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

Date of Report: 10/16/12

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: Sawtooth

B. Fire Number: MT-BRF-005563

C. State: MT

D. County: Ravalli

E. Region: 1

F. Forest: Bitterroot

G. District: Darby

H. Fire Incident Job Code: P1G7K5

I. Date Fire Started: August 30, 2012

J. Date Fire Contained: Not yet contained, monitoring status

K. Suppression Cost: $7.4 million

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): 11
2. Fireline seeded (miles): 11
3. Other (identify): Plus 10 miles of hand line repaired.

M. Watershed Numbers: 170102051001 (Roaring Lion), 170102051002 (Sawtooth), 170102051003 (Canyon Creek/Bitterroot River)

N. Total Acres Burned: 5,927
NFS Acres(5,476) Other Federal ( ) State ( ) Private (452)

O. Vegetation Types: Lodgepole Pine, Ponderosa Pine and mixed conifer overstory

P. Dominant Soils: Rocky silt loams, glacial outwash, moraine

Q. Geologic Types: Belt series metamorphic, calc-silicates, Idaho batholith granitic intrusions

R. Miles of Stream Channels by Order or Class: 6.7 perennial, 14.4 intermittent within fire perimeter (includes private land)

S. Transportation System

Trails: 4 miles Roads: 1 mile (all private)

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 4,778 (low) 1,065 (moderate) 85 (high)

B. Water-Repellent Soil (acres): 617 (all high severity and ½ moderate severity)

C. Soil Erosion Hazard Rating (acres):
4,778 (low) 1,065 (moderate) 85 (high)

D. Erosion Potential: 8.5 tons/acre

E. Sediment Potential: 5,440 cubic yards / square mile (assumes 1cubic yd = 1 ton)

PART IV - HYDROLOGIC DESIGN FACTORS

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

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

C. Equivalent Design Recurrence Interval, (years): 5,10

D. Design Storm Duration, (hours): 6

E. Design Storm Magnitude, (inches): 1.5 (5yr RI), 1.7 (10yr RI)

F. Design Flow, (cubic feet / second/ square mile): 12 (5yr RI), 26 (10yr RI)

G. Estimated Reduction in Infiltration, (percent): 27 to 50%, varies with watershed

H. Adjusted Design Flow, (cfs per square mile): 88 (5yr RI),140 (10yr RI)

Post-fire flows were modeled using the NRCS-based Fire Hydrology V1.3 (Cenderelli) analysis tool for pre and post-fire conditions. Output is in peak flow rates (cfs), which includes baseflow plus the flow component that is attributable to the storm itself. For 5 and 10 year precipitation events in burned watersheds, stormflow varies with the percentage and severity of burned area. “Adjusted” (post fire) flows in Sawtooth Fire watersheds increased from 11 to 78 cfs (5 yr return interval peak) over pre-fire flow estimates. Post-fire peak flows in Sawtooth Fire watersheds (combined Owings and N. Owings surpass existing channel culvert capacity in 2 locations at the 2 yr RI in modeling exercises. Models such as this cannot address debris flows and floatable wood, which can cause culvert plugging and overtopping. Several treatment recommendations are based on the probabilty of this kind of event, rather than the potential for “typical” flood events.

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

1. Channel stability in ephemeral draws within and immediately below high severity burn. High severity burn in upper N. Owings Creek, on both USFS and private jurisdictions is likely to produce increases in surface runoff, which may affect channel stability near a private spring development which is the sole domestic water source for a guest lodge (Downing Mountain Lodge). A moderate risk for post-fire debris flows also threatens water quality for irrigators farther downstream on Owings Creek.
2. Trail prisms/infrastructure – post-fire hydrology driven by high and moderate burn severity will increase risk of damage on 2 miles of system trails, with loss of trail prism and increased repair costs. Record dryness allowed fires to continue burning ground cover and organic soils for extended periods, altering post-fire hydrology even in areas that are typically low severity (ground fire and light fuels). These are moderate-use level trails that access unique areas in the Bitterroot Mt. Range (Sawtooth Canyon, Selway-Bitterroot Wilderness) that the Ranger District would like to keep for the long term. Post-fire hydrology will increase the occurance of surface runoff from burned slopes onto the trail prism. There is a risk of intensive trail gullying and rutting, which may cause extensive damage to the trail prism and concentrated flow may creat downslope gully cutting and associated debris torrents. There is also a risk of falling hazard trees for trail workers implementing prescribed treatments.
3. Owings Creek Road and Westside Road stream crossings of Owings Creek are both located outside of the National Forest boundary– hydro modelling suggests only a 2-yr RI peak flow would exceed culvert capacity (36" pipe – estimated 38 cfs capacity w/ 1.0 Headwater:Depth Ratio) at these sites. There is a high risk of culvert washout at the Owings Creek Road crossing and a low risk of culvert washout at Westside Road. Both sites are off the Bitterroot National Forest, on private or county road. Assessment information will be supplied to Ravalli County and NRCS.

B. Emergency Treatment Objectives:

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a. Protect trail infrastructure from surface flows, reduce stream capture and maintain access;
b. Protect domestic water source from flood flows, debris torrents,
c. Reduce sediment from high-severity burned area in N. Owings Creek

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

Land **NA** % Channel **85** % Roads/Trails **85** % Protection/Safety ___ %

D. Probability of Treatment Success

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	RISK		
Very Likely	Very High **trails, signs**	Very High	Low
Likely	Very High	High **culvert failure**	Low
Possible	High	Intermediate **erosion & debris torrents**	Low
Unlikely	Intermediate	Low	Very Low

	Years after Treatment		
	1	3	5
Land	NA		

Channel			
Directional Tree Felling	90	85	80
Trail Waterbar Installation	85	90	95
Protection/Safety	NA		

E. Cost of No-Action (Including Loss): See attached Cost-Risk Analysis Document

F. Cost of Selected Alternative (Including Loss): $5,726

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Ed Snook

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H. **Treatment Narrative:**

Land Treatments: NA

Channel Treatments:

In-Channel Tree Felling

Objective:
Trap floatable debris and suspended sediment, reduce potential in-channel debris flow bulking above culverts determined to have marginal capacity to pass model flood flows. Reduce debris flow effects around domestic water source on private property, and improve downstream water quality.

Methods:
Treat upper Owings Creek upstream of Downing Mountain Lodge spring development, on FS lands. Starting as close as possible to lower FS boundary, directionally fell trees upstream into channel in an overlapping herringbone pattern. Utilize trees large enough to resist downstream transport, and dead trees where possible. Space pairs of felled trees approximately 150 feet apart, for approximately ½ mile above FS boundary (about 15-20 sites). Implement with Bitterroot NF Wildland Fire staff.

Trail Treatments:

Install Trail Waterbars

Objective
Approximately 2 miles of trail located on steep slopes with high/moderate burn severity are expected to be at risk of deterioration from additional runoff and sediment from post-fire conditions. The threats are from upland slope erosion and flow being deposited on the trail. The trails were not designed for the increased flow that may occur from the fire. This may cause soil erosion on the trail surface and fill-slope. Failure of drainage

culverts and water bars may cause stream capture onto trail surface area causing soil erosion, including loss of the trail by rilling and gullying. The affected trail is TR123 (Sawtooth Canyon Trail).
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Methods
The method for reducing this risk is limited to installing water bars, which would be used to direct and divert flow off the trail. These treatments would reduce the risk of the trail washing out and transporting sediment to streams. Proactive treatment would be cheaper than remediation after damage. Hazard trees may be felled at specific sites to protect trail workers. Implement with contractor and Bitterroot NF Wilderness and Trails staff.

Protection/Safety Treatments:

Install Trail Warning Signs
Objective
Install warning signs to warn users of increased risks due to the fire. These include

I. **Monitoring Narrative:** NA

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

			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										
				$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 Land Treatments				$0	$0		$0		$0	$0
B. Channel Treatments										
Diagonal tree felling	sites	104	15	$1,560	$0		$0		$0	$1,560
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Channel Treat.				$1,560	$0		$0		$0	$1,560
C. Road and Trails										
Trail waterbar	miles	2083	2	$4,166	$0		$0		$0	$4,166
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road & Trails				$4,166	$0		$0		$0	$4,166
D. Protection/Safety										
Warning Signs	each	400	2	$800	$0		$0		$0	$800
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Structures				$800	$0		$0		$0	$800
E. BAER Evaluation										
Assessment	lump	2500	1		$2,500		$0		$0	$2,500
Insert new items above this line!				---	$0		$0		$0	$0
Subtotal Evaluation					$2,500		$0		$0	$2,500
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				$6,526	$2,500		**$0**		**$0**	**$9,026**
Previously approved										
Total for this request				**$6,526**						

PART VII - APPROVALS

1. _____ _____
Forest Supervisor (signature) Date

2. _____ _____
Regional Forester (signature) Date

Sawtooth MT 2012
Cost/Risk Assessment

Part 1. Treatment Cost

Treatment	cost
1. Channel – Directional Felling	$1,560
2. Trail Waterbars	$4,166
TOTAL COST	$5,726

Part 2. Probability of Rehabilitation Treatments Successfully Meeting EFR Objectives

Treatment	%
1. Channel – Directional Felling	80
2. Trail Waterbars	85

Risk of Resource Value Loss or Damage
Identify the risk (high, medium, low, none or not applicable (NA)) of unacceptable impacts or loss of resources.
No Action- Treatments Not Implemented (check one)

Resource Value	None	Low	Mid	High
Human health and safety (Domestic water use)				X
Plant communities at-risk from weed infestation			X	
Native Plant community structure, function and composition		X		
Aquatic community structure, function and composition	X			
Trail structure and investments				X
Watershed integrity (Water Quality)			X	
Heritage resources	X			
Threatened and Endangered Species (terrestrial)	X			
Threatened and Endangered Species (fish)		X		

Proposed Action - Treatments Successfully Implemented (check one)

Resource Value	None	Low	Mid	High
Human health and safety (Domestic water use)			X	
Plant communities at-risk from weed infestation			X	
Native Plant community structure, function and composition		X		
Aquatic community structure, function and composition	X			
Watershed integrity (Water Quality)		X		
Trail structure and investments		X		
Threatened and Endangered Species (terrestrial)	X			
Threatened and Endangered Species (fish)		X		

Part 3. SUMMARY

1. **Are the risks to natural resources and private property <u>acceptable</u> as a result of the fire if the following actions are taken?**

Proposed Action Yes |_X_| No |__| Rationale for answer:
Directional tree felling has been effective in reducing floating woody debris that may plug or bulk up flows and cause channel adjustments. Diagonal-felled trees will reduce channel adjustment potential by screening out floating debris, and reducing flow energy and velocity. The treatments also act to reduce sediment by acting as a sieve, temporary storage site and reducing downcutting.

Trails within the fire perimeter are a valued recreational resource and would be subject to post-fire hydrology and erosion without treatment. Incised trails often require either extensive work or relocation to be functional and meet USFS standards, so proactive trail drainage work would save funding in the long run. The trail system parallels the stream and trail erosion has a high probability of being a sediment source to Sawtooth Creek.

The areas selected for treatment have a high risk of negative impacts to trail and water resources.

No Action Yes |__| No |_X_| Rationale for answer:
Water users on Owings Creek (Downing Mountain Lodge, downstream irrigators) have no alternative sources. Reducing the sediment and debris load will reduce water quality effects downstream of the burned sites and reduce the probability of debris flow effects around the Lodge's spring development.

Alternative(s) Yes |__| No |<u>X</u>| Rationale for answer: The only alternative available would be to helicopter straw mulch the upper Ownings Creek drainage. The estimated cost was between $1.1million (mulch high and moderate severity) and $238,000 (mulch only high severity). The cost:benefit ratio appears to preclude this alternative.

No Action Yes |__| No |_X_| Rationale for answer: N/A

2. Is the probability of success of the proposed action, alternatives or no action acceptable given their costs?

Proposed Action Yes |_X_| No |__| Rationale for answer:
The treatments will be effective at reducing sediment delivery thus protecting stream channels, springs, and downstream water uses. Treatment costs are quite low ($5,726).
Monitoring will identify where weed treatment work is needed. Monitoring and treatment costs are quite low.
The beneficial results of treatment implementation are worth the monetary costs of installation.

No Action Yes |__| No |_X_| Rationale for answer:
Although the monetary cost of no action is low, channel sediment and weed invasion will produce economic and ecological costs. Risk of several new noxious/invasive weed species establishing themselves in the burned area is high. The cost to downstream water users of the lost water use is likely low to moderate, given the nature of irrigation use. The low cost of treatments, and a moderate to high probability for the treatments to reduce the threats suggests the no-action alternative would not be acceptable.

Alternative(s) Yes |__| No |__| Rationale for answer:
N/A

3**. Which approach will most cost-effectively and successfully attain the EFR objectives and therefore is recommended for implementation from a Cost/Risk Analysis standpoint?**

Proposed Action |_X_|, Alternative(s) |__|, or No Action |__|

Comments: