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

Date of Report: October 22, 2007

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

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

[x] 2. Interim Report # 2
[ ] 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: Fool Creek

B. Fire Number: MT-LCF-000009

C. State: Montana

D. County: Lewis and Clark, Flathead, and Teton

E. Region: Northern

F. Forest: Lewis and Clark/Flathead

G. District: Rocky Mountain/Spotted Bear

H. Fire Incident Job Code: PD1M4R

I. Date Fire Started: July 4, 2007

J. Date Fire Contained: est Oct 1, 2007

K. Suppression Cost: $5.8 million

L. Fire Suppression Damages Repaired with Suppression Funds

1. Fireline rehabilitated (miles): In progress

2. Fireline seeded (miles): To be determined
3. Other (identify):

M. Watershed Number: 1701020701, 1003010401, 1003020501

N. Total Acres Burned:
NFS Acres (56,500) Other Federal (0) State (0) Private (0)

O. Vegetation Types: lodgepole pine, Douglas fir, subalpine fir, spruce, limber pine, whitebark pine, aspen

P. Dominant Soils: Typic and Andic Cryochrepts

Q. Geologic Types: --Paleozoic limestones of the Sawtooth Range including Mississipian Madison limestone --Mesozoic sandstones and shales, Pleistocene glacial till

R. Miles of Stream Channels by Order or Class: 1st order 94 miles, 2nd order 60 miles, 3 3nd order 15 miles, 4th order 9 miles, 5th order 6 miles

S. Transportation System

Trails: 72 miles Roads: 12 miles

PART III - WATERSHED CONDITION

See the attached map for a schematic map of burn intensity and soil burn severity.

A. Burn Intensity: Burn Intensity rates the effect of fire on vegetation.

Ownership	Class 2 - Low	Class 3 - Moderate	Class 4 - High	Class 5 - Burned Grassland	Grand Total	%
Flathead National Forest	9,546	13,704	3,532	0	26,785	47
Lewis and Clark National Forest	8,959	9,916	10,840	0	29,715	53
Total	18,505	23,620	14,372	0	56,500	100
%	33	42	25	0	100	

B. Burn Severity (acres): _to date__ Soil Burn Severity rates the effect of fire on soil and the ecosystem.

Ownership	Soil Burn Severity			Unburned	Other	Total
	HIGH	MOD	LOW			
Flathead National Forest	2,762	13,851	7,783	1,909	451	26,756 (47%)
Lewis and Clark National Forest	3,655	16,957	6,863	1,792	476	29,743 (53%)
Grand Total	6,418 (11%)	30,808 (55%)	14,646 (26%)	3,701 (6%)	927 (2%)	56,500

Totals may vary between tables. This is because of rounding errors.

B. Water-Repellent Soil (acres): 56,500

C. Soil Erosion Hazard Rating (acres): 22,140 (low) 34,360 (moderate and high)

D. Erosion Potential: 0 ton/acre (low severity), 8.7 ton/acre (high severity)

E. Sediment Potential: 0.042 tons/acre

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 2 grass shrub, 20-50 conifers

B. Design Chance of Success, (percent): 70

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

D. Design Storm Duration, (hours): 6 and 1 hour

E. Design Storm Magnitude, (inches): 1.7 (6hr) 1.1 (1 hr)

F. Design Flow, (cubic feet/second/square mile): 26.4

G. Estimated Reduction in Infiltration, (percent): 67

H. Adjusted Design Flow, (cfs per square mile): 165.2 (This is for small upland drainages only. Larger drainages have only a small increase).

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

The potential for accelerated expansion of noxious weed species within the fire perimeter, especially along trails is high. The Lewis and Clark National Forest also has a Weeds EIS, and mapped locations. More were identified and mapped in this analysis. Moderate to high intensity and severity burn acres provide ideal seedbeds for noxious weed establishment with little competition from native vegetation.

About 12 miles of roads within the Fool Creek fire and five road crossings in the Fools Creek are at risk. Several road crossing drainage ditches are at risk from plugging and overtopping and localized sections of roads are subject to increased erosion from ditch clogging. Forest road 144 located along the North Fork of the Teton River, north of Teton Pass Ski area, has a 3 mile section of road within the high burn severity areas which has a high potential of fire related road damage. This section of road has 5 undersized culverts, and considerable potential damage to the road ditches and ditch relief culverts. Several road crossing drainage ditches are at risk from plugging and overtopping and localized sections of roads are subject to increased erosion from ditch clogging.

Within the Fool Creek fire perimeter 30 miles of NFS system trails have been burned over with a moderate to high severity wildfire. The trails system is the only transportation system within the Sun River – Teton River drainages of the Rocky Mountain Ranger District. The trail system provides access for year around recreation opportunities, cattle allotments, hunting opportunities, fire suppression, wildlife surveys, and culturally significant sites. These trail miles occur on steep side slopes that are very susceptible to erosion events during normal runoff years. A large fire event such as the Fool Creek fire makes the trails system susceptible to washouts, gullying, and rilling during the upcoming fall and spring runoff events. The increased erosion associated with the fire event will increase the risk to ecological health, stream sedimentation, and public safety within the fire area. In addition, the existing system trails have numerous stream crossings and waterbars that have been affected by the fire. Many of the waterbars constructed from wood have burned and are no longer effective. Some culverts need cleaning and/or replacement to insure unobstructed flows. In some areas the trails have burned away portions of the tread or are very susceptible to soil erosion/raveling that make the trails very unsafe for use by the public.

Of the trails located in close proximity to stream channels (riparian areas) there were several miles that burned with moderate and/or high soil burn severity. The primary post-fire risk associated with these riparian trails is how the fire partially or totally consumed the turnpike logs (which support turnpike the materials), effectively causing the breakdown/degradation of the turnpike trail segments. The turnpike segments are installed to

reduce soil erosion/sedimentation, and provide for public safety on wet trail segments usually occurring on stream floodplains. The breakdown of these turnpike sections poses both a public safety hazard and degradation of water quality due to the direct sedimentation sources to stream channels. Several of the affected riparian areas with burned-out turnpike segments are associated with Bull trout and West-slope cutthroat trout habitat. There are approximately 1,040 feet of turnpike trail that was burned in the fire.

There is a high density of hazard trees on this fire. Pre-fire density of stems was high and most areas are now unsafe as a result of stand-replacing intensity.

B. Emergency Treatment Objectives:

Land Treatments – The objective of weed treatment and detection is to reduce weed expansion by ground-treatment and early detection along roads, trails, and areas having known presence.

Road treatments – Decrease the risk of diverting overland flow and stream flow down roadways, accelerating erosion, and damaging road facilities. Culvert replacement is designed to reduce the risk that stream flows will overtop the road and potentially damage the road and or culvert. The road treatments are also designed to reduce sediment yield to WCT fisheries (North Fork Teton River).

Trail Treatments - The detrimental post-fire effects on the trails system can be mitigated with the proposed work of installing drainage structures (i.e water bars and drain dips), repairing turnpikes, replacing culverts, and shoring up trails with curb logs and cribbing.

The objective of the hazard tree treatments is to protect BAER workers from dangerous trees near trails or roads on which they are working. Since this is largely wilderness, only trees presenting a clear and present danger will be removed.

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

Land **80** % Channel ___ % Roads/Trails **80** % Protection/Safety **80** %

D. Probability of Treatment Success:

	Years after Treatment		
	1	3	5
Land	**80**	**90**	
Channel			
Roads/Trails	**80**	**90**	
Protection/Safety	**95**	**100**	

E. Cost of No-Action (Including Loss): See attachment A for Values at Risk Analysis. Results follow:

Treatments to increase existing culvert capacity and installing additional culverts totaling $135,150 are justified base on a B/C ratio of 1.04. These treatments will support sole access to high valued recreation areas including private recreational cabins on NF lands and protect water quality within the North Fork of the Teton River.

Treatments to water features on trail system totaling $151,062 are justified based on direct monetary values with a B/C ratio of 1.4. These treatments also have a high probability of supporting high valued recreation use, protecting water quality resources, and historic cultural values.

Weed treatments totaling $4,224 are justified to protect ecological integrity and reduced weed spread potential on burned areas and onto currently unburned areas. It is the BAER team's opinion that the value of protecting the ecological integrity and soil productivity from infestation easily exceeds the $5,593 implied minimum value.

F. Cost of Selected Alternative (Including Loss): See above.

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Henry Shovic

Email:hshovic@fs.fed.us Phone:406-570-7946 (cell) FAX406-xxx-xxxx

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:

Noxious Weed/Invasive Treatment: Treat noxious weed/invasive species infestation sites within the burned area to remove the population and prevent the expansion of weeds into newly disturbed sites. Integrated pest management techniques (chemical, biological, mechanical, and cultural control methods) would be used to prevent the spread and establishment of noxious weeds, especially within the moderate to high intensity burn areas. Twenty-four miles of road were identified as having potential or present populations.

Noxious Weed/Invasive Species Detection: Monitor noxious weed treatment, as described in the specification sheet, in the first year following chemical or biological treatment to determine success of weed control. Monitoring would also include looking for new weed infestations and prescribing appropriate treatments. Twenty-four miles of road were identified as having potential or present populations.

Channel Treatments: No channel treatments are proposed.

Roads and Trail Treatments:

Road treatments identified for implementation include upgrading 5 culverts in the Fool Creek fire along the North Fork Teton River.

fire	culvert	culvert Size (ft)	upgraded Culvert Size (ft)
Fool Creek	3	2.5	4
Fool Creek	4	2.5	4
Fool Creek	6	4.2	6
Fool Creek	7	4.2	6
Fool Creek	8	4.6	6

In addition the proposed treatments include ditch maintenance/cleaning, cleaning ditch relief culverts, installation of additional ditch relief culverts, augmenting road drainage around culverts with armored dips, and removing additional (beyond fire suppression road hazard tree removal) hazard trees to protect BAER treatment crews.

On the Fool Creek fire the installation or reinstallation of 201 drainage structures, 19 culverts, 93 ft of puncheon bridge, 499 ft of cribbing, 191 feet of ditching, 750 feet of curb logs, and 1,040 feet of turnpike repair. Work will be in accordance with EM-7720-102 standard specification for construction of trails.

The proposed turnpike repair is very expensive ($40/foot). Attachment B contains a detailed cost breakdown of this work. The primary reason turnpike repairs are so costly is because of their remote location in the wilderness and the time-consuming nature of the work.

Protection/Safety Treatments:

For trails: The removal of hazard trees on all associated miles of trails is required to provide a safe working environment for BAER crews if they are to accomplish the work necessary to mitigate post-fire erosion.

Signs: Eight hazard signs are specified to warn the public of watershed and enhanced wildlife hazards from the fire.

I. Monitoring Narrative:

The monitoring specified is to be completed by a five-individual team of resource specialists for a one day review. It's purpose is to determine treatment completion and effectiveness.

Part VI – Emergency Stabilization Treatments and Source of Funds Initial Request

Line Items	Units	Cost	Units	BAER $	$		unit
A. Land Treatments							
Noxious Weeds/InvasiveTreatments L&C	Miles	24	106	$2,544	$0		
Noxious Weeds/InvasiveDetection L&C	Miles	24	70	$1,680	$0		
Weed Monitoring - Fool Creek Fire Flathead	acres	56.9	28	$1,593	$0		
Subtotal Land Treatments				$5,817	$0		
B. Channel Treatments							
Insert new items above this line!				$0	$0		
Subtotal Channel Treat.				$0	$0		
C. Road and Trails							
Trail head caution signs L&C	EA	8	83	$664			
Trail drainage improvements L&C	miles	22	3800	$83,600			
Road Culvert Replacement L&C	EA	5	36170	$180,850			
Trail Erosion Control (waterbars) Flathead	miles	1055	20	$21,100	$0		
Culvert Replacement - Flathead	ea	350	10	$3,500	$0		
Install Curb Logs - Flathead	miles	7000	0.75	$5,250	$0		
Hazard Tree Removal - Flathead	miles	630	21	$13,230	$0		
Repair Turnpike Trail Segments - Flathead	feet	40	1040	$41,600	$0		
Insert new items above this line!				$0	$0		
Subtotal Road & Trails				$349,794	$0		
D. Protection/Safety							
Hazardous tree Removal along trail	Miles	30	2200	$66,000			
Hazard tree removal Massey Tract	ea	43	145	$6,235			
Hazardous tree Removal along Road	Miles	3	3000	$9,000			
Hazard Warning/Direction SignsFool Creek Fire	ea	441	12	$5,291	$0		
Insert new items above this line!				$0	$0		
Subtotal Structures				$86,526	$0		
E. BAER Evaluation							
Team evaluation L&C	ea	1	25000	$25,000			
Team evaluation Flathead	ea	1	2666	$2,600			
	EA			---	$0		
Insert new items above this line!				---	$0		
Subtotal Evaluation				$27,600	$0		
F. Monitoring							
Local review by 5 specialists	LS	1	3000	$3,000	$0		
Flathead	LS	1	1000	$1,000			
Insert new items above this line!				$0	$0		
Subtotal Monitoring				$4,000	$0		
G. Totals				**$473,737**	$0		
Previously approved				$437,742			
Total for this request				**$473,737**			

Contract Costs for Turnpike Repair

Contract Year	Cost per Foot	Inflation Adjusted Cost per Foot (+3%)	Contract Development and Admin (+20%)	Total Adjusted Cost per Foot

1998	$35	$47	$9	$56
2002	$26	$31	$6	$37
2002	$30	$36	$7	$43
2003	$26	$30	$6	$36
2001	$26	$32	$6	$38
1996	$25	$36	$7	$43
1997	$20	$28	$6	$33
1994	$20	$30	$6	$36
1993	$22	$34	$7	$41
1996	$15	$21	$4	$26
2000	$26	$33	$7	$40
1994	$25	$38	$8	$45
	Averages	$33	7	**$40**

PART VII - APPROVALS

1. /s/ Cathy Barbouletos — 10/22/07
   Forest Supervisor (signature) — Date

2. _____ _____
   Regional Forester (signature) — Date

Attachment A: Values at Risk

BAER Values at Risk Report

David Calkin, PhD, Research Forester, 9/5/07
U. S. Forest Service
Rocky Mountain Research Station, Missoula, MT

The BAER assessment for the three fires within the Lewis and Clark complex (Ahorn, Fool Creek and Skyland fires) applied a new Values at Risk (VAR) Calculation Tool developed by the Rocky Mountain Research Station. The tool was created to improve the economic assessment of the need for proposed treatments to protect the identified VAR, thus improving the selection and defensibility of proposed treatments. In developing this tool the authors surveyed BAER personnel to determine the effectiveness of economic analysis in the BAER assessment process. They found that three fundamental limitations compromise effective calculation of resource values-at-risk: 1) current valuation guidelines are unclear, 2) BAER team members typically have limited training and experience in the field of economics, and 3) data to support direct valuation of specific resources, particularly non-monetary resource values (e.g., sensitive wildlife species, undeveloped recreation, cultural artifacts), are not consistently available. These limitations to past assessments reduced the defensibility of proposed treatments.

Values at Risk Calculation Process

Terminology

Wildfire risk is defined as the product of the likelihood of an event of a given intensity (threat) times the net value change to the affected resource at the given intensity (For example, if there is a 0.50 probability that a post-fire flood containing suspended ash will destroy a $5,000 domestic water system, the monetized risk is $2,500). Risk based assessments require that *threat (the likelihood of experiencing an event)* be clearly differentiated from *risk* and from *values-at-risk* (VAR). Unless a valued resource is in harm's way there is only a threat, it poses no risk.

Application to the Lewis and Clark Fire Complex

At the outset of the BAER assessment process, VAR were identified and spatially coupled to probable threats. The probabilities of threats occurring as well as the probabilities of treatment success were estimated through the course of the BAER assessment using a team of specialists. The designers of the tool realize that assigning the probabilities of threat materializing can be difficult and are often based on expert opinion, and when possible informed by appropriate model runs.

The VAR tool applies a hybrid approach for assessing the economic efficiency of proposed treatments during post-fire assessments: 1) a probability-based Benefit Cost (B/C) analysis is used where monetary values are readily available and 2) an Implied Minimum Value (IMV) is assigned to estimate the efficiency of treatments related to non-monetary resources.

For these non-monetary resources, instead of directly assigning monetary values to non-monetary resources, a computation is used to derive a value of the resource needed to justify a proposed treatment. Implied Minimum Value equals the treatment cost divided by the reduction in likelihood of experiencing the negative outcome; the lower the IMV the easier the treatment justification:

$$\text{IMV} = \left(\frac{\text{treatment cost}}{\text{Prob(loss occurring with no treatment)} - \text{Prob(loss occurring after treatment)}} \right)$$

The IMV does not necessarily represent the actual dollar value of the resource loss averted—in fact, the true monetary value need not be defined. IMV simply reflects that in the BAER team's opinion avoiding the damage

to a threatened non-monetary value is worth at least the calculated implied minimum value, and therefore, the proposed treatment is a wise investment of public funds.

The new VAR tool was applied to each of the three fires separately. Individual results for each fire are described in analysis documents and above.

Attachment B: Itemized Cost Breakdown for Turnpike Repair

To estimate the cost of turnpike repairs, 12 contracts were reviewed between 1994 and 2003. These contracts included turnpike work and associated costs per foot. The raw cost/foot of turnpike repair/upgrades was adjusted for inflation by 3 percent for the number of years since the contract. Then 20 percent was added to the adjusted cost to account for contract preparation and administration. The average of the total adjusted costs per foot is $40. This is the value multiplied by 1,040 feet of trail in the 2500-8 spreadsheet.

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