USDA-FOREST SERVICE

FS-2500-8 (7/00)

Date of Report:

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[X] 1. Funding request for estimated WFSU-SULT funds
[ ] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

[X] 1. Initial Request (Best estimate of funds needed to complete eligible rehabilitation 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: Holy Fire

B. Fire Number: CA-CNF-002642

C. State: California

D. County: Orange County

E. Region: 05

F. Forest: Cleveland NF

G. District: Trabuco RD

H. Date Fire Started: August 31, 2016

I. Date Fire Contained: September 11, 2016

J. Suppression Cost: $1.7 million

K. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): none suggested due to soils, topography, and hand-line only.
2. Fireline seeded (miles): none
3. Other (identify): Main access road rehab (miles): 4 miles

L. Watershed Number: HUC12# 180703010103

M. Total Acres Burned: 148 acres
NFS Acres(**148**) Other Federal ( ) State ( ) Private ( )

N. Vegetation Types: mixed chaparral, chamise, sagebrush and oak.

O. Dominant Soils: Friant Series, fine sandy loam, 30-75% slope

P. Geologic Types: metasedimentary rocks

Q. Miles of Stream Channels by Order or Class: approximately 1 mile of first order channel, contains perennial spring.

R. Transportation System

Trails: 0.5 miles Roads: 0.20 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

16 (low) 80 (moderate) 40 (high)

B. Water-Repellent Soil (acres): 120

C. Soil Erosion Hazard Rating (acres):
1 (low) ___ (moderate) ___ 146 (high)

D. Erosion Potential: 88 tons/acre

E. Sediment Potential: 31,190 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 5

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

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

D. Design Storm Duration, (hours): 0.5

E. Design Storm Magnitude, (inches): 0.49

F. Design Flow, (cubic feet / second/ square mile): 35

G. Estimated Reduction in Infiltration, (percent): 85%

H. Adjusted Design Flow, (cfs per square mile): 139

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency:

Summary: The 148 acre fire burned almost entirely within a single catchment/tributary to the mainstem of Trabuco Creek. The outlet of the catchment drains directly across the only road for ingress/egress for two recreation tracts and to access a popular hiking trail. Trabuco Road is a high use, level 3 road that is used year-round by both the public, recreation residence permittees, FS Staff, and fire prevention. It is the only access road for fire suppression response in Trabuco Canyon.The small alluvial deposit at the outlet of the catchment is used as a parking area for dispersed recreation in Trabuco Creek. Hikers commonly hangout immediately downstream of the catchment confluence with Trabuco Creek (dispersed recreation). At the catchment outlet there is a FS spring box and water tank (FS water right), which is actively used for filling tanks for fire protection and a small historic retaining wall that confines the channel and protects the foundation of the tank.

The 134 acre burned catchment has very steep slopes (ranging between 50-80%) with soils exhibiting primarily moderate to high SBS characteristics. Active sliding and rock fall were observed during site visits (post-fire dry weather conditions) and water repellency was measured as deep as 3 ½ inches. All stream channels/drainage paths within the catchment are transport systems currently charged with loose

alluvium and woody debris. The material sliding off the hillside is contributing to the increased sediment load within the channels.

Peak flow increase for the 2-year storm in the burned catchment is estimated to increase 300% above normal, acting more closely to a 15 year peak flow. Annual erosion rates are predicted to increase as much as 2,320% above normal, delivering approximately 5,591 cubic yards of sediment.

In addition to flooding, sediment and erosion increases, there is a very high risk of debris flows for the catchment. Similar catchments (acreage, geology, terrain, climate, steepness) that burned in Silverado Fire of 2014 produced sizeable debris flows in storms ranking less than 1 to 2 year RI storm events. Sizeable debris flow events (not including all smaller events) occurred during July and September 2015. See watershed report for additional information. The Holy Fire catchment is at increased risk as it is a north-facing slope that had more vegetation before the fire, exhibited higher SBS and deeper soils than Silverado Fire soils, and has steeper slopes. Based on these estimates there is an emergency threat to life, safety, and property near the outlet of the burned catchment particularly related to post-fire debris flow risk. The timing of the risk from debris flows is not limited to winter but will extend throughout the first three years until vegetation can re-establish.

Complete year-round closure or complete seasonal closure of the area is not an option as the road accesses two recreation tracts and is used to access the project area for several FS projects that are planned to occur in FY2017 (related to grant and external partner funding). Trabuco Road is the only access road for fire suppression response in Trabuco Canyon. Additionally, storms producing debris flows in Silverado Canyon occurred during summer and fall months, not just winter. Situational closure will allow for the road to remain open for permittees to access their recreation residence, continued recreation in a very popular area, and planned FS projects using external funds to move forward.

The situational closure will reduce the risk to life and safety but may not completely prevent the occurrence of permittees being trapped behind the crossing or the public still trying to access the closed area. There may still be some risk of a sudden localized storm occurring without enough time to warn the public or close the road. To keep the road open and accessible (at a level 3 maintenance level), an increased need for emergency road clearing and maintenance of the crossing is expected after most storms. To prevent the public from accessing the closed area, closure patrol would be necessary as was needed during closure of the Silverado Fire area during 2015 storms.

Values At Risk, Threat, and Risk Determination

Values at Risk	Threat	Probability	Magnitude	Determination
Life and Public Safety				
Forest use of Trabuco Road at crossing (base of catchment)	Debris flow, flooding, sedimentation, erosion.	**Very Likely**	**Major**	**Very High Risk.**
Parking area at Catchment outlet	Debris flow, flooding, sedimentation, erosion.	**Very Likely**	**Major**	**Very High Risk.**
Recreation in main channel below catchment outlet	Debris flow, flooding, sedimentation.	**Very Likely**	**Major**	**Very High Risk.**
Property				
Trabuco Road (level 3 road)	Debris flow, flooding, sedimentation, erosion.	**Very Likely**	**Major**	**Very High Risk.**
Water Tank and spring box related to FS water rights	Debris flow, flooding, sedimentation, erosion.	**Very Likely**	**Moderate.**	**Very High Risk.**
Bell View Trail	Erosion.	**Unlikely**	**Minor**	**Very Low risk**
Heritage Resources				
Foundation wall	Debris flow, flooding, sedimentation, erosion.	**Very Likely**	**Minor**	**Low risk**
Natural Resources				
Water Quality	Increase in sediment and ash.	**Very Likely**	**Minor**	**Low Risk**

B. Emergency Treatment Objectives:

Values at Risk	Determination	Recommended Treatment
Life and Public Safety		
Forest use of Trabuco Road at crossing (base of catchment) and Trabuco Rd (Level 3)	**Very High Risk.**	**Situational Closure: Close road in response to forecast.** **Stormproofing:** • **Enhance and harden existing crossing and berm.** • **Add additional interception dip down the road below the alluvial fan to prevent diversion down the road.** • **Install k-rails to prevent debris from falling on the road, reduce sedimentation on the road, and to prevent parking on the existing debris flow deposit.** **Safety:** • **Post signage of post-fire hazards in the area.** • **Coordinate with external agencies to establish emergency warning system to inform recreation tract cabin owners and FS staff to close the road or evacuate the area.** • **Educational meetings to inform cabin owners of post-fire risks at crossing and downstream of the catchment outlet.** • **Storm patrol to maintain efficacy of BAER stormproofing treatments and emergency response to keep road open (level 3 road) after storms. Permittees or public may get trapped behind the crossing.** • **Closure patrols to enforce situational closure.**
Parking area at Catchment outlet	**Very High Risk.**	**Close parking area with k-rail. Post signage.** **Closure patrols to enforce situational closure.**
Recreation in main channel below catchment outlet	**Very High Risk.**	**Situational closure to access. Post signage.** **Closure patrols to enforce situational closure.**
Property		
Trabuco Road (level 3)	**Very High Risk.**	**See Life and Safety section.**
Water Tank and spring box related to FS water rights	**Very High Risk.**	**Re-cap spring box.** No other treatment possible.
Bell View Trail	**Low risk**	No Treatment.
Heritage Resources		
Foundation wall	**Low risk**	No Treatment.
Natural Resources		
Water Quality	**Low Risk**	No Treatment

C. Probability of Completing Treatment Prior to First Major Damage-Producing Storm:

Land ____90% Channel____ 90% Roads ____ 90% Structure__90%

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	90	90	95
Channel	90	90	95
Roads	90	90	95
Other	50	50	90

E. Cost of No-Action (Including Loss): **High potential** for risks to life and safety as the site experiences HEAVY use by the public and permittees. Road is the only access route to the canyon for fire suppression. Additionally, >$200,000 for replacement of up to ½ mile road if post-fire flows, sediment, erosion, and debris flow were diverted down the road, causing catastrophic road failure. Complete loss of water system and spring box, ~$30,000.

Total cost: Very High Risk to Life and Safety plus >$230,000 for loss of property.

F. Cost of Selected Alternative (Including Loss): $110,000 to protect life and safety, prevent catastrophic road failure, retain access year-round on level 3 road (with exception of precipitation events) for the public, permittees, and FS staff (projects and fire suppression), and protect the spring box from sedimentation. There is still potential for loss of the water tank and spring box from debris flow (Loss of approximately ~$30,000). Some risk may remain for permittees or the public to be trapped behind the crossing but most risk will be minimized through outreach, education, warning system, and signage.

Total cost: $110,000 + potential cost of replacing water system ~$30,000

G. Skills Represented on Burned-Area Survey Team:

[X] Hydrology	[X] Soils	[ ] Geology	[ ] Range	[ ]
[ ] Forestry	[ ] Wildlife	[ ] Fire Mgmt.	[X] Engineering	[ ]
[ ] Contracting	[ ] Ecology	[ ] Botany	[X] Archaeology	[ ]
[ ] Fisheries	[ ] Research	[ ] Landscape Arch	[ ] GIS	

Team Leader: Emily Fudge

Email: efudge@fs.fed.us Phone: 858-674-2993 FAX: _____

BAER TEAM Members:

Emily Fudge: hydrology, soils, geology

Eraina Nossa: heritage

Foster Kuramata and Andrew Dziobek: engineering

Lance Criley: weeds

H. **Treatment Narrative:**

Land Treatments:

Public and Agency Notification of Emergencies: Forest will notify the public and permitees via press releases, FS managed social media and websites, and meetings of the post-fire effects and hazards. FS will coordinate with local agencies through direct contact to establish alert system. This will include notifying and coordination with Orange County Fire Authority, NOAA, OC Emergency Services, and Orange County Public Works. Intent is to establish an alert system and educate the public to facilitate and increase effectiveness of situational closure. Need for a BAER implementation leader to ensure all recommended treatments are implemented and to manage safety closures.

Item	Unit Cost	# of Units	Total
Forest Liaison and Coordinator	$500	10 days	$5,000
Educational Outreach and Notification (using FS staff)	$500	5 days	$2,500
BAER Implementation Leader (manage treatments and outreach)	$500	10	$5,000
Total			**$12,500**

Channel Treatments:

Situational closure and signage (See Road closure plan). Cost included in other treatments.

Roads and Trail Treatments:

Trabuco Canyon Road: Safety related to road, recreation, and FS staff use at the site is of greatest concern. Situational closures will help protect life and safety. The FS plans to work with local agencies to establish the early warning system and notification of runoff producing events. Situational closures will allow for continued use of the road by permitees, recreational users, and FS staff during most of the year, only closing the road during and after precipitation events. Time sensitive FS projects in the area will not be delayed by road closure (projects funded by grants/partners). Access for fire prevention and fire suppression will be maintained, which is very important as it is the only ingress/egress route for the canyon. Road stabilization (stormproofing) of Trabuco Road at the crossing will reduce road damage and potential for diversion down the road. Installation of k-rails will prevent parking at the catchment outlet as well as reduce some sediment transport and rock fall to the road. Based on expected increases in discharge, sediment, and debris flow potential, storm patrols (time and equipment) are essenital to ensure that BAER storm proofing treatments and k-rails retain their efficacy throughout the year. Closure patrols will ensure the public is not accessing the site during critical events.

Treatment will include:

- enhance existing low water crossing by hardening crossing and cutslope with riprap, and enhance berm at the catchment outlet to keep drainage from diverting down the road. (storm proofing)
- add additional interception dip down the road near the edge of the depositional fan to prevent diversion down the road if drainage path changes due to debris flow. (storm proofing)
- Install k-rails to prevent parking at the site and prevent some sedimentation and rockfall that may damage the road or pose safety risks (15 k-rails near catchment outlet and at parking area, stormproofing).
- Post signage of dangerous crossing for life and safety.
- Situational closure of the road using existing gate and coordination with local agencies (early warning system/coordination).
- Storm patrols to ensure storm proofing treatments and k-rails keep their efficacy throughout the year (20 days of time, 20 days of equipment rental/mobilization costs).
- Closure patrol by FS LEO or other FS staff (20 days)

Item	Unit Cost	# of Units	Total
Initial stormproofing (includes equipment mobilization, time, riprap to harden crossing, etc)	$3,500 10,000	1 1	$13,500
K-rails and installation	$20,000	15	$20,000
Safety and Closure signs	$1,000	6	$3,000
Storm and Closure Patrols (salary)	$500	40	$20,000
Equipment costs for ensuring storm proofing efficacy (equipment rental/mobilization)	$1,500	20	$30,000
Contract Prep and Admin	$500	20	10,000
Total			**$96,500**

Structures:

Spring Box: Re-cap damaged spring box to prevent filling in of box with sediment. Spring box is an acive water right used by the FS for fire protection. Cap needs to be able to withstand significant runoff and bedload expected from post-fire effects. Site may still be damaged due to debris flows.

Item	Unit Cost	# of Units	Total
Recap spring box	$500	1 cap	$500
FS time to implement	$500	1 days	$500
Total			**$1,000**

Other Treatments Considered but Not Selected:

Year-round or Seasonal Closure of Trabuco Rd: This treatment was considered but not selected due to the high demand for year-round access to both recreation residences, dispersed recreation, and access to popular hiking trails. Secondly, the CNF has three grant funded and partner related projects for FY2017. Delaying these projects could result in loss of funding.

Response to fire: Fires in the area spread quickly. Fire prevention patrols and response to fires would require maintaining access along Trabuco Road at all times as it is the only ingress/egress for the canyon. Should Trabuco Road blow out as a result of no action, the ability to respond to a fire in the canyon would be greatly reduced. (There are about 45 recreation cabins in Holy Jim and Trabuco Canyon that are located upstream of the confluence with the burned catchment outlet.) Delayed response to a fire in the canyon could result in major loss of infrastructure (cabins and volunteer fire station), habitat (T&E species) and potentially increase fire size.

The storm events that triggered sizeable debris flows in Silverado Canyon occurred during the summer and fall months. A winter closure would not be sufficient to protect life and safety.

I. **Monitoring Narrative:** N/A

Part VI – Emergency Rehabilitation Treatments and Source of Funds by Land Ownership

			NFS Lands				Other Lands			All
		Unit	# of	WFSU	Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	SULT $	$	units	$	Units	$	$
A. Land Treatments										
Forest Liaison/Coord	day	500	10	$5,000	$0		$0		$0	$5,000
Outreach by FS Staff	day	500	5	$2,500	$0		$0		$0	$2,500
BAER Implementation	day	500	10	$5,000	$0		$0		$0	$5,000
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$12,500	$0		$0		$0	$12,500
B. Channel Treatments										
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Channel Treat.				$0	$0		$0		$0	$0
C. Road and Trails										
Stormproofing	ea	3500	1	$3,500	$0		$0		$0	$3,500
Stormproofing (LWC)	ea	10000	1	$10,000	$0		$0		$0	$10,000
K-rails, installation	ea	1334	15	$20,000	$0		$0		$0	$20,000
Safety Signs/Install	ea	500	6	$3,000	$0		$0		$0	$3,000
Storm/Closure Patrols	ea	500	40	$20,000	$0		$0		$0	$20,000
Equipment Rental cost	ea	1500	20	$30,000	$0		$0		$0	$30,000
Contract Prep/Admin	day	500	20	$10,000	$0		$0		$0	$10,000
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road & Trails				$96,500	$0		$0		$0	$96,500
D. Structures										
Spring cap	ea	500	1	$500	$0		$0		$0	$500
FS Time to install	day	500	1	$500	$0		$0		$0	$500
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Structures				$1,000	$0		$0		$0	$1,000
E. BAER Evaluation										
BAER Evaluation	ea	6500	1	$6,500	$0		$0		$0	$6,500
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Evaluation				$6,500	$0		$0		$0	$6,500
F. Monitoring										
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring				$0	$0		$0		$0	$0
G. Totals				**$116,500**	**$0**		**$0**		**$0**	**$116,500**

PART VII - APPROVALS

1. William Metz — Forest Supervisor (signature) — Date: 09/16/16

2. Jeanne Wade Evans — Regional Forester (signature) — Date: 9/20/16