

[Interim 1](#)[Date of Report: Jan 26, 2021](#)**STATE CREEK FIRE 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 # 1
 - ☐ Updating the initial funding request based on more accurate site data or design analysis

PART II - BURNED-AREA DESCRIPTION**A. Fire Name:** State Creek**B. Fire Number:** MT-BDF-006645**C. State:** Montana**D. County:** Jefferson**E. Region:** 01 – Northern Rockies**F. Forest:** Beaverhead-Deerlodge NF**G. District:** Butte RD**H. Fire Incident Job Code:** P1NH76**I. Date Fire Started:** 08/29/2020**J. Date Fire Contained:** 12/30/2020 (estimated)**K. Suppression Cost:** \$1,608,470.15**L. Fire Suppression Damages Repaired with Suppression Funds (estimates):**

- 1. **Fireline repaired (miles):** 0.52 miles (dozer line), 1.8 miles (handline)
- 2. **Other (identify):** 1.9 miles (roadside hand prep), 2.1 miles (roadside equipment prep)

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

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
100200050302	Upper Little Whitetail Creek	26,413	3,625	13.7
100200050303	Middle Little Whitetail Creek	23,203	725	3.1

N. Total Acres Burned: 4,350*Table 2: Total Acres Burned by Ownership*

OWNERSHIP	ACRES
NFS	3,998
BLM	157
STATE	0
PRIVATE	195
TOTAL	4,350

O. Vegetation Types: Vegetation varies from open sagebrush parks and Douglas-fir/Idaho Fescue habitat types in the lower elevations with Douglas-fir/twinflower/pinegrass at middle elevations in the interior of the fire to wetter lodgepole pine and subalpine-fir stands in higher elevations.

P. Dominant Soils: Soils in the fire area are somewhat excessively drained soils that formed in residuum and colluvium derived from granodiorite (see Table 3 below for a summary of the most common landtypes).

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

Soil Map Unit*	Landform	Geology	Common Soil Series	Vegetation	Acres
75GB2	Rolling uplands, low relief	Granite	Windyridge , Como	Dry Douglas-fir forest	1,616
75GD4	Rolling uplands, low relief	Granite	Goldflint , Ovando	Subalpine forest	624
75GAF	Rolling uplands, low relief	Granite	Ambrant , Rochester	Open grown forest (Douglas-fir), warm phase	516
75GA2	Rolling uplands, low relief	Granite	Como , Windyridge	Open grown forest (Douglas-fir)	408
75GC2	Rolling uplands, low relief	Granite	Como , Kurrie	Dry, mixed coniferous forest	133

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

Q. Geologic Types: Geology of the State Creek fire area is [late Cretaceous granite of the Butte Pluton of the Boulder Batholith](#).

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	3.9
INTERMITTENT	14.6

S. Transportation System:

Trails: National Forest (miles): 1
Roads: National Forest (miles): 13

Other (miles): 0
Other (miles): 9

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Table 5: Burn Severity Acres by Ownership

Soil Burn Severity	NFS	Other Federal (BLM)	Private	Total	% within the Fire Perimeter
Unburned	1,551	86	53	1,690	39%
Low	1,179	71	98	1,348	31%
Moderate	1,004	0	42	1,046	24%
High	262	0	1	263	6%
Total	3,996	157	194	4,347	100%

B. Water-Repellent Soil (acres): We used the water drop penetration time method of determining soil water repellency. Moderate to strong hydrophobicity at 1 and 3cm was common in unburned and burned areas alike, and did not appear to be a good indicator of burn severity. This analysis assumes areas of high severity do have hydrophobic properties, but they are not expected to extend deeper than the top 3cm of soil based on root characteristics and minimal changes observed in physical soil properties deeper than 3cm. Not all high severity acres will be hydrophobic, due to natural variation and rock content/cover. Based on past BAER assessments, it was assumed approximately 2/3 of the high burn severity acres are hydrophobic. (263 acres * 0.67 = 176 acres).

C. Soil Erosion Hazard Rating:

Erosion risk for each soil map unit was completed for the Deerlodge 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-moderate erosion risk (Table 6). Most of the soils along the western edge of the fire have high erosion risk. Soils derived from granite in the Boulder Batholith are known to be especially sensitive to erosion. Note that acres do 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 those map units.

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

Erosion Risk	Acres	Percent
Slight	0	0
Moderate-Slight	0	0
Moderate	193	5.1
High-Moderate	2883	76.4
High	698	18.5

All soils in the fire area have slight mass movement risk. It is important to note that this means that none of the map units in the fire area is known to have mass wasting under normal (unburned) conditions. We have noted, however, that sheet erosion and debris flows have occurred on the 2019 McClusky fire which has the same geology and soil types and is located only 5 miles south of this fire.

D. Erosion Potential: The edited BARC map was uploaded to the WEPPcloud WEPP online model. The [model was run on the Beaver Creek drainage](#) with a single outlet location at the crossing of Beaver Creek on FSR 637, as this crossing has the highest risk of debris flow with the most acres of moderate and high severity burn on steep, erodible soils upstream. We also ran a [baseline run](#) to get an idea of baseline erosion before the fire. The ground-truthed, adjusted BARC map was loaded directly into the model. The landuse options and soil options were determined by hillslope for each run. Multi-factor ranking was used for the climate station option, and PRISM Modified was used as the climate method. Since it is a small area that was modeled (2,900 acres), single climate was selected for 100 years of simulation. Table 7 shows the

results, both per unit area of watershed and also at the outlet of the watershed. Total hillslope loss is predicted to increase from zero to 190 lb/acre/year, which is significant.

Table 7. WEPP PeP modeled erosion for the Beaver 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	22 in/year	22 in/year	210000000 ft ³ /year	220000000 ft ³ /year
Stream discharge	0.61 in/year	6.1 in/year	6000000 ft ³ /year	62000000 ft ³ /year
Total hillslope loss	0	190 lb/acre/year	0 ton/year	260 ton/year
Total channel soil loss	8.2 lb/acre/year	83 lb/acre/year	11 ton/year	120 ton/year
Sediment discharge	8.2 lb/acre/year	270 lb/acre/year	11 ton/year	380 ton/year

E. Sediment Potential: See Table 7, above. 270 lbs/acre/year for the Beaver Creek watershed.

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): The first damaging storm is predicted as a short-duration, high-intensity thunderstorm occurring in late spring or early summer. Hydrologic response of burned areas, particularly in the predominantly high severity burned Beaver Creek drainage, is expected to include ash transport, increased sediment delivery from hillslopes, channel banks, and road prisms, increased runoff, and a potential for debris flow. Based on WEPPcloud model runs for burned vs unburned conditions, the Beaver Creek drainage may see an order of magnitude increase in peak flows. However, unburned riparian areas and the presence of riparian willow complexes downstream of high/moderate severity burned drainages will likely mitigate some of the post-fire hydrologic effects as they will provide increased hydraulic roughness to dissipate energy and act as catchment areas for sediment/debris.

PART V - SUMMARY OF ANALYSIS

Introduction/Background

The State Creek fire is located 3 miles east/northeast of Whitetail Reservoir in the Boulder Mountains about 10 air miles northeast of the community of Butte. Elevations range from 5,400 feet in the eastern edge of the fire at the forest boundary to about 8,200 feet along the western edge of the fire. Slopes range from 10% to 70% and greater. Slopes are steeper along the western edge of the fire, and on the north facing slope directly above Beaver Creek which has slopes exceeding 80%.

Fire severity (heat intensity, duration and loss of vegetation) ranged from low to high depending on terrain, ground cover, weather and suppression activities. Post fire conditions have the potential to directly and/or indirectly impact the natural and cultural landscape, road infrastructure, potential for weed infestations, trail network, and stream courses with the fire perimeter. These resource impacts will be evaluated based on the critical value matrix outlined in Table 8.

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):Post-Fire Hazards

Probability of Damage or Loss: Possible

Magnitude of Consequence: Major

Risk Level: **High**

Closures are not being considered for the fire area nor for trails or roads within the fire area. Therefore, public use of burned NFS lands and downslope NFS lands susceptible to post-fire effects is anticipated. The possible risk to public safety and potential for injury or loss of life warrants installation of signs through BAER to warn users of potential hazards associated with burn areas, allowing them to make informed decisions as to using NFS lands in the vicinity of the fire.

An open adit on NFS lands within the State Creek Fire perimeter was identified during the initial Burned Area Emergency Response (BAER) assessment. The adit is located approximately 100 yds upslope from NFSR 8593 within an area of high/moderate burn severity. Pre-fire images were not available, but it is apparent that the adit is now more visible from the open road, due to the consumption of surrounding vegetation, and likely more accessible.

2. Property (P):Stream Crossing on Beaver Creek at NFSR 637

Probability of Damage or Loss: Possible

Magnitude of Consequence: Moderate

Risk Level: **Intermediate**

This stream crossing was found to not warrant replacement under BAER. The Beaver Creek drainage burned with high severity and increased flow of both water and sediment are expected, with potential for debris flows. However, presence of riparian willow complexes upstream of the crossing will likely dissipate the increased energy and allow for sediment/debris to settle out. This hydraulic roughness will reduce capacity demand at the existing crossing, and the size and condition of the existing culvert will likely provide adequate conveyance. Channel treatments to provide additional energy dissipation or debris catchments were not considered upstream of the crossing because most of the stream corridor runs through private inholdings with evidence of placer activity.

Road Prism NFSR 8593

Probability of Damage or Loss: Possible

Magnitude of Consequence: Moderate

Risk Level: **Intermediate**

NFSR 8593 runs east-west up the Beaver Creek drainage adjacent to the creek, often within the floodplain. Increased water and/or sediment flow is expected post-fire in Beaver Creek, potentially damaging the road prism. However, consideration of the hydraulic roughness provided by the riparian willow complexes and the length of adjacent channel that runs through private inholdings led to the conclusion that neither road nor channel treatments through BAER were warranted.

Stream Crossing on South Fork State Creek at NFSR 637

Probability of Damage or Loss: Unlikely

Magnitude of Consequence: Moderate

Risk Level: **Low**

This stream crossing was found to not warrant replacement, nor any other treatment under BAER. The drainage upstream of the crossing burned at primarily low severity. A significant increase in flow is not expected post-fire, therefore the capacity of existing crossing infrastructure is not likely to be exceeded.

3. Natural Resources (NR):

Spread of Invasive Species

Probability of Damage or Loss: Very Likely

Magnitude of Consequence: Major

Risk Level: **Very High**

There is risk of losing native plant communities and spread of noxious weeds. Primary risk comes from the potential expansion of existing infestations within and adjacent to burned area, particularly in areas of moderate and high burn severity, along with potential introduction of noxious weed seed from fire suppression activities which included off-road travel, digging line, and road improvement. A treatment of early detection and rapid response regarding invasive species within and adjacent to the burned area is warranted through BAER.

Hydrologic Function on NFS Lands

Probability of Damage or Loss: Possible

Magnitude of Consequence: Moderate

Risk Level: **Intermediate**

There is potential for some degree of loss of hydrologic function on NFS lands, particularly in the Beaver Creek drainage. Post-fire effects such as ash transport, increased sediment delivery from hillslopes, channel banks, and road prisms, increased runoff, and debris flows could result in damage. However, existing conditions that would both mitigate potential damage (i.e. riparian willow complexes) and limit treatment effectiveness (i.e. historic placer mining activity), the low likelihood of completing any land or channel treatments to minimize erosion concerns before spring runoff and/or summer thunderstorms, and anticipated treatment effectiveness led to the determination that treatment through BAER was not warranted.

4. Cultural and Heritage Resources:

Unknown site – remains of a small log building

Probability of Damage or Loss: Possible

Magnitude of Consequence: Moderate

Risk Level: **Intermediate**

Prior to the 2020 fire season, cultural resource surveys documented and assessed 3 cultural resources site within or adjacent to the fire perimeters. Within State Creek fire, recorded cultural resources include 0 Eligible sites and 1 Unknown (managed as Eligible) site and 3 Ineligible sites. Treatment suggested: monitor site in spring of 2021 to assess site condition.

Additional Priority Heritage Terrain within State Creek Burn Perimeter:

Probability of Damage or Loss: Likely

Magnitude of Consequence: Major
Risk Level: **Very High**

Within the greater 4,350 acres of the State Creek fire, roughly 300 acres are modeled as High Probability terrain for the discovery of cultural resources. One hundred of these acres are in areas of high burn severity, the remainder are between moderate and low burn severity. Given the historic mining sites in the areas of High Probability on FS lands post burn inventory and assessments should be conducted to identify any present cultural resources. Realizing cultural resource inventory is not funded through BAER it is important for heritage personnel to conduct field inventory when priority project work allows.

B. Emergency Treatment Objectives:

- Reduce risk to forest visitors by informing them of post-fire conditions through sign placement on the roads accessing the fire area.
- [Obscure and seal entrance of the adit.](#)
- Reduce risk of new weed infestations and the further spread of known infestations to promote recovery of desired native vegetation communities.

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

Land: 90%

Channel: N/A

Roads/Trails: N/A

Protection/Safety: 80%

D. Probability of Treatment Success

Table 9: Probability of Treatment Success

	1 year after treatment	3 years after treatment	5 years after treatment
Land	90	80	70
Channel	--	--	--
Roads/Trails	--	--	--
Protection/Safety	75	75	75

E. Cost of No-Action (Including Loss): \$1,000,000 – public needs to be warned about the hazards of entering the post-fire environment. Also, there is a risk of losing native plant communities if weeds spread in the fire area.

F. Cost of Selected Alternative (Including Loss): \$22,400

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Erin Ryan, Pam Fletcher

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Forest BAER Coordinator: Kevin Weininger

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Team Members: *Table 10: BAER Team Members by Skill*

Skill	Team Member Name
<i>Team Lead(s)</i>	Erin Ryan, Pam Fletcher
<i>Soils</i>	Pam Fletcher
<i>Hydrology</i>	Erin Ryan
<i>Engineering</i>	
<i>GIS</i>	
<i>Archaeology</i>	Tammy Cherullo
<i>Weeds</i>	Randell Anderson
<i>Recreation</i>	
<i>Other</i>	Daphne Kampinga (t) – Fisheries

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

The risk to native plant communities will be reduced by use of Early Detection/Rapid Response (EDRR) protocols. Weed treatment will focus on limiting introduction and spread of known existing populations due to ground disturbance from both fire suppression activities and from the fire itself. Weed technicians will patrol the area within and adjacent to high/moderate severity burned lands, including major travel corridors. The proposed treatment is expected to cover up to 228 acres of weed spraying. Weeds will be sprayed using the standard herbicides for the Beaverhead-Deerlodge National Forest, Butte Ranger District and typical surfactant/adjuvant and dye added to the tank mix.

Channel Treatments:

No channel treatments are being requested beyond allowing for natural recovery.

Roads and Trail Treatments:

No road and trail treatments are being requested beyond allowing for natural recovery.

Protection/Safety Treatments:

The risk to human life and safety will be addressed with signage that warns the public of potential post-fire hazards. The signs will be installed along routes that access the State Creek Fire area; proposed sign locations are on NFSR 637 just east of the junction with NFSR 8592 and on NFSR 637 just north of the junction with NFSR 1579.

The adit entrance will be obscured and sealed to resist detection and bar entry.

I. Monitoring Narrative:

BAER treatment effectiveness monitoring for both weed treatments and natural recovery is proposed for the State Creek Fire. Monitoring the effectiveness of our weed treatments will help the continued protection of native plant communities within the fire area and provide context for treatments on similar burned landscapes in the future. Monitoring natural recovery timelines through field observations of post-fire hydrologic function and soil productivity, the condition of cultural resources with upstream/upslope erosion risk, sediment pulses or debris flows, and peak flow events is also a critical component. Observing and documenting this information will allow the BAER team to compare our predictions and subsequent recommendations from this assessment with actual post-fire effects. These monitoring efforts will inform future BAER efforts on the Beaverhead-Deerlodge National Forest, improving efficiency and effectiveness.

PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS

Line Items	Units	Unit Cost	NFS Lands		Other \$	Other Lands				All Total \$
			# of Units	BAER \$		# of units	Fed \$	# of Units	Non Fed \$	
A. Land Treatments										
Weeds EDRR - Fire Suppression Rep	acres	75	28	\$2,100	\$0		\$0		\$0	\$2,100
Weeds EDRR - Native Community Ri	acres	75	200	\$15,000	\$0		\$0		\$0	\$15,000
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Land Treatments</i>				\$17,100	\$0		\$0		\$0	\$17,100
B. Channel Treatments										
				\$0	\$0		\$0		\$0	\$0
				\$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										
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Road and Trails</i>				\$0	\$0		\$0		\$0	\$0
D. Protection/Safety										
Burned area warning signs	sign	250	2	\$500	\$0		\$0		\$0	\$500
Obscure/seal adit	lump	3930	1	\$3,930	\$0		\$0		\$0	\$3,930
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Protection/Safety</i>				\$4,430	\$0		\$0		\$0	\$4,430
E. BAER Evaluation										
Initial Assessment	Report			---	\$0		\$0		\$0	\$0
Team days	days	\$400	20	\$8,000	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				---	\$0		\$0		\$0	\$0
<i>Subtotal Evaluation</i>				\$8,000	\$0		\$0		\$0	\$0
F. Monitoring										
Monitoring of natural recovery	days	\$400	8	\$3,200	\$0		\$0		\$0	\$3,200
Monitoring of weeds EDRR	days	\$400	4	\$1,600	\$0		\$0		\$0	\$1,600
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Monitoring</i>				\$4,800	\$0		\$0		\$0	\$4,800
G. Totals				\$26,330	\$0		\$0		\$0	\$26,330
Previously approved				\$22,400						
Total for this request				\$3,930						

PART VII - APPROVALS

1. _____ Date _____
 Forest Supervisor

State Creek Final Soil Burn Severity

