USDA-FOREST SERVICE
FS-2500-8 (7/00)
Date of Report: 07/08/03

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

[ ] 1. Initial Request (Best estimate of funds needed to complete eligible rehabilitation measures)

[x] 2. Interim Report
[x] 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: East Fork

B. Fire Number: P48728

C. State: UT

D. County: Summit

E. Region: 04

F. Forest: Wasatch-Cache

G. District: 06

H. Date Fire Started: 6/28/2002 I. Date Fire Contained: 7/17/2002

J. Suppression Cost: 11 million as of 7/17, projected 16 million total

K. Fire Suppression Damages Repaired with Suppression Funds

1. Fireline waterbarred (miles): Handlines: 42.8
2. Fireline seeded (miles): None, seeded approx 5 acres of firecamp, helibase areas
3. Other (identify): Dozer Lines recontoured, topsoiled and mulched: 16.4 miles

L. Watershed Number:

M. Total Acres Burned: Perimeter 14204, Burned 10275, Unburned 3929
NFS Acres(9634/6960/2674) State (562/245/317) Private (4008/3069/939)

N. Vegetation Types: Lodgepole Pine

O. Dominant Soils: Landtypes 225,223,238,354,483,484

P. Geologic Types: Quartzite, Shale, Limestone, Quaternary Alluvium

Q. Miles of Stream Channels by Order or Class:
Perennial : 23.4 Intermittent: 14.7

R. Transportation System

Trails: 14 miles Roads: 37.3 miles

PART III - WATERSHED CONDITION

A. Burn Severity All (acres): 3350 (low) 5295 (moderate) 1631 (high) 3929 (unburned)
NFS (acres): 2312 (low) 3523 (moderate) 1126 (high) 2674 (unburned)

B. Water-Repellent Soil (acres): 100% of High severity acres are water repellent

C. Soil Erosion Hazard Rating (acres):
4697 (low) 7344 (moderate) 2163 (high)

D. Erosion Potential: 0.21 to 10.88 tons/acre (modeled using disturbed WEPP)

E. Sediment Potential: 0.05 to 9.94 tons/acre (modeled using disturbed WEPP)

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 10

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

C. Equivalent Design Recurrence Interval, (years): 25

D. Design Storm Duration, (hours): *

The six-hour design storm duration was not used in the calculations because equations based on regional analysis of flow data is available for the area. The method used to determine a design storm is based upon regional curve data, which better takes into account the short-duration, high-intensity thunderstorms that occur in the area.

The 25-year event flood flows were calculated using a regional equation that had been developed for Northeast Region 4 based on area stream gage data (Thomas et al 1994). Studies of the increase in peak flows resulting from wildfire were reviewed. Ponderosa Pine ecosystems in Central Arizona showed a 500% to 1500% increase in peak flows (Rich 1962, *in* DeBano et al 1998) and Monterey Pine ecosystem in the Cape Region of South Africa showed a 290% increase in peak flows (Scott 1993, *in* DeBano et al 1998). There is very little data regarding peak flow increases from wildfire and a large range in values of peak flow following wildfire are reported in the literature.

Several factors were considered in the design flow estimate. For this analysis, an initial value of 500% is used as an estimate of percent increase in peak flows because it represents the area and climate better than any of the other data in the literature. This increase in flow was used to represent increases from those areas that have high burn severity. The increased flow from wildfire for the watershed above the design flow point of interest was weighted by area of high burn severity.

For the design flow, the flows for the estimated 25-year flood flow calculated using the regional equation were multiplied by 5 and then weighted by area of high burn severity. The increased flow value represents the estimated increase in flow in the first year after the burn or until vegetation is established and hydrophobicity returns to prefire conditions. Hydrophobicity is expected to return to prefire conditions within 1 to 2 years because high hydrophobic conditions occur just within the surface inch of the soil, high hydrophobic areas are mostly interspersed with moderate severity burned areas having low hydrophobic conditions and soil conditions that will recover quickly.

E. Design Storm Magnitude, (inches):

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

Location	Area (mi^2)	Discharge (cfs)	Cfs/mi^2
Boundary Creek @ BSA road culvert	4.6	184	40
East Fork Bear River @ lower BSA road bridge	29.7	683	23
Mill Creek @ Hairpin curve culvert	5.8	216	37

G. Estimated Reduction in Infiltration, (percent):

Location	Watershed Area (acres)	High Burn Severity (acres)	Hydrophobic Soils (acres)	Reduced Infiltration (%)
Boundary Creek @ BSA road culvert	2,949	119	119	4.0
East Fork Bear River @ lower BSA road bridge	19,038	690	690	3.6
Mill Creek @ Hairpin curve culvert	3,718	281	281	7.6

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

Location	Adjusted Design Flow (cfs) 5 times Design Flow, weighted high severity areas	Adjusted Design Flow (cfs/mi2) 5 times Design Flow, weighted high severity areas
Boundary Creek @ BSA road culvert	214	46.5
East Fork Bear River @ lower BSA road bridge	782	26.3
Mill Creek @ Hairpin curve culvert	281	48.4

REFERENCES

DeBano, Leonard F., Neary, Daniel G. and Peter F. Ffolliott. 1998. Fire's Effects on Ecosystems. John Wiley & Sons, Inc.

Thomas, Blakemore E., Hjalmarson, H.W. and S.D. Waltemeyer. 1994. Methods for Estimating Magnitude and Frequency of Floods in the Southwestern United States. U.S. Geological Survey, Open-File Report 93-419

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency: Tree and vegetation mortality from the 2002 fire has resulted in elevated amounts of runoff from all rainstorm events. Road and trail surfaces

are collecting and transporting runoff in locations that were dry under prefire conditions. Runoff and sediment from rainstorm events threatens the following resource values:

1) Critical fish habitat for the sensitive species Bonneville and Colorado cutthroat trout. This threat is greatest in the Mill Creek (Bonneville cutthroat) drainage.

2) Drainage structures on system roads and trails. This threat is greatest in Mill Creek (84152 and 293 roads in the Main Fork), and East Fork Bear (main road, Bear River-Smiths Fork Trail, and Baker Lake Trail).

B. Emergency Treatment Objectives:

1) Mitigate delivery of sediment into Mill Creek from post fire damaging rainstorm events by improving road and trail drainage.

2) Mitigate potential for damage to existing road prisms and driving surfaces from post fire rainstorms by installing culverts or rolling dip waterbars where needed.

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

Land **80** % Channel ___ % Roads **96** % Other ___ %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	80	100	100
Channel			
Roads	96	96	96
Other			

E. Cost of No-Action (Including Loss): **$1,390,000.**

No action is assumed to be no treatment to mitigate potential effects to resources at risk from the first damaging rain event. Closure of the Smith Fork-Bear River Trail costs nothing and would still be recommended in this alternative. The BAER evalution has already been completed, and ttherefore is part of the alternative. Monitoring of effects on heritage resources, fisheries, soil quality, and vegetation/weed infestations would not occur. This alternative would feature losses of fish habitat in Mill Creek and the East Fork Bear River, loss of tie hack logging heritage site integrity, loss of recreation opportunities by users of the Smith Fork-Bear River trail system, damage to the main access road and to the Baker Lake trail in the East Fork Bear River, noxious weed infestations, and loss of water quality to support beneficial uses (culinary water) at the Boy Scout Camp.

Value at Risk	Estimated cost *
Loss of Bonneville CT Trout Habitat (8 miles) in Mill Creek	$800,000
Damage to EFBear River road (6 culverts replaced plus surfacing)	$90,000
Noxious weed and Invasive Plant Encroachment	$70,000
Loss of Heritage sites	$400,000
Spring redevelopment and temporary potable water supply	$20,000
Recreation Values (Closure of Bear River-Smith Fork Trail)	$10,000
Total	**$1,390,000.00**

*Values were derived from the Sanford Fire analysis and prorated based on comparative fire sizes.

F. Cost of Selected Alternative (Including Loss): **$87,816.**

This alternative would feature losses in fish habitat in Mill Creek, as well as loss of recreation opportunities by users of the Smith Fork-Bear River trail system. All other resource value losses from the effects of fire have been mitigated by the proposed treatments. The unmitigated losses are difficult to quantify, therefore the cost of the selected alternative includes only costs for treatments, monitoring of the implementation and effectiveness of treatments, and for the evaluation of the effects of the fire on resources at risk. Please refer to the no action alternative costs table for value estimates on some of the unmitigated resource losses.

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Paul Flood

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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 proposed

Channel Treatments: None proposed

Roads and Trail Treatments:

1) Install (5) new 18 inch diameter culverts at various locations along Forest Road 293 in the upper part of Mill Creek, preventing damge to the road prism and sediment delivery into the perennial channel. Prefire, this road with its exisitng drainage features did not deliver excessive amounts of sediment to Mill Creek. Although fire suppression work was done to restore drainage structures on this road, monitoring of recent post fire storm events has discovered many previously undetected ephemeral channels that have acquired perennially flowing character. None of these channels currently have adequate drainage features to handle the increased post fire runoff. Without the treatment, ensuing rainstorm events will continue to deliver sediment from high severity burn sites down and over the waterbars and dips restored under fire suppression, and critical fish habitat will be impacted. (Project RRT 5).

2) Install (8) additional rolling dip road waterbars on Forest Road 293 in lower Mill Creek. This will prevent damage to the road surface fom heightened runoff flows yielded by adjacent high burn severity areas and reduce the overall sediment load in Mill Creek. (Project RRT6).

Structures: None proposed

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.)

Monitoring of watershed and watershed dependent resources will occur to determine if treatments were implemented correctly, if they are effective in providing protection to resources at risk, and if there is a need to prescribe additional treatments. For burned areas where treatments were not prescribed, monitoring will serve to document if this option is providing for the protection of resources at risk. Initial monitoring of projects accomplished under the 7/17/02 initial BAER funding request has occurred during the fall of 2002 and the spring of 2003. The 7/17/02 initial funding request also contained a proposals to monitor the following resource conditions:

Infestation of Noxious Weeds:
Annual monitoring for the next three years of dozer lines and fire suppression vehicle access trails in Mill Creek, Carter Creek, East Fork Bear, and West Fork Blacks Fork. Annual monitoring for the next three years with random transects across high severity burn areas in the same drainages.

Impacts on Bonneville Cutthroat Trout Habitat:
Because Bonneville trout are expected to move to alternate refuges in response to from fire effects on their habitat in Mill Creek, very few projects are being proposed for this drainage. The team felt it would be appropriate to monitor, annually for the next three years, fish populations in Mill Creek and the five other streams that make up the

metapopulation to confirm that the refugia concept is working. Populations will be monitored by fish shockiing.

Impacts on Cultural Resources

The vast majoriy of undamaged cultural features are located in stable landform locations, such as meadows, that will effectively protect them from damage by runoff and floods. Access trails opened for fire suppression activities will be closed and provide further protection to cultural resources from recreation user disturbances. Cultural site integrity will be monitored for changes in each of the next three years. A condition baseline will be established in FY2002 for the 25 most at risk sites.

Impacts on Soil Productivity

The implementation and effectiveness of erosion prevention treatments will be monitored at the road drainage project (Project RRT1) and at other locations in upper Mill Creek on an annual basis for each of the next three years. This monitoring will utilize erosion pins and or erosion bridges located along slope and stream transects that will quantify the amount of sediment leaving the burn area and being delivered to the channel, following precipitation events. A self tipping rain gauge and data logger will be installed in the eastern fork of Mill Creek drainage. Similar monitoring will occur in the eastern fork of Mill Creek and the East Fork of the Bear River to determine if the no treatment options prescribed for these areas provide for protection of watershed values and rehabilitation of the burned area.

Impacts on Channel Stability and Water Quality

Stream channel condition will be monitored beginning in the summer of 2003, using the Pfankuch protocol. Data will be collected on the East and West forks of Mill Creek. Monitoring of channel stability and water quality will occur following precipitation events, and correlated to data collected at the Mill Creek rain gauge

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											
Subtotal Land Treatments				$0							$0
B. Channel Treatments											
Subtotal Channel Treat.				$0				$0		$0	$0
C. Road and Trails											
Culvert Install (RRT5)	each	1500	5	7,500				$0		$0	$7,500
Rolling Dip Install (RRT6)	each	600	16	$10,000				$0		$0	$10,000
Subtotal Road & Trails				$17,500				$0		$0	$17,500
D. Structures											
Subtotal Structures				$0				$0		$0	$0
E. BAER Evaluation											
Subtotal BAER Eval				$0							$0
G. Monitoring Cost											
Subtotal Monitoring				$0							$0
H. Totals				**$17,500**							**$17,500**

PART VII - APPROVALS

/s/ Thomas L. Tidwell
THOMAS L. TIDWELL
Forest Supervisor

Regional Forester

Date

cc: Sherry Hazelhurst