

Date of Report: 09/27/12

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: Stafford
- B. Fire Number: CA-SHF-002953
- C. State: CA
- D. County: Trinity
- E. Region: 5
- F. Forest: Shasta Trinity
- G. District: Hayfork
- H. Fire Incident Job Code: P5G7TZ (0514)
- I. Date Fire Started: September 5, 2012
- J. Date Fire Contained: September 13, 2012
- K. Suppression Cost: \$ 12,415,955 million as of 09/27
- L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): 100 percent of the fireline was water barred, some of it was covered with the vegetation that had been removed at the time of construction.
 2. Fireline seeded (miles): Seeding off all dozer line road intersections was recommended by the local botanist but had not occurred at the time of this report.
 3. Other (identify): All FS roads within the fire were graded, had the outside berms removed and drainage features cleaned out or reconstructed as part of the suppression rehabilitation; 6.6 miles had been completed at the time of this report.
- M. Watershed Number: Barker Creek - Hayfork Creek (180102120205), Carr Creek (180102120203), Rush Creek-Hayfork Creek (180102120303)
- N. Total Acres Burned: 4402 NFS Acres 4111 Other Federal 0 State 0 Private 291
- O. Vegetation Types: mixed conifer/hardwood with ponderosa pine, Douglas fir, montane chaparral and alder/willow riparian areas

P. Dominant Soils:

Map Unit	Map Unit Name	% Area
33	Deadwood family, 60 to 80 percent slopes.	3.5
51	Dunsmuir family, 40 to 55 percent slopes.	5.5
81	Goulding family, 60 to 80 percent slopes	8.0
85	Goulding family-Rock outcrop complex, 50 to 80 percent slopes	2.5
98	Holland family, 40 to 60 percent slopes.	5.5
99	Holland family, 60 to 80 percent slopes	5.5
104	Holland family-Holland family, deep complex, 20 to 40 percent slopes.	3.0
154tw	Holkat-Hoosimbim complex, 50 to 75 percent slopes	4.0
203	Neuns family, 40 to 60 percent slopes.	3.5
204	Neuns family, 60 to 80 percent slopes.	2.5
206	Neuns-Deadwood families complex, 40 to 60 percent slopes.	12.5
208	Neuns-Goulding families association, 40 to 60 percent slopes.	9.0
224	Neuns family-Typic Xerorthents association, 50 to 80 percent slopes.	2.0
229	Neuns family, schist substratum, 60 to 80 percent slopes.	2.0
260	Rock outcrop-Gozem family complex, 60 to 80 percent slopes.	1.0
329	Typic Xerorthents-Neuns family association, 60 to 80 percent slopes.	23
351	Xerofluvents-Riverwash association, 0 to 20 percent slopes.	2.0

- Q. **Geologic Types:** Hayfork Formation, metavolcanics, granitics
- R. **Miles of Stream Channels by Order or Class:** Not mapped
- S. **Transportation System** Trails: 0 Roads: 18

PART III - WATERSHED CONDITION

- A. **Burn Severity (acres):** (low/unburned) 2353 (moderate) 1146 (high) 903
- B. **Water-Repellent Soil (acres):** 2049; There were a number of watersheds with high and moderate soil burn severity that field tested with moderate to high hydrophobicity.
- C. **Soil Erosion Hazard Rating (acres):** (low) 93 (moderate) 325 (high) 3988
- D. **Erosion Potential:**

Subwatershed	Watershed Acreage within Fire	Percent of Watershed with High and Moderate Soil Burn Severity ^A	Pre-Fire Background Sediment (tons/acre)	Post-Fire Yield ^B (tons/acre)	Total Sediment Delivered (tons)	Change in Sediment Yield (compared to pre-fire)
Barker Creek-Hayfork Creek	3406	55	2.3	23.3	79400	10 times
Carr Creek	429	18	3.4	17.5	7500	4.5
Rush Creek-Hayfork Creek	569	20	3.4	18.1	10300	4.5

- E. **Sediment Potential: cubic yards / square mile:** 22,500 (the highest potential is above the 5ft. culvert on 31N13 within a subwatershed almost completely rated at high soil burn severity).

PART IV - HYDROLOGIC DESIGN FACTORS

- A. **Estimated Vegetative Recovery Period, (years):** 2 to 7 years
- B. **Design Chance of Success, (percent):** 85
- C. **Equivalent Design Recurrence Interval, (years):** 25
- D. **Design Storm Duration, (hours):** 5.3
- E. **Design Storm Magnitude, (inches):** 4.65
- F. **Design Flow, (cubic feet / second/ square mile):** 117
- G. **Estimated Reduction in Infiltration, (percent):** 21
- H. **Adjusted Design Flow, (cfs per square mile):** 120.5

PART V - SUMMARY OF ANALYSIS

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

Value At Risk	Probability of Damage or Loss	Magnitude of Consequences	Risk	Discussion
Human Life	Likely	Major	High	Visiting public or forest employees could be injured or trapped during flood or rock fall events there is also increased risk from tree fall during high wind events within the areas of the fire that burned at high severity
Property	Likely	Moderate	High	Damage to vehicles could occur while traveling on forest roads within the areas of the fire that burned at high severity Damage to forest service infrastructure
Water Quality	Likely	Minor	Intermediate	Sediment pulses from eroding hillslopes could further impair Hayfork creek and its tributaries which are listed on the 303(d) list as impaired for sediment and temperature.
Soil Productivity	Possible	Moderate	Intermediate	Effect is restricted to high severity areas within the fire. The high levels of erosion have the potential to alter vegetation communities such as converting a forested community to shrubs and grass.
Critical Habitat Terrestrial Species	Unlikely	Minor	Low	There are no TES, 903 acres of habitat was lost.
Critical Habitat Aquatic Species	Likely	Moderate but short term	Intermediate	Assuming no chronic source of sediment effect are predicted to be minor Increases in peak flows (short-term), significantly increased turbidity levels (short-term), significantly increased fine sediment levels in spawning areas (short-term), moderate increases in coarse sediment supply (short-term), significant increases in large woody debris (LWD) recruitment potential (short- and long-term), unknown changes to the macroinvertebrate community (short-term), significant alterations in water chemistry (immediately following the first rain and then becoming attenuated as the rainy season progresses).
Critical Habitat Sensitive Plants	Likely	Moderate	High	<i>Critical Value at Risk:</i> Native or naturalized communities on NFS lands where invasive species or noxious weeds are absent or present in only minor amounts. <i>Priority Threats:</i> Dozer line construction and noxious weed introduction and spread probability is likely with a moderate magnitude of consequences, which ranks the risk to this critical value as HIGH.
Noxious weeds	Unlikely	Moderate	High	. same as above
Cultural resources	Possible	Moderate	Intermediate	Fire effects where archeological sites where present were low and similar to a mosaic underburn n treatment is recommended for the protection or stabilization of one known site
Abandon Mine				Not assessed at the time of this report

Summary of Affected Resources and Values at Risk

Road Assessment of Values at Risk:

Life and Safety: As a result of the severely burned watersheds threats to life and safety of Forest visitors and personnel entering into certain areas of the burn are likely due to rock and tree fall along roadways and special use permit locations.

Property: There is a likelihood that post burn conditions will increase runoff and the movement of sediment into drainage features such as culvert inlets, overside drains, roadway dips and runouts along some road segments. This occurrence causes drainage features to plug causing uncontrolled water to divert, resulting in the likelihood of damage to the invested road improvements, loss of road function and the denial of access.

Water Quality and Fisheries Assessment of Values at Risk: A tributary to the South Fork Trinity River (SFTR), Hayfork Creek has been designated as impaired by excess sediment/siltation and excess water temperature under Section 303(d) of the Clean Water Act by the State Water Resources Control Board. There is an EPA-approved sediment Total Maximum Daily Load (TMDL) in place for the SFTR system and a TMDL in process for temperature.

Road crossing failure was identified in the TMDL as a source of fine sediment entering into Hayfork Creek. The target was to have less than a 1% failure rate, indicating crossings adequate to pass the 100-year recurrence interval flood. With the addition of high soil burn severity above certain culverts, a lower return interval precipitation event will now provide the same response as a 100-year return interval storm under unburned conditions

Hayfork Creek has aquatic habitat and supports ESA-listed coho salmon Critical Habitat, as well as USFS listed as Sensitive steelhead and salmon. It is also comprised of Essential Fish Habitat (EFH) which relates to commercially pursued salmon. Roads located upslope from Hayfork Creek with culvert crossings on tributaries draining into Hayfork Creek pose a likely risk to the aquatic and fisheries habitat, water quality and soil productivity. As a result of the severely burned watersheds upslope from Hayfork Creek it is likely that sediment and debris could plug culvert inlets causing water to divert onto the roadway. This sheeted or gullied water could wash out fill slopes and create gullies below, increasing sediment loads into Hayfork Creek.

Special use permittees may have property (e.g. spring boxes) on Forest Service lands that could be filled with additional sediment from burned watersheds.

Water Resources: Approximately 25% of the area of Forest Service managed lands of the Barker Creek-Hayfork Creek watershed is affected by the Stafford Fire. In 2010, the watershed was rated as Functioning At-Risk by a fish biologist. Soil erosion was considered to be in a properly functioning condition. With the direct effects from increased soil erosion and loss of soil productivity, added to the indirect adverse effects resulting from the need for increased road maintenance, it is possible, maybe probable that this watershed will move closer to a condition of Not Properly Functioning.

Fish Resources: The mainstem of Upper and Middle Hayfork Creek, in the vicinity of the Stafford Fire, is known to support the following anadromous fish species; Klamath Mountain Province (KMP) steelhead (*Oncorhynchus mykiss*), Upper Klamath and Trinity River (UKTR) Chinook salmon (*O. tshawytscha*, both listed as USFS Sensitive) and Pacific Lamprey (*Lampetra tridentata*). It is also ESA-designated Critical Habitat (CH) for coho salmon due to anadromous fish access. Coho salmon have not been seen in these portions of Hayfork Creek in decades, generally. EFH also comprises the affected reaches of Hayfork Creek.

The anticipated effects to anadromous fishes (primarily KMP steelhead) and their aquatic habitat in Upper and Middle Hayfork Creek, as well as coho salmon CH and Chinook salmon EFH in the vicinity and downstream of the Stafford Fire include:

- Minor Increases in peak flows (short-term), significantly increased turbidity levels (short-term), significantly increased fine sediment levels in spawning areas (short-term), moderate increases in coarse sediment supply (short-term), significant increases in large woody debris (LWD) recruitment potential (short- and long-term), unknown changes to the macroinvertebrate community (short-term), significant alterations in water chemistry (immediately following the first rain and then becoming attenuated as the rainy season progresses).

This assumes that there will be no chronic sources of sediment delivery to the channel of Hayfork Creek due to hillslope gullying, or rotational slump and/or culvert failure, with the mitigating treatments to roads specified in this assessment. The Stafford Fire left nearly all of the Hayfork Creek Riparian Reserves (RRs) intact; the RRs should therefore continue to function at their current level. No other fish bearing streams besides Hayfork Creek were affected by the Stafford Fire.

The anticipated cumulative adverse effects to aquatic habitat will most likely result in a negligible decrease in the population of KMP steelhead in the direct vicinity of the fire in the short-term. Steelhead populations may actually increase in the long-term as hillslope processes stabilize and LWD levels increase.

Botany Assessment of Values at Risk: The resource concerns for botany are damage to special habitats and rare plants from wildfire and fire suppression activities on ecosystem stability and future impacts of the introduction and or spread of noxious weeds resulting from suppression activities on ecosystem stability and soil productivity.

No federally listed Threatened or Endangered plant species or their habitats are known to occur in the Stafford fire area. Surveys for forat sensitive species had not been conducted in this area so it is unknown if any occur within the fire. However, suitable habitat does exist for three Forest Service sensitive species, *Cypripedium montanum* (Mountain lady's slipper), *Cypripedium fasciculatum* (Clustered lady's slipper), and *Eriastrum tracyi* (Tracy's eriastrum).

The 2001 ROD requires management of known sites of any Category A, B, or E species and high-priority sites of Category C or D species. High-priority sites are those that are needed to provide for reasonable assurance of species persistence. There are no known occurrences of survey and manage species within the Stafford Fire.

Since the Stafford Fire is within the wildland urban interface (WUI), noxious weed presence is generally abundant in the fire vicinity, along access roads and on private property adjacent and also within the fire area. Records of known noxious weed occurrences are mapped adjacent and within the fire perimeter. Species known to occur within the fire area are listed in the following table.

Invasive Plants in and Adjacent to the Stafford Fire

Scientific Name	Common Name	Symbol	CDFA Weed List
<i>Centaurea solstitialis</i>	yellow starthistle	CESO3	C
<i>Centaurea stoebe</i> ssp. <i>micranthos</i>	spotted knapweed	CESTM	A
<i>Isatis tinctoria</i>	dyer's woad	IST1	B
<i>Cirsium arvense</i>	Canada thistle	CIAR4	B
<i>Cirsium vulgare</i>	bull thistle	CIVU	--
<i>Dipsacus fullonum</i>	wild teasel	DIPU2	--
<i>Foeniculum vulgare</i>	sweet fennel	FOVU	--
<i>Bromus tectorum</i>	cheatgrass	BRTE	--
<i>Hypericum perforatum</i>	Klamath weed, St. Johnswort	HYPE	C
<i>Rubus armeniacus</i>	Himalayan blackberry	RUAR9	--
<i>Verbascum thapsus</i>	common mullein	VETH	--

Many roadsides of the Stafford Fire are occupied to varying degrees with noxious weeds that were noted while conducting BAER field assessments. The two weeds with the highest level of concern for spread are spotted knapweed, which occurs along Wildwood Rd. south of the fire area, and yellow starthistle, both of which have a high likelihood of spread into the newly created habitat at landings and on dozer lines.

Equipment washing was instituted at the beginning of the fire suppression activities for equipment used by the Forest Service, which undoubtedly reduced the amount of introduction of invasives to the fire area. However, equipment used by Cal-Fire for their suppression activities was likely not washed prior to coming onto those private lands and accessing Forest Service roads.

Heritage Assessment of Values at Risk: Within the perimeter of the Stafford Fire there are nine archaeological sites; eight are historic and one prehistoric/historic. One new site was discovered, a military plane crash site dating from 1943.

All ten of these sites were burned over by the fire but did not suffer suppression damage. The one exception was the Kelly Mine Site, but in this situation the site had been determined not eligible to the National Register. The mine buildings were removed and the mine had reclamation work done by the Forest Service. Dozer line that crossed over this site created no adverse impact.

Each site received a moderate thermal impact from the fire. Some artifact material showed evidence of heat damage, glass melting and scorching of metal surfaces. The aircraft crash site did however suffer some heat damage to aluminum fuselage parts that melted down to small blobs. However, damage overall was not severe due in part to the absence of heavy fuels. Most of the fuel at these sites was grass and shrub understory vegetation.

One site we reviewed will benefit from erosion control work. This site is located in McCovey Gulch. It was only partially burned over and did not suffer severe impacts. However, this site is located down in the Gulch riparian zone and small flood plain. Since the upper part of McCovey Gulch was heavily burned over runoff from this area if not mitigated could damage this site.

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. The team did thoroughly scrutinize and identify treatments for roads 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.

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

Land NA Channel na Roads/Trails 95 Protection/Safety 95

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	90	95	100
Channel			
Roads/Trails	80	80	90
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):**G. Skills Represented on Burned-Area Survey Team:**

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

Team Leader: Barbara Drake Email: bdrake@fs.fed.us Phone: 775-355-5339

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Off-Forest Team Members

Rusty LeBlanc	Transportation System
Robert Taylor	Soils
Rebecca Bigalow	Hydrologist
Carrie Schreiber	Botany Trainee

Forest Team Members or Adjunct (A) Team Members

Lusetta Nelson	Botany
Nichole Brill	Hydrologist Trainee
Eric Wiseman	Fisheries
Erica Spohn	Minning and minerals
Mark Arnold	Heritage

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 Protect Heritage site from flooding using straw bales. Estimated cost 630 dollars.

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 (monitoring).

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

Line Items		Units	Unit Cost	# of Units	BAER Funds
31N13 and 31N42					
1	BAER warning sign	EA	\$ 800.00	4	\$ 3200.00
2	BAER information sign	EA	\$ 100.00	4	\$ 400.00
3	Standard Gates	EA	\$ 7000.00	2	\$ 14000.00
31N13					
4	Install Vert. Riser Pipe	EA	\$ 10000.00	1	\$ 10000.00
5	Install R/R Relief Dip	CY	\$ 175.00	10	\$ 1750.00
6	Install Debris Basin	CY	\$ 2000.00	1	\$ 2000.00
7	Install R/R Spillway	CY	\$ 175.00	15	\$ 2625.00
8	Storm Inspection and Response (monitoring)	EA	\$ 1000.00	5	\$ 5000.00
31N17 and 31N17 A & B					
9	Install Metal End Section	EA	\$ 4000.00	2	\$ 8000.00
10	Install Harden Crossing	EA	\$ 400.00	1	\$ 400.00
11	Install Harden Relief Dips	EA	\$ 500.00	4	\$ 2000.00
12	Storm Inspection and Response (monitoring)	EA	\$ 1000.00	5	\$ 5000.00
31N51A And 31N23					
13	Install Intercepting and Rolling Dips w/ LOD's	EA	\$ 200.00	32	\$ 7000.00
TOTAL ESTIMATE					\$ 61,375.00

Protection/Safety Treatments:

- I. **Monitoring Narrative:** (Describe the monitoring needs, what treatments will be monitored, how they will be monitored, and when monitoring will occur.

Noxious Weed Detection Surveys: All dozer lines on or within fire perimeter should be surveyed in 2013, if new infestations are located an interim request will be prepared for mapping and hand treatment.

Dozer lines are generally mapped with varying levels of quality in different parts of the fire area, so number and length of lines in the GIS database can only be considered to be estimates. Line location and number should be validated. Using the GIS database, there are 21.7 miles of dozer lines on or within the fire perimeter.

Part VI – Emergency Stabilization Treatments and Source of Funds

Line Items	Units	Unit Cost	NFS Lands			Other Lands				Total
			# of Units	BAER \$	Other \$	# of units	Fed \$	# of Units	Non Fed \$	
A. Land Treatments										
Heritage site protection/stabilization										
Straw bales	each	7.00	6	\$42						
Stakes	each	5.00	1	\$5						
GS-11	day	349.00	1	\$349						
2-GS-5	day	233.76	1	\$234	\$0					
Subtotal Land Treatments				\$630						
B. Channel Treatments		0								
C. Road and Trails										
31N13										
Install Vert. Riser Pipe	each	10,000	1	\$10,000						
Install Debris Basin	each	2,000	1	\$2,000						
Install R/R Relief Dip	yrd ³	175	10	\$1,750						
Install R/R Spillway	yrd ³	175	15	\$2,625						
Storm Inspection and Response (monitoring)	each	1,000	5	\$5,000						
31N17 and 31N17 A & B										
Install Metal End Section	each	4,000	2	\$8,000						
Install Harden Crossing	each	400	1	\$400						
Install Harden Relief Dip	each	500	4	\$2,000						
Storm Patrol	each	1,000	5	\$5,000						
31N51A and 31N23										
Install Intercepting and Rolling Dips w/ LOD's	each	200	32	\$6,400						
Subtotal Road Treatments				\$43,175						
D. Protection/Safety										
Install hazard signs for	each	800	4	\$3,200						
Install "area closed" signs	each	100	4	\$400						
Install gates	each	7,000	2	\$14,000						
Subtotal Protection/Safety				\$17,600	\$0					
E. BAER Evaluation										
Assessment										
Subtotal Evaluation				\$20,000	\$0					
F. Monitoring										
Noxious weed detection										
GS-11	day	349.00	20	\$6,980						
2-GS-5	day	233.76	20	\$4,675						
Subtotal Monitoring				\$11,655	\$0					
G. Totals				\$73,060						
Previously approved										
Total for this request				\$73,060	\$0					

PART VII - APPROVALS

1. Brenda Tracy for J. Sharon Heywood
Forest Supervisor (signature)

10/12/12
Date

for 2. Bambi T. Bryant
Regional Forester (signature)

10/16/2012
Date