Forest Service | Bitterroot National Forest | 1801 North First Street
Hamilton, MT 59840

File Code: 2500; 5100 **Date:** October 6, 2016
Route To:

Subject: Observation Fire Burned Area Report

To: Regional Forester

Enclosed is the initial Burned Area Report (FS-2500-8) for the Observation Fire. The BAER Team Leader and an interdisciplinary team prepared this report. I would appreciate your review and approval as soon as possible given that the work associated with this report requires completing an appropriate contracting process prior to implementation in spring of 2017.

Julie K. King

JULIE K. KING
Forest Supervisor

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

Date of Report: 10-06-16

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: Observation

B. Fire Number: MT-BRF-16024

C. State: MT

D. County: Ravalli

E. Region: 1

F. Forest: Bitterroot

G. District: Darby

H. Fire Incident Job Code: P1KCJ4 (0103)

I. Date Fire Started: 06/24/2016

J. Date Fire Contained: 9/15/2016

K. Suppression Cost: $8 million (9/15)

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): 3.5 (dozer line) 2.1 (hand line)
2. Fireline seeded (miles): 3.0
3. Other (identify):

M. Watershed Numbers: 170102051601 (Lost Horse), 170102051602 (S. Lost Horse), 17010250807 (Bitterroot River-Lick Cr)

N. Total Acres Burned: 1,421 (Date of BARC 7/17)
NFS Acres(1,421) Other Federal ( ) State ( ) Private ( )

O. Vegetation Types: Ponderosa Pine, Lodgepole/Subalpine Fir, Whitebark Pine and Spruce/alder Riparian

P. Dominant Soils: coarse sandy loams, glacial outwash, decomposed granite

Q. Geologic Types: Idaho batholith granitic intrusions

R. Miles of Stream Channels by Order or Class: 0.3 perennial, 0.7 intermittent within fire perimeter

S. Transportation System (within High or Moderate Burn Severity)

Trails: 0 miles Roads: 0 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 751 (low) 223 (moderate) 71 (high)

B. Water-Repellent Soil (acres): 183 (all high severity and ½ moderate severity)

C. Soil Erosion Hazard Rating (acres):
751 (low) 223 (moderate) 71 (high)

D. Erosion Potential: 8.3 tons/acre (High Severity)

E. Sediment Potential: 5,312 cubic yards / square mile (assumes 1cubic yd = 1 ton)

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 3 - 5

B. Design Chance of Success, (percent): 73

C. Equivalent Design Recurrence Interval, (years): 5,10

D. Design Storm Duration, (hours): 6

E. Design Storm Magnitude, (inches): 1.4 (5yr RI), 1.6 (10yr RI)

F. Design Flow, (cubic feet / second/ square mile): (5 yr RI) 24 cfsm pre-fire

G. Estimated Reduction in Infiltration, (percent): Variable, by drainage area

H. Adjusted Design Flow, (cfs per square mile): (5 yr RI) 47 - 130 cfsm, for 335 and 187 ac watersheds, respectively

Post-fire flows were modeled using the NRCS-based Fire Hydrology V1.3 (Cerrelli) analysis tool for pre and post-fire conditions. Output is in design storm peak flow rates (cfs), which includes baseflow plus the flow component that is attributable to the storm itself. Peak flows in the Moose Creek watershed increased from 2 cfs pre-fire to 16 cfs post-fire (Moose Creek at FR496 road crossing, 2 yr return interval storm), from 7 cfs pre-fire to 41 cfs post fire (same crossing, 5 yr return interval storm), and from 12 to 56 cfs for the 10 yr RI storm. If the FR496 crossing is designed for the 10 yr RI rainstorm, it has at least a 73% chance of passing all flows over the first 3 years as vegetation is recovering. Flow models cannot address debris flows and floatable wood, which can cause culvert plugging and overtopping even in culverts correctly sized for the predicted streamflow.

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats (narrative):

Critical Values/Resources and threats: **No downstream threats to life from storm events were found in the Observation Fire Area, however, the following threats were deemed significant:**

1. Road Crossings/infrastructure – post-fire hydrology will increase risk of damage at 2 different stream crossings on open system roads, with loss of infrastructue and access. The Ranger District and Forest wish to maintain road access on major roads (FR496, 62953) in the burned area for administrative and recreational purposes. The stream crossings with substantial high and moderate burn severity above them are not adequately sized for expected water, sediment, and organic debris loading. If a crossing does not have adequate capacity it may fail by:
    a. Saturating the road fill, pipe bedding, and roadbed, causing catastrophic failure;
    b. Overtopping, leading to gullying and failure or partial collapse; or
    c. Capturing the downslope ditch, causing catastrophic fill failure where ditch capacity is lost by volume or deposition,
    d. Plugging and causing the stream to run either across or down the road prism, leading to gullying, stream capture.

2. Previously weed-free areas within high/moderate burn severity – loss of competing vegetation due to the fire will enable progressive migration of road & trail side weeds into new areas. The large amount of bare ground caused by the severe burn creates an opportunity for new invasion by weed species not previously found in the watersheds surrounding the fire (Rush Skeletonweed). If untreated or unmonitored, the high and moderate severity areas of the burn, and the large percentage of dry habitat types in the burn area result in a high probability that existing noxious weed populations will expand and displace native plant communities. This risk is primarily on the south and west aspects of the fire (where the dry habitat types are concentrated), along with areas subjected to high-intensity fire that consumed the duff layer and increased the native vegetation recovery period.
3. Existing/mapped Sensitive Plant populations within high/moderate burn severity – loss of canopy, duff layers and native vegetation around surviving sensitive plant population creates an opportunity for weed invasion. If untreated, weeds could establish within the senstitive plant sites and out-compete them, putting them at risk.

B. Emergency Treatment Objectives (narrative):

1. Protect road infrastructure and crossings from flood flows and maintain access;
2. Reduce the threat of significant expansion of existing noxious weeds or invasion of new noxious weeds through an appropriate detection and control effort;
3. Protect existing mapped populations of sensitive plant species from invasives by establishing native species buffers around them.

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

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

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land			
Native/sensitive Plant Seeding	80	85	85
Noxious weed treatment	80	85	85
Channel	NA		
Roads/Trails			
Install Culverts	85	90	95
Protection/Safety	NA		

Table 1 displays a probability/consequences or risk matrix for the threats and VARs:

Table 1. - BAER Risk Assessment

Probability of Damage or Loss	**Magnitude of Consequences**		
	Major	Moderate	Minor
	RISK		
Very Likely	**Very High**	**Very High**	**Low**
Likely	**Very High** – weed invasion	**High** road crossing and access loss, weed invasion in sensitive plant sites	**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.

E. Cost of No-Action (Including Loss): See attached Cost-Risk Analysis Document **page 9**

F. Cost of Selected Alternative (Including Loss): $53,745

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Ed Snook

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H. Treatment Narrative:

(Describe the emergency treatments, where and how they will be applied, and what they are intended to do. This information helps to determine qualifying treatments for the appropriate funding authorities. For seeding treatments, include species, application rates and species selection rationale.)

Land Treatments:

Noxious Weeds Control/Treatment

Objective:

The purpose of the treatment is to maintain ecosystem integrity within the Observation Fire. The fire occurred mainly within a roadless area (Moose Creek, Camas and Hayes Creeks) where few noxious weed populations exist. Discovery of Rush Skeletonweed (a new invader for this part of Montana) on private land downslope of the fire supports a need for monitoring the newly burned areas. Without treatment knapweed and other new invaders may spread into the severely burned areas. By reducing the amount of weed seed along roads, dozer lines & trails in the area, native species will have an opportunity to take advantage of the post-fire nutrient flush without competition from noxious weeds.

Methods:

Detect and treat known noxious weed species at sites in the burn area with high potential for invasion along with areas adjacent to previously weed-free areas. Crews would primarily spray aminopyralid or Escort along roadsides fire operations used during suppression, trails and fireline corridors that provide routes invasive weed species could use to expand into the severely burned areas. Selected sites include spraying along FR496 where fire suppression activity has increased the risk of rush skeletonweed, a new invader, knapweed and other noxious weed species spreading into the burned area. Effects of herbicide treatments at the proposed rates using aminopyralid, clopyralid or picloram are addressed in the Bitterroot National Forest Noxious Weed Environmental Assessment, and all implemented treatments would be consistent with this document. Due to the immediate threat of noxious weed invasion in the burn areas, especially from rush skeletonweed, treatment may require more than one survey to detect and treat target weeds.

Threatened and Rare Plant Site Protection Hand Seeding

Objective:

The purpose of the treatment is to protect existing threatened and rare plant sites within the high and moderate burn severity areas of the Observation Fire. By using native grasses and forbs to help occupy the sites and reduce the likelihood of invasive species establishment, the target sites have a greater chance of maintaining their current rare plant species.

Methods:

Hand-seed certified-weed-free native grass and forb seed in and around the rare plant sites as soon as possible, preferably before snow cover is established.

Channel Treatments: NA

Road and Trail Treatments:

Install Culverts

Objective:
The purpose of the treatment is to reduce the risk that stream flows will overtop the road, cut off access and add sediment to downstream water bodies. Treatments, when combined with armored dips, also reduce potential for debris flow damage. Sites were chosen based on the amount of high and moderate burn intensity in drainages above the roadways, and pre/post fire flow modelling.

Methods:
Excavate existing pipes and install larger culverts at (2) indicated sites. The FR496/Moose Creek crossing has an existing 24" x 86' pipe with substantial road fill above it. Riprap will be placed at inlets and outlets to reduce risk of scour during flood events. Newly disturbed areas that do not receive riprap will be seeded. The upgraded crossings on FR496 and FR62953 will also get a diversion dip to improve probability of passing a debris flow and minimizing damage.

Protection/Safety Treatments: NA

I. **Monitoring Narrative:** NA

Part VI – Emergency Stabilization Treatments and Source of Funds Interim

			NFS Lands				Other Lands				All
		Unit	# of		Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER $	$	units	$	Units	$	$
A. Land Treatments										
Noxious weed treatme	acres	20	544	$10,880	$0		$0		$0	$10,880
Sens. Plant seeding	sites	473	3	$1,419	$0		$0		$0	$1,419
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$12,299	$0		$0		$0	$12,299
B. Channel Treatments										
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Channel Treat.				$0	$0		$0		$0	$0
C. Road and Trails										
	miles			$0	$0		$0		$0	$0
Replace culverts	each	20723	2	$41,446	$0		$0		$0	$41,446
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road & Trails				$41,446	$0		$0		$0	$41,446
D. Protection/Safety										
	sites			$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Structures				$0	$0		$0		$0	$0
E. BAER Evaluation										
Assessment	lump	3272	1		$3,272		$0		$0	$3,272
Insert new items above this line!				---	$0		$0		$0	$0
Subtotal Evaluation					$3,272		$0		$0	$3,272
F. Monitoring										
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring				$0	$0		$0		$0	$0
G. Totals				$53,745	$3,272		**$0**		**$0**	**$57,017**
Previously approved										
Total for this request				**$53,745**						

PART VII - APPROVALS

1. Julie K. Kirp — Forest Supervisor (signature) — 10-6-16 — Date

2. for Jane D. Dennis — Regional Forester (signature) — 10-12-16 — Date

Observation Fire (MT – BRF – 016024) 2016
Cost/Risk Assessment

Part 1. Treatment Cost

Treatment	cost
1. Noxious/Invasive Weed Detection & Treatment	$10,880
2. Sensitive Plant Seeding	$1,419
3. Culvert Replacement	$41,446
TOTAL COST	$53,745

Part 2. Probability of Rehabilitation Treatments Successfully Meeting EFR Objectives

Treatment	%
1. Noxious/Invasive Weed Treatment	80
2. Sensitive Plant Seeding	80
3. Culvert Replacement	85
4. Noxious/Invasive Weed Monitoring	85

Risk of Resource Value Loss or Damage
Identify the risk (high, medium, low, none or not applicable (NA)) of unacceptable impacts or loss of resources.
No Action- Treatments Not Implemented (check one)

Resource Value	None	Low	Mid	High
Human health and safety (Injury from falling trees at trailheads)	X			
Plant communities at-risk from weed infestation				X
Native Plant community structure, function and composition			X	
Aquatic community structure, function and composition		X		
Trail structure and investments	X			
Watershed integrity (Water Quality)			X	
Heritage resources	X			
Threatened and Endangered Species (terrestrial)	X			
Threatened and Endangered Species (fish)	X			

Proposed Action - Treatments Successfully Implemented (check one)

Resource Value	None	Low	Mid	High
Human health and safety (Injury from falling trees at trailheads)	X			
Plant communities at-risk from weed infestation			X	
Native Plant community structure, function and composition		X		
Aquatic community structure, function and composition		X		
Trail structure and investments	X			
Watershed integrity (Water Quality)		X		
Heritage resources	X			
Threatened and Endangered Species (terrestrial)	X			
Threatened and Endangered Species (fish)	X			

Part 3. SUMMARY

1. **Are the risks to natural resources and private property acceptable as a result of the fire if the following actions are taken?**

Proposed Action Yes |_X_| No |__| Rationale for answer:

The risk to relatively weed-free plant communities would be reduced by monitoring for and treating weeds at the common "entry points" for weed invasion. This treatment helps give the native plant community more time to occupy the burned areas and reduce the risk to an acceptable level.

Several identified sites of threatened plant species were burned over by the fire and are at risk of noxious weed invasion and soil erosion. Native species seeding will reduce the risk of non-native invasive species affecting the plant communities on these sites.

FR496 and FR62953 are relatively high-standard roads in good condition, and improving culvert capacity would be a cost-effective way to reduce risk of washouts and losing vehicle access to the Lost Horse Observation Point, a popular recreation spot. Improving the culvert capacity by upsizing would help address post-fire hydrology effects and reduce risk to an acceptable level.

No Action Yes |__| No |_X_| Rationale for answer:

Many areas within the Observation Fire now have no canopy; weed species often establish themselves during this condition. Not monitoring for new invaders can allow hard-to-control species to establish themselves without competition, which would lead to higher control costs or permanent degredation of the plant community. A new invader (rush skeletonweed) has been reported on private lands near the fire. Spread of this plant into the burned area would likely establish the weed on the forest and result in higher control costs in the future.

Native plant communities, including rare and threatened plant species, would be subject to non-native invasive plant expansion into the burned area while native plants are recovering from the fire. The consequences of a new invader (rush skeletonweed) establishing itself in the area would be major, including potential loss of sensitive species and higher control costs in the future.

The Moose Cr/FR496 and FR62953 crossings no longer have the appropriate flow capacity due to fire effects higher in the watershed, and flow modelling suggests a high potential for being over-topped during relatively common rainfall events. Not replacing these culverts could lead to loss of access, sediment from road fill washout in a perennial stream, and higher costs for repair, as fill would have to replaced.

Alternative(s) Yes |__| No |_| Rationale for answer:

2. Is the probability of success of the proposed action, alternatives or no action acceptable given their costs?

Proposed Action Yes |_X_| No |__| Rationale for answer:

The probability of success ranges from 80 to 85 percent for the chosen treatments. This is an acceptable range of success for the estimated costs and the potential for loss or injury.

No Action Yes |__| No |_X_| Rationale for answer:
Although the monetary cost of no action is low, so is the probability of successfully mitigating the post-fire threats. Weed invasion will produce economic and ecological costs. Washing out of a major road fill and two culverts would negatively affect water quality in a perennial stream and cut off access. The relatively low cost of treatments, and a moderate to high probability for the treatments to suceed and reduce the threats suggests the no-action alternative is not acceptable.

Alternative(s) Yes |__| No |__| Rationale for answer: NA

3. **Which approach will most cost-effectively and successfully attain the EFR objectives and therefore**

is recommended for implementation from a Cost/Risk Analysis standpoint?
Proposed Action |_X_|, Alternative(s) |__|, or No Action |__|

Comments: