Date of Report: 09/04/2015

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: Sucker Creek

B. Fire Number: MT-HNF-000164

C. State: MT

D. County: Lewis and Clark

E. Region: 01

F. Forest: Helena

G. District: Lincoln

H. Fire Incident Job Code: P1J1AW15

I. Date Fire Started: 08/10/2015

J. Date Fire Contained: 65% contained as of 09/03/2015

K. Suppression Cost: $ 3,286,000 (as of 8/27/2015)

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): 13.5 miles of dozer line, 0.7 miles of hand line
2. Fireline seeded (miles):
3. Other (identify): XXXX

M. Watershed Number: Copper Creek – 170102030103, Keep Cool Creek 170102030304

N. Total Acres Burned: (Total acres within burn perimeter)
[3000] NFS Acres [ ] Other Federal [ ] State [60] Private

O. Vegetation Types: Vegetation consiststs of mixed forest (Douglas Fir, Ponderosa Pine and Lodgepole Pine) with some interspersed mountain grasslands.

P. **Dominant Soils**: Representative taxonomic groups across the burned area include Typic Cryoboralfs and Argric Cryoborolls. Soil textures associated with these taxonomic groups range from extremely gravelly silt loams, extremely channery loams, and very cobbly clay loams. Soils influenced by volcanic ash loess occurs on approximately 34% of the burned area. These ash-cap soils are highly susceptible to erosion.

Q. **Geologic Types**: Geology across the Sucker Creek Fire consists of argillites, siltites, and quartzites (76.2% of the burned area), with areas of glacial till derived from basalt or metasedimentary rock (23.8%). Landforms are primarily mountain ridges and slopes, with some moraines and glaciated mountain ridges. Slopes are primarily between 40 and 60%.

R. **Miles of Stream Channels by Order or Class**: 6.3 miles of intermittent, 4.0 miles of perennial. The estimate was done in GIS and so is an underestimate.

S. **Transportation System**
Trails: 2 **miles** **Roads**: 23 **miles** (numerous jammer roads not quantified)

PART III - WATERSHED CONDITION

A. **Burn Severity (acres)**: 1438 **(low)** 1105 **(moderate)** 23 **(high)**

B. **Water-Repellent Soil (acres)**: 2960 (hydrophobicity was consistently present to a strong degree and a varying depth from shallow to deep across all burn severities and unburned sites.

C. **Soil Erosion Hazard Rating (acres)**: 24 **(low)** 2910 **(moderate)** 26 **(high)**

D. **Erosion Potential**: 1.34 **tons/acre**

E. **Sediment Potential**: 534 **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)**: 90

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 2.5 in

F. **Design Flow, (cubic feet / second/ square mile)**: 94

G. **Estimated Reduction in Infiltration, (percent)**: 37

H. **Adjusted Design Flow, (cfs per square mile)**: 128

PART V - SUMMARY OF ANALYSIS

The Sucker Creek Fire started on August 10th from a lightening strike in the Keep Cool watershed. Fire activity has remained sporadic resulting in a mosaic of unburned, low and moderate soil burn severity. Typically, as afternoon relative humidity drops and winds increase, small isolated patches of timber will actively burn making minor runs through heavier fuels. Most fo the Sucker Creek Fire has burned into the Snow Talon fire of 2003 immediately to the north at which point fire activity subsides due to the low amount of fuel.

A. Describe Critical Values/Resources and Threats (narrative):
Risks were assisgned 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. There are at least 360 acres of known existing weed infestations within the fire, representing several vectors for spread into the burned area.

Water Quality/Transportation Infrastructure: Due to fire effects, watersheds within the Sucker Creek Fire burn perimeter are 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.

There are approximately 24 miles of roads and trails documented in the Helena NF Motor Vehicle Use Map (MVUM) database that within the burn perimeter. Forest Road Number 1821 provides access to an electronics site that houses various communications equipment for the Forest Service, County EMS, and the Department of Homeland Security, as well as a staffed lookout station. Forest Road 1881 provides the sole motorized access route for maintaining a destination snowmobile trail and conducting ongoing forest management activities in this area.

Eighteen road-stream crossings were found on open roads both within and outside the burn perimeter with drainages that were affected by the fire. These crossings were evaluated for flow capacity in order to determine their adequacy to convey post-fire design storm flow events. Under post-fire conditions, model output suggests that eight of these drainages may see an increase in post-fire runoff that would substantially exceed culvert capacity and overtop roads, leading to failure of the crossing and road damage. Further, inadequate road drainage to accommodate anticipated increases in post-fire overland flow may also lead to erosion of the roadbed and subsequent damage to road segments below burned hillslopes.

Probability of damage or loss to the road system was determined to be ***likely*** 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.

Fisheries:
A reach of Copper Creek is within the fire perimeter, and below extensive burned hillslopes. Copper Creek is critical habitat for bull trout, an ESA-listed species. However, bull trout do not spawn or rear in the reach that would potentially be affected by sediment and ash-laden runoff—this reach is used for migration, and as such, was not found to be at a level of risk sufficient to warrant hillslope or drainage-bottom treatments.

Soil Productivity:
Localized increases in erosion and sedimentation may occur within watersheds that burned under moderate or high soil burn severity. No standalone treatments are proposed to mitigate potential post-fire impacts.

Recreation:
Several milles of snowmobile and ATV trail exist within or below the burned area. However, drainage on these trails was deemed adequate to accommodate potential higher runoff in the post-fire setting. Thus, no treatments are proposed to mitigate potential impacts.

Heritage:
Two documented sites are located within the burn perimeter. Both sites were evaluated for impacts resulting from the Sucker Creek Fire. Niether site was impacted, therefore, no treatments are proposed to mitigate threats to heritage sites.

B. Emergency Treatment Objectives (narrative):

The emergency treatment objective is to prevent the expansion of noxious weeds in areas burned by the Sucker Creek Fire and improve transportation infrastructure in order to accommodate the anticipated increased flows resulting from post-fire watershed response and greatly reduce the likelihood of road failure in the post-fire environment.

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 Sucker Creek 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 - Weeds	Very High	Low
Likely	Very High – roads/crossings	High	Low
Possible	High	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.

Water Quality/Transportation Infrastructure:

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

Land 70% **Channel** na% **Roads/Trails** 90% **Protection/Safety** na%

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	70%	*	*
Channel	NA	NA	NA
Roads/Trails	90%	90%	90%
Protection/Safety	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. The cost of no action 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):

Noxious Weeds:

Ground application with vehicle (truck or UTV) access	Acres with vehicle access: these include dozer lines and roads: 300	Cost per acre $74.00	Total cost: $ 22,200
Backpack only	Backpack acres: 59	Cost Per Acre $225.00	Total Cost $ 13,275

access			
Herbicide needed for treatment acres	All treatment methods: 359	Cost per Acre $20.00	Total Cost $ 7,180
TOTAL			$ 42,655

Water Quality/Transportation Infrstructure

Item	units	Cost/unit	Total cost
Culverts on primary access road, installed	4	Varies by structure, see addendum	$50,240
Culverts on admin access road/snowmobile trail removed, driveable ford installed	3	$3,500	$10,500
Road drainage re-establish/blading	5	$500	$2,500
Clean cross-drain inlets	6	$100	$600
Rolling dips	7	$200	$1,400
COR/contract prep	8	$300	$2,400
TOTAL			$67,640

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Dave Marr (t), Dave Callery

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Core Team Members:

- David Marr - team lead (t), soils
- Dave Callery - team lead, hydrology
- Andy Efta – hydrology
- Wayne Green - hydrology
- Jonathan LeBlanc - soils (t)
- Megan McGinnis – soils (t)
- Josh Lattin—Recreation
- Jen Ryan—Heritage
- Luke Shimer - Range/Noxious Weeds
- Laura Burns – GIS (t)
- Kyle Whelan—GIS, hydrology

H. Treatment Narrative:

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.

Channel Treatments: No channel treatments prescribed at this time.

Roads and Trail Treatments: Post-fire storm flow runoff for each 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. Further details can be found in the Sucker Creek Fire BAER hydrology report.

Model outputs suggest that flows may increase by as much as 85% above pre-fire flows in some drainages and that eight crossings may see changes in post-fire peak flows great enough to overtop the road during a 25-year post-fire runoff event. Post-fire peak flows have been observed and documented to meet and exceed this design event across several Region 1 forests on both sides of the Continental Divide. Acknowledging the inherent uncertainty in runoff modeling both pre- and post-fire, these estimates nonetheless suggest that there is an elevated risk of road erosion, washout, and associated probability of injury and vehicle damage following heavy post-fire precipitation events.

To address these needs, a combination of stormproofing, drainage maintenance and improvement, and crossing replacement has been recommended in effort to minimize risk of road failure and loss of access to critical communications and trail infrastructure. Seven stream culverts were determined to be at unacceptable risk of failure (post-fire Q_{25} ranged from 300% to 1900% of current culvert capacity). Four of these culverts are on the primary road accessing this part of the national forest, including critical access to a communications site used by FS, Department of Homeland Security, and County EMS (FSR 1800 and 1821). Three of the culverts are on a road that provides administrative access to a large area of national forest and is a groomed snowmobile route in the winter (FSR 1881). The proposed treatment for the four crossings on the primary road are upsized culverts to accommodate the post-fire Q_{25} event. The proposed treatment for the three crossings on the administrative road/snowmobile trail is to remove the undersized culverts and install driveable fords.

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.

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	
Line Items	Units	Unit Cost	# of Units	BAER $
A. Land Treatments				
Weed treatments	total	$ 42,655.00	1	$42,655
Weed Tx COR/inspect time	day	$300	8	$2,400
				$0
Insert new items above this line!				$0
Subtotal Land Treatments				$45,055
B. Channel Treatments				
				$0
Insert new items above this line!				$0
Subtotal Channel Treat.				$0
C. Road and Trails				
stream culverts, FSR 1800, 1821	total (4)	50240	1	$50,240
fords, FSR 1881	each	3500	3	$10,500
road drainage re-establishment	mile	500	5	$2,500
clean x-drain inlets	#	100	6	$600
install rolling dips	#	200	8	$1,600
construction COR/contract prep	day	300	8	$2,400
Insert new items above this line!				$0
Subtotal Road & Trails				$67,840
D. Protection/Safety				
				$0
Insert new items above this line!				$0
Subtotal Structures				$0
E. BAER Evaluation				
BAER team salary + travel				$12,000
Insert new items above this line!				---
Subtotal Evaluation				---
F. Monitoring				
weeds pre and post-treatment	days	300	4	$1,200
				$0
Insert new items above this line!				$0
Subtotal Monitoring				$1,200
G. Totals				$114,095
Previously approved				
Total for this request				$114,095

PART VII - APPROVALS

1. D Eric Bradley For Bill Avey — Forest Supervisor (signature) — 9/4/2015 — Date

2. Maria M Mack — Regional Forester (signature) — 9/8/15 — Date