

Date of Report: 9-02-16

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: Roaring LionB. Fire Number: MT-BRF-016075C. State: MTD. County: RavalliE. Region: 1F. Forest: BitterrootG. District: DarbyH. Fire Incident Job Code: P1KJ3Q (0103)I. Date Fire Started: July 31, 2016J. Date Fire Contained: Not yet contained, 70% on 9/2K. Suppression Cost: \$11 million (9/2)

L. Fire Suppression Damages Repaired with Suppression Funds

1. Fireline waterbarred (miles): 3.5
2. Fireline seeded (miles): 1.5
3. Other (identify):

M. Watershed Numbers: 170102051001 (Roaring Lion), 170102051002 (Sawtooth), 17010250807 (Bitterroot River-Lick Cr)N. Total Acres Burned: 8,274 (Date of BARC) 8,658 (9/2)

NFS Acres(6,663) Other Federal () State () Private (1,611)

O. Vegetation Types: Ponderosa Pine, Lodgepole/Subalpine Fir, Whitebark Pine, Cedar/Spruce Riparian and mixed conifer overstoryP. Dominant Soils: coarse sandy loams, glacial outwash, moraine deposits

Q. Geologic Types: Idaho batholith granitic intrusions, moraine deposits

R. Miles of Stream Channels by Order or Class: 14.5 perennial, 11.5 intermittent within fire perimeter (includes private land)

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

Trails: 7.5 miles (TRs 123, 124, 208) Roads: 1.2 mile (FR701)

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 2,931 (low) 1,384 (moderate) 1,365 (high)

B. Water-Repellent Soil (acres): 2,057 (all high severity and ½ moderate severity)

C. Soil Erosion Hazard Rating (acres):
4,778 (low) 1,065 (moderate) 85 (high)

D. Erosion Potential: 8.3 tons/acre

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

PART IV - HYDROLOGIC DESIGN FACTORS

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

B. Design Chance of Success, (percent): 75

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

D. Design Storm Duration, (hours): 6

E. Design Storm Magnitude, (inches): 1.3 (5yr RI), 1.5 (10yr RI)

F. Design Flow, (cubic feet / second/ square mile): Variable, by drainage area

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

H. Adjusted Design Flow, (cfs per square mile): Variable, by drainage area

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. For 5 and 10 year precipitation events ("design storms") in burned watersheds, stormflow varies with the percentage and severity of burned area. "Adjusted" (post fire) peak flows in the most heavily affected Roaring Lion Fire watersheds increased from 6 cfs pre-fire to 73 cfs post-fire (Judd Cr at Judd Cr Hollow Road stream crossing, 2 yr return interval storm) and from 27 cfs pre-fire to 63 cfs post fire (Gold Creek below middle Fork confluence, 2 yr return interval storm). 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. Several "at risk" sites are based on the probability of this kind of event, rather than the potential for "typical" flood events comprised of just water.

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

1. Private lands below the high and moderate severity burn may be subjected to post-fire hydrology, including increased peak flows, mud/ash deposition and, in several areas, debris flows. Mitigating factors include decreased land slope in and around subdivisions, structure locations out of swales and flow paths, and reaches of unburned channel/riparian areas. VARs include residences, private road stream crossings, and irrigation infrastructure. The Judd Creek/ Judd Creek Hollow Road stream crossing is likely the most important private road site due to the number of houses affected. Protective treatments in private areas are the jurisdiction of the NRCS and the specialist reports will be provided to help NRCS determine values at risk (VARs) and potential treatments.
2. Trail prisms/infrastructure – post-fire hydrology driven by high and moderate burn severity will increase risk of damage on 7.5 miles of system trails, with loss of drainage structures and surrounding ground cover. These are moderate to heavy-use level trails that access popular areas in the Bitterroot Mt. Range (Sawtooth Canyon, Roaring Lion Canyon, Ward Mountain) that the Ranger District would like to keep for the long term. Post-fire hydrology will increase the occurrence of surface runoff from burned slopes onto the trail prism. There is a risk of intensive trail gullying and rutting, which may cause extensive damage to the trail prism and concentrated flow may create downslope gully cutting and associated debris torrents. There is also a risk of falling hazard trees for trail workers implementing prescribed treatments.
3. Forest users at Roaring Lion and Sawtooth Trailheads, and Forest Road 701 – fire-damaged trees create a hazard to users at trailheads and the high-use roads accessing them. Personal safety is the value-at-risk, as there is now an elevated risk of trees falling and causing personal injury or property damage to vehicles.
4. Native Plant Communities - Previously weed-free areas within High/moderate burn severity – loss of competing vegetation due to the fire will enable progressive migration of road & trailside weeds into new areas. Freshly burned area along roads and trails create an ideal highway for weed expansion into the roadless and wilderness area affected by the fire. If untreated, the high severity of large parts 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 dramatically, and displace native plant communities. This risk is primarily on the south and west aspects within 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.
5. Road Infrastructure – post-fire hydrology driven by a high percentage of high burn severity along 1.2 miles of FR701 will increase risk of damage at cross-drain culverts, with potential loss of road prism and access to the Sawtooth, Ward Mountain and Roaring Lion Trailheads.

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 – trail erosion or loss, road erosion or loss, weed invasion	Low
Likely	Very High	High	Low
Possible	High - Hazard Trees	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.

B. Emergency Treatment Objectives:

1. Protect trail infrastructure from surface flows, reduce stream capture and maintain access;
2. Protect Forest users from hazard trees at trailheads and parking areas;
3. Reduce the threat of significant expansion of existing noxious weeds or invasion of new noxious weeds;
4. Protect road infrastructure from erosion related to post-fire hydrology.

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

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

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land			
Noxious weed treatment	80	85	85
Channel NA			
Roads/Trails			
Trail Stabilization	85	90	95
Stabilize Culvert Inlets/Outlets	85	90	95
Protection/Safety			
Trailhead Haz Tree Felling	95	85	80

E. Cost of No-Action (Including Loss):_ See attached Cost-Risk Analysis Document_ **page 10**

F. Cost of Selected Alternative (Including Loss): \$41,566

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Ed Snook

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Phone: 406.363.7103

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H. Treatment Narrative:

Land Treatments:

Noxious/Invasive Weed Treatment

Objective:

The purpose of the treatment is to maintain ecosystem integrity within the Roaring Lion Fire Area (Ward Mountain, Roaring Lion Canyon, Sawtooth Canyon, where few noxious weed populations exist. Much of this area is roadless and partially within designated wilderness. 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:

As monitoring indicates, treat road corridors affected by the fire (1.2 miles) that provide routes invasive weed species could use to expand into the severely burned areas. Selected sites include spraying along road FR701 and the Roaring Lion and Sawtooth/Ward Mountain Trailheads where heavy canopy loss has increased the risk of St. Johnswort, knapweed and other species spreading into the burned area. Area trails (up to 7.5 miles), dozer line, and staging areas would be monitored for new weed starts and treated as needed. 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. New invaders and previously weed-free areas would be targeted.

Channel Treatments: NA

Trail Treatments:

Install Trail Waterbars

Objective

Approximately 7.5 miles of trail located on steep slopes with high/moderate burn severity are expected to be at risk of deterioration from additional runoff and sediment from post-fire conditions. The threats are from upland slope erosion and flow being deposited on the trail. The trails are not designed for the increased flow that may occur from the fire. This may cause soil erosion on the trail surface and fill-slope. Failure of drainage culverts and water bars may cause stream capture onto trail surface area causing soil erosion, including loss of the trail by rilling and gullyng. The affected trails are TR208 (Ward Mountain), TR124 (Roaring Lion) and TR123 (Sawtooth Canyon).

Methods

The method for reducing this risk is limited to installing water bars, which would be used to direct and divert flow off the trail. These treatments would reduce the risk of the trail washing out and transporting sediment to streams. Proactive treatment would be cheaper than remediation after damage. Hazard trees may be felled at specific sites to protect trail workers. Short sections of tread may be repaired to allow safe access for stock. Implement with contractor and Bitterroot NF Wilderness and Trails staff.

Road Treatments:

Clean Culverts

Objective:

Removing debris and brush from the inlets and outlets would let culverts function as designed and restore flow capacity. The purpose of this work is to decrease the risk that ditch relief pipes plug and fail, resulting in culvert washouts as well as water flows being diverted down roadways, causing washouts and adding

sediment to downstream water bodies. The treatment aims to maintain access by restoring road drainage and reducing potential for road prism erosion and high cost repairs.

Methods:

Culverts that are currently plugged or have inlet basins that are full or brushed in should be cleaned out to insure unobstructed flows. As soon as possible, culvert inlets and outlets would be brushed and cleaned by hand crew using chain saws, hand tools, and in some more difficult situations, with a rubber-tired backhoe.

Protection/Safety Treatments:

Hazard Tree Felling

Objective:

The high-severity burn around Roaring Lion, Sawtooth and Ward Mountain trailheads has created many standing dead and fire-weakened trees. These are high-occupancy sites where vehicles are often parked for relatively long periods, and people congregate before hiking. The objective of the treatment is to increase safety of trailhead users by reducing hazard trees that could fall into the trailhead area.

Methods:

Felling hazard trees around high-occupancy sites such as the Roaring Lion, Sawtooth and Ward Mountain trailheads would protect the public and their vehicles when they are parked or occupying trailhead areas. Treatment would target hazard trees having the highest probability of damage over the following year, where the trees have confirmed mortality and lean towards objects of value: car parking and public congregation areas within high-occupancy sites. Burned trees would be assessed by a fire fighting crew and those with high hazard ratings and the potential to fall into the parking area would be marked. Treatment targets hazard trees within 1 1/2 tree lengths of the trailhead parking sites. The method reduces risk to workers by using a combination of a feller-buncher to fall trees within its reach from parking surfaces, and/or hand crews to fall trees. Explosives may be used to fall trees unsafe for fallers but out of reach of the feller-buncher. Trees would be left in-place unless clearing is needed to facilitate traffic and/or protect public safety. BAER funds would not be used to deck logs.

I. Monitoring Narrative: NA

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

Line Items	Units	Unit Cost	# of Units	BAER \$	Other \$	# of units	Fed \$	# of Units	Non Fed \$	Total \$
A. Land Treatments										
Noxious weed treatme	acres	28	190	\$5,320	\$0		\$0		\$0	\$5,320
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
Subtotal Land Treatments				\$5,320	\$0		\$0		\$0	\$5,320
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
Subtotal Channel Treat.				\$0	\$0		\$0		\$0	\$0
C. Road and Trails										
Trail waterbar	miles	2080	7.5	\$15,600	\$0		\$0		\$0	\$15,600
Clean Culverts	each	423	16	\$6,768	\$0		\$0		\$0	\$6,768
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
Subtotal Road & Trails				\$22,368	\$0		\$0		\$0	\$22,368
D. Protection/Safety										
Trailhead Hazard Tree	sites	4626	3	\$13,878	\$0		\$0		\$0	\$13,878
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
Subtotal Structures				\$13,878	\$0		\$0		\$0	\$13,878
E. BAER Evaluation										
Assessment	lump	21140	1		\$21,140		\$0		\$0	\$21,140
<i>Insert new items above this line!</i>				---	\$0		\$0		\$0	\$0
Subtotal Evaluation					\$21,140		\$0		\$0	\$21,140
F. Monitoring										
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
Subtotal Monitoring				\$0	\$0		\$0		\$0	\$0
G. Totals				\$41,566	\$21,140		\$0		\$0	\$62,706
Previously approved										
Total for this request				\$41,566						

PART VII - APPROVALS

1. _____
Forest Supervisor (signature)

Date _____

2. _____
Regional Forester (signature)

Date _____

**Roaring Lion Fire (MT – BRF – 016075) 2016
Cost/Risk Assessment**

Part 1. Treatment Cost

Treatment	cost
1. Trail Waterbars	\$15,659
2. Hazard Tree Felling at Trailheads	\$13,878
3. Noxious/Invasive Weed Treatment	\$5,364
4. Clean Culvert inlets and outlets	\$6,763
TOTAL COST	\$41,664

Part 2. Probability of Rehabilitation Treatments Successfully Meeting EFR Objectives

Treatment	%
1. Trail Waterbars	85
2. Hazard Tree Felling at Trailheads	95
3. Noxious/Invasive Weed Treatment	80
4. Clean Culvert inlets and outlets	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 ☒ No ☐ Rationale for answer:

Trails within the fire perimeter are a valued recreational resource and would be subject to post-fire hydrology and erosion without treatment. Heavily eroded trails often require either extensive work or relocation to be functional and meet USFS standards, so proactive trail drainage work would save funding in the long run. The areas selected for treatment have a high risk of negative impacts to trail infrastructure, but stabilizing the trail through the use of new waterbars and drain dips would decrease those risks to an acceptable level.

The Roaring Lion, Sawtooth and Ward Mountain trailheads have a substantial number of fire-killed and weakened trees around them, which have already started to fall. Assessing and felling these trees would reduce the risk of injury or property damage at these high-occupancy site to an acceptable level.

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.

FR701 (Roaring Lion road) is a relatively high-standard road in good condition, and improving culvert and ditch drainage would be a cost-effective way to reduce risk of washouts and losing vehicle access to the trailheads. Improving on the existing drainage would help address post-fire hydrology effects and reduce risk to an acceptable level.

No Action Yes ☐ No ☒ Rationale for answer:

The Ward Mountain trail has many steep sections and will be very prone to erosion within high and moderate burn severity areas. Taking no action would mean elevated repair costs in the future or loss of the trail, neither of which is acceptable.

Most, if not all, of the trees around the 3 trailhead parking areas are dead, and have already begun to fall. No action would require keeping trailhead parking areas closed until the danger passes, which would likely take 5-10 years. This does not meet the goal of keeping these close-to-town recreation areas open. While the probability of a tree hitting someone is low, the consequences are very high.

Many areas within the Roaring Lion 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 degradation of the plant community.

No action may result in loss of road surface fines, which would have to be trucked in for repair. New fill and grading costs would likely equal or exceed the cost of improving the culvert capacity, and the road may have to be closed until repair funding could be found.

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 ☒ No ☐ Rationale for answer:

The probability of success ranges from 80 to 95 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 ☒ 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. The relatively low cost of treatments, and a moderate to high probability for the treatments to succeed 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 ☒, Alternative(s) ☐, or No Action ☐

Comments: