USDA-FOREST SERVICE FS-2500-8 (7/00)

Date of Report: June 11,2002

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: Arrowhead

B. Fire Number: P54924

C. State: CA

D. County: San Bernardino

E. Region: 5

F. Forest: San Bernardino

G. District: Cajon

H. Date Fire Started: May 31, 2002

I. Date Fire Controlled: June 7, 2002

J. Suppression Cost: $2,800,000

K. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): 1.5 mi. of dozer line and 3.5 miles of handline
2. Fireline seeded (miles): 0
3. Other (identify): Roads within and on the perimeter of the fire were graded.

L. Watershed Number: 1807020313 Waterman-Strawberry Creeks

M. Total Acres Burned:
NFS Acres(1821) Other Federal ( ) State ( ) Private (755)

N. Vegetation Types: Chamise, Northern mixed chaparral, Knobcone pine, Canyon live oak,

O. Dominant Soils: Osito-Modesto, Trigo, Ramona, Ruch

P. Geologic Types: Mesozoic plutonic rocks – quartz monzonite

Q. Miles of Stream Channels by Order or Class:
1st Oder - 13.0 2nd Order – 4.6 3rd Order – 3.8 4th Order – 4.4 5th Order – 0.8

R. Transportation System

Trails: 0 miles Roads: 9.3 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 427 (low) 291 (moderate) 1823 (high)

B. Water-Repellent Soil (acres): 1823

C. Soil Erosion Hazard Rating (acres):
___ (low) ___ (moderate) 2577 (high)

D. Erosion Potential: 34 tons/acre

E. Sediment Potential: 21,732 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

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

B. Design Chance of Success, (percent): 80

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

D. Design Storm Duration, (hours): 1

E. Design Storm Magnitude, (inches): 0.92

F. Design Flow, (cubic feet / second/ square mile): 311

G. Estimated Reduction in Infiltration, (percent): 20

H. Adjusted Design Flow, (cfs per square mile): 348

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency:

Introduction

The Arrowhead Fire burned 2,577 on National Forest and Private lands. Watershed response over the fire areas was characterized as follows:

Severity Rating	% of Fire	Acres Within Fire
High	71%	1,823
Moderate	11%	291
Low	17%	427
Unburned	1%	36

Slopes are steep to very steep averaging between 47 and 61 percent. Evidence of debris flows and mass wasting are found throughout the burn area. Vic Andresen, geologist provided an overview of the potential problems and concluded that a hydrologist and soil scientist were critical in the evaluation. Vegetation consists primarily of annual grasses at lower elevations with chamise, manzanita, ceothonus at mid to higher elevations. Knobcone pine is found on north facing slopes at higher elevations of the fire. Elevations range from 1920 feet at the bottom of the fire to 3795 feet at the top.

Based upon field surveys and the flow and sedimentation analyses the following watershed emergencies exist.

Life and Property

Flooding, debris flows, and sediment bulked flows are a threat to human life and property in the following locations:

Life and Property

1. Commercial and residential buildings at Arrowhead Springs.
2. 40th street culvert and road crossing - East Twin Creek.
3. Forest Road 1N24.
4. Arrowhead Springs access road to Coldwater Canyon.

Property

1. Arrowhead Springs water supply line and Well #3.
2. Southern California Gas Company natural gas pipeline buried in and adjacent to Forest Road 1N24.
3. Arrowhead Puritas water supply line.
4. Culvert on Arrowhead Springs access road.
5. Forest Road 1N24. Forest Road 1N24 provides the only fire access to the area and is the only access to maintain the Arrowhead Springs Water system and So. California Gas pipeline.
6. USGS Gaging Station - East Twin Creek.
7. Metropolitan Water District bore hole entrance and fence – East Twin Creek.

Loss of Control of Water

Based on the flow analysis the loss of control of water in the East Twin Creek watershed threatens all of the locations listed under Life and Property.

Water Quality

Strawberry Creek and East Twin Creek and their tributaries within and downstream of the Arrowhead Fire have a high potential for increased sedimentation and adverse affects on water quality.

Long Term Soil Productivity

Soils within the fire are vulnerable to accelerated rates erosion compared to pre-fire erosion rates due to loss of vegetative canopy and groundcover and slight to strong hydrophobicity.

Natural Resources

Santa Ana speckled dace, a Forest Service Sensitive Species and potentially Mountain yellow-legged frog, a proposed endangered species, are threatened by flooding in Strawberry Creek and Coldwater Canyon.

Riparian habitat, habitat for Endangered and Sensitive fish and wildlife species is at risk because of the potential for non-native invasive plants to expand their range due to the disturbance in the drainage.

B. Emergency Treatment Objectives:

1. Inform users of National Forest land, agencies repsonsible for flood control and emergency response related to floods and debris flows, personnel repsonsible for managing Arrowhead Springs, Southern California Gas Company, and Arrowhead Puritas Water Company of the potential for flooding, sedimentation, debris flows, and mass wasting that could aversely affect capital improvements and harm people using or maintaining the capital improvements such as, commercail and residential buildings and pipelines.

2. Approximately 3.2 miles of 1N24 runs northeasterly on Forest Service lands from Arrowhead Springs with burned areas on both sides of the road. As a result of the fire, additional runoff, silt, and debris has the potential to cause failure of drainage structures and overtopping of the roadway by high flows with ensuing damage to the road embankment and areas downstream of the drainage structure. The objective is to reduce the potential for roadbed to suffer erosion and cutting due to slides, debris and silt plugging flow lines thereby forcing surface runoff to run down the roadway for long distances causing cutting and loss of roadbed material. Loss of significant portions of the road would add to the sediment and flooding problems downstream.

   Alternatives of decommissioning the road or making it the responsibility of the permittees was considered, but not chosen because the District determined that they needed continued Forest Service Access to the site for management purposes. The alternative of pulling undersized drainage structures and placing temporary covers and going back after storms and fixing the damage was considered, but is not a sound option. There is potential for a major loss of the investment we have in the road and for large failures that would make the problem of sediment and debris flows even worse than will be experienced from the fire.

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

Land N/A % Channel N/A % Roads 80 % Other N/A %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land			
	N/A	N/A	N/A
Channel			
	N/A	N/A	N/A
Roads			
	85%	90%	95%
Other			
Early Warning	95%	95%	95%

E. Cost of No-Action (Including Loss): $1,322,000

F. Cost of Selected Alternative (Including Loss): $508,948

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Steve Loe

Email: sloe@fs.fed.us Phone: 909-884-6634 ext. 3131 FAX: 909-383-5770

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:

None.

Channel Treatments:

None.

Roads and Trail Treatments:

There is a need to increase the size of some existing drainage structures to prevent the structures from washing out. In some cases grouted rock spillways will need to be installed to handle the additional flows and bed load. There are also undermined drainage structures that need to be replaced or reinstalled to handle the additional runoff. The outlets of drainage structures need to be protected from erosion by installing loose rock riprap energy dissipaters. There are some cases were additional intercepting dips and over side drainage structures will need to be installed between existing structures to decrease the distances between existing cross drains to remove flows off the road way before they start cutting the roadbed.

In addition to these prescriptions, the road bed will need to be graded to maximize the drainage flow lines to allow for additional bed loads, debris, and flows; intercepting dips will need to be deepened to handle additional flows and silt; inlets to culverts and over side drainage flumes will require cleaning of all loose vegetation, debris, and silt to maximize their efficiency; earth berms channeling flows will need to be reinforced; lead off ditch lines will need to deepened.

Structures:

None

Other:

Cooperate with San Bernardino County and the City of San Bernardino to install an Early Warning System rain gauge in upper Strawberry Creek watershed to monitor precipitation. Link the system to local government emergency response and flood control agencies and a flashing light system using the appropraite electronic linking system. The system should be capable of initiating a road closure on 40th Street within 5 minutes of recorded precipitation. San Bernardino County and the City would be responsible for the installation, maintenance and operation of the early warning system.

The early warning system will be returned to the Forest Service Cache unless one of the cooperators ends up purchasing the system, whereby it will become their property.

H. **Monitoring Narrative:**

(Describe the monitoring needs, what treatments will be monitored, how they will be monitored, and when monitoring will occur. A detailed monitoring plan must be submitted as a separate document to the Regional BAER coordinator.)

The road work would be monitored for 2 years to ensure that the prescribed treatments are effective and minor improvements made where needed. Funding is requested for the first year at this time.

The riparian habitat upstream of the Arrowhead Springs property (heavily infested) will be monitored annually for two years to determine if there is a spread of arundo and broom, highly invasive non-native weed species, onto the National Forest. Funding is requested for the first year at this time.

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

Line Items	Units	Cost	Units	SULT $	$	units	$	Units	$	$
A. Land Treatments										
				$0			$0		$0	$0
				$0			$0			
				$0			$0		$0	$0
				$0			$0		$0	$0
Subtotal Land Treatments				$0			$0		$0	$0
B. Channel Treatments										
				$0			$0		$0	$0
				$0			$0		$0	$0
				$0			$0		$0	$0
				$0			$0		$0	$0
Subtotal Channel Treat.				$0			$0		$0	$0
C. Road and Trails										
Forest Road 1N24	EA	$185,948	1	$185,948			$0		$0	$185,948
				$0			$0		$0	$0
				$0			$0		$0	$0
				$0			$0		$0	$0
Subtotal Road & Trails				$185,948			$0		$0	$185,948
D. Structures										
Early Warning System	EA	$35,000	1	$35,000			$0		$0	$35,000
				$0			$0		$0	$0
				$0			$0		$0	$0
				$0			$0		$0	$0
Subtotal Structures				$35,000			$0		$0	$35,000
E. BAER Evaluation										
Salary and Travel				$20,344			$0		$0	$20,344
				$0			$0		$0	$0
F. Monitoring		$2,250	1	$2,250			$0		$0	$2,250
G. Totals				**$243,542**			**$0**		**$0**	**$243,542**

PART VII - APPROVALS

1. /s/ Gabriel Garcia (for) Gene Zimmerman — 6/14/02
   Forest Supervisor (signature) — Date

2. /s/ Gilbert Espinosa (for) — 6/18/02
   Regional Forester (signature) — Date