

Report Date: 9-16-16

**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: Cedar FireB. Fire Number: CA-SOF-002595C. State: CaliforniaD. County: Kern/TulareE. Region: 05 – Pacific SouthwestF. Forest: 13 – SequoiaG. District: Kern River/Western DivideH. Fire Incident Job Code: P5KME1 (0513)I. Date Fire Started: August 16, 2016J. Date Fire Contained: September 24, 2016K. Suppression Cost: \$54,500,000 as of Sept. 5

## L. Fire Suppression Damages Repaired with Suppression Funds

1. Fireline waterbarred (miles): 93.8 miles total on fire; 9.6 miles as of 9-11-16  
 2. Fireline seeded (miles): 0 miles  
 3. Other (identify): 0

M. Watershed Number(s): (6<sup>th</sup> level hydrologic units, percent of watershed acres within fire perimeter):

6th Field HUC	Subwatershed Acres	Forest Service (Acres) In Fire Perimeter	% Subwatershed Burned
Bull Run Creek	21,114	13,950	66
Coral Creek – Kern River	35,914	950	3
Headwaters White River	13,100	340	3
Isabella Lake – Kern River	30,431	1,420	5
Sandy Creek – Poso Creek	18,952	7,400	41
Upper Cedar Creek	23,588	4,490	19

N. Total Acres Burned: 29,200 Acres

Sequoia NF (28,210), Other Federal (70), State (0), Private (920)

**O. Vegetation Types:** The dominant vegetation communities within the fire perimeter include Conifer (White fire, Sierra Nevada mixed conifer, red fire, and ponderosa pine), hardwood (Bigleaf maple, white oak, black oak, and canyon live oak), Mixed Conifer and Hardwood Forest/Woodland and Shrub (mixed and montane chaparral). Stands in the eastern portion of the fire burned in 1990 and subsequently either planted or regenerated. These stands have a very high brush component, mostly whitethorn and manzanita.

Vegetation Cover Type	Percent
Grassland	1.6
Red Fir	7.0
White Fir	26.6
Sierra Nevada Mixed Conifer	24.2
Pacific Ponderosa Pine	6.8
California Black Oak	10.0
Canyon Live Oak	4.0
Black Oak-Digger Pine	0.8
California Coast Live Oak	0.4
Chaparral	18.5

**P. Dominant Soils:**

Soils range from very shallow to deep, with most soils being moderately deep, depending on landscape position and parent materials. Parent materials include igneous (granite, granodiorite, biotite, tonalite, etc.), metamorphic, and metavolcanic rocks. In general, soils at higher elevations are characterized by steep slopes, high surface and profile rock content, and minimal horizon development. Soils that support productive timber production are best characterized as deep, loamy soils and have high organic matter content and therefore serve as an effective sink for atmospheric carbon. Soils in meadows are also deep, with high inherent organic matter content and therefore sequester large amounts of carbon. Soils on northern aspects tend to be deeper and more productive due to higher moisture content while soils on south facing slopes tend to have lower nutrient status and organic matter content due to more droughty conditions. Surface soil textures range from coarse sandy loams to loams, some with gravelly texture modifiers. Coarse sandy soils are generally derived from granitic parent materials while loamy soils originated from metasedimentary and metavolcanic materials.

Soil Series	Taxonomic Classification	Acres
Auberry-Cieneba-Rock Outcrop complex, 10 to 30 percent slopes	Fine-loamy, mixed, semiactive, thermic Ultic Haploxeralfs and Loamy, mixed, superactive, nonacid, thermic, shallow Typic Xerorthents	196
Auberry-Cieneba-Rock Outcrop complex, 30 to 50 percent slopes	Fine-loamy, mixed, semiactive, thermic Ultic Haploxeralfs and Loamy, mixed, superactive, nonacid, thermic, shallow Typic Xerorthents	322
Chaix-Rock Outcrop-Chawanakee complex, 30 to 50 percent slopes	Coarse-loamy, mixed, superactive, mesic Typic Dystroxerepts and Loamy, mixed, active, mesic, shallow Typic Dystroxerepts	6,613
Chaix-Rock Outcrop-Chawanakee complex, 50 to 75 percent slopes	Loamy, mixed, superactive, nonacid, thermic, shallow Typic Xerorthents and Loamy, mixed, active, mesic, shallow Typic Dystroxerepts	7,069
Cieneba-Rock Outcrop complex, 50 to 75 percent slopes	Loamy, mixed, superactive, nonacid, thermic, shallow Typic Xerorthents	2,885
Dome-Chaix-Rock Outcrop association, steep	Coarse-loamy, mixed, superactive, mesic Typic Dystroxerepts and Loamy, mixed, superactive, nonacid, thermic, shallow Typic Xerorthents	2,155
Dome-Rock Outcrop-Chaix complex, 30 to 50 percent slopes	Coarse-loamy, mixed, superactive, mesic Typic Dystroxerepts	1,506
Holland-Bohna association, steep	Fine-loamy, mixed, semiactive, mesic Ultic Haploxeralfs and Fine-loamy, mixed, superactive, thermic Typic Argixerolls	482

Holland-Dome-Chaix association, moderately steep	Fine-loamy, mixed, semiactive, mesic Ultic Haploxeralfs and Coarse-loamy, mixed, superactive, mesic Typic Dystroxerepts and Loamy, mixed, superactive, nonacid, thermic, shallow Typic Xerorthents	173
Holland-Shaver association, steep	Fine-loamy, mixed, semiactive, mesic Ultic Haploxeralfs and Coarse-loamy, mixed, superactive, mesic Humic Dystroxerepts	468
Livermore Family-Rock Outcrop complex, 30 to 50 percent slopes	Loamy-skeletal, mixed, superactive, thermic Typic Haploxerolls	612
Rock Outcrop-Cieneba complex, 50 to 75 percent slopes	Loamy, mixed, superactive, nonacid, thermic, shallow Typic Xerorthents	624
Rock Outcrop-Cieneba-Chawanakee complex, 30 to 75 percent slopes	Loamy, mixed, superactive, nonacid, thermic, shallow Typic Xerorthents	2,538
Shaver-Chaix association, very steep	Coarse-loamy, mixed, superactive, mesic Humic Dystroxerepts and Loamy, mixed, superactive, nonacid, thermic, shallow Typic Xerorthents	1,430
Wind River Family-Monache Variant, drained, warm association, sloping	Coarse-loamy, mixed, superactive, mesic Ultic Haploxerolls and Coarse-loamy, mixed, superactive, frigid Cumulic Ultic Haploxerolls	466
Woolstalf-Rock Outcrop complex, 30 to 50 percent slopes	Loamy-skeletal, mixed, superactive, mesic Pachic Ultic Haploxerolls	819
Xerofluvents-Xerorthents-Riverwash association, sloping	Xerofluvents-Xerorthents-Riverwash association, sloping	355

**Q. Geologic Types:** Surficial geology is primarily composed of Cretaceous Period coarse-grained biotite granite, with some hornblende and granodiorite (8965 ac.); medium-grained, fairly dark tonalite (5,441 ac.); dark hornblende and biotite granite (5,210 ac.); fine- to coarse-grained rocks of varied texture, some muscovite bearing (3196 ac.); small, nearly round plugs of biotite granite (plutons) that intrude the granite of Kern River (1,660 ac.); fine-grained granodiorite with coarser biotite (1,352 ac.); Monzogranite of Butler Peak - Fine- to medium-grained muscovite-biotite monzogranite (808 ac.); dominantly dark, thick-bedded to massive, quartzite; tuffaceous and other metavolcanic rocks (246 ac.) and Triassic Period siliceous pelite and thin calcareous beds; massive marble (1,992 ac.).

**R. Miles of Stream Channels by Order or Class:** **Perennial: 36 miles (34 on SONE)** **Intermittent/Ephemeral: 33.3 (32 SONE) miles**

**S. Transportation System: Trails: 27 miles Roads: 86.5 miles**

### **PART III - WATERSHED CONDITION**

**Burn Severity on NF Lands (acres): 2,611 (unburned) 10,271 (low) 10,636 (moderate) 4,607 (high)**

**Acres by Burn Severity on FS Lands in 6<sup>th</sup>-Field Hydrologic Units**

6 <sup>th</sup> -Field Subwatershed	High	Moderate	Low	Unburned	Total acres Burned	Subwatershed acres on Forest
Bull Run Creek	2,693	6,609	3,687	570	12,988	13,558
Coral Creek - Kern River	24	418	428	77	870	946
Headwaters White River	0	7	142	185	149	334
Isabella Lake - Kern River	21	522	664	206	1,206	1,412
Sandy Creek - Poso Creek	951	1,596	3,605	1,246	6,151	7,397
Upper Cedar Creek	918	1,484	1,745	327	4,146	4,473
<b>Grand Total</b>	<b>4,607</b>	<b>10,636</b>	<b>10,271</b>	<b>2,611</b>	<b>25,520</b>	<b>28,120</b>

**B. Water-Repellent Soil (acres): 6,094**

Watershed	Low	Moderate	High	% Watershed Burned
Bull Run Creek (180300010603)	225.8	1,493.2	1,814.3	25.4
Corral Creek-Kern River (180300010604)	25.7	91.9	15.7	14.1
Headwaters White River (180300050201)	8.5	1.6	0.1	3.1
Isabella Lake-Kern River (180300010607)	47.5	119.9	13.4	11.5
Sandy Creek-Poso Creek (180300040101)	229.1	352.1	617.9	15.4
Upper Cedar Creek (180300040102)	106.4	330.9	597.9	22.9
<b>Total</b>	<b>643.62</b>	<b>2,389.6</b>	<b>3,059.3</b>	<b>--</b>

**C. Soil Erosion Hazard Rating (acres):**

Watershed	Low	Moderate	High	Very High
Bull Run Creek (180300010603)	2,582.3	4,766.4	4,332.6	1,721.9
Corral Creek-Kern River (180300010604)	90.4	329.0	399.6	19.9
Headwaters White River (180300050201)	164.3	80.5	3.9	None
Isabella Lake-Kern River (180300010607)	267.1	429.9	675.4	19.5
Sandy Creek-Poso Creek (180300040101)	2,381.0	3,138.2	1,256.3	742.0
Upper Cedar Creek (180300040102)	518.7	1,392.7	1,438.3	804.7
<b>Total</b>	<b>6,003.8</b>	<b>10,136.7</b>	<b>8,106.1</b>	<b>1,566.2</b>

**D. Erosion Potential: 12.32 ton/acre**

**E. Sediment Potential: 8,673.28 cubic yards / square mile**

**PART IV - HYDROLOGIC DESIGN FACTORS**

A. Estimated Vegetative Recovery Period, (years): 2 to 3

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

C. Equivalent Design Recurrence Interval, (years): 2, 5, and 10

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

E. Design Storm Magnitude, (inches): 1.92, 2.56, and 3.12"

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

Bull Run Creek	<u>10.0</u>
Corral Creek-Kern River	<u>12.9</u>
Headwaters White River	<u>13.3</u>
Isabella Lake-Kern River	<u>14.7</u>
Sandy Creek-Poso Creek	<u>11.7</u>
Upper Cedar Creek	<u>11.0</u>

G. Estimated Reduction in Infiltration, (percent): 4.7 to 177%

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

Bull Run Creek	<u>18.65</u>
Corral Creek-Kern River	<u>13.13</u>

Headwaters White River	<u>13.26</u>
Isabella Lake-Kern River	<u>15.02</u>
Sandy Creek-Poso Creek	<u>14.71</u>
Upper Cedar Creek	<u>13.17</u>

#### **PART V - SUMMARY OF ANALYSIS**

**Background:** The Cedar Fire was reported on August 16, 2016 in the Cedar Creek drainage and progressed north and northwest toward the communities of Balance Rock, Panorama Heights, and Sugar Loaf. Eventually it moved southeast toward Wofford Heights and then northeast into the Stormy Creek drainage and Baker Ridge. Hot, windy conditions combined with very dry fuels and drought stressed conifers caused the fire to grow quickly. The California Interagency Incident Management Team 5 took over command on August 20th. At the fire's height's 2,436 personnel were assigned to the fire. The Sequoia National Forest Type 3 Incident Management Team took over the Cedar Fire Thursday morning, September 8. The Cedar fire burned the eastern and western sides of the Greenhorn Mountains on the Western Divide and Kern River Ranger Districts.



## A. Describe Critical Values/Resources and Threats:

### Summary of Issues:

Critical Value	Value at Risk	Drainage with Value	Risk	Threat Description
Human Life & Safety Property	Roads Motorized Access	Sandy Poso Creek Upper Cedar Creek Isabella Lake Kern R. Bull Run Creek Coral Creek Kern R. Headwaters White R.	Very High Very High** NA Very High Very Low Low	Post-fire watershed conditions threaten public and employee life and safety using the Forest Service roads within the fire perimeter. Many roads are downslope of high/moderate severity burned areas increasing the risk from debris flows, increased runoff, and erosion from over-steepened slopes during storm events. These events can plug culverts, erode roadbeds, and trap the public behind damaged areas. There is also an increased risk from burned, hazard trees, and rock fall across the high and moderate burn severity areas.
Human Life & Safety Property	Highway 155	Upper Cedar Creek Isabella Lake Kern R.	Very High High	Post-fire watershed conditions threaten the life and safety of traffic on Highways 155. Portions of the highway is downslope of high/moderate severity burned areas increasing the risk from debris flows, rolling rocks, runoff, and erosion during storm events. Many evaluated highway culverts are undersized and/or partially plugged. Debris flow and/or bulking from ash, sediment, and woody debris could block the culvert at the 155 crossing, potentially causing bypass, and in extreme cases, road prism failure. Highway culvert on Cane Creek has large debris above that could block it. Post-fire events can further plug small culverts, erode roadbeds, and stop access on one of the key highways from the Kern River valley to the San Joaquin Valley.
Human Life & Safety Property	Homes, Buildings	Sandy Poso Creek  Upper Cedar Creek Isabella Lake Kern R. Bull Run Creek Coral Creek Kern R. Headwaters White R.	Intermediate except Very High at Peel Mill Cr. Way Intermediate High NA NA NA	Primary/secondary homes and recreational residences occur downstream within the Sandy Poso drainage. There are also recreational residences in the Weeping Spring, Slick Rock, and Alder Summer Home Creek tracts in the Upper Cedar drainage, and homes within Wofford Heights in the Isabella Lake Kern River drainage. Some of these areas face post-fire risk from moderate and high severity burned slopes above. Most homes in the Poso Park, Panorama, Balance Rock, Pleasant View, and Spear Creek are out of the floodplain with the exception of the Peel Mill Cr. Way. Decks, gardens, driveways, and footbridges, however, are in or adjacent to stream channels. One culvert on Hwy. 155 may plug from high erosion hazard that if plugged would go over the road and down into some Weeping Spring roads/homes.

<b>Property</b>	<b>Campgrounds</b>	Sandy Poso Creek Upper Cedar Creek Isabella Lake Kern R. Bull Run Creek Coral Creek Kern R. Headwaters White R.	Very Low Very High NA High/Low NA NA	The Gooseberry, Tiger Flats, and Panorama campground/dispersed sites were lightly burned or unburned. All of these sites are not in hillslope positions where post fire erosion and runoff would impact them. Hazard trees pose a high risk to several sites and the entrance at the Panorama campground. The Cedar Creek campground and roads are at very high risk from higher flows and debris flows due to extensive burned hillslopes in the headwaters. 50% of the campsites are adjacent to the stream.
<b>Property</b>	<b>Trails</b>	Sandy Poso Creek Upper Cedar Creek Isabella Lake Kern R. Bull Run Creek Coral Creek Kern R. Headwaters White R.	High to Very High Very High NA High to Very High Very Low NA	Post-fire watershed conditions threaten the life and safety of visitors using the Forest Service trails within the fire perimeter. Trails are downslope of high/moderate severity burned areas increasing the risk from debris flows, increased runoff, and erosion from over-steepened slopes during storm events. These events can wash out the trail tread and damage other infrastructure. There is also an increased risk to visitors from hazard trees.
<b>Natural Resources</b>	<b>Native or naturalized communities non-forested</b>	Sandy Poso Creek Upper Cedar Creek Isabella Lake Kern R. Bull Run Creek Coral Creek Kern R. Headwaters White R.	Very High Very High Very High Very High Very High Very High	Field reviews indicate that there is a risk of noxious weed invasion along roads, handlines and dozerlines used during fire suppression activities. There is a high likelihood that noxious weed seeds were brought into the area by fire equipment and weeds were spread through the fire from suppression activities through local noxious weed infestations in and around the fire. The slow natural regeneration following moderate to high burn severity also leaves some areas at risk. Known noxious and invasive weed populations are expected to aggressively compete with native species for space and nutrients in burned areas.
<b>Cultural &amp; Heritage Resources</b>	<b>Cultural Sites</b>	Sandy Poso Creek Upper Cedar Creek Isabella Lake Kern R. Bull Run Creek Coral Creek Kern R. Headwaters White R.	NA Low to Very High NA Very Low/Intermediate NA NA	The majority of cultural sites (mortar cups in rock outcrops, mine adits, etc.) occur in locations that are not prone to postfire debris flows and erosion. Some sites occur in low severity burn areas with minimal groundcover loss, while others have lost ground cover but are not obvious to the public thus reducing the risk from looting. One site (Trixie Prospect) has landscape features (collapsed shafts, trench), and artifacts. These features are at high risk from debris flows, surface erosion, and runoff.
<b>Property</b>	<b>Community Water Sources (Orient Water Supply)</b>	Sandy Poso Creek Upper Cedar Creek Isabella Lake Kern R. Bull Run Creek Coral Creek Kern R. Headwaters White R.	NA NA NA Very High NA NA	The Kernville and part of the Wofford Heights Community water system is at very high risk due to relatively large area of moderate and high severity burn in the headwaters of the Bull Run drainage that flows into the North Fork Kern River. Storms can increase sediment and ash into the water system damaging filtration systems and causing the water system to shut down for several days until the turbidity had past.

Natural Resource	Soil Productivity	Sandy Poso Creek Upper Cedar Creek Isabella Lake Kern R. Bull Run Creek Coral Creek Kern R. Headwaters White R.	High High High High High Very Low	<p>There are 7,003 acres of suitable timberland within the fire perimeter of which 1,700 acres burned at high and 2,443 acres burned at moderate severity. Timber production soil suitability is based successfully restocking stands within 5 years after harvest. It is unlikely these acres will be restocked within 5 years, so they are not likely to return to timber suitability for 5-10 years. Additionally, we've lost substantial carbon storage from soils that exhibit high and moderate soil burn severities, which serves as the long term nutrient supply for vegetation and microfauna. Soil pH has increased due to soil heating in moderate and high burn severities that results in denaturation of organic acids. It is reasonable to expect soil temperatures to remain higher than normal due to increased solar insolation, further exacerbating reforestation success. Oxidation of C has also reduced water holding capacity of the soils, meaning that microfaunal habitat is reduced.</p>
------------------	-------------------	--	--	---

\* Hazard trees only, \*\* Hazard trees low risk, NA – Not Applicable



## B. Emergency Treatment Objectives:

The goal of the burned area emergency rehabilitation is to:

- Reduce threats to human life and safety to users of roads and protect road infrastructure in high and moderate severity burn areas in Sandy Creek-Poso Creek, Upper Cedar Creek, and Bull Run Creek subwatersheds (e.g. overflow structures, enlarging culverts that could plug, and dropping select hazard trees on roads that can't be closed).
- Reduce threats to human life and safety by installing warning signs and conducting road storm patrols.
- Reduce threats to human life and safety to visitors using the Forest Service campgrounds and trails within the fire perimeter and protect the trail infrastructure downslope of high/moderate severity burned areas from debris flows, increased runoff, and erosion from over-steepened slopes during storm events.
- Control expected invasion of noxious weeds within the area, especially along and adjacent to Forest roads and dozer lines used by fire equipment and in existing populations.
- Characterize the Trixie Prospect archaeological site before erosion, runoff, and debris flows damage historically significant landscape features.

## Objective:

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

Land 85 % Channel NA % Roads/Trails 75 % Protection/Safety 100 %

## D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land (Cultural Protection)	100	90	90
Land (Noxious Weeds)	70	60	50
Roads (Drainage and Erosion Control)	80	75	70
Trails (Drainage and Erosion Control)	80	75	70
Protection/Safety (Hazard Trees)	100	85	70
Protection/Safety (Road Gates)	100	90	80
Protection/Safety (Campground Closure)	100	90	75
Protection/Safety (Road and Trail Warning Signs)	90	80	75

## E. Cost of No-Action (Including Loss): Refer to Values at Risk (VAR) spreadsheet for specific information

- Market Resource Values (direct losses and loss of use): \$5,515,400
- Cedar Fire Treatment Cost: \$743,798
- Expected benefit of treatment: \$4,743,244
- Benefit/cost ratio: 6.4

## F. Cost of Selected Alternative (Including Loss): Refer to (VAR) spreadsheet for specific information

## G. Skills Represented on Burned-Area Survey Team:

<input checked="" type="checkbox"/> Hydrology	<input checked="" type="checkbox"/> Soils	<input type="checkbox"/> Geology	<input type="checkbox"/> Range	<input checked="" type="checkbox"/> Recreation
<input type="checkbox"/> Forestry	<input type="checkbox"/> Wildlife	<input type="checkbox"/> Fire Mgmt.	<input checked="" type="checkbox"/> Engineering	
<input type="checkbox"/> Contracting	<input type="checkbox"/> Ecology	<input checked="" type="checkbox"/> Botany	<input checked="" type="checkbox"/> Archaeology	
<input type="checkbox"/> Fisheries	<input type="checkbox"/> Research	<input checked="" type="checkbox"/> GIS	<input type="checkbox"/> Landscape Arch	

Team Leader: John Chatel, Pacific Northwest TES Program Manager

Email: jchatel@fs.fed.us

Phone: 503-808-2972

FAX: 503-808-2469

**Team Members:**

<b>Name</b>	<b>BAER Position</b>
John Chatel, PNW RO	BAER Team Leader
Chris MacDonald, Kaibab NF	Soils
Lizandra Nieves-Rivera, Willamette NF	Soils
Andy Stone, Sequoia NF	Hydro
Marcos Rios, Sequoia NF	Engineering
Peter Landucci, Sequoia NF	Engineering
Tim Kelly, Sequoia NF	Heritage
Kenneth Elsner, FWS Lakewood Field Office	GIS
Lisa Brehm, Ottawa NF	GIS
James Munoz, Santa Fe NF	Recreation
Fletcher Linton, Sequoia NF	Botany

**H. Treatment Narrative:**

**Land Treatments:**

**Cultural Treatments**

**Purpose of Treatment:** The site is located in an area of high intensity and severity burn. Consultation with the forest hydrologist as well as the BAER soil scientists suggests that the steep slopes around the site as well as the soil of the archaeological features themselves (many of which possess slopes well beyond angle of repose) are extremely susceptible to erosion. As much of the site's significance is tied to the shape of the landscape, erosion could pose a significant adverse effect to the site. The proposed treatments would capture the morphology of archaeological features in the site to preserve at least some record of the historical significance of the site as expressed through its features. Morphological features and artifacts will be captured through a combination of plane-table survey and geo-tagged photos.

**General Description:** The site was rated as a very high risk due to erosion, runoff, and debris flow risk upslope. The project will mitigate potential loss of the cultural landscape at the Trixie Prospect (site 0513540151H) with a combination of geo-tagged photos and plane table survey using a Crew of three GS-5 archaeological technicians for 10 days.

**Location (Suitable) Sites:** Site 0513540151 is in the headwaters of Cedar Creek.

**Design/Construction Specification(s):** Document the morphology of the cultural landscape including archaeological features with a combination of geo-tagged photos and plane table survey.

**Noxious Weeds Early Detection Rapid Response**

**Purpose of Treatment:** Prevent establishment of new infestations and spread of existing infestations. Evaluate and eliminate the potential for noxious invasive weed establishment and spread, in selected high priority affected by the Cedar fire suppression activities.

**General Description:** Known infestations (Yellow Starthistle, Spanish Broom, Italian Thistle, and Tocolote) and areas of increased probability of infestation (e.g. Roads, suppression repair of fire control lines, drop points, helispots, staging areas, areas of moderate to high burn severity, and BAER implementation impacts within the Cedar Fire perimeter will be assessed for potential spread or expansion. Inspect selected areas and monitor for newly established weed occurrences. Monitoring will include documentation and hand pulling small new weed occurrences at the time of inspection. New weed occurrences will be pulled to root depth, placed in sealed plastics bags, and properly disposed. Documentation of new infestations will include:

- GPS negative and positive inspection results
- Incorporate data into GIS spatial database
- Establish photo points
- Map perimeter of new infestation
- Estimate number of plants per square meter
- Treatment method
- Dates of treatment
- Evaluate success in subsequent inspection
- Inspections and monitoring should be accomplished during May/June 2008. Based upon the first year's survey, additional surveying may be requested for up to three years. BAER funding is only requested for the first year after fire.

**Location (Suitable) Sites:** The treatment is delayed noxious weed detection surveys of roads, dozer lines, drop points, and ICP/camp areas affected by the Cedar fire. These areas will be surveyed for evidence of introduction or spread of noxious weeds. If any new or outlying populations are found in these surveys, a supplementary request for noxious weed treatment will be submitted.

**Design/Construction Specifications:** Infestations and treatments will be reported in the appropriate database. No herbicides are proposed that require specifications.

### **Channel Treatments:** No Treatments Proposed

### **Roads and Trails Treatments:**

#### **Road Drainage Stabilization**

**Purpose of Treatment:** The watersheds burned in the Cedar Fire will show the effects of the fire via increased runoff rates, erosion, sediment, and debris transport creating a future concern for roads and culverts. The effects will most likely result in plugged culverts and overtopped or washed away road surfaces and fills. There is also increased danger to structures that remain in the floodplains due to the increased risk for debris slides. Protect road infrastructure by minimizing erosion of the road surface and reducing excessive sediment delivery into the watersheds.

**General Description:** The roads listed in the location section below were found to have issues with their drainage system due to the expected increase in flows. The minimal treatments required to mitigate these issues are:

- **Oversized Drains** – Oversized drains reduce risk from fill slope erosion and down cutting the road prism. The structures also reduce adverse effects to soil, water, and aquatic habitat from fill slope erosion.
- **Critical Dips** – Roadway dips modify the road drainage by altering the template and allowing surface flows to run off the road to prevent any excessive erosion of the surface.
- **Drainage Armor** – The armor consisting of rip-rap placed where runoff could possibly cause erosion to the road surface and fill slope.
- **Culvert Cleaning** – This item is to restore drainage to original flow capacity. Cleaning culvert includes the cleanout of catchment basins, inlets and outlets. The cleanout of catch basins is done to capture the sediment transported from the channel or ditch. Capturing the sediment will help in preventing the culvert inlet from being partially plugged or completely buried. Culvert outlet cleanout is done to remove any material that would impede the flow of water through the outlet of the culvert.
- **Ditch Cleaning** – The cleanout of road ditches is required to remove any debris that may deflect the flow out of the ditch and also to ensure the flow reaches the outflow structure.
- **Culvert Inlet Modification** – The purpose of this treatment, is to increase the flow and debris passage capacity to prevent road damage.

**Location (Suitable) Sites:** The total mileage of systems roads within the fire perimeter is 86.5 miles. These roads may run through all or some of the low, moderate, and high severity burn areas. Those sections of roads that run through the moderate and high severities were found to have, or will have, road drainage issues and at a minimum will require some level of treatments. Drainage will be focused on the following road segments within the moderate to high burn severity. See treatment map for specific locations.

- 23S16 SUGARLOAF
- 24S02 BAKER POINT
- 24S03 SCHULTZ
- 24S07 SANDY CREEK
- 24S15 PORTUGUESE MEADOW
- 24S35 SHULTZ CREEK
- 24S35A SHULTZ CREEK-A
- 24S35C SHULTZ CREEK-C
- 24S37 SOUTH DRY MDW.
- 24S45 STORMY CANYON
- 24S46 DEEP CREEK
- 24S80 LOWER DRY MEADOW
- 24S80A LOWER DRY MEADOW-A
- 24S83 UPPER DRY MEADOW
- 24S93 PEEL PEAK
- 24S93B PEEL PEAK-B
- 24S94 SPEAR
- 24S94A SPEAR-A
- 25S06 TIGER FLAT C.G.
- 25S07 CEDAR CREEK C.G.
- 25S11 GREENHORN EAST
- 25S16 CALF CREEK
- 25S19 COW CREEK
- 25S28 OWL MINE
- 25S36 BLACK
- 25S37 CAVE
- 25S38 BULL RUN BASIN
- 25S38A BULL RUN BASIN-A
- 25S39 SILVER STRAND

**Design/Construction Specifications:**

1. Forest Service personnel will oversee and inspect the work.
2. All work identified shall meet Forest Service Specifications and Drawings of FP-03 Specifications and Supplemental Specifications for Roads and Bridges.
3. Road Work to comply with Archeology Section 106.

**Trail Drainage**

**Purpose of Treatment:** Burned watersheds in the Cedar Fire will show the effects of the fire via increased runoff rates, erosion, sediment, and debris transport creating a future concern for trails. Treatments are designed to minimize trail surface erosion and stream sediment loading.

**General Description:** Install drainage structures to prevent erosion, mass wasting and debris flows that are predicted to occur following the burn. Drainage structures include:

- **Outsloping:** Establishing a downward grade from the inside edge (uphill side) of the tread to the outside edge (downhill side) of the tread. Downward sloping of 0.5" to 1" per foot of trailbed width is normally sufficient (FSH 2309.18). Soil may be loosened with a Pulaski and removed



using a McLeod, and can be used to fill holes in the tread. This treatment would occur as necessary on all trails that require storm proofing.

- **Maintenance of existing waterbars:** Using a shovel to dig material from directly upslope of the waterbar, to maintain the trail's outslope, and filling behind the waterbar with the removed material (0723-2806-MTDC). If drains are eroded they would be armored with rock collected from adjacent the trail. This treatment would occur as necessary on all trails that require storm proofing.
- **Installation of grade dips:** This treatment would occur where tread erosion from accelerated post-fire flows is likely. Tread would be reshaped to create a gradual dip where water can exit the tread followed by a rise at an angle to the trail's outslope to divert water off the trail.
- **Filling of Stump and Root Holes:** This treatment would occur anywhere stump and root holes may destabilize trail tread or pose a risk to safety of trail users. Fill material would be removed from adjacent the trail tread, and would be packed into the stump or root hole then compacted with the back of a McLeod or a tamping bar.
- **Monitor:** Conduct drainage performance following precipitation events, by performing tread work as described above. Cost for follow-up monitoring and maintenance is less because of the decrease in amount of work to fell hazard trees, and the predicted amount of material clean-up should be significantly less than initial stabilization.

**Location (Suitable) Sites:** Trail within the burn perimeter that is likely to contribute significant volumes of sediment to stream system if drainage facilities are not adequate for increased runoff. 27 miles of trail are within the fire perimeter of which 12.8 miles are within high and moderate burn severity. Of this 10 miles are on steeper grades susceptible to erosion. Specific trails needing treatments include the Portuguese (31E59), Sunday Peak (31E66), Bull Run (32E39), Bohna Ridge (31E83), Spout Spring (32E41), Black Mountain (32E36), Owl (32E54), Marshall Meadow (31E60), Cattle Run (32E38), Telephone Ridge (31E67), and Split Mountain (32E50):

**Design/Construction Specifications:** Construction would meet Forest Service specifications as outlined in the Forest Service National Trail Drawings and Specifications (EM-7720-103), the Trail Construction and Maintenance Notebook (0723-2806-MTDC), and the Trails Management Handbook (FSH 2308.18). All soil and rock used for structure construction or filling of burned-out stump holes would be gathered from locations adjacent the trail. If existing, the organic material from the surface of borrow pits would be retained and the pits would be rehabilitated by recontouring to a natural grade before replacement of the surface organic material. All implementation work would be consistent with guidelines outlined in the Health and Safety Code Handbook (FSH 6709.11) and relevant job hazard analysis documents.

## **Protection/Safety Treatments:**

### **Hazard Warning and Closure Signs for Trails**

**Purpose of Treatment:** Ensure maximum visibility and readability of signs to warn public of hazards on trails and recreation sites in the burned area, or to inform public of closed areas.

**General Description:** The signs will warn of increased hazards from falling burned trees, debris flows and flooding, or to notify visitors of trail and site closures. A Forest Order would be obtained to temporarily close all NFS trails and campgrounds within the Cedar fire perimeter to public use for one winter. The closure order would be posted in the Ranger District offices, the Forest Supervisor's Office, at display boards where trail users and campers may receive information, and on the hazard warning sign posts at trailheads/campgrounds and trail junctions. The order would be terminated when no longer necessary, and closure signs would be removed after termination.

**Location (Suitable) Sites:**

Install signs at campgrounds, trailheads, and trails that enter or are within the burned area or provide access to trails within the burn.

**Design/Construction Specifications:** All sign installation would occur according to the Forest Service Sign and Poster Guidelines (EM 7100-15). Treated posts would be sized to allow for a 2' burial depth, 5' of length before the bottom of the sign, and 2" of post above the top of the sign which would be



slanted at a 45° angle away from the sign face. Pre-drilled post-fire hazard warning signs would be ordered and mounted on the treated wooden posts with vandal-resistant hardware.

### **Campground Closure**

**Purpose of Treatment:** The Cedar Creek campground would be closed for one to three seasons depending on upslope vegetative recovery. The campground is at high risk from hillslope erosion, runoff, and debris flows from high and moderate severity burn areas in the headwaters above. This drainage is predicted to have the highest runoff (177% increase) of the fire and high probability of debris flows sweeping through campsites, roads, and footbridges in the campground.

**General Description:** Six specific treatments are need to close the campground.

1. Campground infrastructure (picnic tables, grills and campfire rings) will be removed from those sites that are adjacent to the stream channel and stockpiled in safe locations at the site. These should be reinstalled once safe to do so.
2. The 36" culvert and road crossing in the upper campground will be removed and stockpiled so the material will not be swept into the highway below. This crossing should be reinstalled once safe to do so.
3. Install K rails cement barriers along the Highway 155 pullout and entrance to the campground above the highway to prevent the public access. Barriers are intended to keep vehicle traffic out of the area and serve as a visual barrier to discourage foot traffic.
4. A small footbridge at the lower campground over the stream will be removed to prevent it from being swept downstream.
5. Install a gate (discussed in further detail under road gate closures) on road 25S07 to the lower campground.
6. Install "No Parking" signs along the highway and new gate to the lower campground to detour the public from entering the closed area.

**Location (Suitable) Sites:** Cedar Creek campground; Install K-Rails on the Following FS Road 25S07

#### **Design/Construction Specification(s):**

- Standard Specifications for Roads and Bridges on Federal Highway Projects (FP-03) with Forest Service Supplemental Specifications.
- Sign and Poster Guidelines for the Forest Service EM7100-15

### **Hazard Warning/Closure Signs for Roads**

**Purpose of Treatment:** The purpose of "Warning Signs" is to reduce risks to human life and safety by warning motorists while traveling the authorized routes within the areas susceptible to flooding, debris flows, hazards trees, and all other risks attributable to post fire events on the landscape. Road closure signs are needed to alert the travelers of closed roads which will be necessary to protect all users from driving into areas that have been determined to be more susceptible to hazards caused by the fire. We also want to ensure maximum visibility and readability of signs to warn public of hazards on sites in the burned area.

**General Description:** Install signs that enter or are within the burned area. The signs will warn of increased hazards from falling burned trees, debris flows and flooding, or to notify visitor's site closures.

**Location (Suitable) Sites:** Locations for "Burned Area" warning signs will be located at points of entries by use of forest system roads into the burned areas. These locations are as follows:

- BAER Warning Signs
  - 23S16
  - 24S15
  - 24S16
  - 24S50
- Closure and Information

- 23S16
- 24S03
- 24S07
- 24S35
- 24S37
- 24S50
- 24S83
- 24S93
- 25S07
- 25S36

**Design/Construction Specification(s):**

1. Standard Specifications for Roads and Bridges on Federal Highway Projects (FP-03) with Forest Service Supplemental Specifications.
2. Sign and Poster Guidelines for the Forest Service EM7100-15

**Road Gate Closure**

**Purpose of Treatment:** Install gates for public safety especially during periods of expected moderate to high rainfall events and hazard trees that can't be fully mitigated during drainage installation. In the event severe stormy weather passes over the area, storm water and debris flows will be higher than pre-fire levels. A gate would be necessary in preventing the public from accessing the area of the forest by vehicle during these severe weather events. Where travel has been determined to be unsafe, install closures (special order) on roads until other treatment is performed or until natural rehabilitation has taken place.

**General Description:** Install gates at suitable location on Forest Roads to be closed. Gates are intended to keep vehicle traffic out of the area, and serve as a non-removable visual barrier to discourage foot traffic. Gate location should be selected to prevent access around the sides of gates. Install barrier rock if needed.

**Location (Suitable) Sites:** Install Gates on the following FS Roads:

- 24S03
- 24S35
- 24S93
- 25S07
- 25S36
- 25S38

**Design/Construction Specification(s):**

1. The gate shall be constructed according to the *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects FP-03* (Similar to the photo below). All signing associated with the gate installation shall follow Forest Service Engineering Manual 7100-15 and the Federal Highways MUTCD. This includes typical gate barricade markers and object markers and any signs that may be installed with the gate such as a road closed sign.
2. Ensure the area around the gate is large enough for a vehicle with trailer to turn around.

**Hazard Tree Falling for Trails and Panorama Camp Ground**

**Purpose of Treatment:** Threats to trail crews installing drainage and staging at the Panorama campground features will be mitigated through the falling of trees identified to be hazardous.

**General Description:** Forest service trails within the Cedar Fire that pass through areas where the severity of the burn is moderate and high are at risk of having burnt and dying trees fall over the roadway. These hazard trees pose a risk to trail crews especially during high wind events.

**Location (Suitable) Sites:** Hazard trees posing a risk to life and safety of crews working along trails and staging at the Panorama campground would be identified by qualified Forest Service personnel and felled before work crews pass the location. Hazard trees would be felled away from the trail and

campground, if possible, and would be bucked out of the trailway as necessary.

**Design/Construction Specification(s):**

1. FS personnel will prepare and administer the contract.
2. All implementation work would be consistent with guidelines outlined in the Health and Safety Code Handbook (FSH 6709.11) and relevant job hazard analysis documents.

**Hazard Tree Falling for Roads**

**Purpose of Treatment:** The threat of hazard trees falling over those roads that are remaining opened to the public will be mitigated by falling trees identified to be hazardous.

**General Description:** Forest service roads within the Cedar Fire that pass through areas where the severity of the burn is moderate and high are at risk of having burnt and dying trees fall over the roadway. These hazard trees pose a risk to road users especially during high wind events.

**Location (Suitable) Sites:** The initial area to first concentrate the removal of hazard trees is on those high use roads (Maintenance Level 3 and above) that will remain open and traverse through the sections of high and moderate burn severities. These roads provide important access and would be treated for safety reasons. Expand treatment to high use ML2 roads in high severity areas if the roads shall remain open. Moreover, roads that would be receiving treatments and have hazardous trees, would be treated for hazard tree removal to accommodate safety for the workers/contractors.

**Design/Construction Specification(s):**

1. FS personnel will prepare and administer the contract.
2. Estimated miles of roads in the high to moderate burn severity total 67 miles. There are several ML2 roads that require only spot treatment to protect work for drainage
3. Assumption include: (1) the removal of hazard trees within approximately 120 feet of the road centerline and (2) only 70% of the miles would need hazard tree treatment.
4. Based on these assumptions there is approximately 1,070 acres that need treatment for hazardous trees. However, only select trees within these acres need to be addressed.

**Road Storm Patrols**

**Purpose of Treatment:** Regular road monitoring will be implemented to evaluate the condition of roads for motorized access and to identify and implement additional work needed to maintain and/or repair damage to road surfaces and flow conveyance structures across roads in order to provide safe access across FS lands. Patrols are used to identify those road problems such as plugged culverts and washed out roads and to clear, clean, and/or block those roads that are or have received damage. The storm patrollers shall have access to at least a backhoe and dump truck that can be used when a drainage culvert is plugged or soon to be plugged and to repair any road receiving severe surface erosion. The BAER Team considered this treatment to be the minimum necessary to achieve a reduction in risk to the accumulated critical values of:

- Road Users
- Hydrologic function
- Road and bridge infrastructure

**General Description:** Roads within the Cedar Fire contain drainage structures that cross streams located in watersheds that have a high to moderate burn severity. These streams now have the potential for increased runoff and debris flows. These increases in flows pose a threat to the existing crossings which may result in plugging drainage structures or exceeding their maximum flow capacity. If these flows plug drainage structures the result could be massive erosion and debris torrents further down the drainage due to the failure. Storm inspection/response keeps culvert and drainage structures functional by cleaning sediment and debris from the inlet between or during storms. This work will be accomplished through Forest Service Road Crew, equipment rental, and general labor.

**Location (Suitable) Sites:** The patrols should first focus on the Forest Service roads that receive the most traffic and are of more value to the transportation system. Per the BAER Treatments Catalog, storm patrols are intended for use at the following locations:

- Road crossings where loss of control of water or exceedance is identified.
- Road access is necessary throughout the storm season.
- Road crossings where high sediment and debris is anticipated.
- Roads susceptible to landslides.
- Roads with all-season surfacing (aggregate or asphalt).

Other roads within the fire perimeter may be patrolled as necessary depending on the storm magnitude and location.

#### **Design/Construction Specifications:**

1. FS personnel will direct the work. The patrols are used to identify those road problems such as plugged culverts and washed out roads and to clear, clean, and/or block those roads that are or have received damage.
2. Immediately upon receiving heavy rain the FS will send out patrols to identify road hazard conditions – obstructions such as rocks, sediment, washouts, and plugged culverts so the problems can be corrected before they worsen or jeopardize motor vehicle users.
3. The road patrols shall bring in heavy equipment necessary to mechanically remove any obstructions from the roads and culvert inlets and catch basins where necessary.
4. All excess material and debris removed from the drainage system shall be placed outside of bank-full channel where it cannot re-enter stream channels.

#### **Monitoring Narrative:**

*\* No monitoring funding is not being requested. All of the monitoring below is already included in the previous treatments. Monitoring is only displayed here to better portray what is taking place.*

Regularly inspect gates and signs for condition and visibility and look for signs of non-compliance at closed areas.

#### **Road Treatments**

**Storm Patrols** – Monitor the storm-patrol response time to ensure objectives are being met. Identify the type of storm event that mobilizes material.

**Road Drainage** – Monitor road drainage (i.e. culverts, drain dips, etc.) and roadbed conditions after significant storm events to ensure the maximum drainage capacity is maintained until the natural re-vegetation of the burned area has occurred. Maintain and/or repair any damage to road surfaces. Remove sediment and debris from ditches and entrances to culverts.

**Cedar Creek Campground Closure** - Regularly inspect barrier and signs for condition and visibility and look for signs of non-compliance at closed areas.

**Road Closures** - Regularly inspect gates and signs for condition and visibility and look for signs of non-compliance at closed areas.

**Road and Trail Signs** - Regularly inspect signs for condition and visibility, ask visitors if they saw the signs, and look for signs of non-compliance at closed areas.



**Part VI – Emergency Stabilization Treatments and Source of Funds**
**Initial Request**

Line Items	Units	Unit Cost	# of Units	BAER \$	Other \$	# of units	Fed \$	# of Units	Non Fed \$	Total \$
<b>A. Land Treatments</b>										
Cultural Resource Protection	Sites	\$4,500	1	\$4,500	\$0		\$0		\$0	\$4,500
Noxious Weeds Treatment	Acres	\$18	360	\$6,498			\$0		\$0	\$6,498
<i>Subtotal Land Treatments</i>				\$10,998	\$0		\$0		\$0	\$10,998
<b>B. Channel Treatments</b>										
<i>Insert new items above this line!</i>					\$0		\$0		\$0	\$0
<i>Subtotal Channel Treat.</i>				\$0	\$0		\$0		\$0	\$0
<b>C. Road and Trails</b>										
Road Drainage	Miles	\$8,479	67.5	\$572,326	\$0		\$0		\$0	\$572,326
Trail Stabilization and Hazard Trees	Miles	\$4,193	10	\$41,929			\$0		\$0	\$41,929
<i>Subtotal Road &amp; Trails</i>				\$614,255	\$0		\$0		\$0	\$614,255
<b>D. Protection/Safety</b>										
Hazard Tree Falling Along Roads	Acres	\$17	1,070	\$18,436	\$0		\$0		\$0	\$18,436
Cedar Creek Campground Closure	Each	\$18,725	1	\$18,725	\$0		\$0		\$0	\$18,725
Gate Closure (Roads)	Each	\$7,680	6	\$46,080	\$0		\$0		\$0	\$46,080
Road Storm Patrols/Drainage	Days	\$2,240	9	\$20,160	\$0		\$0		\$0	\$20,160
Trail Hazard Signs	Each	\$401	20	\$8,010	\$0					\$8,010
Burned Area Warning Signs Roads	Each	\$396	18	\$7,136	\$0					\$7,136
<i>Insert new items above this line!</i>					\$0		\$0		\$0	\$0
<i>Subtotal Structures</i>				\$118,547	\$0		\$0		\$0	\$118,547
<b>E. BAER Evaluation</b>										
Assessment Team	Report	\$106,286	1	\$106,286			\$0		\$0	
<i>Subtotal Evaluation</i>				\$106,286	\$0		\$0		\$0	
<b>F. Monitoring</b>										
	Days	\$0	0	\$0			\$0		\$0	\$0
	Days	\$0	0	\$0	\$0		\$0		\$0	\$0
<i>Subtotal Monitoring</i>				\$0	\$0		\$0		\$0	\$0
<b>G. Totals</b>				\$743,800	\$0		\$0		\$0	\$743,800
Previously approved				\$0						
Total for this request										



PART VII - APPROVALS

1. /s/ [Signature] 19 SEP 2016  
Forest Supervisor (signature) Date
2. /s/ [Signature] 9/30/2016  
Regional Forester (signature) Date

Sept. 27, 2016

After regional review of the request, the Regional Forester recommends approval after adjustments to road treatments that reduce total road treatment costs to \$555,286 and reduce the total to \$684,831. Recommended reductions in road treatments: to cut road treatments in low severity burn areas, and substitute rock armoring for overside drains in 23 locations.

