

Date of Report: 10/23/2020**SOURDOUGH BURNED-AREA REPORT****PART I - TYPE OF REQUEST****A. Type of Report**

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

B. Type of Action

- ☒ 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)
- ☐ 2. Interim Request #____
 - ☐ Updating the initial funding request based on more accurate site data or design analysis

PART II - BURNED-AREA DESCRIPTION**A. Fire Name:** Sourdough Fire**B. Fire Number:** MT-BDF-006759**C. State:** Montana**D. County:** Beaverhead**E. Region:** R1**F. Forest:** Beaverhead Deerlodge**G. District:** Dillon**H. Fire Incident Job Code:** P1NP4C**I. Date Fire Started:** October 30th, 2020**J. Date Fire Contained:** November 31st, 2020**K. Suppression Cost:****L. Fire Suppression Damages Repaired with Suppression Funds (estimates):**

1. Fireline repaired (miles): NA
2. Other (identify): NA

M. Watershed Numbers:*Table 1: Acres Burned by Watershed*

HUC #	Cabin Creek	Total Acres	Acres Burned	% of Watershed Burned
100200011105	Cabin Creek	38558	5922	15%
100200011104	Headwaters Medicine Lodge Creek	15802	1334	8%
100200011106	Lower Muddy Creek	19401	269	1%
100200010701	Upper Muddy Creek	21162	6	<1%

N. Total Acres Burned:*Table 2: Total Acres Burned by Ownership*

OWNERSHIP	ACRES
NFS	4555
BLM	1358
PRIVATE	8
TOTAL	5921

O. Vegetation Types: Vegetation was primarily open sagebrush/grass parks with a few acres of Douglas-fir/Idaho Fescue habitat types.

P. Dominant Soils: Soils in the fire area are very deep stony loams (see Table 3 below for a summary of the most common landtypes). The Garlet series (Loamy-skeletal, mixed, superactive Typic Eutrocryepts) with a thin Oi horizon in the top inch or so, with a thick E horizon (up to 21 inches) is reasonably representative of soils observed. A horizons, when present, are very thin—often only a centimeter or two, even in open sagebrush/grass parks. Soils with volcanic ash influence are also common in the fire area, see the Waldbillig series (Loamy-skeletal, mixed, superactive Andic Eutrocryepts).

Table 3. Most common soil map units found in the Bear Creek fire area, with associated landforms, geology, and common soil series.

Soil Map Unit*	Landform	Geology	Common Soil Series	Acres
547C, 547E, 547S, 547Sa, 547Sr, 547Vr, 547X	Steep Mountain Slopes	Quartzite	<u>Garlet</u>	2,627
257S, 257Sa	Cirque Basins	Quartzite	<u>Waldbillig</u>	1,837
227S, 227Sa	Valley Trough walls	Quartzite	<u>Garlet</u> , <u>Petty</u> , <u>Worock</u>	1,414
217S, 217Vra	Cirque Headwalls	Quartzite	<u>Garlet</u> , <u>Como</u>	896
532E, 532S, 532X	Moderate Mountain Slopes	Volcanics	<u>Libeg</u> , <u>Garlet</u>	580

*Letters at the end of each soil map unit denote different vegetation.

Q. Geologic Types: Geology of the Sourdough fire area is complex, particularly around the edges of the fire. The dominant geology is Proterozoic and Archean granitic gneiss and schist. A minor amount Mississippian sandy limestone, sandstone, chert and mudstone of the Scott Peak through McGowan Creek Formations is present in the northern, upper elevations of the fire area near Bear Canyon Spring, Porcupine Spring, and Sourdough Peak. The southwestern portion of the fire surrounding Cow Creek on BLM land is underlain with Tertiary age sediment deposits and Quaternary alluvial fan deposits, while the southern boundary of the fire has Eocene age tufts and sandstone of Challis Volcanics group.

R. Miles of Stream Channels by Order or Class:

Table 4: Miles of Stream Channels by Order or Class

STREAM TYPE	MILES OF STREAM
PERENNIAL	10.5*
INTERMITTENT	12.6

*perennial stream miles may include intermittent stream length

S. Transportation System:

Trails: National Forest (miles): 1 mile unauthorized, 0.7 miles of off forest trails

Roads: National Forest (miles): 4.8 system miles, 8.4 UR route miles Off Forest (miles): 1.2 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Table 5: Burn Severity Acres by Ownership

Soil Burn Severity	NFS	BLM	Private	Total	% within the Fire Perimeter
Unburned	533	164	6	703	12%
Low	3469	1149	2	4620	78%
Moderate	553	46	0	599	10%
High	0	0	0	0	0%
Total	4555	1359	8	5922	100%

B. Water-Repellent Soil (acres): Water repellent soils were likely not common but may be present in forested areas and locations where vegetative litter was high enough to increase soil heating.

C. Soil Erosion Hazard Rating: Erosion risk for each soil map unit was completed for the Beaverhead Soil Survey area in 2011. These risk ratings are similar to the ones generated by NRCS but are modified to

consider landform (see Ruppert and Fletcher, 2011). The majority of the fire area is considered to have high erosion risk (Table 6). Most of the soils in the Bear Creek drainage have high erosion risk. Note that acres may not match other totals, because only Forest Service ownership was considered. Also some map units (a small acreage) were county soil survey units, and risk ratings were not developed for these.

Table 6. Erosion risk of soils in the Bear Creek Fire.

Erosion Risk	Acres	Percent
Slight	2,598	28
Moderate-Slight	354	4
Moderate	834	9
High-Moderate	127	1
High	5,233	57

D. Erosion Potential: WEPP PeP was run for both unburned and burned scenarios as described in the soils report. Table 7 show the results, both per unit area of watershed and also at the outlet of the watershed. Total hillslope loss is predicted to increase by 62.5 times, which is significant.

Table 7. WEPP PeP modeled erosion for the Bear Creek watershed. Unburned and burned results are included.

	Unburned model results per unit area of watershed	Burned model results per unit area of watershed	Unburned model results from outlet	Burned model results from outlet
Precipitation	29 ft ³	29 ft ³	480,000,000 in/year	490,000,000
Stream discharge	8.8 ft ³	15 ft ³	150,000,000 in/year	260,000,000
Total hillslope loss	32 ton/year	2,000 ton/year	72 lb/acre/year	4,600 lb/acre/year
Total channel soil loss	0 ton/year	790 ton/year	0 lb/acre/year	1,800 lb/acre/year
Sediment discharge	31 ton/year	1,200 ton/year	72 lb/acre/year	2,700 lb/acre/year
Sediment delivery ratio for watershed	0.991	--	0.991	0.419

E. Sediment Potential: An increase from 72 lbs/acre/year to 2700 lbs/acre/year is possible based on model results which would be a very significant increase.

F. Estimated Vegetative Recovery Period (years): 1-3 years grass and forbs, 10-15 years shrubs, 20-50 years conifers

G. Estimated Hydrologic Response (brief description): Based on the modeling detailed in Table 7 hydrologic response in the Bear Creek drainage would include a high probability of debris flows and increased runoff in the upper transport reaches of the watershed. There are unburned and low severity burned depositional areas present above the primary crossing where most of the debris flows will settle out, additional debris storage may be necessary and is described in the treatment narrative below. A similar situation exists in the Everson Drainage where the headwaters were highly burned but the lower depositional reaches remain intact with good storage potential above the road crossings.

Sheet flow from the canyon walls and locations in the watershed with moderate to high severity fire effects on slopes greater than 30% is expected and could create hazards where those locations are in close proximity to roads and trails.

PART V - SUMMARY OF ANALYSIS

Introduction/Background

The Sourdough fire is located southwest corner of the Tendoy Mountain Range. Elevations range from 7,400 feet in the western edge of the fire to 9,500 feet on the Northern end on Sourdough peak. Fire severity (heat intensity, duration and loss of vegetation) ranged from low to moderate depending on terrain, ground cover, weather and suppression activities. Post fire severity conditions resulting from this fire have the potential to directly and/or indirectly impact the natural conditions as evaluated in this section.

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

Table 8: Critical Value Matrix

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	RISK		
Very Likely	Very High	Very High	Low
Likely	Very High	High	Low
Possible	High	Intermediate	Low
Unlikely	Intermediate	Low	Very Low

1. Human Life and Safety (HLS):

Within the sourdough fire area, public safety is not a significant risk because most of the burned areas were grass and shrubs and did not leave a large number of dead trees in public access areas. There is an elevated risk from increased runoff which could affect intermittent streams basins but do not warrant any treatments or signage.

2. Property (P):

Within the Sourdough fire area, road and trail infrastructure was impacted by fire related effects but roads are generally primitive and most of the FS system roads were on ridges where fire effects will be minimized. Although preemptive road work may not be prudent patrolling the roads that have fire effects will be important because the probability of loss is **possible** making the Magnitude of consequences **High** in this remote part of the forest. The 3923 road may see infrastructure impacts but is under the maintenance jurisdiction of the BLM.

There are no system trails within the fire perimeter although there is a non-system trail up Porcupine creek that may see some impacts.

3. Natural Resources:

Weeds



The interior portion of the fire is relatively weed-free however, the south east perimeter of the fire has known infestations of spotted knapweed. Throughout the course of the fire, response vehicles used multiple travel routes where these known infestations occur. A weed wash station was not available for use, making the potential for weed seed introduction likely to occur. Heavy equipment was used along the east perimeter where the knapweed infestation is located to move from one location on the fire to another. These actions created soil disturbance reducing competition for native species and increased likelihood of invasive seed dispersal. Although late in the season, the potential for seed distribution and new noxious weeds being introduced is still of significant risk due to the size and location of the knapweed patch.

Risk Assessment - Threats to native plant communities due to the establishment and/or spread of noxious weeds. Spread and/or expansion of noxious weeds on neighboring Private, Federal and State lands. Threats to the scenic values of the Continental Divide Trail and other recreation values.

Probability of Damage or Loss – Very high. Based on burn size and severity, proximity to neighboring noxious weeds populations, high motorized use throughout the surrounding and burned area.

The Magnitude of Consequence – Major. The loss of native plant communities, scenic integrity of the Continental Divide Trail and the spread of noxious weeds.

Risk Level – Very high. The primary risk is from noxious weed populations on neighboring Private, Federal and State lands within the burn area. Secondary risks include noxious weed populations on neighboring Private, Federal and State lands adjacent to the burn area, seed introduction from cross country travel and various activities related to fire suppression activities that took place within noxious weed populations.

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

Land: 75%

Channel: NA

Roads/Trails: 80%

Protection/Safety: NA

D. Probability of Treatment Success

Table 10: Probability of Treatment Success

	1 year after treatment	3 years after treatment	5 years after treatment
Land	80%	65%	50%
Channel	NA	NA	NA
Roads/Trails	75%	70%	50%
Protection/Safety	NA	NA	NA

E. Cost of No-Action (Including Loss): \$500,000, increased probability of resource damage from increased noxious weed infestations in disturbed areas.

F. Cost of Selected Alternative (Including Loss):**G. Skills Represented on Burned-Area Survey Team:**

- ☒ Soils ☒ Hydrology ☐ Engineering ☒ GIS ☐ Archaeology
☒ Weeds ☐ Recreation ☐ Fisheries ☐ Wildlife
☐ Other:

Team Leader: Kevin Weiner**Email:** kevin.weinner@usda.gov**Phone(s)** 406-683-3857**Forest BAER Coordinator:** Vince Archer**Email:** vincent.archer@usda.gov**Phone(s):** 559-920-6598**Team Members:** Table 11: BAER Team Members by Skill

Skill	Team Member Name
Team Lead(s)	Kevin Weiner
Soils	Pam Fletcher
Hydrology	Kevin Weiner
GIS	Kevin Weiner
Weeds	Brad Winger

H. Treatment Narrative:**Land Treatments:**

Noxious weed treatments are broken out based on accessibility of known infestations and anticipated spray needs. All of the control lines within the fire perimeter utilized existing roads but additional disturbance was present with the increase in traffic and use of heavy equipment. There were approximately 11 miles motorized routes (accounting for 110 acres) that were heavily used for backburning which is an activity known to increase noxious weed infestation from the number of weed vectors associated with fire staff and equipment. This activity adjacent to known infestations was the primary concern for range staff and the now open landscape may increase off road use which has been a problem on this landscape. There was an additional 13 acres that will need to be treated by horseback/backpack that are not accessible from motorized routes. The cost per acre for these treatments will be higher to facilitate access. The table below show the breakdown of treatments based on early detection rapid response program to control and eradicate populations.

Line Items	Units	Unit Cost	# of Units	BAER \$
Bear Creek Fire Weed Treatment motorized	acres	\$100.00	110	\$16,900.00
Horseback/ Backpack	acres	\$300.00	13	\$3,900.00
Bear Creek Fire Weed Detection	acres	\$8.00	225	\$1,800.00
Weed Treatments Total				\$20,000.00

Roads and Trail Treatments:

The roads within the fire perimeter will likely be impacted from the fire effects, but most are primitive routes that have not received any maintenance in many years. There is a limited amount of work that could be completed but patrolling the roads for safety concerns makes the most sense to ensure any unforeseen failure does not risk public safety. All of the FS roads within the fire perimeter have some fire effects and non-system roads are recognized as open road in the B-D forest plan therefore, 13 miles of roads will be proposed for storm patrol.

I. Monitoring Narrative:

Fires of this scale are rare in the Tendoy mountains and there is evidence of significant debris flows occurring historically in this area therefore, we request 2 days to complete early detection rapid response monitoring of the weed treatments and storm patrol to ensure conclusions in this landscape were consisted with analysis in this report.

			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											
Weed Treatments motorized	acres	110	110	\$12,100							\$12,100
Weed Treatments non-motorized	acres	300	13	\$3,900	\$0			\$0		\$0	\$3,900
Weed Treatments detection	days	8	300	\$2,400							\$2,400
<i>Insert new items above this line!</i>				\$0	\$0			\$0		\$0	\$0
<i>Subtotal Land Treatments</i>				\$18,400	\$0			\$0		\$0	\$18,400
B. Channel Treatments											
				\$0	\$0			\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0			\$0		\$0	\$0
<i>Subtotal Channel Treatments</i>				\$0	\$0			\$0		\$0	\$0
C. Road and Trails											
RT-6 Road Storm Patrol	Miles	1,000	13	\$13,000	\$0			\$0		\$0	\$13,000
<i>Insert new items above this line!</i>				\$13,000	\$0			\$0		\$0	\$13,000
<i>Subtotal Road and Trails</i>											
D. Protection/Safety					\$0			\$0		\$0	
				\$0	\$0			\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0			\$0		\$0	\$0
<i>Subtotal Protection/Safety</i>											
E. BAER Evaluation	Report			---	\$0			\$0		\$0	\$0
Initial Assessment	days	\$2,500	5	\$12,500	\$0			\$0		\$0	\$0
Team Assessment				---	\$0			\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$12,500	\$0			\$0		\$0	\$0
<i>Subtotal Evaluation</i>											
F. Monitoring											
											\$0
EDRR re-vegetation review	days	400	2	\$800	\$0			\$0		\$0	\$800
<i>Subtotal Monitoring</i>				\$800							\$800
<i>Insert new items above this line!</i>											
G. Totals				\$32,200	\$0			\$0		\$0	\$32,200
Previously approved											
Total for this request				\$32,200							

1. _____
Forest Supervisor Date

