S01 (Sierra National Forest) should be closed from October, 2015 to April, 2016. Signage notifying the public of flood, rock fall and debris flow

hazard should be installed at the point of closure.

To protect life and property at Kirch Flat campground along the South Fork of the Kings River, the campground should be closed from October, 2015 to April, 2016. Signage notifying the public of flood flow hazard should be installed at the point of closure

OHV (Off Highway Vehicle) Trespass

Increased unauthorized access to the Rough Fire burned area is expected to occur due to removal of vegetation. Unauthorized access is a threat to the burned watersheds. Erosion, spread of invasive species, damage to cultural sites, destruction of rare plant and native plant communities, disturbance to wildlife, destruction of wildlife habitat, and risks to public safety can result from unauthorized access. The BAER Assessment team has identified areas off the Spanish OHV trail and 11S025A for example, within the burned area for barriers to prevent unauthorized off highway vehicle access: Old, previously closed skid trails and routes that were grown over are now exposed . These areas offer easy unauthorized OHV access to burned areas and thus are recommended for blocking and signage to protect vegetative recovery.

Blocking will consist of installation of native on site materials, Funding for crews to construct the barriers and signage is requested. This will also require limited heritage clearance for the ground disturbance,

Through past experience, the BAER Team determined that signage, and barriers, installed to discourage soil disturbance and assist in allowing natural vegetative recovery, are not effective without enforcement patrol. Therefore, additional funding is requested to monitor effectiveness these barriers. Funding is also requested for District FPOs to patrol within and adjacent to the burned area to enforce the physical barriers and deter unauthorized access, on National Forest System lands.

Table 9. OHV (Off Highway Vehicle) Trespass

Item	Unit	Unit Cost	# of Units	Cost
OHV Techs. X4	Days	REDACT		
GS-11 Archaeologist Clearance	Days			
GS-12 Recreation Specialist	Days			
Misc. Supplies	EACH			
Carsonite Posts and stickers	Each			
1-GS-7 Patrol	Days			
Mileage for Patrol	Miles			
Total Cost				

Trail Storm Proofing (motorized and non-motorized):

Prior to the first damaging rain events and within the first year following the fire, storm proofing is recommended to minimize erosion of the trail tread. Storm proofing treatments, implemented with hand-tools, would include out-sloping, de-berming, water-bars, armored crossings at ephemeral drainages, and other suitable treatments outlined in the BAER Treatments Catalog to protect the trails from accelerated post fire flows and soil erosion. Rogers Ridge, Cliff Camp, Bear Wallow, Statham, Kings River NRT hiking trails and Spanish OHV trail would be treated. Repairs are recommended for at least 4 miles of hiking trails and 2 miles of OHV trail (total of approximately 6 miles) within high and moderate soil burn severity where high watershed responses are anticipated.

Table 10. Implementation Crew Labor Cost and Project Oversight (Trail Specialist)

Item	Unit	Unit Cost	# of Units	Cost
Wilderness Techs.x 4	Days			
GS-12 Recreation Specialist	Days			
Fire crew (hazard tree mitigation)	Days			
1 GS-11 Archaeologist Clearance	Days			
Supplies	Each			
Travel (mileage)	Miles			
Total Cost				

REDACT

Protection/Safety Treatments:

Hazard Signs for Debris Flow: An emergency exists for threat of life or injury to individuals using Garnet Dike Road, and segments of PG&E’s road off Black Rock Road, Rodgers Ridge, and the three hiking trails within the Rough Fire. This threat stems from debris flow activity attributable to the changed conditions created by the wildfire. There is also a threat from rockfall at Rodgers crossing and segments of Rodgers Ridge Road, but this threat is existing and is not significantly affected by the wildfire

Table 11. Debris Flow Warning Sign by location

Treatment Costs ID	Line Item	Units	Unit Cost	Quantity	BAER Cost
Rodgers Ridge Trail	Debris Flow Warning Sign	EA			
Bear Wallow Trail	Debris Flow Warning Sign	EA			
Kings River Trail	Debris Flow Warning Sign	EA			
Garnet Dike Road	Debris Flow Warning Sign	EA			
Rodgers Ridge Roads	Debris Flow Warning Sign	EA			

REDACT

Hazard Signs for motorized and non-motorized trails: To inform trail user life/safety, hazard signs are recommended on five hiking trails and on the Spanish OHV trail. Following the first winter, the trail and watershed conditions should be evaluated to determine if hazardous conditions still exist. Closure would be implemented through the issuance of a forest order or area closure and trailhead signage.

Table 12 Hazard Sign Development and Placement

Item	Unit	Unit Cost	# of Units	Cost
GS-12 Recreation Officer	Days			
Hazard signs (includes installation)	Each			
Misc. Supplies	each			
Travel (Mileage)	Miles			
Total Cost				

REDACT