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

Date of Report: April 6, 2016

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:Muskrat Pass (Family Peak Complex) B. Fire Number:MT-LCF-5058

C. State:Montana D. County:Flathead, Glacier

E. Region: R1 F. Forest:Flathead

G. District: D1 H. Fire Incident Job Code:P1J1JO

I. Date Fire Started: 8/12/2015 J. Date Fire Contained:Snowfall 2015

K. Suppression Cost:$4,000,000 Family Peak Total

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles):
2. Fireline seeded (miles):
3. Other (identify):

M. Watershed Number:

6th Code Number	6th Code Name	Percent of Watershed Burned
170102070104	Cox Creek	3%

N. Total Acres Burned: 1,526
NFS Acres(1,526) Other Federal ( ) State ( ) Private ( )

O. Vegetation Types: : Elevations within the burned area perimeter range from 5,955' to 6,960'. Primary vegetation types include Lodgepole Pine, Douglas-fir and subalpine fir conifer forests communities. Primary conifer species include Douglas-fir, lodgepole pine, subalpine fir and whitebark pine. Aspen also occurs throughout most forest types. Brush and grass areas primarily consist of mountain big and low sagebrush, bitterbrush, and a variety of grasses (Idaho fescue, bluebunch wheatgrass).

P. Dominant Soils:

Landtype II – Glaciated cirque basins (Glacial Till and Metasedimentary rocks)
Landtype IIIa – Forested steep lateral moraine (Glacial Till and Metasedimentary rocks)
Landtype VI – Peaks, alpine ridges, and rockland (Metasedimentary rocks)
Landtype VII – Forested, cool aspect breaklands (Glacial Till and Metasedimentary rocks)

Q. Geologic Types:
The Muskrat Fire burn area is underlain by Mississippian age Madison Group limestone sediments. Debris avalanches are common in all lithologies and dangerous on slopes at upper elevations and in narrow tributary valleys. Surficial deposits in general are mainly the result of active slope processes, including landslides, that tend to thicken toward the valley fill, and active river-channel processes that redistribute gravel and sand. However, the main source of surficial deposits within the burn area are derived from Pleistocene glaciation consisting of till and outwash deposits.

R. Miles of Stream Channels by Order or Class:

Intrermittent: 3 miles Perennial: 1 Miles

S. Transportation System

Trails: 2 miles Roads: miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 157 (low) 1,570 (moderate) 47 (high) Total acres burned: 1,774

B. Water-Repellent Soil (acres): High and moderate severity have varying degree of water repellency.

C. Soil Erosion Hazard Rating (acres):

	USFS		BIA	
Class	**Acres**	**Percent**	**Acres**	**Percent**
No to Very Low	957	68		
Low	115	8		
Moderate	319	22		
High	27	2		

The Muskrat portion of the Family Peak fire burned approximately 1,774 acres in the upper Cox Creek Watershed on the Flathead National Forest lands. Severity is mixed, but dominated by low to moderate. The overall soil burn severity pattern is mosaic and patchy. Where high burn severity occurs, it is generally associated with consumption of relatively dense forested stands.

Landforms in the burned area consist of cirque basins, alpine ridges, glacial trough walls, breaklands, moraines, alluvial fans, and floodplains. Channel morphology ranges between extremely steep headwater channels to low gradient, self-formed alluvial channels.

On August 3 and 4th, 1.2 inches of rain fell onto portions of the burned area, and few signs of surface runoff or erosion were observed in the field. Subsequent rains since the before mentioned rain event have not caused any observable soils movement.

D. Erosion Potential: .9 tons/acre

E. Sediment Potential: 1.2 tons/acre

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 3 to 5

B. Design Chance of Success, (percent): 85

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

D. Design Storm Duration, (hours): 1

E. Design Storm Magnitude, (inches): 1

F. Design Flow, (cubic feet / second/ square mile): 26.5

G. Estimated Reduction in Infiltration, (percent): 56

H. Adjusted Design Flow, (cfs per square mile): 165 cfs/mi^2

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

A comprehensive list of potential values at risk within or directly downstream of the Muskrat fire was compiled from multiple sources:

- A Lewis and Clark National Forest personnel meeting (conducted August 30th)
- An inter-agency meeting with representatives from the BIA and the Blackfeet Tribe.
- Field review of the burned area and BAER team meetings
- Field review by FNF trails specialists
- Discussions with Spotted Bear Ranger District and FNF BAER Coordinator

Following guidance in Interim Directive 2520-2013-1, the BAER assessment team evaluated potential values through field assessment and subsequent analysis to identify the critical values (FSM 2523.1 – Exhibit 01) that may be treated under the BAER program. The critical values were assigned a level of risk defined by the probability of damage or loss coupled with the magnitude of consequences using the risk assessment matrix (FSM 2523.1 – Exhibit 02). Critical values with unacceptable risks signify a burned-area emergency exists. The probability of damage or loss is based on the watershed response analysis completed by the BAER Assessment Team.

Critical values having a “Very High” or “High” risk rating include a treatment identification number(s) that corresponds to recommended emergency stabilization actions known to mitigate potential threats or minimize

expected damage, which are described in Section H. No treatments were identified for values when the analysis resulted in an "Intermediate" or lower risk rating.

Post Fire Watershed Response

The vast majority of the burn (88%) is moderate severity and only about 3% is classified as high severity. Post-fire watershed response is expected to be relatively minor due to small amounts of high burn severity and topography. However, accelerated runoff and erosion is expected to occur on trails affected by the fire.

Values at Risk:

The risk matrix below and associated definitions were used to evaluate risk levels in the assessment. (Exhibit 2 of Interim Directive No.: 2520-2010-1). Proposed treatments and their associated risk levels are discussed below in the following categories: Life, Property, and Natural Resources.

Probability of Damage or Loss	**Magnitude of Consequences**		
	Major	Moderate	Minor
	RISK		
Very Likely	**Very High**	**Very High**	**Low**
Likely	**Very High**	**High**	**Low**
Possible	**High**	**Intermediate**	**Low**
Unlikely	**Intermediate**	**Low**	**Very Low**

Probability of Damage or Loss: The following descriptions provide a framework to estimate the relative probability that damage or loss would occur within 1 to 3 years (depending on the resource):

- Very likely. Nearly certain occurrence (90% - 100%))
- Likely. Likely occurrence (50% - 89%)
- Possible. Possible occurrence (10% - 49%)
- Unlikely. Unlikely occurrence (0% - 9%)

Magnitude of Consequences:

- Major. Loss of life or injury to humans; substantial property damage; irreversible damage to critical natural or cultural resources.
- Moderate. Injury or illness to humans; moderate property damage; damage to critical natural or cultural resources resulting in considerable or long term effects.
- Minor. Property damage is limited in economic value and/or to few investments; damage to critical natural or cultural resources resulting in minimal, recoverable or localized effects.

Property: Forest Service Trails

Risk Assessment: Trail Infrastructure

Probablity of Damage or Loss: Likely (50-89% chance)

Magnitude of Consequence: Moderate

Risk Level: High

The Google Earth image in Figure 1 shows the Flathead NF portion of the fire in the headwaters of Cox Creek. The white line is the approximate boundary between the Lewis and Clark and Flathead National Forests. Approximately 1.5 miles of Trail 147 on the Flathead side have been affected by moderate and high severity burns.

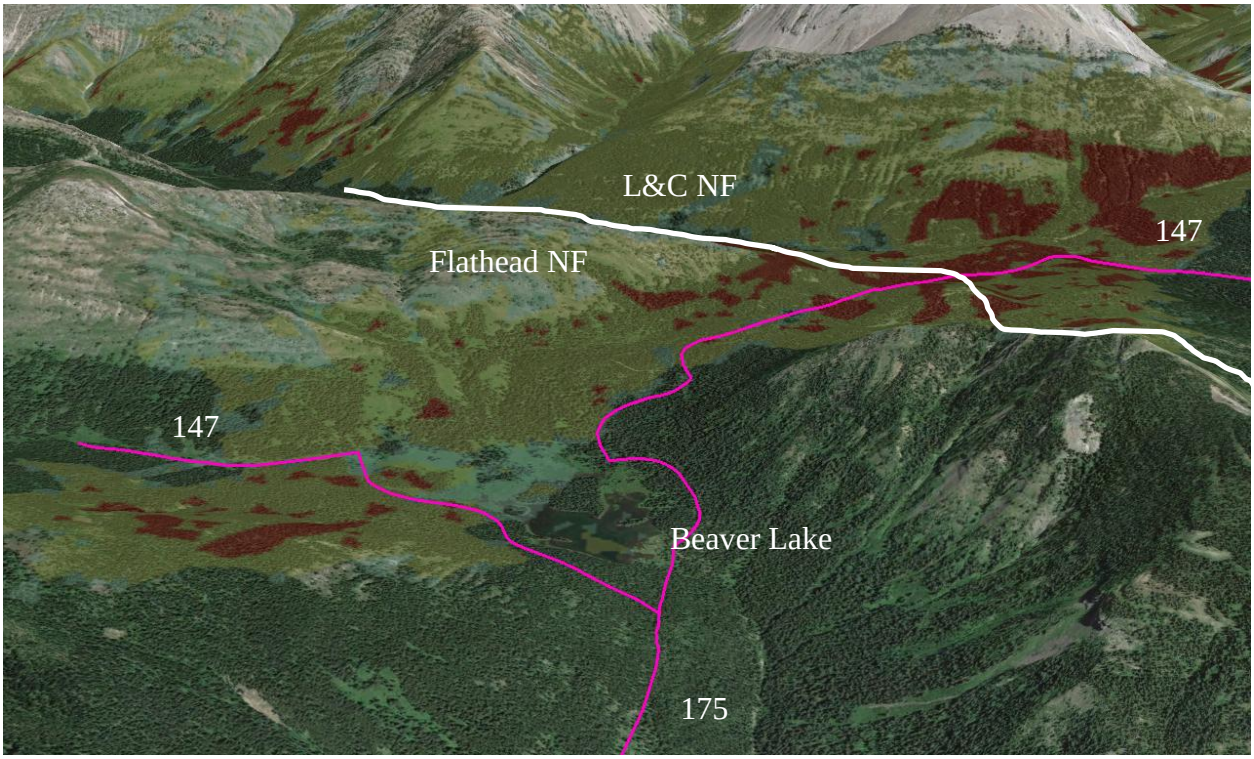

Figure 1. Google Earth image of trails in the burned area. Note that trails are located in relatively gentle terrain.


Figure 2. Photo of burned turnpike on Trail 147 above Beaver Lake (photo by Russel Owen).

Trail 147 in the burned area is at risk of further damage that is likely to occur in the next 12 months. There are approximately 2.0 miles of trail within the burned area and 1.5 miles directly affected by the fire. Some portions of the trail system are on relatively steep terrain, and these portions are susceptible to erosion and further damage. This future damage is likely to occur through direct erosion of tread. A quote from Russell Owen's review of the burned trails is provided below.

> Quote from Russell Owen in 09/12/2015 e-mail: *Impacts to the Muskrat Creek Trail occurred from Muskrat Pass to the trail junction near Beaver Lake with Cox Creek trail. These impacts were relatively light as the trail is not on too steep a slope. We cut the trail out, though trees will continue to come down on it. There are some significant trail impacts on trail 175 from Beaver Lake to the Wilderness boundary. I included photos of these impacts. All the extensive turnpike that had been built in*

this section of trail burned. We took all but a couple larger trees off this section of trail—the ones we left all have easy routes around them.

B. Emergency Treatment Objectives:

- Prevent additional loss of trail infrastructure that is likely to occur during the next few months.

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

Land - NA Channel – NA Roads/Trails - 75% Protection/Safety - NA

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land			
Channel			
Roads/Trails	75	100	n/a
Protection/Safety			

E. Cost of No-Action (Including Loss): **$8,600**

F. Cost of Selected Alternative (Including Loss): **$14,400**

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Craig Kendall, Flathead NF

Email: craigkendall@fs.fed.us Phone: 406-758-6485

H. **Treatment Narrative:**

The proposed trail treatments are designed to prevent further loss of prisms. This loss is likely to occur in the next 12 months without treatment. In addition, the cost of these treatments is expected to be less than reconstruction of prisms in the event of complete loss. To provide for trail worker safety, hazard trees would be removed along all sections of trail approved for treatment to protect BAER workers. Proposed treatments are summarized below.

- Replace damaged trail and drainage structures that were destroyed in the fire along sections of trail that are likely to experience further loss in the next 12 months.
- Construct new trail structures along sections of trail that are likely to experience further loss in the next 12 months.

- Remove hazard trees as necessary to provide safe environment for FS employees doing BAER work.
- Install signs to warn trail users of post-fire hazards.

I. **Monitoring Narrative:**

Monitoring of post-fire conditions and the effects of storm events will be monitored informally by ranger district personnel and reported to the Forest BAER Coordinator.

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

PART VII - APPROVALS

1. _____ _____
Forest Supervisor (signature) Date

2. _____ _____
Regional Forester (signature) Date

			NFS Lands		
		Unit	# of		Other
Line Items	**Units**	**Cost**	**Units**	**BAER $**	**$**
A. Land Treatments					
Weed Spraying	Acres	200	5	$ 1,000	
Subtotal Land Treatments				$1,000	$0
B. Channel Treatments					
Insert new items above this line!				$0	$0
Subtotal Channel Treat.				$0	$0
C. Road and Trails					
Water Bars and Grade Dips	Each	$ 60	39	$ 2,340	
Plastic Culvert Installation	Each	$ 90	16	$ 1,440	
Hazard Tree Removal	Miles	$ 1,000	1.5	$ 1,500	
Insert new items above this line!					
Subtotal Road & Trails				$5,280	$0
D. Protection/Safety					
Post-fire Hazard Signs	Each	300	3	$900	
					$0
Insert new items above this line!				$0	$0
Subtotal Structures				$900	$0
E. BAER Evaluation					
Team Evaluation	Each				$2,000

Insert new items above this line!				---	$0
Subtotal Evaluation				$0	$2,000
F. Monitoring					
Post-fire Monitoring	Each			$0	$0
Insert new items above this line!				$0	$0
Subtotal Monitoring				$0	$2,000
G. Totals				**$7,180**	$2,000