Forest Service

Helena - Lewis and Clark National Forest

2880 Skyway Drive
Helena, MT 59602
406-449-5201
1220 38th Street North
Great Falls, MT 59405
406-791-7700

File Code: 2520 **Date:** September 6, 2019
Route To:

Subject: Horsefly Fire Initial BAER Funding Request

To: Regional Forester, Northern Region

We request initial funding authority for Burned Area Emergency Response (BAER) emergency stabilization treatments on the 1,357 acre Horsefly fire, Helena-Lewis and Clark National Forest. The request for $28,532 will be applied toward these treatments. More details on specific needs are outlined in the attached 2500-8.

We understand that all treatments must be completed within one year of the Regional Office's funding approval date. If you have any questions, please contact Sara Mayben at (406) 791-7726.

/s/ WILLIAM AVEY
Forest Supervisor

Enclosure

cc: Scott Nagel, Chirre Keckler, Michael Stansberry, Vince Archer, Tammy Petersen, Megan McGinnis

Date of Report: 8/28/2019

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: Horsefly Fire

B. Fire Number: 000162

C. State: Montana

D. County: Lewis and Clark County

E. Region: Northern Rockies Region

F. Forest: Helena-Lewis and Clark NF

G. District: Lincoln Ranger District

H. Fire Incident Job Code: P1JM3S (0115)

I. Date Fire Started: August 5, 2019

J. Date Fire Contained: September 30, 2019 (estimated)

K. Suppression Cost: $6,400,000

L. Fire Suppression Damages Repaired with Suppression Funds (estimates):

1. **Fireline repaired (miles):** 0.5 (as of 8/29/2019)
2. **Other (identify):** 1 mile of hand line (as of 8/29/2019)

M. Watershed Numbers:

Table 1: Acres Burned by Watershed

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
170102030206	Blackfoot River-Hardscrabble Creek	12,480	424	3.4
170102030201	Blackfoot River-Willow Creek	12,416	795	6.4
170102030205	Hogum Creek	7,634	1	0.0
100301011805	Upper Canyon Creek	15,178	96	0.8
100301011804	Virginia Creek	19,417	41	0.3

N. Total Acres Burned:

Table 2: Total Acres Burned by Ownership

OWNERSHIP	ACRES
NFS	1357.6
OTHER FEDERAL (LIST AGENCY AND ACRES)	0
STATE	0
PRIVATE	0
TOTAL	1357.6

O. Vegetation Types: Predominantly high elevation lodgepole pine and subalpine fir overstory with minor components of Douglas fir, Engelmann spruce, and white bark pine. Understories consist primarily of huckleberry, grouse whortleberry, and beargrass communities. These forest types are periodically interspersed with small high-elevation meadows consisting of bunch grasses and generally high proportions of bare gravelly soils.

P. Dominant Soils: Area soils are predominantly (82%) sandy-textured Andic and Dystric Cryochrept loams which occur on mountain slopes. Volcanic ash loess is commonly intermixed in the upper inches of the soil profile, and the unique nutrient and water holding capacities associated with volcanic ash are highly vulnerable to post-fire erosion. Overall soil profiles are have moderate soil erosion hazard. Approximately 13 percent of the burned area is mapped as slump-prone. These areas occur primarily in basins and toe slopes and may be more vulnerable to post-fire mass movement as a result of increased subsurface lateral water flow in the absence of living vegetation.

Q. Geologic Types: The majority of the area (82%) is comprised of rhyolitic rocks and tuffs, with minor interspersed components of basalt and Belt Supergroup metasedimentary argilites, siltites, and quartzites. Landforms within the burned area are primarily mid to high elevation mountain slopes and ridges, with minor components of basins, toe slopes, and structural breaklands. Soils tend to be skeletal with a high ratio of cobbles and gravels, and are formed from colluvium and residuum with a component of windblown volcanic ash sediments.

R. Miles of Stream Channels by Order or Class:

Table 3: Miles of Stream Channels by Order or Class

STREAM TYPE	MILES OF STREAM
PERRENIAL	0
INTERMITTENT	2.2
EPHEMERAL	0
OTHER (DEFINE)	0.1 – small pond

S. **Transportation System:**
Trails: *National Forest (miles):* 1.4 *Other (miles):* N/A
Roads: *National Forest (miles):* 0 *Other (miles):* N/A

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Table 4: Burn Severity Acres by Ownership

Soil Burn Severity	NFS	Other Federal (List Agency)	State	Private	Total	% within the Fire Perimeter
Unburned or Very Low	352.3	N/A	N/A	N/A	352.3	26
Low	442.4	N/A	N/A	N/A	442.4	33
Moderate	499.7	N/A	N/A	N/A	499.7	37
High	63.2	N/A	N/A	N/A	63.2	5
Total	1,357.6				1,357.6	100

B. Water-Repellent Soil (acres): 313 (resulting from strong hydrophobicity in high severity, and weak hydrophobicity across approximately 50% of moderately burned areas)

C. Soil Erosion Hazard Rating: Moderate

D. Erosion Potential: 1.6 tons/acre. ERMiT model values ranged from 0 to 7.6 tons per acre based on a 10% exceedance probability within the first year following the burn.

Sediment Potential: 943 cubic yards per square mile. WEPP PEP modeling suggests a sediment delivery ratio of 0.556.

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

G. Estimated Hydrologic Response (brief description): Post-fire hydrologic response within the fire perimeter is predicted to be considerably higher than the unburned condition in the first year after fire, and moderately higher in small perennial streams with burned headwaters. The absence of understory and overstory vegetation is expected to result in increased overland flow, rilling, and erosion. However, ground cover vegetation is expected to re-establish quickly due to the extensive low to moderate soil burn severity, and therefore partial hydrologic recovery is expected to occur as soon as the first growing season after the fire. Full hydrologic recovery is not expected for several decades as shrubs and conifers recover, due to the stand-replacing nature of the moderate burn.

PART V - SUMMARY OF ANALYSIS

Introduction/Background

The Horsefly fire began on August 5, 2019, in the Flesher Pass area of the Lincoln Ranger District. Due to hot temperatures and strong winds, by the following afternoon the fire had grown to approximately 1200 acres. The fire burned in dense, gray-stage, mountain-pine beetle-killed lodgepole pine stands with dense understories of subalpine fir. Due to the understory ladder fuels, the fire moved quickly, had consistent area coverage, and intensely burned throughout the perimeter, moving across high-elevation mountain slopes, ridgelines, and headwater drainages along the Continental Divide. The burn area is within the Specimen Creek IRA, and primary transportation infrastructure affected by the fire is the Contental Divide Trail. Due to limited safe access to the fire perimeter, the fire was suppressed with dozer line and numerous dozer contingency lines were put in to limit fire growth and protect adjacent communities near Flesher Acres. Prior to the burn, the densely forested landscape supported pristine native vegetation communities highly valued for their scenic character. The resultant post-fire landscape is predominantly consistent swaths of "black toothpick" forest surrounded by dozer line, with the Continental Divide National Scenic Trail (CDT) edging the southeast portion of the burn. While fire behavior was consistently intense throughout the burn, due to the fast fire movement, the soils within the burn typically experienced low and moderate burn severity. High soil burn severity occurred where high concentrations of jackstrawed lodgepole created persistent heat pockets that burned for longer durations. Notwithstanding the low soil burn severity throughout much of the fire, the steep terrain, dramatic vegetation loss, and reduced ground cover may contribute to a strong post-fire watershed response within headwater drainages, even within low- and moderate-soil burn severity areas. Long duration (6+ hour), high intensity convective storms are the precipitation events of concern. These events typically occur in the spring and summer, and are expected to produce strong damaging runoff and elevated flows within the burned area in the first year following the fire.

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

Table 5: 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**

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

1. **Human Life and Safety (HLS):**
   a. High. Hazard trees with burned out root collars and boles are very common along sections of the Continental Divide National Scenic Trail which pass through moderate and high burn severity. These hazard trees make it possible that site repair workers and Forest Service staff carrying out administrative functions within the IRA may experience injury or loss of life from falling trees.
2. **Property (P):** Very High. Sections of the Continental Divide National Scenic Trail affected by the fire provide important access into the Specimen Creek IRA near the popular Flesher Pass, and are heavily utilized both by the recreating public, as well as Forest Service staff for safety and administrative use. Common trail use includes horseback and mountain bikes, and the trail is maintained to allow those access mechanisms. Portions passing through high and moderate severity burn are very likely to experience moderate damage to trail tread due to erosion. During assessment, rilling and sediment mobilization were already evident along segments of trail with only low and moderate slope due to the near complete loss of vegetative cover coupled with erodible rhyolitic parent materials. These sections of trail have very high likelihood of damage from post-fire erosion. Loss of trail function would significantly impact forest administrative functions into the Specimen Creek IRA. Furthermore, this portion of the CDT represents significant forest and national infrastructure investment, due to the level of use, highly scenic area, and primary access point from Flesher Pass. As such, special consideration was given when assessing the magnitude of consequence and whether risks to trail infrastructure was unacceptable (as per national guidance, May 2019). It was determined that even in low severity burn, unacceptable risks exist to trail infrastructure. This determination was made based observed erosion during field assessment. Aside from the CDT, one culvert downstream of the fire is at risk of overtopping due to the elevated post-fire hydrologic response. Resultant sediment from crossing failure would overwhelm downstream crossing infrastructure and present cascading impacts to FS road infrastructure. Due to the existing culvert being undersized, failure is likely, and property damage would be moderate to major.
3. **Natural Resources (NR):** Very High. Natural, pristine high-elevation vegetation communities and vistas along the Continental Divide Trail are very likely to experience moderate damage due to the threat of invasive species along suppression-related dozer line and hand line accessing the fire perimeter, contingency lines, and primary suppression access routes. During suppression, equipment was observed passing through known, existing patches of knapweed and other noxious weeds before entering undisturbed forest habitats. Risk to these important and currently un-infested vegetation communities is very high.
4. **Cultural and Heritage Resources:** No threats to cultural or heritage resources were identified during this assessment.

B. Emergency Treatment Objectives: Emergency treatment objectives are as follows: 1) preserve the ecological integrity of native plant communities in the suppression area and CDT through early detection, rapid response weed treatment; 2) provide for public safety along the heavily trafficked CDT by placing signage near each entrance into the burned perimeter, 3) stabilize damaged and at-risk sections of the CDT where the trail passes through highly erodible and fire-damaged areas by installing drainage features, providing for worker safety by removing hazard trees at trail work sites, and 4) protect forest infrastructure by removing one at-risk culvert crossing along 4108.

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

Land 80%
Channel N/A
Roads/Trails 70%
Protection/Safety 90%

D. Probability of Treatment Success

Table 6: Probability of Treatment Success

	1 year after treatment	3 years after treatment	5 years after treatment
Land	50%	50%	50%
Channel	N/A	N/A	N/A
Roads/Trails	70%	80%	90%
Protection/Safety	90%	90%	80%

E. Cost of No-Action (Including Loss): Approximately $120,000. This includes loss of 2 stream crossings, associated downstream road infrastructure, loss of 1.4 miles of the Continental Divide National Scenic Trail, as well as loss of use costs associated with infrastructure failure. It also includes implied minimum value for plant community loss. Mitigation of potential injury or loss of life, soil productivity, and ecological integrity were accumulated values considered when developing treatment recommendations. While it is acknowledged that these treatments will reduce hazards to human life and impacts to natural resources, it is impossible to factor a monetary loss for these values into the cost of no action.

F. Cost of Selected Alternative (Including Loss): $37,091.60 (based on replacement cost of road and trail infrastructure). There is a 30% chance the proposed treatments may not be effective or completely implemented prior to the first damaging event. The cost of the selected alternative is estimated using the funding requested for treatment plus this 30% chance of failure ($28,532 + (0.3*$28,532)).

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Megan McGinnis
Email: megan.l.mcginnis@usda.gov **Phone(s)** 406-791-7729

Forest BAER Coordinator: Scott Nagel
Email: scott.nagel@usda.gov **Phone(s):** 406-495-3723

Team Members: *Table 7: BAER Team Members by Skill*

Skill	Team Member Name
Team Lead(s)	Megan McGinnis
Soils	Megan McGinnis
Hydrology	Kate Condon
Engineering	
GIS	
Archaeology	Jen Ryan
Weeds	Megan Dawson, Luke Shimer
Recreation	Josh Lattin
Other	

H. Treatment Narrative: Treatments are presented in a map in Appendix A

Land Treatments: Weed detection monitoring and herbicide ground application are recommended along road corridors, trail heads, trails, dozer line, and hand line accessing the Horsefly Fire where known weed infestations are documented. Proposed weed treatment is almost entirely exclusive to suppression activity, including extensive dozer line. Weed presence was documented on all road access utilized by suppression equipment, and equipment was documented passing through known and seeding weed populations. Weeds targeted for treatment are: spotted knapweed, Canada thistle, musk thistle, bull thistle, common mullen, and houndstongue. Detection monitoring will be prioritized in the fire area adjacent to known weed infestation and disturbance corridors. The following resources are requested for weed detection monitoring: one GS07 technician ($263 per day) for three (3) days; one

GS05 technician ($136 per day) for seven (7) days; one 4-wheel drive pickup truck for 200 miles ($0.85 per mile). The weed detection monitoring component of this request totals $2,930. Land based herbicide application with truck and UTV would occur early in the first growing season post-fire. Other funding sources will be sought in out-years to treat any expansions of noxious weeds identified in subsequent monitoring. All work will be accomplished using ground-based equipment and will include the following: 1) 13 miles (68 acres) of truck or UTV access herbicide application at $28 per acre; 2) 14 miles (56 acres) of backpack access herbicide application at $129 per acre; and requisite herbicide itself, costing $25 per acre. The weed treatment portion of this request totals $12,228.

Channel Treatments: No channel treatments are recommended as a part of this assessment

Roads and Trail Treatments: One road treatment is recommended; FS Road #4108 has two stream crossings, the upper of which is undersized. Stream modeling shows elevated up-slope hydrologic response would result in the upper culvert being overtopped in a one-in-ten year storm event. Due to the potential for cascading impacts to the downstream crossing and road infrastructure, the upper culvert is recommended for removal. Culvert removal would require the following: one day of excavator and operator time at $175 per hour; one day of dump truck and operator time at $150 per hour; and contract preparation and administration cost, estimated at 15% of construction cost, or $400. Total culvert removal cost would be $3000. Trail treatments along the Continental Divide National Scenic Trail are also recommended in order to maintain administrative access into the IRA and preserve forest infrastructure and investment in the National Scenic Trail. Treatments to improve trail drainage, including drainage feature installation, drainage feature restoration, surface erosion control through spot retread, and 500 ft. of trail reroute are recommended where CDT trail structure crosses areas of highly concentrated fire-related damaged areas. The vast majority of recommended treatments overlap with areas of high and moderate severity burn. Recommended trail treatments would require the following: 41 drainage structure installations at $150 each; repair of 32 drainage structures at $75 each; 1000 feet of spot retread for surface erosion control at $0.20 per foot. Total costs associated with post-fire treatment of the CDT is $8,750.

Protection/Safety Treatments: Warning signage along the Continental Divide Trail is recommended at each entrance into the burn perimeter to warn of post-fire risks and help maintain public safety. A total of two (2) signs are requested at an estimated cost of $100 each.

Monitoring Narrative: Trail and weeds effectiveness monitoring is recommended. Two days of trail monitoring is recommended in order to ensure drainage structures function properly after installation. Weeds treatment effectiveness monitoring is recommended for 5 days at varying points in the growing season following herbicide application in order to ensure herbicide application coverage and effectiveness, as well as identify items for follow-up forest treatment.

PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS

			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 Detection Monitoring										
One GS07 Technician	Days	263.00	3	$789	$0		$0		$0	$789
One GS05 Technician	Days	135.00	7	$945	$0		$0		$0	$945
4-Wheel Drive Pickup	Miles	0.85	200	$170	$0		$0		$0	$170
Weed Treatment										
Truck or UTV herbicide appl	Acres	28.00	68	$1,904	$0		$0		$0	$1,904
Bakcpack herbicide applicat	Acres	129.00	56	$7,224	$0		$0		$0	$7,224
Herbicide required for treatn	Acres	25.00	124	$3,100	$0		$0		$0	$3,100
Subtotal Land Treatments				$14,132	$0		$0		$0	$14,132
B. Channel Treatments										
				$0	$0		$0		$0	$0
Subtotal Channel Treatments				$0	$0		$0		$0	$0
C. Road and Trails										
Culvert removal	Each	3000.00	1	$3,000	$0		$0		$0	$3,000
Trail drainage installation	Each	150.00	41	$6,150	$0		$0		$0	$6,150
Trail surface erosion control	Foot	0.20	1,000	$200	$0		$0		$0	$200
Trail drainage structure repa	Each	75.00	32	$2,400	$0		$0		$0	$2,400
Subtotal Road and Trails				$11,750	$0		$0		$0	$11,750
D. Protection/Safety										
Trail Warning Signs	Each	100.00	2	$200	$0		$0		$0	$200
Subtotal Protection/Safety				$200	$0		$0		$0	$200
E. BAER Evaluation										
Initial Assessment	Report	1000.00	1	---	$0		$0		$0	$0
Subtotal Evaluation				$0	$0		$0		$0	$0
F. Monitoring										
Trail treatment effectiveness	Day	260.00	2	$520	$0		$0		$0	$520
Weed treatment effectivene:	Day	386.00	5	$1,930	$0		$0		$0	$1,930
Subtotal Monitoring				$2,450	$0		$0		$0	$2,450
G. Totals				$28,532	$0		**$0**		**$0**	**$28,532**
Previously approved										
Total for this request				**$28,532**						

PART VII - APPROVALS

1. _____ 9/6/19

Deputy Forest Supervisor — Date