

Date of Report: 08/04/2015

# 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: Cabin Gulch
- B. Fire Number: MT-HNF-000119
- C. State: MT
- D. County: Broadwater
- E. Region: 01
- F. Forest: Helena
- G. District: Townsend
- H. Fire Incident Job Code: PIJZB1
- I. Date Fire Started: 07/21/2015
- J. Date Fire Contained: 07/27/2015
- K. Suppression Cost: \$ 2,829,321 (as of 07/28/2015)
- L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): 0.2
2. Fireline seeded (miles): 0
3. Other (Identify):
- M. Watershed Number: Middle Fork Deep Creek - 100301010802 (1188 acres), Upper Deep Creek - 100301010804 (433 acres)
- N. Total Acres Burned: 1621 acres
- [ 1599 ] NFS Acres [ 0 ] Other Federal [ 0 ] State [ 22 ] Private

- O. Vegetation Types:** Mountain shrubland and upper and low, mixed forest (Douglas Fir (north slopes) and Rock Mountain Juniper / grasses (south slopes))
- P. Dominant Soils:** Typic Haploborolls and Lithic and Typic Ustochrepts
- Q. Geologic Types:** Metasedimentary rocks of argillites, siltites, and quartzites.
- R. Miles of Stream Channels by Order or Class:** 7.0 miles total (Intermittent: 5.8 miles, Perennial: 1.2 miles)
- S. Transportation System**
- Trails: .3 miles      Roads: 3.4 miles

### PART III - WATERSHED CONDITION

- A. Burn Severity (acres):** 464 (low)      666 (moderate)      115 (high)
- B. Water-Repellent Soil (acres):** 115 – need to get w/Beth (or me) on this number
- C. Soil Erosion Hazard Rating (acres):** 615 (low)      18 (moderate)      988 (high)
- D. Erosion Potential:** 2 tons/acre
- E. Sediment Potential:** 1179 cubic yards / square mile

### PART IV - HYDROLOGIC DESIGN FACTORS

- A. Estimated Vegetative Recovery Period, (years):** 1-3 grass, 20-25 shrubs, 20-50 conifers
- B. Design Chance of Success, (percent):** 80
- C. Equivalent Design Recurrence Interval, (years):** 25 year post-fire
- D. Design Storm Duration, (hours):** 6 hr. and 24 hr.
- E. Design Storm Magnitude, (inches):** 1.6 in and 2.4 in
- F. Design Flow, (cubic feet / second/ square mile):** 98
- G. Estimated Reduction in Infiltration, (percent):** 7
- H. Adjusted Design Flow, (cfs per square mile):** 105

## **PART V - SUMMARY OF ANALYSIS**

The Cabin Gulch Fire started on July 21<sup>st</sup>, suspected to have originated off Forest. According to the Initial Attack Incident Commander, the majority of the fire activity occurred on July 23<sup>rd</sup> when prevailing winds out of the west carried the fire across much of the final burned area. Due to the rapid rate of spread, the fire resulted in the majority of the burned area having a low to moderate soil burn severity with moderate to high intensity. Beginning on July 26<sup>th</sup> and ending July 27<sup>th</sup>, the fire received moderate duration, low intensity/sporadic rain events totalling .9 inches to 1.25 inches of precipitation across the fire. (rain measured using two different methods in several locations)

### **A. Describe Critical Values/Resources and Threats (narrative):**

The Interdisciplinary BAER Team identified the threatened values at risk to be the native vegetation communities, cultural resource sites, system roads and soil productivity. Risks were assigned based on Interim Directive No. 2520-2014-1. After examination of the fire area the BAER team, in consultation with other specialists, identified the following values at risk.

Native vegetation: Native vegetation communities and soil productivity are at risk from rapid expansion of noxious weeds from existing populations in the burn area vicinity. Less than 15% of the burned area is currently occupied by noxious weeds. Roads, trails and past timber harvest areas, however, currently harbor noxious weed infestations which will readily spread under post-fire conditions. Noxious weed spread is a threat that would ***very likely*** affect values at risk such as soil productivity, vegetation, wildlife habitat and biodiversity, and land/property values in the vicinity of the fire resulting in ***major*** loss of ecological diversity thus impacting multiple resources. Noxious weed species in the burn perimeter include spotted knapweed, Canada thistle, musk thistle, bull thistle and houndstongue. Cheatgrass has invaded several parts of the burn as well. There are at least 180 acres of known existing weed infestations within the fire, representing several vectors for spread into the burned area.

Heritage: Site 24BW0403 is a prehistoric lithic scatter that is recorded and recommended as eligible for listing on the National Register of Historic places. This site is located on both sides of FS Road 4181 near the junction with Highway 12. It is within the burn perimeter and was impacted by moderate intensity - low severity fire. Site 24BW0403 has lost the vegetative cover previously stabilizing the site making it ***possible*** to lose provenience and context as the result of erosion. Once provenience of artifacts is compromised, much of the site's informational potential is lost, resulting in a ***major*** magnitude of consequence due to the loss of cultural and scientific value. This site is one of three known sites near or within the fire perimeter, but is the only one perceived to be threatened.

Water quality/transportation infrastructure: Due to fire effects, the Cabin Creek watershed is likely to generate higher stormflows in the first few years following the fire. Larger flow events in part are a function of increased surface runoff from bare hillslopes. Furthermore, burned and exposed soils are more susceptible to erosion, entrainment and transport to stream channels. This combination of increased runoff and greater susceptibility to erosion threatens transportation infrastructure.

Three small (12-117 acre) tributary drainages to the East Fork of Cabin Creek drain directly to the East Fork Road; there are no drainage structures to convey runoff along or across the road. Under pre-fire conditions, the dry south facing hillslopes drained by these watersheds

have not been observed to produce runoff in the recent past. During post-fire field reconnaissance, however, defined channels were observed in these small draws. The road itself cuts through historic alluvial deposits for each of these drainages as no suitable alternative road locations exist given the steep topography in the area. Under post-fire conditions, model outputs suggest that these drainages may see an increase in post-fire runoff that may in turn exacerbate road erosion and increase the potential for road washout. This road serves as a primary haul route for ongoing contracted timber sale operations, a portion of which fall within the burn perimeter.

Probability of damage or loss to the road system was determined to be possible based on runoff modeling. Should the road become impassable due to blockage and/or loss of structural stability, major consequences for the safety of the public, contractors, and Forest Service personnel would exist.

Soil Productivity: Localized increases in erosion and sedimentation may occur within watersheds that burned under moderate soil burn severity. Due to lack of downstream values likely to be adversely affected, no standalone treatments have been proposed to mitigate impacts.

#### B. Emergency Treatment Objectives (narrative):

The emergency treatment objective is to prevent the expansion of noxious weeds in areas burned by the Cabin Gulch Fire, to preserve the integrity of newly exposed cultural resource sites until revegetation can occur or more in-depth analysis can be performed and adjust the hydrologic interactions with the road infrastructure in order to accommodate the anticipated increased flow resulting from post-fire watershed response.

In accordance with the revised Forest Service manual, the risk matrix below, Exhibit 2 of Interim Directive No.: 2520-2010-1, was used to evaluate the Risk Level for each value identified during the Cabin Gulch 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. While Risk Assessment was completed for the Non-FS Value at Risk (increased post-fire runoff response), it was not included in the risk matrix.

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	<b>RISK</b>		
Very Likely	Very High - <del>Major</del>	Very High	Low
Likely	Very High	High	Low
Possible	High - <del>Major</del>	Intermediate	Low
Unlikely	Intermediate	Low	Very Low

Noxious weeds: Weed treatments will concentrate on the areas of known weed infestations in an attempt to counter fire-induced weed spread. Immediate weed treatment is needed to prevent known weed infestations from quickly flourishing after the fire and creating large sources of new weed seeds. These areas have high public use, which could exacerbate the spread of the existing populations.

**Heritage:** One of three sites has been identified as needing immediate stabilization to preserve site provenience, integrity and value. The site would be stabilized with mulch until native vegetation recovers.

**Roads:** Mitigate effects of changed post-fire watershed response (runoff, erosion, and deposition) by adding road drainage features along the East Fork Cabin Gulch road in the vicinity of the fire-affected drainages..

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

**Land 90% Channel na% Roads/Trails 90% Protection/Safety na%**

**D. Probability of Treatment Success**

	Years after Treatment		
	1	3	5
<b>Land</b>	70%	*	*
<b>Channel</b>	NA	NA	NA
<b>Roads/Trails</b>	90%	90%	90%
<b>Protection/Safety</b>	NA	NA	NA

\*will depend on follow-up weed treatment not funded through BAER

**E. Cost of No-Action (Including Loss):**

The most effective time to prevent post-fire proliferation of weeds in the burned area is before populations within the burn perimeter re-emerge and develop mature seed heads. The cost to treat the existing populations would be less than that needed to treat a substantially greater area of infestation after post-fire expansion. The value of lost ecological integrity, native habitat and soil productivity is difficult to quantify but is certainly far in excess of the proposed BAER treatment. Similarly, the damage or loss of heritage resources is irreplaceable and not easily quantified. The cost of no action on the East Fork road would likely be substantially greater than the cost of proposed BAER treatments in road repair expenses alone, whereas the cost to public and personnel safety is more difficult to quantify.

**F. Cost of Selected Alternative (Including Loss):**

**Heritage:**

- Two-person crew, one day: \$300
- 10 bales of certified weed-free straw: \$100
- **Total: \$400**

**Roads:**

- Construction of three rolling dips: \$1200

**Noxious Weeds:**

Ground application with vehicle (truck or UTV) access	Area of existing infestation accessible by spray vehicle: 82 acres	Cost per acre \$74	Total cost: \$6,068.00
Backpack only access	Area of existing infestation accessible on foot only: 98 acres	Cost Per Acre \$225	Total Cost \$22,050
Herbicide needed for treatment acres	All treatment methods: 180	Cost per Acre \$20	Total Cost \$3,600
<b>Totals</b>			<b>\$31,718</b>

**G. Skills Represented on Burned-Area Survey Team:**

<input checked="" type="checkbox"/> Hydrology	<input checked="" type="checkbox"/> Soils	<input type="checkbox"/> Geology	<input checked="" type="checkbox"/> Range
<input type="checkbox"/> Forestry	<input type="checkbox"/> Wildlife	<input type="checkbox"/> Fire Mgmt.	<input checked="" type="checkbox"/> Engineering
<input type="checkbox"/> Contracting	<input type="checkbox"/> Ecology	<input type="checkbox"/> Botany	<input checked="" type="checkbox"/> Archaeology
<input type="checkbox"/> Fisheries	<input type="checkbox"/> Research	<input type="checkbox"/> Landscape Arch	<input checked="" type="checkbox"/> GIS

**Team Leader:** David Marr (t), Dave Callery

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**Core Team Members:**

- |                                     |                                  |
|-------------------------------------|----------------------------------|
| ▪ David Marr—team lead (t), soils   | ▪ Jen Ryan—Heritage              |
| ▪ Dave Callery—team lead, hydrology | ▪ Tony Smith—Range/Noxious Weeds |
| ▪ Andy Efta - hydrology/soils       | ▪ Kyle Whelan—GIS                |
| ▪ Beth Anderson--soils              | ▪ Don Senn—Engineering           |

**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 weeds: Identified treatment involves truck or UTV based spray equipment (through IDIQ contracts) to treat areas accessible and adjacent to roads. For more remote

populations detached from roads, crew personnel with backpack sprayers would be needed.

Heritage: The heritage site would be covered with certified weed free straw to decrease site erosion potential and allow time for vegetation to reestablish or until personnel can further document the site's artifacts.

**Channel Treatments:** No channel treatments prescribed at this time.

**Roads and Trail Treatments:** As noted above, the increased potential for runoff and erosion downslope of three ephemeral drainages may increase the potential for road erosion and washout.

Post-fire storm flow runoff for each ephemeral drainage was estimated using the unit hydrograph method (SCS, 1973). Runoff curve numbers for modeled watersheds were derived from NRCS reference, discussion with other R1 hydrologists, and previous BAER reports from the area. A composite curve number was established via weighted average based on drainage area burned under each constituent severity class. Raw pre- and post-fire RCN generated runoff estimates were adjusted using relationships to prior statistical analysis on nearby stream gage data to more accurately runoff response in this drainage. Further details can be found in the Cabin Gulch BAER hydrology report.

Model output suggests that there may be an approximately 25-45% increase in runoff following a 25 year recurrence interval event in the largest of the three drainages (approx. 117 acres) and a 200% to 400% increase in post-fire runoff for a 25 year post-fire runoff event in the two smaller drainages (12-17 acres in size). Acknowledging the inherent uncertainty in runoff modeling both pre- and post-fire, model estimates nonetheless suggest that there is an elevated risk of road erosion, washout, and associated probability of injury and vehicle damage should even a 5-year post-fire runoff event occur.

To address this value at risk, construction of a rolling dip would be installed below each of three burned draw intersecting the East Fork road to minimize length of road drainage flowpaths and associated erosion and washout potential.

**Protection/Safety Treatments:** No protection/safety treatments prescribed at this time.

**I. 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.)**

Noxious Weeds: monitoring will be done prior to treatment in order to develop/refine the treatment contract, and post-treatment during the first post-fire year in order to identify any noxious weed populations not effectively treated during initial treatment, and to determine if native plant communities have been able to outcompete the noxious weeds. Follow-up treatment would be pursued in subsequent years using non-BAER funding sources.

Heritage: monitoring of revegetation rates to stabilize and protect the sites from erosion will be conducted. No BAER funding was requested for heritage monitoring.

Roads: monitoring will consist of road patrols during/following significant rain and snowmelt events. No BAER funding was requested for roads monitoring.

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

			NFS Lands	
			# of	
Line Items	Units	Unit Cost	Units	BAER \$
<b>A. Land Treatments</b>				
Weed treatments	total	\$ 31,800.00	1	\$31,800
Weed Tx COR/inspect time	day	\$300	6	\$1,800
Heritage site stabilization	each	\$400	1	\$400
				\$0
<i>Insert new items above this line!</i>				\$0
<i>Subtotal Land Treatments</i>				\$34,000
<b>B. Channel Treatments</b>				
				\$0
<i>Insert new items above this line!</i>				\$0
<i>Subtotal Channel Treat.</i>				\$0
<b>C. Road and Trails</b>				
water bars	each	340	3	\$1,020
construction COR	day	300	1	\$300
				\$0
<i>Insert new items above this line!</i>				\$0
<i>Subtotal Road &amp; Trails</i>				\$1,320
<b>D. Protection/Safety</b>				
				\$0
<i>Insert new items above this line!</i>				\$0
<i>Subtotal Structures</i>				\$0
<b>E. BAER Evaluation</b>				
BAER team salary + per diem				\$9,000
				\$0
<i>Insert new items above this line!</i>				---
<i>Subtotal Evaluation</i>				---
<b>F. Monitoring</b>				
weeds pre and post-treatment	days	300	3	\$900
				\$0
<i>Insert new items above this line!</i>				\$0
<i>Subtotal Monitoring</i>				\$900
<b>G. Totals</b>				
Previously approved				\$36,220
Total for this request				\$36,220



PART VII - APPROVALS

1.   
Forest Supervisor (signature)

8/6/15  
Date

2.   
Regional Forester (signature)

8/7/15  
Date