USDA-FOREST SERVICE FS-2500-8 (6/06)

Date of Report: 01/08/2009

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
[x] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

[] 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)
Report revised by Andrew Breibart on 8/29/08 to correct omissions and errors
[x] 2. Interim Report # 1
[ ] Updating the initial funding request based on more accurate site data or design analysis
[x] Status of accomplishments to date

[ ] 3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Cub Fire

B. Fire Number:CA-LNF-002713

C. State:CA

D. County:Tehama

E. Region: 5

F. Forest: Lassen NF

G. District: Almanor Ranger District

H. Fire Incident Job Code:P5D8M9

I. Date Fire Started:June 21, 2008

J. Date Fire Contained: July 20, 2008

K. Suppression Cost: $21 Million (includes the Onion Fire)

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles):20 miles as of July 20, 2008 (includes Onion Fire)
2. Fireline seeded (miles):
3. Other (identify): 12 miles of rehab on NFSR 27N06 as of July 20, 2008 (includes Onion Fire)

M. Watershed Number: 1802015799

N. Total Acres Burned:15,078
NFS Acres(14,974) Other Federal ( ) State ( ) Private (104)

O. Vegetation Types: Conifer and manzanita with pockets of Black Oak and Cedar

P. Dominant Soils: Windy stony sandy loam (30-50% slope), Cohasset stony loam (30-50% slope), McCarthy sandy loam (30-50% slopes), and Rockland

Q. Geologic Types; Andesites from the Yana Volcanic Center; Tuscan formation lahar, and colluvium from mass wasting.

R. Miles of Stream Channels by Order or Class:
Perennial: 13.7 and Seasonal: (Intermittent and Ephemeral): 46

S. Transportation System

Trails: 2.2 miles Roads: 24.4 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 5,998 (low) 3,969 (moderate) 1,895 (high)

NFS Burn Severity (acres): 5,954 (low) 3,950 (moderate) 1,895 (high)

B. Water-Repellent Soil (acres):609

C. Soil Erosion Hazard Rating (acres):
112 (low) 2,607 (moderate) 11,053 (high) 1,306 (very high)

D. Erosion Potential: 5 (moderate burn severity in Cub Creek) - 54 (high burn severity in Cub Creek) tons/acre

E. Sediment Potential: Post-fire: 2,300 cubic yards/square mile (moderate burn severity in Cub Creek)-24,000 (high burn severity in Cub Creek cubic yards / square mile

Pre-fire: <1 cubic yard/square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years):	3 years
B. Design Chance of Success, (percent):	90
C. Equivalent Design Recurrence Interval, (years):	10
D. Design Storm Duration, (hours):	6
E. Design Storm Magnitude, (inches):	4
F. Design Flow, (cubic feet / second/ square mile):	61 cfs/sq. mile
G. Estimated Reduction in Infiltration, (percent):	21%
H. Adjusted Design Flow, (cfs per square mile):	94 cfs/sq. mile

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

Initial Values at Risk are listed in the table below

The Cub Fire burned approximately 11,852 acres in headwater streams tributary to Deer Creek. Deer Creek is considered an anchor for the recovery of the Central Valley spring-run Chinook salmon, a federally listed species. Due to a variety of factors that are impossible to accurately ascribe cause and effect, the current population trend of spring-run salmon in the watershed is down. The result is a significantly lower population of adult fish (140) than at any time since populations began to be monitored on a consistent basis in 1992. In contrast, the average population over the past ten years is 1679 adults. This low population of adults means that fewer adults will spawn, with each redd and egg proportionately more valuable than in previous years. A high proportion (likely 50%) of redds will be located in a reach 4-6 miles downstream of the fire. Between October and January, eggs and alevins incubate in redds. Eggs and alevins of Central Valley Steelhead incubate till April. During this time period, they would be most vulnerable to mortality if the redds filled with fine-grained sediment as a result of post-fire storm runoff within 2 years after the fire. Eighty-nine percent of the average annual precipitatin falls between October and April. Cub Creek and Rattlesnake creeks are two of the headwater streams that are tributary to Deer Creek and within the fire perimeter. In the past 10 years, the reach from Cub Creek to Rattlesnake Creek has been the location of 14% of spring-run spawning for Deer Creek. Fifty-five percent of the Cub Watershed (3,968 acres) had a moderate and high burn severity. Average watershed slope is 45%. Due to the following watershed characterestics, we expect a high amount of sediment delivered to Deer Creek from these watersheds, which could have serious consequences on the population of Central Valley spring-run Chinook and Central Valley spring-run steelhead. All values at risk are listed in the table below (Table 1).

Table 1. Values at risk identified during the Cub BAER Assessment.

Values At Risk	Disposition After Assessment
California State Route 32-hazards	Emergency: Risk of rock fall and ash onto the road; plugging of cross-drains-Notification letter to the District Ranger has been sent. District Ranger will contact California Department of Transportation (CalTans) regarding hazards.
California State Route 32-North Fork Calf Creek Culvert	No Emergency: Increased runoff and debris is not expected. Fifteen percent of 1,430 acre watershed burned at moderate and high burn severity. Five by Five foot box culvert should handle increased runoff from fire.
Deer Creek Recreationists	Emergency-Loss of life could occur to people in and around Cub Creek and Rattlesnake Creek, Deer Creek within the burn areas during storm events from increased runoff and debris in streams. Loss of life could also occur in Deer Creek downstream of the fire.
Forest Service Roads-road failures	Emergency: Risk of road related failures within areas of moderate and high burn severity on NFS roads 27N12 and 28N12E. Road failures could deliver increased sediment to Rattlesnake Creek; and Deer Creek between Elam Creek and Cub Creek.

Forest Service Roads-Safety	Emergency-Safety hazard from hazard trees and increased rock fall.
Pacific Crest Trail-safety	Emergency: Safety hazard from hazardous trees has been addressed by suppression rehabilitation.
Noxious invasive plants-spread	Emergency exists from spread of noxious invasive plants.
Designated critical and essential anadramous fish habitat below Deer Creek Falls. Habitat supports one of few remaining naturally reproducing populations of spring-run Chinook salmon and steelhead. Creek provides habitat for holding, spawning and rearing.	Emergency: Likely increased mortality of eggs and alevins of both species due to increased erosion, result of high burn severity areas in headwaters of Cub and unnamed drainages tributary to Deer Creek.
Resident fishery: Cub Creek, Rattlesnake Creek, Deer Creek; rainbow trout	Emergency: Erosion and sedimentation will increase. Some reduction in habitat quality is expected with biggest impact to spawning. Result of high burn severity areas in headwaters of Cub Creek and Rattlesnake Creeks.

B. Emergency Treatment Objectives:

1. Mitigate the threats to human life and property from rock fall, debris, and ash from adjacent hill slope onto California State Route 32.
2. Mitigate the threats to human life due to increased runoff and debris in streams within and downstream of the burned areas.
3. Mitigate the threat of loss of NFS roads and trails within areas of moderate and high burn severity.
4. Mitigate the loss to human life as a result of hazardous trees along the Pacific Crest Trail, a major system trail between the Canadian and Mexican borders.
5. Mitigate the loss of eggs and alevins of federally listed species between October and April.

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

Land **95** % Channel ___ % Roads/Trails **95** % Protection/Safety **95** %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	90	95	100
Channel			
Roads/Trails	90	95	100
Protection/Safety	90	95	100

E. Cost of No-Action (Including Loss): $2,624,000

F. Cost of Selected Alternative (Including Loss):$485,000

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader:Andrew Breibart

Email:abreibart@fs.fed.us Phone:530-252-6456 FAX:530-543-6428

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:

*Helimulch (*helimulch contract at $1,063,122 and the administration at $4,532**)** To reduce the amount of sediment reaching Deer Creek, which supports one of few remaining naturally reproducing populations of spring-run Chinook salmon and steelhead, 1,061 acres of high burn severity areas in Cub Creek and unnamed drainages tributary to Deer Creek will be treated with weed-free and seed-free straw mulch. Application rates will be 1 ton/acre. Application will be done via a helicopter to slopes between 15% and 60%, as there are no roads within Cub Creek. Cub Creek is being treated, as 56% of the watershed burned at moderate and high burn severity. Rice straw should reduce sediment yield from 19,875 cubic yards/square mile to 2,649 cubic yards/square mile within areas of high burn severity in Cub Creek for two years following the fire. By year three, vegetation is expected to have recovered.

The BAER Team Implementation Leader reduced treatment acres from 1,061 acres to 1,042 acres due to concerns with safety and operability of helicopters. Mountain West Helicopters (MWH) completed the helimulch treatment of 1,042 acres at a cost of $477/acre. Approximately $9,800 was spent on Forest Service salaries for contract preparation (BAER Team Leader), GIS support, 4 inspectors, the COR, and per diem for the COR. Don Tinsley, Sierra Cascade Province Contracting Officer, served as the project CO. His salary is covered by the Province, so he didn't charge his time to the BAER code. Kirby Cook, Helitack Manager on the Bitterroot National Forest, was hired as the COR.

MWH began staging operations on Friday October 11 and commenced aerial application on Monday October 13. Two helicopters were used for aerial operations. Two hours into operations, one of MWHs' sub-contractors caused an accidental fire at the staging area and 500 tons of rice straw mulch was consumed (nearly 48% of its supply). The staging area was located within a rock pit, within the Cub Fire. There was no risk of a new wildfire. MWH spent all of Monday and Tuesday suppressing the fire with bucket drops from its two helicopters, while Forest Service personnel worked on the ground to contain the blaze. After two days of fire suppression, MWH was able to restart operations in a nearby staging area. MWH replaced the burned rice straw and absorbed any losses from loss of the mulch and suppression costs. A new staging area was created 0.25 miles from the burned mulch and was created in an old timber sale landing adjacent to NFSR 27N12. Despite this delay in operations, MWH completed the treatment on Saturday October 16. Final inspections were conducted that same day.

Rice straw staged on NFSR 27N12.

KMAX with one load.

Both photographs show unit 2, which is comprised of conifers and slopes between

Monitoring of noxious invasive weeds ($4,600)

Only Medusahead (*Taeniatherum caput-medusae*), Perennial pepperweed (*Lepidum latifolium*), and Yellow starthistle (*Centaurea solstitialis*) have been identified within the burn area (Table 2).

Table 2. Noxious invasive weeds within the Cub Fire.

Weed species	**Location**
Medusahead	Found along Hwy. 32 about a quarter-mile southwest of Potato Patch Campground
Perennial pepperweed	Found along Hwy. 32 at outlet of Rattlesnake Creek
Yellow starthistle	Scattered locations along Hwy 32 from Alder Creek Campground southwest to the Forest Boundary with the largest concentration at the helispot between Deer Creek Falls and Potato Patch Campground; also along Hwy. 32 at the outlet of Slate Creek and along Road 27N02 about 1.5 miles from junction with 27N06, just southwest of Rattlesnake Creek

Approximately $4,600 is needed for the detection surveys. The funds will be used to survey hand and dozer lines constructed off the highway and any staging areas on National Forest Service lands.

Channel Treatments:

Roads and Trail Treatments:

NFS Roads

Items	Costs
Mobilization	$2,000
12 rolling dips along NFSR 27N12 @ $1200 each (includes surfacing)	$14,400
Roadway drainage repair, including 2 channel crossings on NFSR 28N12E	$7,500
Engineering support (survey, design, contract admin, reporting)	$5,000
Hydrology specialist time design input	$500
Storm Patrol, force account	$8,000
Hazard Tree Removal in work areas	$2,800
Total	**$40,200**

Road treatments were implemented via force acount at an estimated cost of $31,200. Costs associated with road treatments were for labor only. Materials were supplied from near-by sources.

27N12 in Rattlesnake Creek watershed

- 5 new rolling dips were installed
- 12 rolling dips were reconstructed with 170 cubic yards of rip rap and 950 cubic yards of base material.
- 12 miles of road were bladed.
- 40 feet of a roadside ditch were lined with 30 cubic yards of rip rap.

Rock-lined ditch on NFSR 27N12

28N12E in Elam Creek watershed

- Two low water crossings were constructed with 100 cubic yards of drain rock and 48 cubic yards of rip rap.

Low water crossing on 2*N12E on steep seasonal drainage with high soil burn severity upstream of crossing.

28N12 in Elam Creek watershed

- 5 miles were bladed.

Protection/Safety Treatments:

An informal memo written by Andrew Breibart was sent to the District Ranger via email, identifying potential hazards and culvert problems with State Route 32. The District Ranger will forward a version of this letter to California Department of Transportation through the correspondence database.

A version of this letter was forwarded to California Department of Transportation. The local office was observed cleaning culverts and replacing culverts on State Route 32 in October.

Hazardous condition in Deer Creek, Cub Creek, and Rattlesnake Creek- awareness of streamflow conditions and prudent caution should be exercised by people near the streams during storm events. Public Relations will post safety information through various media outlets regarding all the hazards associated with this fire and the 7 other fires that have occurred on the Lassen National Forest in 2008. These safety messages will inform the public about road-side hazards (burned trees and rock fall); and hazardous conditions in burned watersheds. Information regarding hazards in streams may include increased debris and runoff during post-fire events. Salary for Public Affairs Officer's time would be $3,835.

Eight signs posting the hazards and safety concerns regarding hazard trees and increased rock fall on roads will be placed in eight critical locations to warn all people who drive NFS roads of the safety concerns (page 182 of the 2006 BAER catalog published by National Technology & Development). Signs cost of $500.00 each, which includes installation. Total cost of signs is $4,000.

Hazards from burned trees along the Pacific Crest Trail (PCT) were removed by a Type 3 team during fire suppression rehabilitation. No additional treatments are recommended.

I. **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.)

Helimulch Treatment Effectiveness Monitoring

I. Objectives

The objective of Burned Area Emergency Response (BAER) monitoring for the Cub Fire is to determine the effectiveness of the helimulching treatment at reducing surface erosion within areas of high soil burn severity and to determine if additional mulch application is required to reduce surface erosion.

II. Methods

Eight soil plots and 2 soil transects were delineated in October following the aerial application of helimulch and before the first damaging storm. The eight plots are between 300 to 250 square feet and range in slope gradient, elevation, topographic location (location on hillside), and amount of ground cover. All eight plots are within the high intensity burn area located on the north-eastern facing side of the south-western ridge of Cub Creek.

Two transects are located on the western and eastern sides of the north-facing southern ridge. These transects were delineated after aerial rice straw application. The transects are 300 foot in length with ground cover estimations made every 10 feet for a total of 30 inspection points. Aerial ground cover measurements were determined visually, estimating approximately 1 foot by 1 foot centered on the 10 foot point. Post-winter visual measurement will be conducted using the same the technique, and then compared to the initial observations. A loss of rice straw ground cover and evidence of erosion will be evaluated to determine the need for a reapplication of rice straw mulch.

The following types of data will be recorded at each plot and transect:

- Ground cover percentage per transect and plot will be measured and calculated by taking the mean.
- Depth of mulch.
- Presence and absence of surface erosion will be noted (rills and gullies)
    - Length and depth of rills and gullies will be measured.
- Hydrophobicity will be measured along the transect at every 5th observation point.

III. Schedule

Monitoring will occur after design storms during the 2008/09 winter, given that sites are accessible and roads are drivable. Final monitoring will occur in the spring after snow melt occurs. A monitoring report will be submitted to the Regional BAER Coordinator in an interim report.

IV. Costs

	Days	Salary	Total
GS-11 Hydrologist	3	$290	$870
GS-11 Soil Scientist	6	$269	$1,614
GS-07 Hydrologist	10	$179	$1,790
Two vehicles (mileage at $0.50/mile)			$800
Total			**$5,074**

Part VI – Emergency Stabilization Treatments and Source of Funds **Interim #**

Line Items	Units	Cost	Units	BAER $	$	units	$	Units	$	$
A. Land Treatments										
monitoring nox weeds	plan	4,600	1	$4,600	$0		$0		$0	$4,600
helimulch	job	1002	1061	$1,063,122	$0		$0		$0	$1,063,122
helimulch contract	hours	56.65	80	$4,532	$0		$0		$0	$4,532
				$0	$0		$0		$0	$0
Subtotal Land Treatments				$1,072,254	$0		$0		$0	$1,072,254
B. Channel Treatments										
				$0	$0		$0		$0	$0
Subtotal Channel Treat.				$0	$0		$0		$0	$0
C. Road and Trails										
road drainage work	contract	23,900	1	$23,900	$0		$0		$0	$23,900
road work support	ea.	8300	1	$8,300	$0		$0		$0	$8,300
storm patrol	ea.	1000	8	$8,000						$8,000
Subtotal Road & Trails				$40,200	$0		$0		$0	$40,200
				$0	$0		$0		$0	$0
D. Protection/Safety										
signs	sign	500	8	$4,000	$0		$0		$0	$4,000
Public affairs-safety	pay per	3,835	1	$3,835	$0		$0		$0	$3,835
Subtotal Protection/Safety				$7,835	$0		$0		$0	$7,835
E. BAER Evaluation										
assessment	team	10540	1	---	$10,540		$0		$0	$10,540
				---	$0		$0		$0	$0
Subtotal Evaluation				---	$10,540		$0		$0	$10,540
F. Monitoring										
				$0	$0		$0		$0	$0
Subtotal Monitoring				$0	$0		$0		$0	$0
G. Totals				$1,120,289	$10,540		**$0**		**$0**	**$1,130,829**
Previously approved										
Total for this request				**$1,120,289**						

PART VII - APPROVALS

1. ***/s/ Lorene T. Guffey for Kathleen S. Morse*** _____ ***2/9/09*** _____
   Forest Supervisor (signature) Date

Partial regional approval, reference cover letter for specifics

2. _____ _____
   Regional Forester (signature) Date