

Date of Report: March 28, 2016

BURNED-AREA REPORT

(Reference FSH 2509.13)

PART I - TYPE OF REQUEST**A. Type of Report**

- ☒ 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)
☐ 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: Sheep Mountain B. Fire Number: MT-LCF-5098
C. State: Montana D. County: Lewis and Clark
E. Region: R1 F. Forest: Lewis and Clark
G. District: D1 H. Fire Incident Job Code: P1J222
I. Date Fire Started: 8/26/2015 J. Date Fire Contained: TBD
K. Suppression Cost: \$737,000
L. Fire Suppression Damages Repaired with Suppression Funds
 1. Fireline waterbarred (miles):
 2. Fireline seeded (miles):
 3. Other (identify):
M. Watershed Number:

6 th Code Number	6th Code Name	Percent of Watershed Burned
100301040208	Lower SouthFork Sun River	10.5%
100301040111	Lower North Fork Sun River	0.003%

- N. Total Acres Burned: 4336
 NFS Acres(**4336**) Other Federal () State () Private ()

Ownership	Acres
Lewis and Clark National Forest	4336
Flatehead National Forest	
Tribal Lands (Blackfeet Reservation)	
State Of Montana	
Private	

O. Vegetation Types: Elevations within the burned area perimeter range from 4,500' to 8,050'. Primary vegetation types include Lodgepole Pine, Douglas-fir and subalpine fir conifer forests communities. The eastern side of the fire consists of sage brush/prairie grasses with cottonwood and aspen 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: Typic and Andic Cryochrepts

Q. Geologic Types:

The Sheep Mountain 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:

Intermittent: 5.9 miles Perennial: 3.4 Miles

S. Transportation System

Trails: 7 miles Roads: miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 3774 (low) 371 (moderate) 191 (high)

B. Water-Repellent Soil (acres): 562

C. Soil Erosion Hazard Rating (acres):

Class	USFS		BIA	
	Acres	Percent	Acres	Percent
No to Very Low	2264			
Low	1510			
Moderate	371			
High	191			

Fire intensity and soil burn severity are often incorrectly used synonymously. Fire intensity refers to the above ground fire effects generally identified through visual observations of changes in vegetation. Soil burn severity is the effect of fire at and below the ground surface, specifically how the fire changes the physical and chemical composition of the soils. While fire intensity is not the primary indicator of wildfire effects on soils, observed changes from pre- to post-fire vegetation are used to interpret soil burn severity and to inform watershed response. Soil burn severity that detrimentally impacts soil conditions leads to further degradation of soil productivity and soil-hydrologic function.

As illustrated on the burn severity map, the overall soil burn severity pattern is mosaic and patchy. However, large contiguous areas of moderate and high burn severity exist throughout the burned area. Moderate soil burn severity is generally associated with consumption of sagebrush/bitterbrush. Where high burn severity occurs, it is generally associated with consumption of relatively dense forested stands.

D. Erosion Potential: 9 tons/acre

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

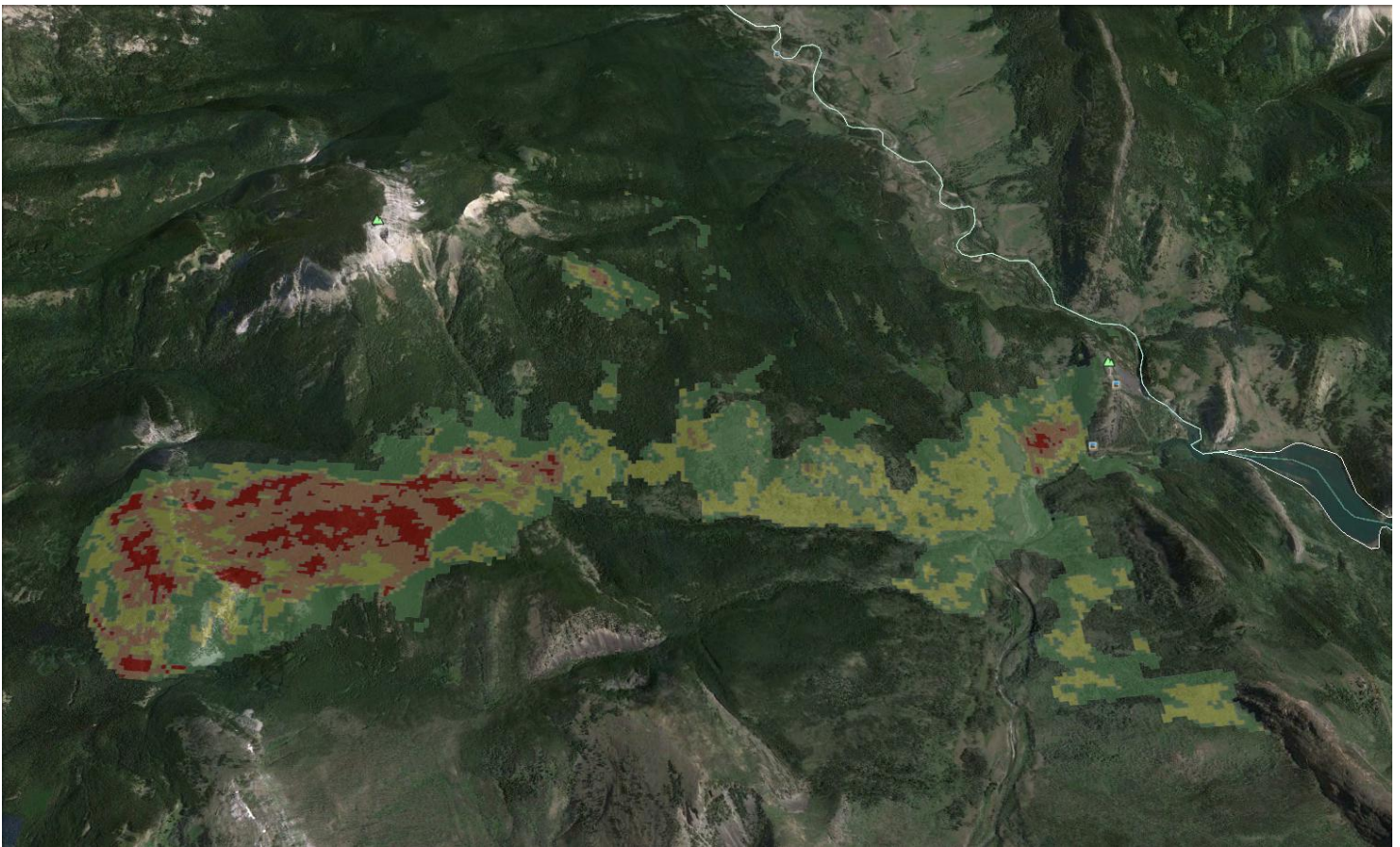
D. Design Storm Duration, (hours): 6 and 1 hour

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: A comprehensive list of potential values at risk within or directly downstream of the Sheep Mountain Burned Area 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 Blackfoot Tribe.
- Field review of the burned area and BAER team meetings

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

Based on soil burn severity, runoff estimates, watershed topography, evidence from storms during the week of August 4th, and downstream values, the primary areas of concern for watershed response are:

- Trail system within the moderate and high severity burn areas.

A large long duration rain event August 3rd through the 6th produced around 1.5 inches of rainfall over much of the burned area. Interestingly, no debris/mud flows or flooding occurred within or downstream of the fire perimeter. The USGS gage located on Badger Creek only showed a 0.25 foot increase in gage height. This event demonstrated the potential response of the burned area to possible intense rainfall.

Debris flows generally do not move large material (cobble, boulders) beyond the toe of steep tributary drainages. Where steep tributaries (gradient of 10-15 %+) meet main stem receiving streams (~5% gradient), large, coarse debris flow material is deposited. While the coarse material stops, water, floatable debris, and significant amounts of gravel, sand, and silt do not. Beyond the hill-slope toe, the threat from these events is primarily related to rapidly increased stream flows, floatable debris, and increased fine grained sediments in main stem channels downstream (Badger Creek, Whitetail Creek, and North Fork Birch Creek).

Human Health and Safety:

There are 7 miles of trails within the Sheep Mountain Fire. Threats to safety of trail users from flooding and/or debris flow and from hazardous trees exist, particularly adjacent to steep burned hill-slopes, at stream crossings and/or in flood prone areas adjacent to creeks.

Risk Assessment: *Threats to public safety*

Probability of Damage or Loss: *Likely – High potential hazard to public due to high public recreation use on trails that pass through high and moderate severity burn*

Magnitude of Consequence: *Moderate – Risk of injury or illness due to exposure for public safety.*

Risk Level: *High*

Infrastructure:

Forest Service Trails Affected by the Fire - There are 7 miles of trails within the burned area.

Erosion of trail surface and sediment delivery to trails is likely to occur on an ongoing basis for the next 3 years. Impacts are likely to occur adjacent to steep burned hill-slopes or streams and at stream crossings. Of these 7 miles, approximately 2 miles are routed directly through either moderate or high soil burn severity areas. However, the vast majorities of the 7 trail miles have been and will continue to be affected by post wildfire run-off, scouring or deposition. Threats to safety of trail users from flooding and/or debris flow and from hazardous trees exist, particularly adjacent to steep burned hill-slopes, at stream crossings and/or in flood prone areas adjacent to creeks.

The trails are Forest Service property. The probability of damage or loss is very likely and the magnitude of consequences is moderate to major.

Recommended response actions include closures, warning signs, a variety of trail storm proofing treatments, storm inspection and response, removal of hazardous materials (burned signs and carsonites) and a limited amount of hazardous tree removal to provide for the safety of BAER workers.

Risk Assessment: Threats to Forest Service trails

Probability of Damage or Loss: Likely – High potential of trail drainage failure due to post-fire flows

Magnitude of Consequence: Major – Loss of FS infrastructure.

Risk Level: High

Native vegetation: No occurrences of non-native weed species have been documented within the Sheep Mountain fire perimeter. Currently, the Rocky Mountain Ranger District conducts integrated weed management strategies that deal with weed infestations within the fire areas.

Risk Assessment: Threats to native plant communities due to the establishment or spread of noxious weeds.

Probability of Damage or Loss: Very Likely - Based on moderate and high burn severity and proximity to known weed infestations.

Magnitude of Consequence: Major – Loss of native plant communities and spread of noxious weeds.

Risk Level: Very High

B. Emergency Treatment Objectives:

- Mitigate, to the extent possible, threats to personal injury or human life of forest visitors, permit holders and Forest Service employees at administrative and recreation facilities or while traveling select roads and trails on NFS lands within or downstream of the burned area.
- Warn users of Forest trails of hazards present in the burned area. Consider temporary closure to protect public users of NF lands.
- Treat invasive plants that are a threat to naturalized ecosystems by minimizing the expansion of existing populations in the burned area and control of expected invasion of noxious weeds within and adjacent to the area where soils/vegetation was disturbed as a result of fire suppression activities.

In accordance with the revised Forest Service manual, the risk matrix below, Exhibit 2 of Interim Directive No.: 2520-2014-1 was used to evaluate the Risk Level for each value identified during the Sheep Mountain Fire BAER assessment. Only treatments directly addressing FS Values at Risk with a rating of High or above are being requested for BAER authorized treatments.

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	RISK		
Very Likely	Very High - Native Veg	Very High	Low
Likely	Very High – Roads/Trails	High - Health and Safety	Low
Possible	High	Intermediate	Low
Unlikely	Intermediate	Low	Very Low

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

Land - NA Channel – NA Roads/Trails – 70% Protection/Safety - NA

D. Probability of Treatment Success

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

E. Cost of No-Action (Including Loss): **\$33,000**

F. Cost of Selected Alternative (Including Loss): **\$16,535**

G. Skills Represented on Burned-Area Survey Team:

Name	Skill
Dave Callery	Hydrology
Beth Anderson	Soils
Jason Oltrogy	Range/Weeds
Mark Bodily	Archeology
GIS	Dave Yarger
Ian Bardwell	Trails
Kraig Lang	Trails
Tessa Donahue	VAR
Wayne Green	Geology

Team Leader: Wayne Green, Forest Hydrologist, Lewis and Clark National Forest

Email: wgreen@fs.fed.us

Phone: 406-791-7740

FAX: 406-731-5302

H. **Treatment Narrative:**

Land Treatments:

Weeds Treatments

Noxious weed control with herbicides is recommended for current and new invader infestations within the Sheep Mountain Fire. Herbicide applications will follow the requirements and mitigation outlined under the latest NEPA and Biological Assessment for listed fish species.

EDRR

Inventory of trails and any susceptible sites for both current and new invader weed populations, and monitoring of weed control methods should be initiated to determine *potential for weed spread and effectiveness of treatments*.

- *Treat satellite infestations of spotted knapweed along Forest Trails within the burned area. The knapweed population along the trail system is contributing a seed source and the trail system is acting as a spread corridor for further expansion into the burned areas.*
- *Monitor weed populations within and adjacent to the fire to determine if the combination of fire disturbance and susceptible habitat facilitates weed spread or increases weed densities, along with post treatment effective monitoring.*

Channel Treatments:

No Channel Treatments are proposed.

Response Action – Trail Drainage Treatments

General Description: Sections of trails routed through or adjacent to steep burned areas (both moderate and high soil burn severity) area at high risk. Treatments include installing rolling dips, water-bars and rock water bars. Treatments are needed to provide sustainability of the trail and to prevent off-site impacts should the trails erode or fail.

Location: The trails are located primarily through areas mapped as moderate to high soil burn severity, approximately 2 trail miles. With the expected watershed response, these routes will have varying levels of damage depending on the localized precipitation. The trail drainage treatment and storm patrols are designed to work in concert to maintain the sustainability of the routes. While not all 2 miles will actually be treated, at some point the entire length of the trails will be traveled to reach the segments needing drainage work. A rapid assessment was completed during the assessment to evaluate of trail conditions. However, this treatment used the following criteria to determine suitable sites. Each trail segment listed for treatment would be:

1. Within or below moderate and high-burn severity areas
2. Have a sustained grade through burned areas that lacks adequate drainage
3. Has the potential to deliver sediment to streams
4. Consists of previous drainage structures that were damaged by the fire

Design/Construction Specifications: According to USFS Trails Handbook 2309.18. Installation should be designed to last no more than 3 years. Permanent structures are not part of this treatment. If safety risks (e.g. hazard trees) cannot be mitigated for work crews, work will be delayed until threat is reduced or stabilized.

Purpose of Treatment: This treatment is designed to stabilize trails lacking adequate drainage features for anticipated increases in runoff. The stabilization methods may vary by site but are designed to reduce trail erosion or damage. The BAER Team considered this treatment to be the minimum necessary to achieve a reduction in risk to the following critical values:

1. Trail infrastructure
2. Soil productivity
3. Hydrologic function
4. Safety of trail users

Treatment Effectiveness Monitoring: The sections of trail improved during this treatment will be inspected after implementation and in 2017 to ensure that drainage features are functioning.

I. Monitoring Narrative:

Trail Treatment Effectiveness Monitoring:

Trail treatments will be monitored at the time of storm inspections to determine and document the effectiveness of treatments.

Part VI – Emergency Stabilization Treatments and Source of Funds

Interim #

Weeds	Acres			\$0	\$0		\$0		\$0	\$0
EDRR	Miles	2	700	\$1,400	\$0		\$0		\$0	\$1,400
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Land Treatments</i>				\$1,400	\$0		\$0		\$0	\$1,400
B. Channel Treatments										
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Channel Treat.</i>				\$0	\$0		\$0		\$0	\$0
C. Road and Trails										
Trail Waterbars				\$0	\$0		\$0		\$0	\$0
Mod Burn Severity	Miles	2210	1	\$2,210	\$0		\$0		\$0	\$2,210
Highburn Severity	Miles	2925	1	\$2,925	\$0		\$0		\$0	\$2,925
Work Tread and Slope										
Mod Burn Severity	Miles	2800	1	\$2,800	\$0					
Highburn Severity	Miles	4200	1	\$4,200	\$0					
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Road & Trails</i>				\$12,135	\$0		\$0		\$0	\$5,135
D. Protection/Safety										
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Structures</i>				\$0	\$0		\$0		\$0	\$0
E. BAER Evaluation										
				\$1,000			\$0		\$0	\$0
<i>Insert new items above this line!</i>				---	\$0		\$0		\$0	\$0
<i>Subtotal Evaluation</i>				---	\$0		\$0		\$0	\$0
F. Monitoring										
	year	1	1000	\$1,000	\$0		\$0		\$0	\$1,000
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Monitoring</i>				\$1,000	\$0		\$0		\$0	\$1,000
G. Totals										
				\$14,535	\$0		\$0		\$0	\$7,535
Previously approved										
Total for this request				\$14,535						

PART VII - APPROVALS

1. _____
Forest Supervisor (signature)

Date

2. _____
Regional Forester (signature)

Date