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

Date of Report: 09/25/2018

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: Brownstone

C. State: Montana

D. County: Flathead

E. Region: Northern (1)

F. Forest: Flathead

G. District: Glacier View

H. Fire Incident Job Code: P1L2T0

I. Date Fire Started: August 2, 2018

J. Date Fire Contained: October 1, 2018 (estimated)

K. Suppression Cost: $ 55,000

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): 0
2. Fireline seeded (miles): 0
3. Other (identify): 0

M. Watershed Numbers: 170102090204

N. Total Acres Burned: 3,173
NFS Acres (3,173) Other Federal () State () Private ()

O. VegetationTypes: Douglas fir, ponderosa pine, larch, sub-alpine fir, riparian

P. Dominant Soils:

Wilderness Map Symbol	Landform	Parent Material	Erodibility
VI	Cirque Headwalls and Alpine Ridges	Metasedimentary Rocks	L
VII	Glacial Trough Walls and Structural Breaklands	Glacial Till and Metasedimentary Rocks	M
Va	Glaciated Mountain Ridges and Cirque Headwalls	Glacial Till and Metasedimentary Rocks	L
II	Cirque Basins	Glacial Till and Metasedimentary Rocks	M
III	Glaciated Mountain Slopes and Ridges	Glacial Till and Metasedimentary Rocks	L
IIIa	Forested Steep Lateral Moraine	Glacial Till and Metasedimentary Rocks	L
Vc	Glaciated Mountain Ridges	Metasedimentary Rocks	L
IV	Landslide Deposits	Landslide Deposits and Metasedimentary Rocks	L
Vb	Glaciated Mountain Ridges	Metasedimentary Rocks	L

Q. Geologic Types: The burned area lies on the following geologic formations from the South Fork Flathead River to the ridge tops: Quaternary Alluvium, Sheppard, Snowslip, Mount Shields, Bonner, McNamara, and Garnet. These formations include a variety of lithologies including quartzite, limestone, siltite, and argillite.

R. Miles of Stream Channels by Order or Class:

Stream miles by order within perimeter.

Stream Order	Length (Miles)
1	7.0
2	2.5
3	0.0
4	0.0
5	0.0
Grand Total	9.5

S. Transportation System

Trails: 1.0 miles Roads: 0 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 698 (unburned); 906 (low); 1,372 (moderate); 197 (high)

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

C. Soil Erosion Hazard Rating (acres):

3,173 (low) (moderate) (high)

D. Erosion Potential: 0.8 tons/acre

E. Sediment Potential: 0.5 tons/acre

PART IV - HYDROLOGIC DESIGN FACTORS

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

B. Design Chance of Success, (percent): 80

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

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

E. Design Storm Magnitude, (inches): 1.5 inches

F. Design Flow, (cubic feet / second/ square mile): 5 cfs/mi^2

G. Estimated Reduction in Infiltration, (percent): 30

H. Adjusted Design Flow, (cfs per square mile): 70 cfs/mi^2

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

Summary of Potential Watershed Response

The Brownstone Fire burned roughly 3,173 acres, mostly within the Brownstone Creek watershed. The southern portion of the fire burned the headwaters of Francois Creek. Brownstone and Francois Creeks drain directly into the South Fork Flathead River. The fire burned in a mosaic pattern and resulted in a well distributed mix of severity levels (Figure 1). Overall, the pattern of burn severity is typical of past fires in the Bob Marshall Wilderness.

Landforms in the burned area consist of cirque basins, alpine ridges, glacial trough walls, breaklands, alluvial fans, and floodplains. Channel morphology ranges between very steep headwater channels to lower gradient alluvial channels.

The BARC imagery has not been field verified, but past experience has shown that initial imagery slightly over-estimates severity on the Flathead National Forest. Several fires have burned on the Flathead National Forest and Bob Marshall Wilderness during the past couple of decades. Watershed response tends to be relatively mild because fall rains tend to be of long duration and short intensity. In low and moderate severity burns, needle cast is common, which aids in infiltration. Erosion is likely to occur during spring snowmelt and rain. Recovery of burned areas is typically quite rapid (3-5 years).

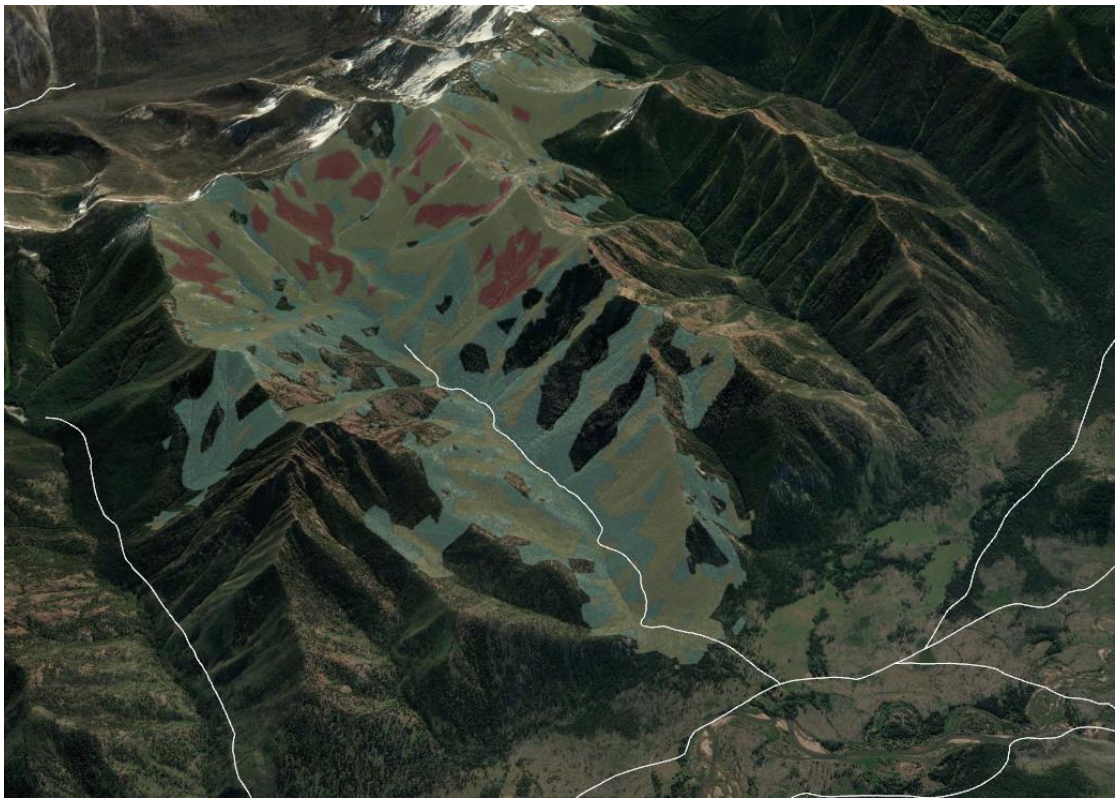

Figure 1. Brownstone Fire looking east. Trails are shown in white.

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

Trail 465 runs along Brownstone Creek (Figure 1) through low and moderate severity burns. This trail is at risk of further damage that is likely to occur in the next 12 months. This future damage is likely to occur through the following mechanisms.

- Direct erosion of trail prisms due to loss of drainage features such as water bars and dips
- Direct erosion of tread due to loss of adjacent and upslope vegetation
- Fillslope failure due to direct loss of forested vegetation and root systems. This potential failure mechanism is likely to occur on steep hillslopes with moderate and high burn severity.
- Fillslope failure due to direct loss of crib logs and/or retaining wall structures.

Trail segments that would be eligible for emergency treatments were identified using the following landscape and trail filters to separate short term (<12 months) risks from long term risks.

- Burn severity levels adjacent to and upslope of trail segments
- Hillslope position (ridgetop, midslope, or valley bottom) of trail segments
- Hillslope gradient
- Aspect
- Iminent risk of furhther loss of trail prisms in the next 12 months

Trail grades within the area vary from 5% to 20% with hillslope gradients up to 40%. Pre-fire trail conditions within the fire perimeter ranged from excellent to good with annual maintenance occurring on all of the trails, and recent improvements to address deferred maintenance on some. GIS analysis has determined that approximately 1 mile of trail (465) needs emergency treatments, in the form of drainage work.

Natural Resources: Native Plant communities

Noxious weeds are present on the edge of and within the burned area. These populations are substantial in size and have the potential with the available seed bed to spread into burned areas, especially via Brownstone Creek Trail 465.

Risk Assessment – Threats to native plant communities

Probability of Damage or Loss: Likely - Based on burn severity and proximity to existing weed infestations.

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

Risk Level: High – Invasive species treatment is needed on documented infestations. Additional invasive species monitoring next year will determine if weeds spread is occurring further into the burned area.

There are 200 acres directly adjacent to Trail 126 which are infested with spotted knapweed, Canada thistle, houndstongue, oxeye daisy, cheatgrass, tall tumblemustard, bull thistle, sulfur cinquefoil, and yellow toadflax. This area is less than 1 mile from the burned area by Trails 126 and 465. There is a high risk that weeds could be transported from this area into the burn. The combined length of Trail 465 and the portion of Trail 126 that is within the current infestation is roughly 3.5 miles. Given a buffer of 100 feet on both sides of the 3.5 mile segment is roughly 85 acres. This area is a high priority for EDRR as there are difficult-to-control weeds directly adjacent and within the burned area. Native seeding is also needed after spraying to ameliorate the risk of weed spread.

B. Emergency Treatment Objectives:

As noted above, threats to life, property, and natural resources could potentially result from post-fire conditions in the burned area. For these reasons the primary treatment objectives are:

- Prevent additional loss of trail infrastructure that is likely to occur in the next 12 months
- Minimize potential effects of post-fire conditions on the spread of noxious weeds.

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

Land **N/A** % Channel **N/A** % Roads/Trails **10** % Protection/Safety **N/A** %

Work on trails can start immediately following approval of BAER request. This work would continue until snowfall, then resume in the spring. Further damage to trails is expected to occur in the spring before BAER work is initiated.

D. Probability of Treatment Success

	Years after Treatment		
	1	2	3
Land	N/A	75	75
Channel	N/A	N/A	N/A
Roads/Trails	10	50	100
Protection/Safety	N/A	N/A	N/A

E. Cost of No-Action (Including Loss): $19,568

F. Cost of Selected Alternative (Including Loss): There remains a 20% chance that the proposed treatments for this initial work may not succeed. Total cost of the action alternative plus this 20% chance of failure is $ 17,359

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Craig Kendall

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 complete 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. Proposed treatments are summarized below.

- Replace damaged trail 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 and trail users.
- EDRR for weeds to prevent or minimize spread into burned areas.
- Native seeding to reduce the risk of noxious weed spread into the burned area.
- 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. Continued monitoring and inventory of trail conditions is likely to result in submission of an Interim 2500-8 in the coming months.

PART VI - EMERGENCY STABILIZATION TREATMENTS AND SOURCE FUNDS

Line Items	Units	Unit Cost	NFS Lands # of Units	BAER $	Other $
A. Land Treatments					
EDRR	acres	200	24	$4,800	
Seeding	acres	240	24	$5,760	
Subtotal Land Treatments				$10,560	$0
B. Channel Treatments					
Insert new items above this line!				$0	$0
Subtotal Channel Treat.				$0	$0
C. Road and Trails					
Trail Stabilization	miles	$1,385	1	$1,385	
Insert new items above this line!					
Subtotal Road & Trails				$1,385	$0
D. Protection/Safety					
Post-fire Hazard Signs	each	300	1	$300	
Hazard Tree Removal	miles	800	1	$800	$0
Insert new items above this line!				$0	$0
Subtotal Structures				$1,100	$0
E. BAER Evaluation					
Team Evaluation	each				$2,500

Insert new items above this line!				---	$0
Subtotal Evaluation				$0	$2,500
F. Monitoring					
Post-fire Monitoring	each			$0	$0
Insert new items above this line!				$0	$0
Subtotal Monitoring				$0	$2,500
G. Totals				**$13,045**	$2,500

PART VII - APPROVALS

1. /s/ Chip Weber — 10/02/2018
   Forest Supervisor — Date

2. /s/ Jane D. Darnell — 10/04/2018
   Regional Forester — Date