Date of Report:

ROCK CREEK FIRE
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: Rock Creek

B. Fire Number: MT-CNF-013472

C. State: Montana

D. County: Carbon

E. Region: Northern (1)

F. Forest: Custer

G. District: Beartooth

H. Fire Incident Job Code: P1HWM4

I. Date Fire Started: 08/20/2013

J. Date Fire Contained: TBD

K. Suppression Cost: TOTAL: approx. $3.7 million

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): approx. 800 feet (erosion matting and seeding used as an alternative to waterbarring along most of the dozerline)
2. Fireline seeded (miles): 3.4
3. Other (identify): 1.9 acres of helispots seeded, .78 miles of steep dozerline stabilized using erosion mat

M. Watershed Numbers:

HUC NUMBER	HUC_NAME
100700060903	Rock Creek-Snow Creek

N. Burned Acres by Ownership:

OWNERSHIP	ACRES
PRIVATE	60.7
USDA FOREST SERVICE	900.2
TOTAL	960.9

O. VegetationTypes: Predominantly lodgepole pine overstory across the upper elevations and west end of the fire. Mixed bunchgrass and herbaceous communities with xeric shrubs dominate the east-facing slopes on the east end of the fire.

P. Dominant Soils: loamy-skeletal to sandy-skeletal, very channery sandy loam to very channery loamy sand surface textures in areas with volcanic geology and very gravelly coarse sand to very stony coarse sand in areas with granitic geology.

Q. Geologic Types: Predominantly gneiss and granite with inclusions of volcanics noted during field assessment.

R. Miles of Stream Channels by flow regime:

STREAM TYPE	MILES
Perennial	1.39
Ephemeral	1.55
TOTAL	2.94

S. Transportation System: No Forest Service system roads occur within the burned area. Approximately three-quarters of a mile of Highway 212, the Beartooth Highway, lie directly adjacent to the fire's eastern boundary.

PART III - WATERSHED CONDITION

A. Burn Severity (Acres):

BURN SEVERITY	OWNERSHIP	ACRES
UNBURNED	PRIVATE	0.4
UNBURNED	USDA FOREST SERVICE	129.7
LOW	PRIVATE	12.4
LOW	USDA FOREST SERVICE	292.7
MODERATE	PRIVATE	40.6
MODERATE	USDA FOREST SERVICE	341.3
HIGH	PRIVATE	7.3
HIGH	USDA FOREST SERVICE	136.6
TOTAL		960.9

B. Water-Repellent Soil (acres): 488 FS acres (assuming acreage in moderate to high burn severity all displays moderate to strong hydrophobicity)

C. Soil Erosion Hazard Rating (acres) *

EROSION HAZARD	ACRES
moderate	435.2
high	381.8
severe	143.9
TOTAL	960.9

* No soil survey data exists for the Beartooth District, so systematic assignment of erosion hazard using NRCS/NASIS protocols was not feasible. Erosion hazard ratings were assigned assuming that erosion susceptibility will not change in soils burned under low severity. High and severe erosion ratings were assigned to those areas burned under moderate and high severity, respectively.

D. Erosion Potential: 6.35 tons/ac/yr (ERMiT results for a forested hillslope burned under moderate severity 1 year post-fire, 20% probability of occurrence)

E. Sediment Potential: 3344 cubic yards / square mile (assume 1.2 tons/cubic yard of soil)

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):	10
D. Design Storm Duration, (hours):	6 hr. and 24 hr.
E. Design Storm Magnitude, (inches):	1.9 in and 3.4 in
F. Design Flow, (cubic feet / second/ square mile):	121-203
G. Estimated Reduction in Infiltration, (percent):	24
H. Adjusted Design Flow, (cfs per square mile):	150-251

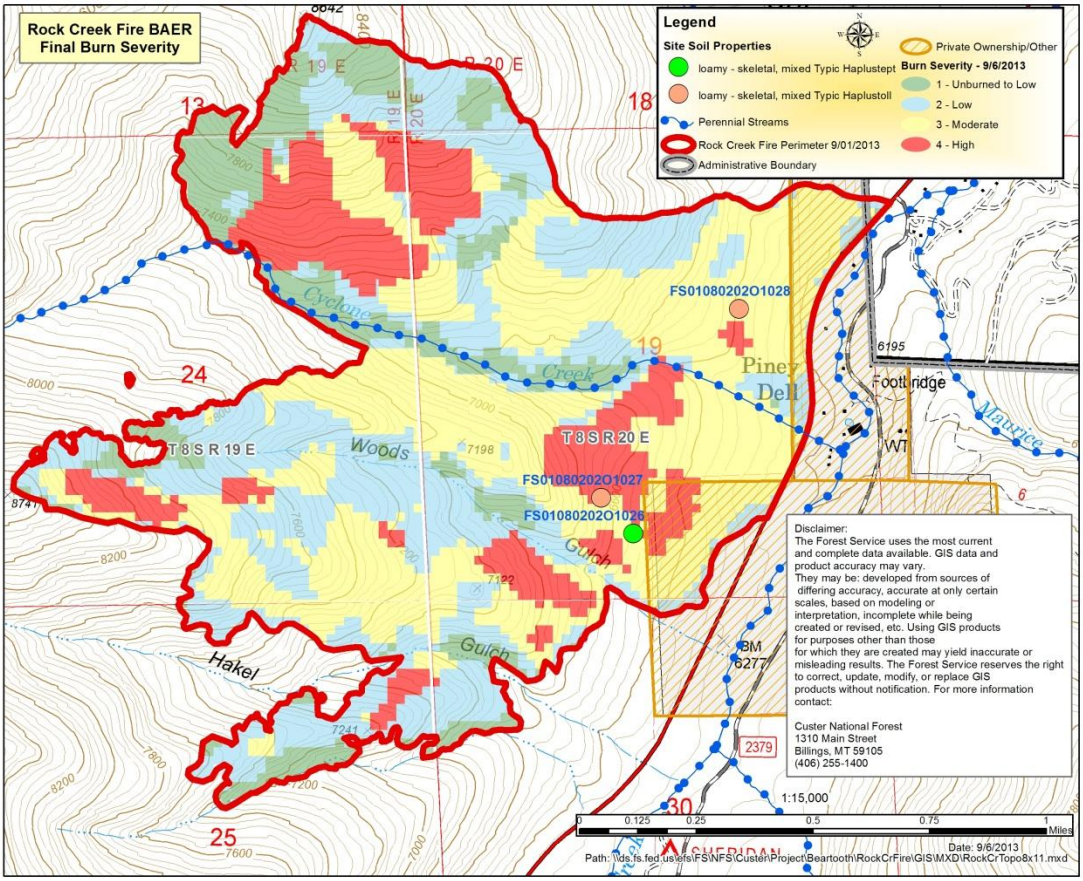
PART V - SUMMARY OF ANALYSIS

A. Critical Values/Resources and Threats:

The Rock Creek Fire, likely human-caused, started on August 20th adjacent to the Beartooth Highway approximately five miles south of Red Lodge, MT. The fire spread to the west and south through steep, rugged terrain toward the West Fork Rock Creek drainage. Following approximately a week and a half of active fire suppression under the direction of a Type II incident management team, fire growth finally slowed. Limited access to the western flank of the fire contributed to the lengh of time it took to slow the fire's westward progression.

The fire moved relatively slowly up the east-facing slope toward the ridge between the Rock Creek/West Fork Rock Creek watersheds. In many locations throughout the fire perimeter the fire burned under higher severity than intensity; as an example, multiple locations across the fire were observed to have burned under low

intensity (intact needles in tree crowns, minimal needle and fine branch consumption) but displayed moderate burn severity (Map 1). This can likely be attributed to fire residence time in the understory. Portions of range vegetation within the burn perimeter displayed moderate severity burn conditions that correlated with moderate intensity burning. Much of the area burned under low intensity/moderate severity conditions with fingers of high intensity and severity conditions occurring sporadically, in some places as a result of chimney effect in steep confined drainages (Photo 1).



Map 1. Final Burned Area Reflectance Classification (BARC) map for the Rock Creek Fire.

Photo 1. View of Rock Creek Fire from the southeast, with the Beartooth Highway in the foreground.

The physiography of the burned area is characterized by steep, east-facing hillsides adjacent to Highway 212 which are deeply incised by the east-west running sub-drainages listed above. East and south facing hillsides are mostly open areas vegetated by grass and sagebrush, with sparse coniferous tree present in many locations. Patches of encroaching conifers are also present, particularly in the upper regions of the hillsides. North and northeast facing slopes are mostly coniferous forest, as are south facing slopes in the upper portion of the Cyclone Creek drainage. Areas adjacent to streams are vegetated by deciduous as well as coniferous tree species and shrubs. The burned area is composed of approximately 50% forested and 50% open areas.

Approximately 50% of the fire burned under moderate to high severity conditions. Five drainages upslope of the Beartooth Highway burned. Approximately 23% of the the largest of those drainages, Cyclone Creek, burned under moderate to high severity. Higher percentages of the other drainages burned, but under predominantly low severity conditions with low percentages of moderate and high severity burn.

Values at Risk:
Risks were assigned based on Interim Directive No. 2520-2013-1.

After examination of the fire area the BAER team, in consultation with other specialists, identified the following values at risk. The following post-fire effects and identified values at risk were identified and addressed where possible with BAER treatment proposals:

- **Potential Loss of Native Vegetation and Ecological Integrity due to Fire-induced Weed Spread** For most noxious weed species identified in the fire, disturbed sites and dry potential vegetation types are the most at risk from invasion and spread. Disturbed areas would be roads, livestock spring developments and where ground disturbing fire suppression actions occurred (dozer lines, hand lines, helispots, safety zones, and drop points). There is potential for loss of native vegetation and ecological integrity in core winter range for the Silver Run Elk Herd. Weed assessment and treatment of fire induced weed spread is needed.

- **Potential Loss of Native Vegetation Recovery and Soil Stabilization without Livestock Deferment** Fires can be a devastating event to rangeland infrastructure and livestock removal, but at the same time, fire can provide many benefits to rangeland. Managing rangeland after fire can mean the difference between rangeland improvement or rangeland damage. The ability of rangelands to recover and produce forage following the fire depends on three factors – moisture conditions, time of burning, and management in the following years. One cannot control the first two factors, but livestock deferment of about 40 cow/calf pairs until late in the 2014 grazing season will help rangelands recover and soil to stabilize.

- **Heritage/Cultural Resources:** Six recorded cultural resources are located on the Custer National Forest within or adjacent to the fire perimeter. In addition, four new sites were discovered and recorded during suppression and BAER assessment. All sites were field-reviewed to identify risk(s) from erosion, watershed failure, debris flow and hazard tree fall that could potentially affect site integrity and permanently alter or destroy cultural resources. None of the cultural resource sites monitored and/or recorded warrant immediate BAER treatment. The Rock Creek Fire began along the Red Lodge-Cooke City Approach Historic District, commonly referred to as the Beartooth Scenic Byway, a 60 mile long road corridor linking Yellowstone National Park Northeast entrance with the Rock Creek drainage, south of the community of Red Lodge. The roadway bordered the fire along the east flanks, and served in part as a fireline. While no contributing features such as bridges and turnouts are located along the stretch of the road within the fire perimeter, the original setting and route is protected.

- **Non-FS Values at Risk from Increased Post-Fire Peak Discharge:** While model results indicate that post-fire peak discharge increases will be modest, they could be significant enough to overwhelm

already limited culvert capacity at the Beartooth Highway. The Cyclone Creek drainage drains across a debris flow fan where channel flow has continually migrated and split over time. This creates a complicated situation for hydraulic analysis that is beyond the scope of this BAER analysis. Numerous private structures are downslope of the highway from the burn perimeter. More detailed hydraulic analysis is recommended for the Montana Department of Transportation and Natural Resources Conservation Service. This analysis and potential mitigation treatments, however, cannot be addressed using BAER spending authorities.

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 Rock Creek 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 - **Weeds**	Low
Possible	High	Intermediate	Low
Unlikely	Intermediate	Low	Very Low

Weed spread had risk levels of intermediate or greater and therefore are the only resources recommended for BAER funded treatments. Administrative action will be taken for livestock deferment and BAER funds are not requested for this action.

B. Emergency Treatment Objectives:

- Weeds and native vegetation recovery - Reduce the risk of expansion of existing infestations of noxious weeks and allow burned plant communities to recover more rapidly.

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

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

D. Probability of Treatment Success

	Years after Treatment		
	1	**3**	**5**
Land (weeds)	70	70	90

E. Cost of No-Action (Including Loss): $42,750

Cost of No-Action assumes 14% anticipated increase in weed proliferation if not treated. No-Action Cost accounts for only one year of weed treatment following proliferation; outyear costs will continue to increase by 14% per year if left untreated.

F. Cost of Selected Alternative: $ 37,500

G. Skills Represented on Burned-Area Survey Team:

[x] Hydrology [x] Soils [x] Geology [x] Range
[ ] Forestry [ ] Wildlife [ ] Fire Mgmt. [ ] Engineering

[ ] Contracting	[x] Ecology	[x] Botany	[x] Archaeology
[ ] Fisheries	[ ] Research	[ ] Landscape Arch	[x] GIS

Team Leader: Andy Efta

Email: Andy Efta jefta@fs.fed.us Phone 406-255-1407 kreid@fs.fed.us Phone: 406-255-1413

Core Team Members:

- Dale White- Hydrology
- Dave Callery- Hydrology
- Kim Reid – Range/Botany/Noxious Weeds
- Terry Jones – Range/Noxious Weeds
- Tom Keck – Soils, Geology
- Sarah Howell – Soils field technician
- Mary Gonzales – GIS
- Bryce Hancock - GIS
- Halcyon LaPoint – Heritage
- Mike Bergstrom – Heritage

H. Treatment Narrative:

Land Treatments

Weed Treatments: The emergency to the resource caused by the fire is of a high priority, especially in those areas which have highly invasive species concentrations prior to the burn. About 295 acres of the Rock Creek Fire is predominately infested with spotted knapweed. Sporadic infestations of leafy spurge, Canada thistle, cheatgrass and absinth wormword exist. Even though weeds existed in pre-fire conditions, the seed banks in the soils associated with those infestations have long term viability aspects that will take advantage of post-fire conditions. Although the estimated net infested acreage is small in the context of the gross fire area, the entire NFS acre Fire area provides a seed bed where weed seeds can become established from several spread vectors and remain viable in the soil for years. Weed seed viability can last up to 20 years for spotted knapweed which can produce up to 40,000 seeds per plant and up to 8 years for leafy spurge which produces up to 4000 pounds seed per acre and has a substantial rhizomatous root system.

About 3.5 miles of dozer suppression lines were built in the Rock Creek fire. 1.5 miles (about 3 acres) occurred on NFS lands and are considered prime weed beds, especially where there are known seed beds and infestations being in the area and suppression activities possibly moving seed source around suppression lines. Weed wash stations were established, however, a few days of initial attack activities (dozer work through infestations) did not have this preventative measure which makes some of the fire area more vulnerable to new weed seed sources.

The fires burned grassland and forest land, and eliminated natural competition for invaders. The fire-caused disturbance created perfect habitat for noxious weed invasion and expansion. If emergency mitigation activities are not implemented, this problem will very likely expand exponentially and will require extensive future resources to manage.

Recommended land treatments to mitigate the emergency are weed detection, herbicide weed treatment, and livestock deferment from burned areas during recovery of native vegetation. Proposed treatments will follow Forest Service regulatory requirements and protocols in accordance with existing 1986 Custer Forest Plan and 2006 Custer National Forest Weed Management EIS NEPA decisions.

BAER team vegetation experts assessed areas at risk from invasion and potential seed sources into these areas. Locations were identified for continued assessment to determine where treatment within one year of fire containment will be needed to protect vulnerable vegetation resources. These areas will be the first priority

for detection assessment and potential future noxious weed treatment. The second priority for detection assessment will be the remainder of the burned area.

I. Monitoring Narrative:

Part VI – Emergency Stabilization Treatments and Source of Funds

Line Items	Units	Unit Cost	# of Units	BAER $	Other$
A. Land Treatments					
Weed detection & herbicide treatment	AC	$125	298	$37,500	$0
Subtotal Land Treatments				$37,500	$0
B. Channel Treatments					
C. Roads and Trails					
D. Protection and Safety					
E. BAER Evaluation					
Assessment (person days)	Days	$350	60		$ 21,000
Travel costs	LS	$	550		$550
Subtotal Evaluation					$21,550
F. Monitoring					
G. Totals					
Previously approved				$0	
Total for this request				$37,500	

PART VII - APPROVALS

1. _____ 09/09/2013
Deputy Forest Supervisor Date

2. _____ 09/ /2013
Regional Forester Date