

Date of Report: 09-24-10**BURNED-AREA REPORT**  
(Reference FSH 2509.13)**PART I - TYPE OF REQUEST**

## A. Type of Report

- ☒ 1. Funding request for estimated WFSU-SULT funds  
☐ 2. Accomplishment Report  
☐ 3. No Treatment Recommendation

## B. Type of Action

- ☒ 1. Initial Request (Best estimate of funds needed to complete eligible rehabilitation measures)  
**Assessed through September 24, 2010**
- ☐ 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: **Cardinal Creek Fire**

B. Fire Number: MT-FNF-211,

C. State: Montana

D. County: Flathead

E. Region: 01

F. Forest: Flathead

G. District: Spotted Bear

H. Dates the Fires Started: 7/25/10

I. Date Fires Contained: Unknown

J. Suppression Cost: (as of 9/17/10) \$125,000,.

K. Fire Incident Job Code(s) **P1FM4S** .

L. Fire Suppression Damages Repaired with Suppression Funds – Not Apply.

Watershed Number: **Cardinal Creek:170102090202, 170102090106**

M. Total Acres Burned: Cardinal Fire “boundary area “ NFS Acres - 2,069

N. Vegetation Types: Predominantly Douglas-fir, Lodgepole Pine, and Subalpine fir forest cover-types, with small areas grassland.O. Dominant Soils: Dominantly Eutroboralfs, Cryoboralfs, Cryochrepts, with small areas of Udifluvents and Cryants.

P. Geologic Types: Precambrian meta-sedimentary; predominantly argillites, siltites, quartzites, or limestones. Also some Paleozoic Limestones.

Q. Approximate Miles of Stream Channels :

Fire	Perennial Stream (miles)	Intermittent Streams (miles)	Total Stream length (miles)
Cardinal Creek	5.1	3.2	8.3

R. Transportation System: F.S. Trails: 6.0 miles in fire areas (note not all trails are mapped in INFRA)

### **PART III - WATERSHED CONDITION**

A. Burn Severity: (acres): 234 (11%-low) 591 (29%-moderate) 730 (35%-high) 514 (25% unburned)

B. Water-Repellent Soil (acres): 660

C. Soil Erosion Hazard Rating (acres): 145 (low) 270 (moderate) 1,654 (high)

D. Erosion Potential: 20.8 tons/acre (average) (range .5 to 31.2 tons/acre)

E. Sediment Potential: 9,370 cubic yards / square mile

### **PART IV - HYDROLOGIC DESIGN FACTORS**

- A. Estimated Vegetative Recovery Period, (years): 2
- B. Design Chance of Success, (percent): 80
- C. Equivalent Design Recurrence Interval, (years): 5
- D. Design Storm Duration, (hours): 6 and 1 hr.
- E. Design Storm Magnitude, (inches): 1.7
- 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

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

A. Describe Watershed Emergency:

- Water Quality, Fisheries, and Aquatics, both within the fire area and downstream.

The soil burn severity was mapped out for the entire area of the wilderness fire using satellite imagery. Based upon this classification, approximately 25% of the fire area burned with high soil burn severity. Approximately 38% of the fire area burned with a moderate burn severity, the remainder was low or unburned. All the surface soils in the fire area have a volcanic ash influenced surface layer. The volcanic ash soils in this area typically are slightly to moderately hydrophobic (water-repellent) following wildfires.

The hydrophobic condition caused by the drying effect of the fire of this type of soils tends to lessen within several months with high humidity/dew events or a short duration, low intensity rain event in which the soil surface layers can be slowly wetted. The amount of re-wetting needed depends on the dryness of the surface soil. Some of the hydrophobic should have ameliorated with the precipitation during recent days. However if an intense rainstorm were to occur over the fire area before the hydrophobic soil conditions recovered potentially significant erosion could be expected from some of the moderate burn severity and high burn severity sites. The modeled potential post-fire soil erosion (WEPP model), and recently observed post-fire erosion events, revealed that potentially more than 30 tons per acre of soil loss could occur.

Typical late summer early fall precipitation events do not have the high intensity rainstorms that occur during the summer associated with thunderstorms. The expected scenario post-fire responses in most watersheds that have a significant percentage of their area in moderate or high burn severity would likely be: (1) an initial flush of wood ash into the creeks; (2) to some extent minor areas of rill and some small gully erosion in the ephemeral drainages on the steep valley walls with the high burn severity. Many areas within the fires have down woody debris on the hill-slopes, which are effective natural sediment traps to capture sediment (eroded soil) prior to deposition into a stream channel. No general grass seeding of the hillslopes, or other hill-slope erosion control treatments were recommended for the moderate or high soil burn severity areas. This interpretation was based upon past observations of the amelioration of the soil hydrophobic conditions, the natural revegetation, and the low probability of significant soil erosion/sediment delivery event occurring. Sources of potential post-fire sediment increase from the trail system were identified as treatment needs to be proposed in this plan.

The potential post-fire sediment increases are a concern due the fisheries resource in the area of the wildfires. Bull trout is listed as threatened under the Endangered Species Act. Gordon Creek is one of the primary spawning streams for Bull trout in the South Fork of the Flathead River. The Cardinal Fire is almost entirely within the Gordon Creek watershed, and the portion of the Gordon Creek within the fire area is a Bull Trout spawning reach.

Westslope cutthroat trout, is considered a sensitive species in Region 1. Populations of Westslope cutthroat trout are found in Gordon Creek within the fire boundary. Increased sediment loads post-fire can impact spawning and rearing habitat quality.

- Threats to Long-term Soil Productivity and Ecosystem Integrity

The trails in the burn area provide a natural avenue of ingress to a host of noxious weed species that is currently found in and surrounding the Bob Marshall Wilderness Area. Weed spread in the wilderness has the potential to reduce native plant diversity, allow for soil erosion, and damage wildlife habitat. Weeds may increase dramatically within the fire area, especially along trails and adjacent to existing weed populations.

Those weed species of greatest concern include spotted knapweed (*Centaurea stoebe*), St. John's wort (*Hypericum perforatum*), hawkweed complex (*Hieracium aurantiacum*, *H. floribundum*, *H. pratense*, *H. piloselloides*), Canada thistle (*Cirsium arvense*) and common tansy (*Tanacetum vulgare*). All are Montana State and Flathead County listed noxious weed species. Tansy ragwort (*Senecio jacobaea*), another noxious weed species, is a concern on the Flathead NF in burned areas; however, no plants have been identified in the proximity of this fire area.

In wilderness areas, noxious weeds pose a special problem because they are difficult to find, treat, or access. Control of weeds in the wilderness is also much more costly than in the front country because of the difficulty of accessing and treating remote sites, especially in rugged terrain. Therefore, monitoring and treating weeds immediately while infestations are small is paramount in wilderness areas.

- Threats to Life and Property

In general the system trails within the burned area of the Bob Marshall Wilderness Area were in good condition prior to the wildfire. A field survey by the district resource personnel was completed to assess the post-fire condition of the system trails in the moderate/high burn severity areas. That survey information, interpretations, and estimates of needed work were used to develop specifications in this report.

The burn severity map and system trail map were analyzed to develop the following summary table of trails impacted during the wildfire, by soil burn severity class. The trails affected by the wildfire include trails # 35 (1 mile), #205 (1mile), #136 (1.5 miles) and #628 (.5 mile).

<b>Soil Burn Severity Class Associated with System Trails</b>	<b>Total Miles of Trail by Soil Burn Severity</b>
Unburned	.5
Low Burn Severity	.6
Moderate Burn Severity	.9
High Burn Severity	4.0
<b>Total Miles</b>	<b>6.0</b>

The majority of the fire affected trails occurring on steep side slopes that are susceptible to erosion events during normal runoff years. A large fire event makes the trails system susceptible to major soil erosion (rilling and/or gullyng) during the upcoming fall and spring runoff events. The increased post-fire runoff will increase the risk to stream sedimentation, and public safety within the fire area. The existing system trails have numerous waterbars that have been affected by the fire. Many of the waterbars constructed from wood have burned and are no longer effective. Purpose of the proposed treatment work is to decrease the risk that post-fire trail and hillslope surface water flows are diverted off the trails, to prevent washouts.

There is a high density of hazard trees associated with this fire due to the intensity of the fire and the dryness of the trees prior to the fire. Many trees have the roots burned out and are very susceptible to tip-over. This poses a safety hazard to both the public and the Forest Service crews working on post-fire treatment projects. Only trees presenting a clear and present danger to the work crews installing the erosion control measures will be removed with the proposed BAER funding.

#### B. Emergency Treatment Objectives:

**Land Treatments** – The objective of weed treatment and detection is to reduce weed expansion by ground-treatment and early detection along trails and areas having known presence.

**Trail Treatments** – The objective of the trail erosion control treatments are to minimize fire effects on water quality and fisheries habitat by reducing the amount of sediment delivered to streams from the fire-impacted system trails. The hazard warning signing and hazard tree treatment is to provide for public and Forest Service employee health and safety.

C. Probability of Completing Treatment Prior to First Major Damage-Producing Storm:

Land **80** % Channel **NA** % Trails **80** % Other **NA** %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
<b>Trails</b>			
Erosion Control	90	90	90
Hazard Tree Removal	95	85	75
Hazard Signing	100	100	100
<b>Land</b>			
Weed Monitoring	90	80	80

E. Cost of No-Action (Including Loss): **See attached cost-risk analysis document.**

F. Cost of Selected Alternative (Including Loss): **See attached cost-risk analysis document.**

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Dean Sirucek, Hydrologist, Flathead National Forest

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H. **Treatment Narrative:**

LAND TREATMENTS:

*Noxious Weed Monitoring:* Known and high potential noxious weed infestation sites within the burn area will be monitored. As required by current policy, **this monitoring will occur during the first year after fire containment.** If monitoring indicates a need for immediate treatment (first growing season) then procedures and treatments described in the 2001 Forestwide Weed Management EA would be followed on those identified sites. If the monitoring indicates the fire has exacerbated the existing weed problem long-term funding avenues for treatment will be pursued.

TRAIL TREATMENTS:

The existing system trails within the Bob Marshall Fire Complex have numerous areas/structures affected by the fire including: stream crossings, waterbars, and the trail prism in some areas. The purpose of this work is to decrease the risk that post-fire trail and hillslope surface water flows will cause significant soil erosion and stream sedimentation. Some of these potential post-fire erosion situations are a risk to public safety by the users of the wilderness area.

*Maintain/Install Drainage Structures on Trails:* Install and maintain waterbars, drain dips, relief ditches, and culverts on trails that traverse moderate and high severity burn areas (that are safe to access this fall) to prevent erosion that may occur during spring runoff.

Within one year of containment, install burned out waterbars, and construct any new additional waterbars, drain dips, and relief ditches on portions of the burned over trails needing that type of treatment.

Field surveys revealed extensive areas of trees susceptible to tip-over due to the roots and/or boles of the trees being burned out. These hazard trees are a very serious human safety issue for users of the wilderness trail system. The removal of hazard trees is needed on the sections of trail where post-fire rehab work is being done to provide a safe working environment for BAER crews. Most of the hazard tree concerns are in the moderate and high severity burn areas, and that is where the BAER treatments would be accomplished.

*Hazard Tree Treatment – Trails:* Prior to BAER crew working within a burned area, cut and remove standing, leaning, and fallen hazard trees along working sites portion of the system trails, primarily within moderate and high severity burn areas.

*Install Hazard Warning Signs:* Install 3 public hazard warning signs along the main trails that were affected by the wildfire, to warn the public of the post-fire hazard trees and flash flood potential.

### I. Monitoring Narrative:

## BAER Implementation Monitoring

After the implementation of the various BAER treatments members of the district will review the implementation and effectiveness of these projects.

**PART VI - EMERGENCY REHABILITATION TREATMENTS AND SOURCE OF FUNDS BY LAND OWNERSHIP**

**Please see attached spreadsheet.**

## PART VII - APPROVALS

1. Forest Supervisor (signature) Date

2 \_\_\_\_\_  
Regional Forester (signature) \_\_\_\_\_ Date \_\_\_\_\_