

Date of Report: September 11, 2007

BURNED-AREA REPORT

(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

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

B. Type of Action

- ☒ 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 DESCRIPTIONA. Fire Name: AhornB. Fire Number: MT-LCF-000013C. State: MontanaD. County: Lewis and ClarkE. Region: NorthernF. Forest: Lewis and ClarkG. District: Rocky MountainH. Fire Incident Job Code: PD1Q0HI. Date Fire Started: July 11, 2007J. Date Fire Contained: est Oct 1, 2007K. Suppression Cost: \$14.6 million

L. Fire Suppression Damages Repaired with Suppression Funds

1. Fireline rehabilitated (miles): In progress
2. Fireline seeded (miles): To be determined
3. Other (identify): _____

M. Watershed Number: 100301040204, 100301040205, 100301040207, 100301040208, 100301040203, 100301040202

N. Total Acres Burned:

NFS Acres (47,952.) Other Federal (452) State (0) Private (8)

O. Vegetation Types: subalpine spruce fir forest; lodgepole pine forest

P. Dominant Soils: Andic Cryochrepts, Typic Cryochrepts, Typic and Lithic Cryoborolls

Q. Geologic Types: --Paleozoic limestones of the Sawtooth Range including Mississippian Madison limestone
--Mesozoic sandstones and shales, and Pleistocene glacial tills

R. Miles of Stream Channels by Order or Class: 1st order 160 miles, 2nd order 102 miles, 3rd order 26 miles, 4th order 16 miles, 5th order 10 miles

S. Transportation System

Trails: 62 miles

Roads: 0 miles

PART III - WATERSHED CONDITION

A. Burn Intensity Burn Intensity rates the effect of fire on vegetation

Ownership	Class 2 - Low	Class 3 - Moderate	Class 4 - High	Class 5 - Burned Grassland	Grand Total	%
Bureau of Reclamation	416	43	18	0	477	1
Private	8	0	0	0	8	1
Lewis and Clark National Forest	15,238	16,028	16,660	0	47,927	98
Total	15,662	16,071	16,678	0	48,412	
%	32	33	35	0	100	100

Burn Severity (acres): to date Soil Burn Severity rates the effect of fire on soil and the ecosystem.

Ownership	Soil Burn Severity			UNBURNED	OTHER (Rockland, water etc)	TOTAL
	HIGH	MOD	LOW			
Bureau of Reclamation	10	41	318	83	0	452 (1%)
Private	0	0	6	2	0	8 (1%)
Lewis and Clark National Forest	5,736	22,914	13,833	3,048	2,421	47,952(98%)
Grand Total	5,746 (12%)	22,955 (48%)	14,157 (29%)	3,133 (6%)	2,421 (5%)	48,412

Totals may vary between tables. This is because of rounding errors.

B. Water-Repellent Soil (acres): 48,412

C. Soil Erosion Hazard Rating (acres): 21,564 (low) 26,848 (moderate and high)

D. Erosion Potential: 0 ton/acre (low severity), 7.3 ton/acre (high severity)

E. Sediment Potential: 0.042 tons/acre

PART IV - HYDROLOGIC DESIGN FACTORS

To be determined

A. Estimated Vegetative Recovery Period, (years):	<u>2 grass shrub, 20-50 conifers</u>
B. Design Chance of Success, (percent):	<u>70</u>
C. Equivalent Design Recurrence Interval, (years):	<u>5</u>
D. Design Storm Duration, (hours):	<u>6 and 1 hour</u>
E. Design Storm Magnitude, (inches):	<u>1.7 (6hr) 1.1 (1 hr)</u>
F. Design Flow, (cubic feet/second/square mile):	<u>26.4</u>
G. Estimated Reduction in Infiltration, (percent):	<u>56</u>
H. Adjusted Design Flow, (cfs per square mile):	<u>165</u>

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

Trails: Within the Ahorn fire perimeter, 38 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 the Sun River drainage of the Rocky Mountain Ranger District. The trail system provides access for year around recreation opportunities, cattle allotments, hunting opportunities, fire suppression, wildlife surveys, and culturally significant sites.

These trail miles occur on steep side slopes that are very susceptible to erosion events during normal runoff years. A large fire event such as the Ahorn 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.

Noxious weeds/invasive plant: 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 disturbances resulting from all levels of burn severities in a wildfire incident and fire suppression related activities (hand lines, structure protection, drop spots, camps, etc.) that cause vegetation and soil alteration provide the optimum conditions for noxious weed invasion. Road and trail corridors, as well as trailheads and campgrounds, are extremely vulnerable to noxious weed invasion.

The potential for accelerated expansion of noxious weed species within the fire perimeter, especially along trails is high. Moderate to high intensity and severity burn acres provide ideal seedbeds for noxious weed establishment with little competition from native vegetation.

Hazard Trees: There is a high density of hazard trees on this fire. Pre-fire density of stems was high and most are now unsafe as a result of a stand-replacing intensity. Selected hazard trees will be felled to protect workers restoring trail drainage needed to handle predicted post fire runoff and erosion.

B. Emergency Treatment Objectives:

Trails: Objective of the trail treatments is to protect these travel routes and downstream aquatic systems from the consequences of post-fire flow events likely in the first two years after the fire. Without treatment, these sites and routes will be at high risk of washing out, losing the investment in the travel route while also

contributing sediment to the aquatic ecosystem. The detrimental post-fire effects on the trails system can be mitigated with the proposed work of installing drainage structures (i.e water bars and drain dips), replacing culverts, and shoring up trails with curb logs and cribbing. Trail drainage work will only be conducted in steeper burned areas with high erosion hazard.

Land Treatment:

Invasive Plant Species: Evaluate and assess fire effects to the forest vegetation resource, including sensitive plant species, and identify values at risk associated with vegetation changes and losses. Determine rehabilitation and monitoring needs supported by specifications to aid in vegetative recovery and watershed stabilization efforts. Provide management recommendations to assist in vegetative recovery, prevent noxious weed spread into burned areas, and protect or restore species of concern.

Noxious Weed/Invasive Species Detection: Monitor noxious weed treatment, as described in the specification sheet, in the first year following chemical or biological treatment to determine success of weed control. Monitoring would also include looking for new weed infestations and prescribing appropriate treatments.

Hazard Trees: The objective of the hazard tree treatments is to protect the BAER workers from dangerous trees near trails or roads on which they are working. Since this is largely wilderness, only trees presenting clear and present danger will be removed.

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

Land 80 % Channel % Roads/Trails 80 % Protection/Safety 90 %

D. Probability of Treatment Success:

	Years after Treatment		
	1	3	5
Land	80	90	
Channel			
Roads/Trails	80	90	
Protection/Safety	95	100	

E. Cost of No-Action (Including Loss): See attachment for Values at Risk Analysis. Results follow.

Proposed treatments totaling \$160,672 to water features on trail system are justified based on direct monetary values with a B/C ratio of 1.9. These treatments have a high probability of supporting high valued recreation use, protecting water quality resources, and historic cultural values.

Weed treatments on 42 miles totaling \$15,868 are justified to protect ecological integrity and reduced weed spread potential on burned areas and onto currently unburned areas. It is the BAER team's opinion that the value of protecting the ecological integrity and soil productivity from infestation easily exceeds the \$17,829 implied minimum value.

F. Cost of Selected Alternative (Including Loss): See above.

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Henry Shovic

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H. **Treatment Narrative:**

Land Treatments:

Trail Treatments: On the Ahorn fire the installation or reinstallation of 218 drainage structures, 24 culverts, 45 ft of puncheon bridge, 545 ft of cribbing, 300 feet of ditching, and 818 feet of curb logs. Work will be in accordance with EM-7720-102 standard specification for construction of trails.

Noxious Weed/Invasive Treatment: Treat noxious weed/invasive species infestation sites within the burned area to remove the population and prevent the expansion of weeds into newly disturbed sites. Integrated pest management techniques (chemical, biological, mechanical, and cultural control methods) would be used to prevent the spread and establishment of noxious weeds, especially within the moderate to high intensity burn areas.

Noxious Weed/Invasive Species Detection: Monitor noxious weed treatment, as described in the specification sheet, in the first year following chemical or biological treatment to determine success of weed control. Monitoring would also include looking for new weed infestations and prescribing appropriate treatments.

Protection/Safety Treatments: The removal of hazard trees on all associated miles of trails is required to provide a safe working environment for BAER crews if they are to accomplish the work necessary to mitigate post-fire erosion.

I. **Monitoring Narrative:**

The monitoring specified is to be completed by a five-individual team of resource specialists for a one day review. It's purposed in to determine treatment completion and effectiveness.

Part VI – Emergency Stabilization Treatments and Source of Funds

Initial Request

A. Land Treatments										
Noxious Weeds/Invasive Treatments	Miles	42	300	\$12,600	\$0		\$0		\$0	
<i>Subtotal Land Treatments</i>				\$12,600	\$0		\$0		\$0	
B. Channel Treatments										
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	
<i>Subtotal Channel Treat.</i>				\$0	\$0		\$0		\$0	
C. Road and Trails										
Trail drainage improvements	miles	28	3000	\$84,000			\$0		\$0	
				\$0			\$0		\$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	
<i>Subtotal Road & Trails</i>				\$84,000	\$0		\$0		\$0	
D. Protection/Safety										
Trail head caution signs	EA	8	83	\$664			\$0		\$0	
Hazard Tree Treatments	Miles	38	2000	\$76,000						
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	
<i>Subtotal Structures</i>				\$76,644	\$0		\$0		\$0	
E. BAER Evaluation										
Team evaluation	ea	1	25000	\$25,000	\$25,000		\$0		\$0	
	EA			---	\$0					
<i>Insert new items above this line!</i>				---	\$0		\$0		\$0	
<i>Subtotal Evaluation</i>				\$25,000	\$25,000		\$0		\$0	
F. Monitoring										
Noxious Weeds/Invasive Detection	Miles	42	85	\$3,570	\$0		\$0		\$0	
Local Review of treatments 5 specialists	LS	1	3000	\$3,000						
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	
<i>Subtotal Monitoring</i>				\$6,570	\$0		\$0		\$0	
G. Totals										
				\$204,814	\$25,000		\$0		\$0	
Previously approved										
Total for this request				\$204,814						

PART VII - APPROVALS

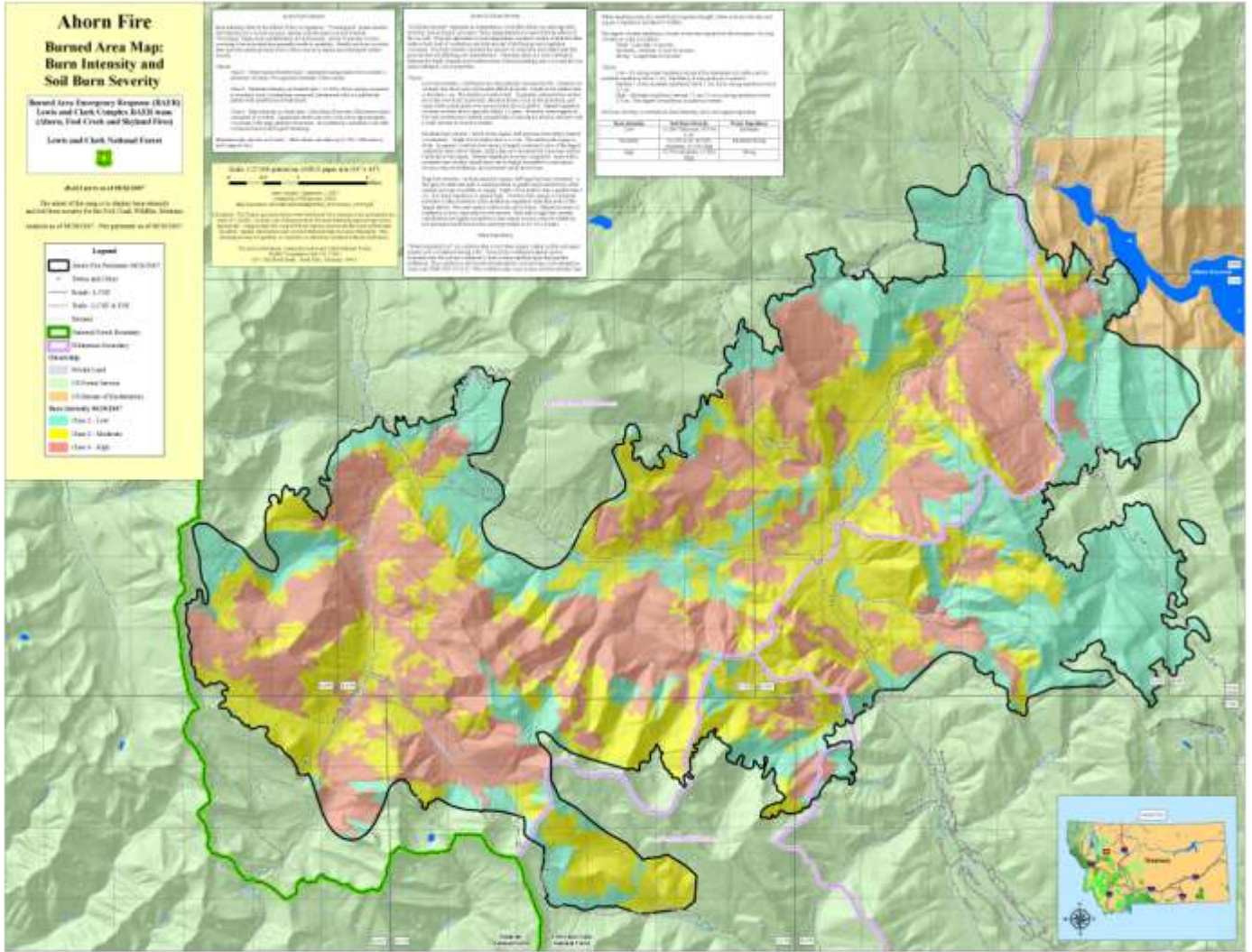
1. /s/ Lesley Thompson
Forest Supervisor (signature)

9/11/07
Date

2.

Regional Forester (signature)

Date



BAER Values at Risk Report

David Calkin, PhD, Research Forester, 9/5/07

U. S. Forest Service

Rocky Mountain Research Station, Missoula, MT

The BAER assessment for the three fires within the Lewis and Clark complex (Ahorn, Fool Creek and Skyland fires) applied a new Values at Risk (VAR) Calculation Tool developed by the Rocky Mountain Research Station. The tool was created to improve the economic assessment of the need for proposed treatments to protect the identified VAR, thus improving the selection and defensibility of proposed treatments. In developing this tool the authors surveyed BAER personnel to determine the effectiveness of economic analysis in the BAER assessment process. They found that three fundamental limitations compromise effective calculation of resource values-at-risk: 1) current valuation guidelines are unclear, 2) BAER team members typically have limited training and experience in the field of economics, and 3) data to support direct valuation of specific resources, particularly non-monetary resource values (e.g., sensitive wildlife species, undeveloped recreation, cultural artifacts), are not consistently available. These limitations to past assessments reduced the defensibility of proposed treatments.

Values at Risk Calculation Process

Terminology

Wildfire risk is defined as the product of the likelihood of an event of a given intensity (threat) times the net value change to the affected resource at the given intensity (For example, if there is a 0.50 probability that a post-fire flood containing suspended ash will destroy a \$5,000 domestic water system, the monetized risk is \$2,500). Risk based assessments require that *threat (the likelihood of experiencing an event)* be clearly differentiated from *risk* and from *values-at-risk (VAR)*. Unless a valued resource is in harm's way there is only a threat, it poses no risk.

Application to the Lewis and Clark Fire Complex

At the outset of the BAER assessment process, VAR were identified and spatially coupled to probable threats. The probabilities of threats occurring as well as the probabilities of treatment success were estimated through the course of the BAER assessment using a team of specialists. The designers of the tool realize that assigning the probabilities of threat materializing can be difficult and are often based on expert opinion, and when possible informed by appropriate model runs.

The VAR tool applies a hybrid approach for assessing the economic efficiency of proposed treatments during post-fire assessments: 1) a probability-based Benefit Cost (B/C) analysis is used where monetary values are readily available and 2) an Implied Minimum Value (IMV) is assigned to estimate the efficiency of treatments related to non-monetary resources.

For these non-monetary resources, instead of directly assigning monetary values to non-monetary resources, a computation is used to derive a value of the resource needed to justify a proposed treatment. Implied Minimum Value equals the treatment cost divided by the reduction in likelihood of experiencing the negative outcome; the lower the IMV the easier the treatment justification:

$$IMV = \left(\frac{\text{treatment cost}}{\text{Prob(loss occurring with no treatment) - Prob(loss occurring after treatment)}} \right)$$

The IMV does not necessarily represent the actual dollar value of the resource loss averted—in fact, the true monetary value need not be defined. IMV simply reflects that in the BAER team's opinion avoiding the damage to a threatened non-monetary value is worth at least the calculated implied minimum value, and therefore, the proposed treatment is a wise investment of public funds.

The new VAR tool was applied to each of the three fires separately. Individual results for each fire are described in analysis documents and above.

