USDA-FOREST SERVICE FS-2500-8
Date of Report: ***September 6, 2009***

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

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

B. Type of Action

[X] 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: Cottonwood Fire

B. Fire Number: CA-BDF- 11598

C. State: CA

D. County: Riverside

E. Region: 5

F. Forest: San Bernardino

G. District: San Jacinto

H. Fire Incident Job Code: P5E5XD

I. Date Fire Started: August 27, 2009

J. Date Fire Contained: August 31, 2009

K. Suppression Cost: $3.6 million as of 9/4/09

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): Approximately 1.7 miles total, 0.6 miles on FS land
2. Fireline seeded (miles): None
3. Other (identify): None

M. Watershed Number: M. Watershed Number: **HUC 6**: 18070202105(San Jacinto River/Poppet Creek, 18070202104 (San Jacinto River/North Fork San Jancinto River).

N. Total Acres Burned: 2,460
NFS Acres (1813) Other Federal (102) State ( ) Private (545)

O. Vegetation Types: Coastal scrub, mixed chaparral, coastal oak woodland, valley foothill riparian.

P. Dominant Soils:

Soil Map Unit Description	Acres
Typic Xerorthents, warm-Typic Haploxeralfs-Badland complex, 30 to 100 percent slopes	1,171
Trigo family-Lithic Xerorthents, warm complex, 50 to 75 percent slopes	547
Soboba-Hanford families association, 2 to 15 percent slopes	192
San Andreas-Osito-Modesto families complex, 15 to 50 percent slopes	119
Gullied Land	118
Trigo family-Lithic Xerorthents, warm complex, 30 to 50 percent slopes	86
San Andreas-Osito-Modesto families complex, 15 to 50 percent slopes	43
Wapi-Pacifico families, dry-Rock outcrop complex, 50 to 75 percent slopes	41
Riverwash	26
Riverwash-Soboba families association, 2 to 15 percent slopes	21
San Emigdio Fine Sandy Loam, 2 to 8 percent slopes	20

Q. Geologic Types:

Geology Types (acres)	
Bautista Beds	1,199
Tonalite of San Jacinto Pluton	696
Very Young Landslide Deposits	206
Very Young Wash Deposits	204
Old Alluvial Valley Deposits	77
Very Old Alluvial Fan Deposits	21
Very Young Alluvial Fan Deposits	6

R. Miles of Stream Channels by Order or Class: Stream Order 4 – 2.81 miles, Stream Order 5 – 5.92 miles, Stream Order 6 – 3.89 miles. (0.13 miles canal/ditch, 0.02 miles canal/aqueduct, 1.33 miles pipeline, and 11.13 miles of intermittent stream channel)

S. Transportation System: Trails: 0 Roads: 4.0 miles FS Roads

PART III - WATERSHED CONDITION

A. Burn Severity by total and FS (acres):

Burn severity by total: 1209 ac (Low), 997 ac (Moderate), 0 ac (High), 253 ac (Unburned).
Burn severity by FS: 904ac (Low), 818 ac (Moderate), 0 ac (High), 91 ac (Unburned).

B. Hydrophobic Soils: Approximately– 400 acres, 16%

C. Soil Erosion Hazard Rating:

Soil Erosion Hazard Rating (acres)	
Very High	1,964
High	190
Moderate	256
Low	24
Not Applicable[1]	26

[1]River wash soil map unit associated with braided channel of San Jacinto River.

D. Erosion Potential: 10 tons/acre first year post fire

E. Sediment Potential:

Sediment yield produced by 6th field watersheds burned (1st year)

Pre and Post Fire Discharge for 6th Field Watersheds for the Cottonwood Fire, 2009				
6th Field Watersheds	Ws Area Miles^2	Pre Fire flow in cfs	Post Fire flow in cfs	Post Fire flow increase (x pre fire)
San Jacinto River/North Fork San Jacinto River	38.7	113.3	121.0	1.07 x
San Jacinto River/Poppet Creek	44.3	126.2	126.4	1 x

- Average erosion rate for high, moderate, and low burn severity plus unburned portion of watershed outside of burn perimeter.
- The values compare pre-fire and post-fire conditions. Rates for individual 6th field watersheds are listed.

F. Debris Flow Potential: Increased potential in steep slopes with moderately burn severity.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 3-5

B. Design Chance of Success, (percent): 75%

C. Equivalent Design Recurrence Interval, (years): 1

D. Design Storm Duration, (hours): 24

E. Design Storm Magnitude, (inches): 1.4

F. Design Flow, (cubic feet / second/ square mile): 2.9

G. Estimated Reduction in Infiltration, (percent): 25

H. Adjusted Design Flow, (cfs per square mile): 3.1

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

The Cottonwood Fire occurred within the San Jacinto Mountain Range at the northern-most portion of the Peninsular Ranges of California, approximately 5 miles east of Hemet, California. The burned area is roughly bounded on the northeast by the San Jacinto Ridge Road (FS 5S09), and on the south by the South Fork San Jacinto River. The Fire burned a total of 2,460 acres. A total of 1,813 (74%) acres burned on National Forest System (NFS) land, 102 acres (4%) on Bureau of Land Management (BLM) Land, and 545 (22%) acres burned on private lands. The team assessed the entire burn area affected by the fire. Approximately 998 acres (41%) of the entire burn was determined to have moderate soil burn severity, and 1,209 acres (49%) of the entire burn was determined to have low soil burn severity. Approximately 253 acres (10%) were considered unburned. The burn pattern of the fire was such that generally the eastern third of the fire area burned at moderate severity. See attached Soil Burn Severity Map, Figure 1 in the Appendix.

Summary of Watershed Response

Hydrologic Response: The 6th field watersheds, San Jacinto River/ North San Jacinto Creek and San Jacinto River/ Poppet Creek, show increases of 1.07 and 1 times greater respectively. This increase is for the Q1.5 storm or a discharge that occurs 75% over the course of the year. The San Jacinto River/ Poppet Creek

watershed does not display an increase due to the small area of the total watershed burned. The pourpoints have larger times greater ranging from 1.42-1.76x. The pourpoints have a greater increase because they are completely within the burned area. (Refer to Appendix A for pre and post fire discharge.)

Erosion Response: The erosion rates were modeled using Rock:Clim, Disturbed WEPP, and ERMiT WEPP modeling (Elliot, 2006), an internet based model developed by the USDA Forest Service Rocky Mountain Research Station that estimates probable erosion rates using specific factors for climate, soil texture, rock fragment content, vegetative cover, slope, and soil burn severity. Erosion was modeled for representative areas within the fire perimeter, slopes were determined by GIS modeling with erosion rates being calculated by weighted averages for the soil burn severity rating. The overall average erosion rate was estimated at 10 tons of soil per acre for the first year post fire using the five-year precipitation. In contrast, the natural background erosion rate is estimated to be 1.8 tons per of soil acre. Background erosion rates should return with the recovery of post fire vegetation and soil cover levels, estimated to be within a 3 to 5 year timeframe.

Geologic Response: The fire area is split by the San Jacinto fault at a prominent slope break that lies across the Oak Spring and associated features. North of this slope break is described as tonalite of the San Jacinto pluton. South of this fault is dominated by Bautista Beds, uplifted and tilted layers of sedimentary rocks transitioning west and then lower in elevation to very old and very young alluvial fan deposits. The area of the fire adjacent and near the San Jacinto River is described by the geology map as very young wash deposits. These wash deposits consist of a mix of rounded material sizes predominantly granites and tonalite from the San Jacinto Mountain Range as well as sedimentary rocks. Several areas of the fire area are mapped as very young landslide deposits. Geomorphic evidence of landslide and debris flow features are present throughout the fire area. The reduction in vegetative cover could result in increases in geologic processes, landsliding, and debris flows.

Values at Risk

The following values were identified during the initial phase of the Cottonwood Fire BAER assessment process as “at risk” from the effects of the fire including increased runoff and debris flows, rock and debris fall, erosion and sedimentation, and landslides:

Life: While the approximately 49% of the fire was low severity, threats to public safety exist to Forest users along Forest Road 5S07 from increased potential for rockfall and flooding. Historically, Forest Road 5S07 has been difficult to maintain during storm events due proximity of the road within an intermittent stream in Bee Canyon. As a result of the fire, ingress and egress along Forest Road 5S07 may become compromised during storm events. There is increased potential for public safety along State Highway 74 if infrastructure becomes compromised and road is overtopped.

Property: There are approximately 4 miles of NFS Roads with in the Cottonwood fire perimeter. Additional roads that could be impacted due to increased watershed response is State Highway 74, identified as a key evacuation route for mountain residents by the Riverside Mountain Area Safety Task Force. Additional roads and infrastructure that provide ingress and egress to private properties could also be damaged from increased sediment and debris flows.

Water Quality and Quantity: The most noticeable effects on water quality will be increased sediment from the burned area into North Fork of San Jacinto River. During storm events this will increase turbidity and contribute to pool filling. Increased nitrogen may occur during the first year after the fire. (Kovacic et. al.) Nitrogen levels to downstream water reservoirs are non-significant due to a small percentage of the watershed burned. Natural recovery is the recommended treatment.

The above threats will be the most acute during the first post-fire rain season from December through February with a lower level of hazard during the following winter seasons until burn areas experience new vegetative growth and become more stabilized. With coastal chaparral environments such as with the Cottonwood Fire, the post-fire watershed threat should be reduced measurably after two to three years with favorable precipitation. (Refer to Hydrologist Specialist Report, Cottonwood Project File for a more complete description of sediment recovery rates.)

Threats to Soil Productivity: There is no emergency threat to soil productivity due to fire-adapted ecosystem and lack of productive timber stands.

Threats to Cultural Resource: A total of six known archaeological sites exist within the Cottonwood burn perimeter. Two sites are prehistoric Native American sites and four are historic. Two of the historic sites are linear resources. Both the Bee Canyon Road and the Lake Hemet Municipal Water District water transmission system sustained minor damage from the fire and will not be impacted significantly by watershed erosion. A loss of protective vegetation at all of the archaeological sites puts them at risk to looting and vandalism, particularly those that are located near Highway 74.

Additional observations for cultural resources are summarized in the Archaeologist Specialist Report, Cottonwood BAER Project File.

Threats to Wildlife: The area affected by the Cottonwood Fire contained designated critical habitat for arroyo toad (*Bufo californicus*) a federally-endangered species. The area is considered unoccupied for the amphibian. The Cottonwood Fire also supports habitat for R5 Sensitive species arroyo chub, partially armored threespine stickleback, San Diego horned lizard, California legless lizard, coastal rosy boa, San Diego ringneck snake, San Diego and San Bernardino mountain kingsnake, two-striped garter snake and habitat for Management Indicator Species (MIS) species mule deer and mountain lion. No emergency conditions exist for arroyo toad critical habitat as a result of anticipated post-fire effects. Post-fire effects may actually be beneficial to arroyo toad critical habitat as a result of storm-events which will reestablish sand bars and suitable breeding habitat.

There will be some short term negative post-fire effects for arroyo chub and partially armored threespine stickleback and their habitats. Post-storm event will result in lowered water quality and sedimentation into pools. There will be short term loss of overstory vegetation as the riparian habitat recovers from burn. However, flood events may also establish or create new pools. Sensitive species reptiles will be temporarily displaced as riparian and chaparral habitats recover, but should not be significantly impacted. Large mammals such as mountain lion and mule deer will benefit from a reduction in dense vegetation, and new grass growth. No emergency conditions exist for R5 sensitive or MIS species as a result of the Cottonwood fire.

Native Vegetation Recovery: An emergency exists with respect to vegetative recovery as a result of the threat of post-fire noxious plant introduction and spread. The unknowing introduction and dispersal of invasive weeds into areas disturbed by fire suppression and rehabilitation has the potential to establish large and persistent weed populations. In addition, it is highly likely that existent non-native plant infestations will increase in the burn area, due to their accelerated growth and reproduction and a release from competition with natives. These weed populations could affect the structure and habitat function of native plant communities within the burn area. It is expected that most native vegetation would recover if weed invasions are minimized.

Rare Plants: The threat of increased non-native plant invasion as well as the threat of off-road vehicle use in the occupied habitat of slender-horned spineflower constitutes an emergency. It is highly likely that existing weed populations will increase in the burned spineflower occupied habitat. There is potential that off-road vehicle use will increase in spineflower habitat due to the burn's removal of thick vegetation surrounding the habitat.

A summary of critical values and resources is in the table below.

Value Category	Hazard	At Risk	Emergency Yes/No
Life & Safety	Increased runoff and debris flows, rock and debris fall, erosion and sedimentation, and landslides.	Users of National Forest road 5S07 and 5S09.	Yes
Property	Increased runoff and debris flows, rock and debris fall, erosion and sedimentation, and landslides.	Forest Service roads: 5S07 and 5S09.	Yes

Water Quality	Increased turbidity and temporal increases in nutrient loading.	Potential short-term impacts to aquatic dependant organisms within immediate vicinity of fire area.	No
Soil Productivity	Increased runoff and debris flows, rock and debris fall, erosion and sedimentation, and landslides.	There is no emergency to soil productivity due to fire-adapted ecosystem and lack of productive timber stands.	No
Heritage Resources	A loss of protective vegetation at all of the archaeological sites puts them at risk to looting and vandalism	Sites along San Jacino River.	Yes
Botany	Slender-horned Spineflower (Federally Endangered)	Occupied Habitat	Yes
Ecosystem Structure and Function	Post-fire weed introduction and spread.	Vegetative recovery.	Yes
Wildlife & Fisheries Resources	Increased scouring and debris flows resulting in changes to channel morphology, lowered water quality, and erosion of streambanks and associated riparian vegetation.	▪ Designated Critical Habitat for Arroyo toad (Federally-Endangered) ▪ Partially Armored Three-Spine Stickleback, arroyo chub, San Diego horned lizard, California legless lizard, coastal rosy boa, San Diego ringneck snake, San Diego and San Bernardino mountain kingsnake, two-striped garter (R5 Sensitive) ▪ Mule deer, Mtn lion (MIS)	No

The BAER Assessment Team worked coordinated with Natural Resource Conservation Service, California Department of Transportation, and the Lake Hemet Municipal Water District to identify general areas of downstream values at risk.

B. Emergency Treatment Objectives

As noted above, the greatest threats to life and property are from increased erosion and sedimentation, flooding potential, and increased debris flow potential and rock fall. For these reasons the primary treatment objectives are to reduce the risk to human safety, reduce the risk of degradation of significant natural resources including the potential spread of noxious weeds, and protection of cultural resource sites.

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

Land **80** % Channel **--** % Roads/Trails **--** % Protection/Safety **90** %

D. Probability of Treatment Success

	Years after Treatment: This refers only to NFS lands, not all lands downstream		
	1	3	5
Land	80	90	100*
Channel	n/a	n/a	n/a
Roads/Trails	n/a	n/a	n/a
Protection/Safety	90	90	90

*It is assumed that there will be a full vegetative recovery by year 5.

E. Cost of No-Action (Including Loss): $3.8 million

F. Cost of Selected Alternative (Including Loss): $800,000

G. Skills Represented on Burned-Area Survey Team:

[X] Hydrology	[X] Soils	[ ] Geology	[ ] Range	[ ] Public Information
[ ] Forestry	[X] Wildlife	[ ] Fire Mgmt.	[ ] Engineering	[ ] Inter-agency coordinator
[ ] Contracting	[ ] Ecology	[X] Botany	[X] Archaeology	
[ ] Fisheries	[ ] Research	[ ] Landscape Arch	[X] GIS	

Team Leader: Marc Stamer

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Core Team Members:

- Jason Jimenez – Soil Scientist
- Mary Moore – Hydrologist
- Kyle Wright – Hydrologist (T)
- Anne Poopatanapong – Wildlife
- Julie Scrivner – Archaeologist
- Jordon Zylstra – Botany/GIS

Adjunct Team Members:

- John Ladley – Recreation

H. **Treatment Narrative**

Land Treatments

Noxious Weed Detection Surveys

Conduct noxious weed detection surveys in areas of soil disturbance by suppression equipment, heavy traffic from outside resources, and vulnerable locations within the burn area. This objective would be accomplished by surveying the 1.7 miles of dozer lines, 4 miles of travel routes through FS lands used during fire suppression (i.e. FS system roads), and the 5 uninfested helispots in 2010. Surveyors should look for all California State Noxious Weeds (www.cdfa.ca.gov/weedhome). Estimated costs are based on the assumptions that two visits would be necessary due to flowering times. If timing is such that all the target species are detected in one visit, the actual costs would be lower than displayed below.

Noxious Weed Detection Cost

Item	Unit	# of Units	Unit Cost	Total
GS-11 botanist	Days	2	$365	$730
2-GS-07 botanist	Days	6	$230	$2,760
Vehicle Mileage	Mile	250	$.37	$93
Total				**$3,583**

Channel Treatments – None proposed

Road and Trail Treatments – None proposed

Safety and Protection Treatments

Interagency Coordination

Throughout the first year post-fire, it is critical that the Forest Service cooridnates with California Department of Transportation to facilitate clean-out/maintence of infrastructure along State Highway 74. The Forest should coordinate with the Lake Hemet Metropolitan Water District to facilitate maintenance of the aqueduct system within the fire. The interagency coordinator will provide appropriate reports to

cooperating agencies such as California Department of Transportation, Lake Hemet Metropolitan Water District, and the Natural Resource Conservation Service.

Interagency Coordination Treatment Cost

Item	Unit	# of Units	Unit Cost	Total
Forest BAER Coordinator	Days	1	$375	$375
Forest Liaison	Days	5	$357	$1,785
Total				**$2,160**

Natural Vegetative Recovery Protective Fencing

Install several segments of three strand, smooth wire fencing (approximately 1/2 mile) to prevent OHV incursion and disturbance of burned lands. Protective fences and barriers provide public safety, protect cultural and Forest Sensitive Species sites, and allow for natural vegetative recovery of a burned area (BAER Guidance Paper-Gates, Fences, & Barriers). San Jacinto Ranger District specs should be used while building the smooth wire fence.

Protective Fencing Treatment Cost

Item	Unit	# of Units	Unit Cost	Total
Barbless-barb wire fencing materials	Mile	.5	$6,200	$3,100
GS05 Recreation Technician	Days	5	$231	$1,155
Vehicle Mileage	Mile	100	$.47	$47
Total				**$4,302**

BAER Warning Signs

BAER warning signs Purpose is protection of life and safety and cultural and natural resource sites. Treatment sites: Cottonwood Fire burn area entry points designated by San Jacinto Ranger District along Bee Canyon Road and at Cranston Fire Station and where archaeological sites and Federally Listed Plants locations are known. Construct and install signs with text, font, colors, size and shape designated by the Forest Service at locations determined by the San Jacinto Ranger District. Warning signs will be to San Bernardino Forest specs (i.e black on yellow) and will alert drivers, walkers, cyclist, and others to traffic hazards in order to minimize accidents. Sign text will be in English and in Spanish.

Sign Treatment Cost

Item	Unit	# of Units	Unit Cost	Total
BAER Warning Signs	Each	10	$300	$3,000
GS05 Recreation Technician	Days	1	$231	$231
Vehicle Mileage	Mile	50	$.47	$23.50
Total				**$3,254.50**

I. Monitoring Narrative

Monitoring is specifically designed to answer the question; Did BAER treatments provide the needed protection and rehabilitation of the burned area? The effectiveness monitoring efforts identified for the Cottonwood Fire include the following:

Treatment Effectiveness Monitoring: Monitor the BAER treatments to check that signs and fencing are present and functioning properly to reduce threats to public safety and life, reduce impacts to native vegetation

recovery, archaeological sites, and Federally Endangered Plant Occurrences. Typical monitoring visits will be one day per week.

Treatment Effectiveness Monitoring

Item	Unit	# of Units	Unit Cost	Total
GS-5 Recreation Tech.	Days	52	$231	$12,012
Vehicle Mileage	Miles	3,120	.50	1,560
Total				**$13,572**

Recommendations

This report is an initial funding request based on a rapid assessment. If additonal treatment needs are identified through more site specific on-the-ground investigation in cooperation with interested agencies, noxious weed detection surveys, interim requests for additional funding will be submitted. These funding requests will identify the purpose for each treatment, and specific treatment specifications, locations, and number of each treatment.

The BAER Assessment Team recommends that Cal Trans maintains due diligence in patrolling and maintiaining State Highway 74 and associated infrastructure and that Lake Hemet Municipal Water District monitors and maintains the aqueduct during storm events. The BAER Assessment Team also recommends the district continues to close access to Bee Canyon Road (5S07) storm events to reduce the threat to life and property from a post-fire watershed response.

Part VI – Emergency Stabilization Treatments and Source of Funds

			NFS Lands				Other Lands			All
		Unit	# of		Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER $	$	units	$	Units	$	$
A. Land Treatments										
Noxious Weed Surveys	Lump Sum	$3,583	1	$3,583	$0		$0		$0	$3,583
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$3,583	$0		$0		$0	$3,583
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										
				$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 Road & Trails				$0	$0		$0		$0	$0
D. Protection/Safety										
1/2 Mile Fence	Lump Sum	$4,302	1	$4,302	$0		$0		$0	$4,302
BAER Warning Signs	Lump Sum	$3,255	1	$3,255	$0		$0		$0	$3,255
Interagency Coord	Lump Sum	$2,160	1	$2,160	$0		$0		$0	$2,160
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Structures				$9,717	$0		$0		$0	$9,717
E. BAER Evaluation										
Assessment Team	Lump Sum	$26,084	1	---			$0		$0	$0
Insert new items above this line!				---	$0		$0		$0	$0
Subtotal Evaluation				---	$0		$0		$0	$0
F. Monitoring										
Treatment Effectiveness	Lump Sum	$13,572	1	$13,572	$0		$0		$0	$13,572
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring				$13,572	$0		$0		$0	$13,572
G. Totals				$26,872	$0		**$0**		**$0**	**$26,872**
Previously approved										
Total for this request				**$26,872**						

PART VII - APPROVALS

1. /s/ *Jeanne Wade Evans* 09/08/2009
   Forest Supervisor (signature) Date

2. */s/ George Kulick (for)* *9/30/09*
   Regional Forester (signature) Date

The Appendix items are provided separately to reduce file size. They include:

Figure 1: Soil Burn Severity Map

Figure 2: Geologic Map

Appendix A: Summary of cost-risk analysis

Appendix B: Treatment Justification Table

Appendix C: Noxious Weed Report and Monitoring Plan

All other documents are in the Project Record on the Cottonwood BAER external hard drive.