

BURNED-AREA REPORT

PART I - TYPE OF REQUEST

PART II - BURNED-AREA DESCRIPTION

HUC 6 Number	HUC6 names
100301040102	Lick Creek
100301040103	Headwaters North Fork Sun River

100301040104	Route Creek
100301040105	Gates Creek
100301040106	Rock Creek
100301040107	Upper North Fork Sun River

N. Burned acres by Ownership

Ownership	Total Acres
Private	0
State	0
BLM	0
Forest Service	11,100
Other	0
Total Acres	11,100

O. VegetationTypes: Vegetation types within the perimeter of the Red Sahle Fire include 25 year old Lodge Pole pine, Subalpine and valley bottom meadow grasslands.

P. Dominant Soils: Soils form based on an integration of climate, geologic parent material, topography, living organisms, and time. Within relatively short distances, the combination of soil-forming factors can vary, resulting in soils with different physical and chemical characteristics. Soils within the Red Shale Fire perimeter are derived mainly from limestone on the ridges and ridge tops. Hillslopes are generally underlain by argillites and siltites and quartzites, drainage bottoms are mantled with colluvium and residuum deposited through glacial till. The dominant soils are classified at the family level as Typic /Lithic Cryoborolls/Cryochrepts with surface textures of cobbly/very gravelly silt loams/loams. Surface rock ranges in cover from 15 to 70 percent and in size from gravels to cobbles. Land Type Association units (LTA) and attributes used in the analysis are from the Holdorf et al, 1980 publication (Holdorf et al, 1980).

Table 1. General characteristics from the Land Type Association (LTA) unit analysis for the Red Shale Fire

LT	Landform	Slope Range	Parent Material	Soil Family	Soil Surface Texture
10	Forested & grassy floodplains & terraces	0-10	Mixed	Fluvents, Typic & Argic Cryoborolls	Variable
12	Glacial outwash fans / stream terraces	2-30	Coarse glacial outwash	Typic ustochrepts	Coarse textures
27	Forested break lands	60+	Mixed, Limestone	Typic & Andic Cryochrepts, Lithic Cryandepts	Loam, Silt Loam
36	Convex ridges and shoulders	25-60	Sedimentary	Typic ustochrepts	Gravelly sandy-loam
53	Glacial till on outwash benches	10-40	Sandstones and shales	Argic cryoborolls	Very cobbly loam

66	Forested high elevation ridges & slopes	25-60	Mixed, Limestone	Andic Cryochrepts	Silt Loam
68	Benches, ridges, valley sideslopes	10-60	Soft sandstone/s hale	Typic cryoborolls and cryoboralfs	Loamy-skeletal loams and sandy loams
74	Structural break lands	50-90	Residuum overlain by sandstone and shale	Typic cryochrepts	Loamy-skeletal loam

Table 2. Soil erosion ratings based on Land Type Associations (LTA) units with associated acres within the fire perimeter

LT	Soil Material Erodibility	Hydrologic Soil Group	Percent of Burn Area
10	Moderate	C	0.02 %
12	Moderate	C	38.1 %
27	Low	C	1.8 %
36	Moderate	C	28.4 %
53	Moderate	C	0.01 %
66	Low	C	3.2 %
68	Moderate	C	19.1 %
74	Moderate	C	9.3 %

Q. Geologic Types: The following are the geological formations within the Red Shale Fire: Cambrian rocks; lower cretaceous Mount Pablo Formation and Jurassic Morrison Formation; Helena, Empire, and Spokane Formation; Diorite sills and dikes; and glacial deposits. .

R. Miles of Stream Channels by flow regime:

FIRE	PERENNIAL	INTERMITTENT/EPHEMERAL	TOTAL
Red Shale Fire	41	~20	61

S. Transportation System (NFS only):

Open Road miles

Fire Name	Sum of Miles
Red Shale	0
Other Public Roads	0

Roads Open to All Vehicles, Yearlong	0
Roads Open to Highway Legal Vehicles Only, Yearlong	0
State or US Highway	0

Total	0
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Open Trail miles

Fire Name	Sum of Miles
Red Shale	24
Trail Special Designation, Yearlong	24
Trails Open to Vehicles 50 inches or Less in Width, Yearlong	0

Grand Total	24
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Admin Use routes

Row Labels	Sum of Miles
Red Shale	0
ADMIN	0

Grand Total	0
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PART III - WATERSHED CONDITION

A. Burn Severity (NFS acres ONLY):

Fire	Unclassified	Unburned	Low Severity (Forest and Non-Forest)	Moderate Severity	High Severity
Red Shale			2952	6136	2040

Burned NFS Acres by Vegetation Type

Vegetation Type	Fire Acres (%)		
Sparse Vegetation	15 (T)		
Grassland	155 (1.4%)		
Shrub	87 (1%)		
Lodgepole	10,856 (98%)		
Water	1.4 (T)		
Total	11,114		

B. Water-Repellent Soil (acres): NA.

C. Soil Erosion Hazard Rating (acres)

(low) 500

(moderate) 9500

(high) T

D. Erosion Potential: 13.5 tons/acre (ERMiTT results for moderate/High severity)

E. Sediment Potential: 5082 cubic yards / square mile (25% of surface erosion delivered)

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 3-7

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

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

D. Design Storm Duration, (hours/minutes): 6/30

E. Design Storm Magnitude, (inches): 1.7/1.1

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/mi²

PART V - SUMMARY OF ANALYSIS

A Describe Critical Values/Resources and Threats:

Summary

The most recent acreage available for the Red Shale Fire based on the latest incident report is 12,400 total acres within the burn perimeter. Actual burn acres based on BARC imagery is estimated at 11,114 acres.

The Red Shale fire was started by lightning ignitions on July 8. The fire is generally located 25 miles west of Choteau, Montana. Designated a fire for resource benefit, the Red Shale fire burned almost exclusively with the 1988 Gates Park Fire in 25 year old lodgepole pine and grassy meadows. Slowly consuming the regrowth, the fire burned for almost for months until an early late September snowstorm. The fire was solely within the Bob Marshall Wilderness Areas.

Summary of Watershed Response

The snowpack snow water equivalent (SWE) during the winter of 2012/13 was average to below average throughout the Rocky Mountain Ranger District with lower than average snow pack and without the typical June rains, resulting in dry fuel conditions. July and August, when much of the Red Shale occurred was in a moderate to high burn conditions (temperatures over 95 degrees, 20-30 mph winds, and relative humidity <10%).

The Red Shale Fire was designated a Wilderness fire for resource benefits. The fire occurred entirely within the boundary of the Bob Marshall Wilderness. Though conditions were not optimal it was designated a fire use fire and allowed to burn. Decision criteria included its location in the Bob Marshall Wilderness, limited access, safety concerns from snags, and the high expense of effective suppression. Much of it burned in a desired mosaic pattern with small pockets of high and moderate severity burn. However, there were several large areas of contiguous moderate severity with complete canopy consumption.

With the loss of ground cover from the areas with large contiguous moderate severity burning exhibited water repellent (hydrophobic) conditions.as there is a risk of post-fire erosion from a short duration-high intensity rainstorm in the next several years

The data entered into the ERMiT model includes climate, soil texture, rock content of the soil profile, vegetation type (forest, range, or chaparral), hillslope gradient and horizontal length, and soil burn severity. The climatic data for the Red Shale Fire was based on the information available from the Gibson Dam station. Soil characteristics were determined from previous BAER reports completed in the area and landtype association descriptions in the Holdorf 1980 document. Slope characteristics and burn intensity were determined from GIS models and BARC Imagery. Below is a list of the input variables used for analysis:

High Intensity:

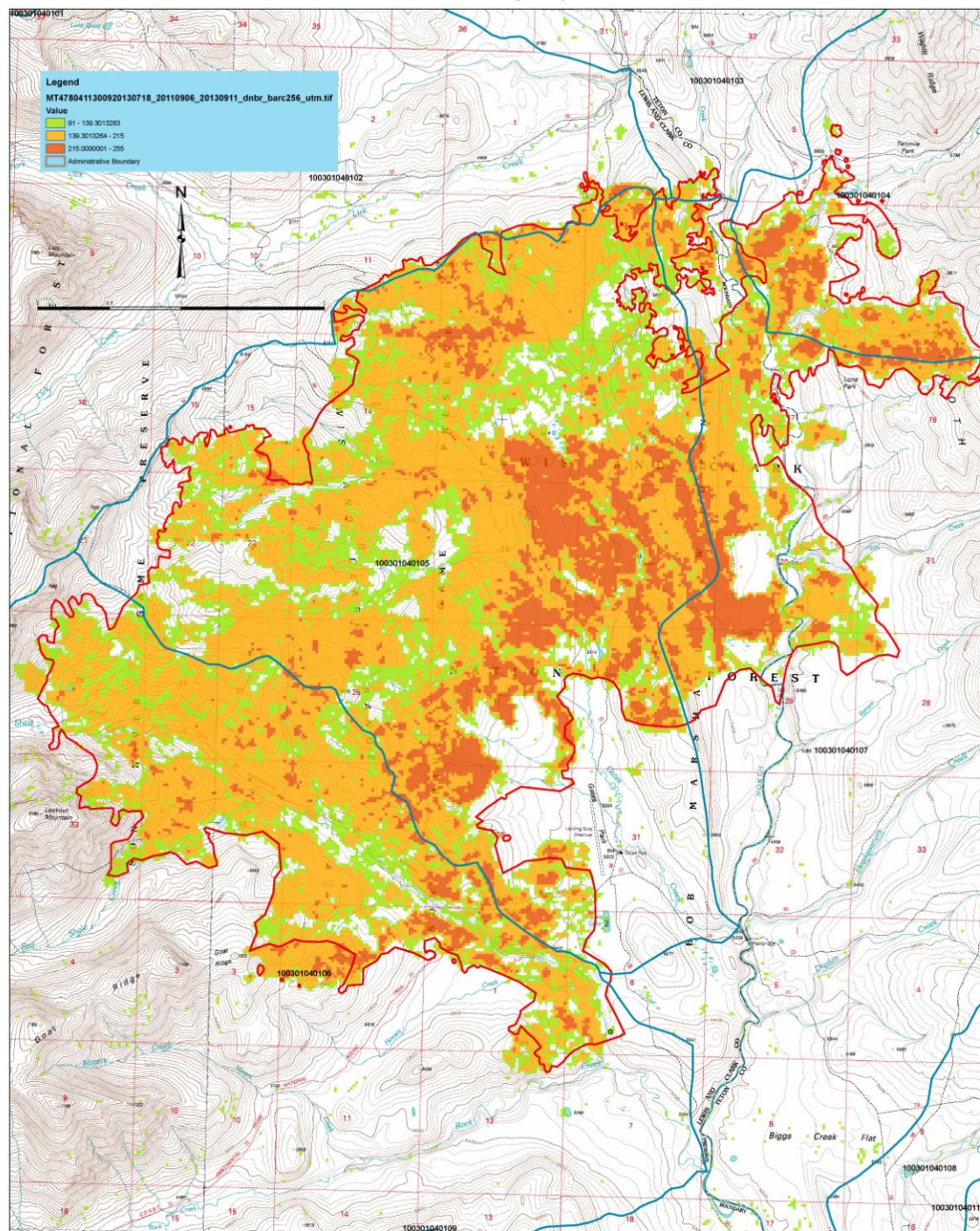
Slope Length: 1000ft
Surface Text: Sandy Loam
Rock Content: 45%
Hillslope %: 20, 40, 10

Low Intensity:

Slope Length: 1000ft
Surface Tex: Sandy Loam
Rock Content: 45%
Hillslope %: 20, 40, 10

Redshale Fire Burn Map

2013 Red Shale Fire BAER
Burn Severity Map



The Red Shale Fire burned almost exclusively with the 1988 Gates Park Fire. The higher intensity fire effects were limited to 1988 fire, 25-year old regeneration of lodgepole pine. Burn pattern was mosaic with large areas of moderate to low/non-burn throughout the interior of the fire. Low to moderate burns were found within the grassy meadows and moist north facing slopes.

The results from the ERMiT runs were used to create erosion hazard potentials specific to the Red Shale Fire. High erosion hazard is defined by slopes >30% that fall within high burn intensity/moderate to high burn severity areas. Low erosion hazard is defined by slopes >30% that fall within low burn intensity/low to moderate burn severity. The results of the ERMiT runs, separated by erosion hazard provide potential erosion (ton ac⁻¹) within the first two years following the fire (Table 6).

Table 6. Results of ERMiT modeling.

Burn Severity	Acres	Potential Erosion Hazard (ton/acre)	
		Year 1	Year 2
Low	2952	4.48	2.0
Moderate	6136	6.32	4.6
High	2040	9.98	5.0



The Red Shale fire burning almost exclusively within the 1988 Gates Park Fire, burning up to, but not into the older growth lodgepole pine that was not consumed in 1988. The soil burn severity in the fire perimeter was very mosaic and was judged to be predominantly low to moderate with pockets of high severity. Trail segments and cultural resource within the fire perimeter within heavily burned areas comprise the majority of the Values at Risk – predominantly Puncheon bridges, trail segments and localized cultural resource sites.



Aerial photograph illustrating the mosaic nature of the Red Shale Fire.

Values at Risk:

Risks were assigned based on Interim Directive No. **2520-2010-1**.

The BAER inter-disciplinary team identified issues that result from fire effects within the Red Shale Fire. The primary watershed effects from the fires include a potential reduction in infiltration, due to water repellency, with the resulting increase in potential runoff. Increased runoff, especially where the vegetation and surface duff layer has been burned will result in increased potential for soil erosion and sedimentation. After examination of the fire area the BAER team, in consultation with other specialists, identified the following values at risk due either to increased runoff, increased soil erosion potential, or public safety hazards. These estimated post-fire effects and identified values at risk shaped the analysis and report:

Trails and Recreation: There are roughly 22 miles of trails within the fire perimeter. These trails are the only access into the area and are used by Forest personnel and the public. The trail system has been damaged by the fire and is now a hazard to travelers. The fire will likely result in trail damage through high intensity rain events and will likely result in sediment delivery to streams and waterways. Approximately 260 feet of puncheon bridges were burned in the fire. These bridges provide protection of sensitive wetlands and wet soils.

ANALYSIS METHODS:

1. The classified BARC was added to a generated slope raster classified by percent of slope in order to come up with six categories divided by percentage of slope (side slope) and burn intensity:
 - i. 0-15% Slope, Medium - High Intensity Burn
 - ii. 0-15% Slope, Low Intensity Burn
 - iii. 15-30% Slope, Medium - High Intensity Burn
 - iv. 15-30% Slope, Low Intensity Burn
 - v. >30% Slope, Medium - High Intensity Burn
 - vi. >30% Slope, Low Intensity Burn
2. This raster was converted to a polygon layer and then intersected with the Bob Marshall Wilderness Complex Trails layer, with a resulting output of "Trails within the burn, classified based on their side slope and the intensity of burn along those segments." Miles of trail was then re-calculated on this

resulting output (OUTPUT: TrailBarcSlopeIntersect). The summary is below, broken out by slope/burn intensity:

Red Shale Slope-Intensity	Miles
0-15% Slope, Low Intensity Burn	2.39
0-15% Slope, Med - High Intensity Burn	8.59
15-30% Slope, Low Intensity Burn	1.7
15-30% Slope, Med - High Intensity Burn	5.53
>30% Slope, Low Intensity Burn	0.39
>30% Slope, Med - High Intensity Burn	1.11
Total Burned Miles	19.71
Total Burned Moderate and High Intensity	15.23

In some areas stabilization and drainage structures burned even in areas where low intensity fire was predominant. These structures are essential to protect trail integrity.

The attribute table was exported and brought into an Access database for querying and analysis. The following numbers were used to standardize, per mile, the general drainage system work needs based on side slope and burn intensity and their cost (Ian Bardwell, Trail Coordinator, Rocky Mountain Ranger District):

Slope-Intensity	Waterbars per mile @ \$65/per	Ditching Feet per Mile @ \$3/foot
0-15% Slope, Low Intensity Burn	5	500
0-15% Slope, Med-High Intensity Burn	10	500
15-30% Slope, Low Intensity Burn	10	300
15-30% Slope, Med - High Intensity Burn	25	300
>30% Slope, Low Intensity Burn	25	200
>30% Slope, Med - High Intensity Burn	50	200

In Access the Trail BARC Slope Intersect Table was queried together with the specific numbers and costs per structure type presented in item 3, above.

Trails and Heritage/Cultural Resources: All significant (NRHP eligible), potentially eligible and unevaluated sites or portions of sites within the burned area were carried forward for the consideration of effects by the recommended BAER treatments.

The table below lists the sites at risk which were identified in association with the Red Shale Fire. Site significance (NRHP eligibility) is noted, as being at potential threat or risk. Whether or not the site is in the burned area, and recommended treatments is also shown. Risk was ranked as high, moderate or low to determine the need for site treatment under BAER protocol.

Site Number	Site Type/ Discussion	NRHP Status	In Burn Area	Fire Impacts Threats	BAER Risk rating	Recommendations/ Site Treatments
24LC1526	North Fork Sun Trail #110	Eligible	Yes	Burned puncheon. Post-fire trail rehab may affect trail character.	Moderate	Design BAER treatments to retain historic trail integrity; Use cultural PA to consult with SHPO
24LC1801	Rock Creek Trail #111	Recommended Eligible	Yes	Possible burned puncheon. Post-fire trail rehab may affect trail character.	Moderate	Design BAER treatments to retain historic trail integrity; Use cultural PA to consult with SHPO
24LC1806	North Fork Red Shale Trail #130	Recommended Eligible	Yes	Burned puncheon. Post-fire trail rehab may affect trail character.	Moderate	Design BAER treatments to retain historic trail integrity; Use cultural PA to consult with SHPO
24TT0185	Tie hacker's Road	Not Eligible	Yes	n/a	Low	n/a
24TT0558	East Side Sun Trail # 109	Uneval.	Yes	Burned puncheon. Post-fire trail rehab may affect trail character.	Moderate	Design BAER treatments to retain historic trail integrity; Use cultural PA to consult with SHPO
24TT0559	Ray Creek Trail # 164	Uneval.	Yes	Post-fire trail rehab may affect trail character.	Moderate	Design BAER treatments to retain historic trail integrity; Use cultural PA to consult with SHPO
n/a	Trail #162	Unrecorded, known to be historic	Yes	Burned puncheon. Post-fire trail rehab may affect trail character.	Moderate	Record Site. Design BAER treatments to retain historic trail integrity; Use cultural PA to consult with SHPO
n/a	Trail #163	Unrecorded, known to be historic	Yes	Burned puncheon. Post-fire trail rehab may affect trail character.	Moderate	Record Site. Design BAER treatments to retain historic trail integrity; Use cultural PA to consult with SHPO
24LC0936	Gates Park Guard Station	Eligible	No	n/a	Low	Unwrap structures
24LC1524	Rock Creek Guard Station	Uneval	No	n/a	Low	Unwrap structures
24TT0560	Wrong Creek Guard Station & Lithic Scatter	Uneval	No	n/a	Low	Unwrap structures

The sites within the burned area are all associated with forest or public values where ‘heritage’ is not the primary function; these resources are referred to in cultural resource management as ‘multi-use’ heritage assets. These sites are part of the historic National Forest Trail System and Forest Service Administrative site. BAER restoration treatments are generally proposed by the primary function; hence, heritage values are integrated into the treatment, and reviewed by the archaeologist, but not ascribed a ‘monetary’ value in the economic analysis. If the risk to heritage sites is ranked as ‘moderate’ or ‘high’ and the threat is not mitigated by treatments already proposed, site specific heritage treatment would be prescribed.

Five (5) of the seven (7) System trails in the Red Shale Fire have been previously recorded as historic linear sites. The Region’s Programmatic Agreement (PA) for Cultural Resources contains a special appendix for the Maintenance of Historic Trails. Under the PA, NHPA Section 106 compliance for trails maintenance is accomplished. This includes inventory of the trail and historic record documentation as mitigation for the incremental changes that occur from maintenance. According to this protocol, two (2) trails (#162 and #163) will require more complete inventory if there are proposed BAER treatments for them. All historic trails will likely require post-fire rehabilitation and replacement of puncheon bridges. **Cultural stipulations require the trails to be rehabbed to their original character and the puncheon bridges be replaced in-kind.**

- **Soil Productivity:** High intensity rainfall during the first two years following the fire will accelerate soil erosion. The loss of a major portion of the topsoil could significantly reduce soil productivity of those sites. In addition, pre-fire populations of noxious weeds are anticipated to significantly increase as a result of the fire and potentially impact soil productivity.
- **Water Quality:** Increased delivery of sediment and nutrient yields are anticipated from portions of watersheds that burned at moderate or greater intensity. Some populations of aquatic organisms may be impacted particularly in the North Fork Sun River and perennial tributaries from the fire.
- **Potential Loss of Native Vegetation and Ecological Integrity due to Weed Infestation and Spread:** Noxious weeds/invasive plant species pose a serious threat to the composition, structure, and function of native plant communities. Depending on burn severity and site potential, fire as a disturbance process has the potential to greatly exacerbate infestations of certain noxious weed species. Soil disturbance resulting from all levels of burn severities in a wildfire incident and fire suppression related activities (hand lines, structure protection, drop spots, etc.) that cause vegetation and soil alteration provide the optimum conditions for noxious weed invasion.

The potential for accelerated expansion of noxious weed species within the fire perimeter, especially within and adjacent to already infested areas is high. Moderate and high intensity burned acres provide ideal seedbeds for noxious weed establishment with little competition from native vegetation.

Herbaceous vegetation, forests and riparian habitats are crucial for a variety of terrestrial and aquatic species. These areas and soil stabilization are the emergency values at risk found on National Forest.

Risk Matrix

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 Elbow Pass Complex Fire BAER assessment. Only treatments that had a risk of Intermediate or above are recommended for BAER authorized treatments.

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

For the Red Shale Fire, the risk levels by resource included Trails, soils, wetlands, weeds/sensitive plants, and cultural resources. System trails and weeds/sensitive plants resources had risk levels of very high and therefore are resources recommended for BAER funded treatments. Soils also rated very high, however wilderness designation of the location of the fire would preclude any treatment to stabilize soils.

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	RISK		
Very Likely	Very High Soil (Wetland)	High	Low
Likely	Very High Trails	High Cultural	Low
Possible	High	Intermediate weeds/sensitive plants	Low
Unlikely	Intermediate	Low	Very Low fisheries

Emergency Treatment Objectives:

Weed Control, Native Vegetation Recovery and Soil Stabilization: Known areas of invasive weed species within the burn perimeter are small. The risk of spread is believed to be possible and the magnitude of consequence is moderate. Continued monitoring of the most likely vectors of weed spread will reduce the risk of expansion of existing infestations and allow burned plant communities to recover more rapidly.

System Trails: The trails in the fire perimeter are the only access within this area of the forest and located entirely within the Bob Marshall Wilderness Area. They are used extensively by the public for recreation and by the forest for administration. The objectives for the trails treatment will be to stabilize the system by providing drainage, wetland protection and erosion control to limit sediment delivery to waterways. Puncture bridges are located over sensitive wetland plants and soils. Some of these were damaged or destroyed during the fire. The bridges are important structures for the protection of wetlands resources including sensitive soils and plants. Also, trail crew safety during the trail treatments will need to be completed by removal of hazardous trees that present an eminent threat/hazard.

Probability of Completing Treatment Prior to Damaging Storm or Event:

Land NA % Channel NA % Roads/Trails 95 % Protection/Safety 95 %

Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land (weeds)	NA	NA	NA
Land (site protection)	NA	NA	NA
Channel	NA	NA	NA
Roads/Trails	95	85	75
Protection/Safety	90	90	90

E. Cost of No-Action (Including Loss): \$2,000,000

F. Cost of Selected Alternative: \$115,065

G. Skills Represented on Burned-Area Survey Team:

<input checked="" type="checkbox"/> Hydrology	<input checked="" type="checkbox"/> Soils	<input checked="" type="checkbox"/> Geology	<input 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

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Core Team Members:

- Beth Anderson – Soil Scientist
- Wayne Green – Hydrologist/Geologist
- Ian Bardwell – Engineering/Trails
- Kelsey McCartney – GIS/Archaeology Specialist
- Tessa Donahue – Values at Risk
- Mark Bodily – Heritage

H. Treatment Narrative:

Land Treatments:

Weed Treatments: Monitor of known invasive weed sites will continue with forest accounts.

Trail and Cultural Treatments:

Trail rehab work proposed for trails #162 and #163 will require heritage recording two sites as directed by the Programmatic Agreement prior to ground disturbing activities.

This work is from 10 to 16 trail miles into the Bob Marshall Wilderness, all supplies will be carried on foot or on pack animals and BAER crews will camp near work areas. Though needed stabilization work will be relatively expensive due to logistics, failure to complete this work will result of loss of the infrastructure and far greater future costs. Within the fire perimeter, approximately 15 miles of NFS system trails have been burned over with a moderate to high intensity wildfire. The trails system is the only transportation system within this area of the Bob Marshall Wilderness area of the Rocky Mountain Ranger District. The trail system provides access for year around recreation opportunities, hunting opportunities, fire suppression, wildlife surveys, and are considered culturally significant sites.

The treatment is to stabilize 15 miles of trails in order to minimize erosion and stream sedimentation from post-fire runoff and protect the trails as a historic heritage resource. Protect crews doing the necessary trail work by removing hazard trees that threaten the worksites of the crews. Treatment also includes reconstruction of 380 feet of Puncheon Bridge to protect riparian wetland and soil resources.

METHODS: Use a mix of waterbar installation, ditching, out-sloping, and puncheon bridge reconstruction to direct water off the trail as quickly as possible while maintaining the overall trail integrity, in order protect wetland areas and prevent sediment from entering streams by minimizing trail erosion that is likely to occur due to fire effects. Work will be in accordance with EM-7720-102, Forest Service Standard Specifications for Construction of Trails and conform to wilderness standards based on a minimum tools analysis.

GIVENS: The impacted trails are all in the Bob Marshall Wilderness. They are designed and maintained as pack and saddle trails.

ASSUMPTIONS: Because of the nature of the terrain in the fire area and the pattern of burn along the trails, proposed treatment of the burned miles of trail should, in the majority of cases, be adequate to mitigate the impacts of any future runoff event causing sediment delivery into streams, soil stabilization of wet areas, and to protect the character and potential site eligibility of the historic Forest Service Trails system. Analysis of the fire-effected trails, therefore, will be limited to those areas actually burned, as shown on the BARC (as opposed to within the greater area of the fire perimeter). Note: There may be cases where some drainage work is needed outside the actual burn area to prevent increased sedimentation, such as areas where a steep segment of trail may itself be unburned but the slope above it is burned, but in general a visual overview of the burned area data did not reveal this to be a common occurrence, and therefore the analysis was run on only those mile of trail actually burned.

Approximately 380 feet of Puncheon Bridge were burned. These trail segments occur across wet soils and wetland areas. The bridges protect soils and wetland resources from impacts from users (i.e. hikers and horse traffic) and also Forest Service personal. A large fire event such as the Red Shale fire makes the trails system susceptible to washouts, gullying, and rilling during the upcoming fall and spring runoff events. The increased erosion associated with the fire event will increase the risk to ecological health, stream sedimentation, and public safety within the fire area.

Excessive surface flows down the routes located on steep slopes are likely and will likely result in significant surface erosion and failure in localized areas. We plan to rebuild the trails to taking measures to keep the trail from further impacts from post fire runoff and debris torrents. Travel during wet periods is a significant safety issue due to the slippery nature of the soil. Without the treatments, overland flow, and soil erosion will damage both the trail as well as transfer additional sediment load into the aquatic system. It is likely that many of the routes will become impassible within the next year without treatment. Long sections of the travel routes pass through riparian areas that are wet for most of the year and will require the reconstruction of puncheon bridges through these sensitive areas.

Trail rehab work proposed for trails #162 and #163 will require heritage recording two sites as directed by the Programmatic Agreement prior to ground disturbing activities.

There are no motorized routes within the fire perimeter.

Trail treatments by method include:

Treatment type	Explanation: Provide explanation and rationale for each treatment
Safety:	Selective hazard tree removal where trail crew doing stabilization are at risk.
Trail Work:	
Puncheon Bridges	Rebuild to provide safe travel, protect soils, wetlands, and reduce erosion. The treatment will preserves the historic trails.
Trail	Stabilize trail through removal of berms and increase/improve drainage.
Weeds Treatment:	No Treat Proposed.
Cultural Resources:	Oversee proposed trail work to ensure known heritage sites are protected .
Cultural Resource Monitoring	Document repairs of trail system during construction and reconstruction.

I. Monitoring Narrative: Treatments and fire recovery will be completed for three consecutive years starting in the spring of 2014. Treatments will be surveyed for effectiveness of stability, erosion control and safety. The fire will be monitored for vegetation recovery.

Part VI (A) – Emergency Stabilization Treatments and Source of Funds Lewis and Clark National Forest.
(see below)

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

Line Items	Units	Unit Cost	NFS Lands		Other \$	Other Lands				All Total \$
			# of Units	BAER \$		# of units	Fed \$	# of Units	Non Fed \$	
A. Land 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 Land Treatments</i>				\$0	\$0		\$0		\$0	\$0
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*										
Puncheon Bridges	Foot	100	380	\$38,000	\$0		\$0		\$0	\$38,000
Trail work\Water Bars	Foot	85	214	\$18,190	\$0		\$0		\$0	\$18,190
Trail work\Outslope	Foot	2.5	7600	\$19,000	\$0		\$0		\$0	\$19,000
Trail Work\Ditching	Foot	1.85	10,000	\$18,500	\$0		\$0		\$0	\$18,500
Heritage Oversight	Day	6	563	\$3,375	\$0		\$0		\$0	\$3,375
<i>Insert new items above this line!</i>	Foot			\$0	\$0		\$0		\$0	\$0
<i>Subtotal Road & Trails</i>				\$97,065	\$0		\$0		\$0	\$97,065
D. Protection/Safety										
Select haz tree removal**	Miles	15	1,000	\$15,000	\$0		\$0		\$0	\$15,000
				\$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>				\$15,000	\$0		\$0		\$0	\$15,000
E. BAER Evaluation										
				---			\$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										
Treatment and recovery		1000	3	\$3,000	\$0		\$0		\$0	\$3,000
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0

*This work is from 10 to 16 trail miles into the Bob Marshal Wilderness, all supplies will be carried on foot or on pack animals and BAER crews will camp near work areas.

**This is a rough estimate and interim request will be made if additional funds are required to protect employee safety.

PART VII - APPROVALS

1. /s/ Robin Strathy for William Avey
Forest Supervisor (signature)

11/25/2013
Date

2. _____

Regional Forester (signature)

Date