

Date of Report and Type: October 4, 2018; Initial

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 DESCRIPTION**A. Fire Name:** Davis**B. Fire Number:** MT-KNF-000161**C. State:** Montana**D. County:** Lincoln**E. Region:** Northern Region**F. Forest:** Kootenai**G. District:** Three Rivers**H. Fire Incident Job Code:** 0114 / P1L1D32**I. Date Fire Started:** 07/29/2018**J. Date Fire Contained:** 40% as of 10/02/2018**K. Suppression Cost:****L. Fire Suppression Damages Repaired with Suppression Funds (Estimates):**

- 1. Mechanical Fire Line (miles): 15
- 2. Hand Fire Line (miles): 2.5
- 3. Fuel Breaks (miles): 5.5
- 4. Safety Zones (acres): 0
- 5. Road Repair (miles): 0.5
- 6. Drop Points (#): 8
- 7. Heli-spots (#): 5
- 8. Water Sources (#): 6 streams, 2 lakes
- 9. Landings (#): 2

M. Watershed Numbers:

HUC #	Watershed Name
170101030202	Upper West Fork Yaak
170101030201	Freeman Creek
170101050201	South Fork Hawkins Creek

N. Total Acres Burned:

Table 1: Total Acres Burned by Ownership (estimated pending final calculations)

OWNERSHIP	ACRES
NFS	4142
OTHER FEDERAL (CANADA)	2578
STATE	
PRIVATE	
TOTAL	6720

- O. Vegetation Types:** The vegetation is a mixed forest of subalpine fir, Douglas-fir, Engelmann spruce, lodgepole pine, and western larch. The forest understory is dominated by forbs and low-growing shrubs. Bear grass is common.
- P. Dominant Soils:** The soils have a surface layer of loess that has been influenced by volcanic ash. The surface layer is 4-14 inches thick. It is medium textured. The content of angular rock fragments in the subsoil ranges from 20 to 50 percent. The substratum is dense and brittle when moist.
- Q. Geologic Types:** The area is underlain by argillite, siltite, and quartzite of the Belt supergroup. Thin deposits of dense, brittle glacial till overlie the bedrock in places.
- R. Miles of Stream Channels in Fire Boundary by Order or Class:**

Table 2: Miles of Stream Channels by Order or Class

STREAM ORDER	MILES OF STREAM
FIRST	5.33
SECOND	0.62
THIRD	
FOURTH	

S. Transportation System:

Trails: National Forest (miles): 2.1 Other (miles): NA (undetermined trails)
Roads: National Forest (miles): 9.3 Other (miles): NA (undetermined roads)
Roads: National Forest by Maintenance Level (miles): ML1 – 7.4; ML2 - 0; ML3 – 1.9

PART III - WATERSHED CONDITION**A. Burn Severity (acres):**

Table 3: Burn Severity Acres by Ownership

Soil Burn Severity	NFS	Other Federal (Canada)	State	Private	Total	% within the Fire Perimeter
High	1692	234			1926	29
Moderate	1415	984			2399	36
Low	605	915			1520	22
Unburned	430	445			875	13
Total	4142	2578			6720	100

- B. Water-Repellent Soil (Acres):** High and moderate severity have varying water repellency
- C. Soil Erosion Hazard Rating:**
- D. Erosion Potential (Tons/acre):**
- E. Sediment Potential (Cubic yards/square mile):**

PART IV - HYDROLOGIC DESIGN FACTORS

- A. Estimated Vegetative Recovery Period (Years):** 1-3 grass, 5-10 shrubs, 20-50 conifers
- B. Design Chance of Success (Percent):** 80% depending on site and treatment

C. Equivalent Design Recurrence Interval (Years): 25 years post-fire

D. Design Storm Duration (Hours): 6 hr. and 24 hr.

E. Design Storm Magnitude (Inches): Q2 – 6hr 0.86” and 24hr 1.57”; Q100 – 6hr 1.97” and 24hr 3.22”

F. Design Flow (CFS/square mile): 5

G. Estimated Reduction in Infiltration (Percent): 30

H. Adjusted Design Flow (CFS/square mile): 70

PART V - SUMMARY OF ANALYSIS

Overview

The Davis Fire started on July 29, 2018, from a lightning strike. Approximately 29% of the burn area burned at a high soil burn severity and 36% moderate soil burn severity. The rest of the fire was either low burn severity or unburned within the fire perimeter. Typically in high and moderate areas the soils burned intensely, consuming all organic duff on the soil surface along with leaves and needles on standing live vegetation.

Based on historical precipitation patterns, it can be expected that winter snow storms in the form of snow have a high probability of occurring in the following weeks. Long duration (6+ hour), high intensity storms are the precipitation events of primary concern. Hazardous post-fire conditions may be worsened in the case of a rain-on-snow event, where these long-duration rainstorms falling on a shallow snowpack to produce very high peak flows. Additionally these types of long-duration events are likely to occur in the spring months following the fire. The risk of flooding and erosional events will increase as the result of the fire, creating hazardous conditions within and downstream of the burn area.

Watershed Response

Hydrologic Response: Watershed conditions in the burned watersheds have changed as a result of the fire. Vegetation and underlying organic matter slows runoff and protect soils from direct raindrop impact, assists with water infiltration to soil and releases runoff at slower rates. Consumption of organic material and high soil heating can promote the formation of water repellent layers, at or near the soil surface, which can result in significant amounts of soil loss.

Due to the steepness of some of these drainages, the amount of moderate and high burn severity, and the large areas now devoid of vegetation and groundcover after the fire, large runoff producing storms could create increased surface flow that can transport available sediment from the slopes and along the channel bottoms. These responses are expected to be greatest in initial storm events, and will become less evident as vegetation is reestablished, providing ground cover, increasing surface roughness, and stabilizing and improving the infiltration capacity of the soils. As a result, values at risk are expected to be at an increased risk from post fire flooding and sedimentation.

Erosion Response: Primary effects of fire on soils are removal of soil cover and soil heating effects, as affected by peak temperatures during the fire front and subsequent smoldering consumption of duff and woody debris. Soil heating effects are below ground, which may compromise soil structure stability and infiltration characteristics, which changes the ability of soils to accept rain events and/or produce runoff. Soil cover is crucial in physically protecting soil from erosion by absorbing raindrop impact, and dissipating energy of surface runoff at the duff/soil interface; in unburned condition this normally limits erosion to small-scale effects, and fines re-deposited on hillslopes prior to reaching a channel. With cover removal by this fire, large contiguous areas are vulnerable to rain and runoff impacts and mobilized sediments will frequently be delivered to streams. Soil burn severity mapped for this fire reflects the relative degrees of soil heating effects and cover reduction as a result of this fire. This mapping may be further used to quantify erosion risk and sediment production through various models.

Geologic Response: As a result of ground cover by the fire, sediment may be transported into channels and/or result in debris-flows with higher probabilities along some of the moderate to steep canyons. Soils are exposed and have become weakened, and rocks on slopes have lost their supporting vegetation. Roads are at risk from rolling rock, plugged culverts, debris slides and debris flows. Stream channels and mountainside ephemeral channels will be flushed of the sediment that in some places is loose and deep, in other places shallow. That sediment will deposit in some channels, re-routing flow, raising flood levels, then covering roads or eroding road prisms. Recovery of pre-fire slope stability and watershed hydrologic response is dependent on many factors and typically occurs within 5-10 years following the fire. Recovery of high burn severity areas is slower because little or no vegetative ground cover remains, the potential for needle cast is low, and soils may be impacted by fire effects.

Vegetation Response: Grasses and forbs are expected to re-establish within 1-3 years, shrubs within 5-10 years, and mixed conifer including Douglas-fir, western larch, lodgepole pine, subalpine fir, and spruce within 20-50 years.

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

A comprehensive list of potential values at risk within or directly downstream of the burned area is being compiled for the interim report through consultation with local management and resource specialists and through BAER Team. This initial assessment is based on known values at risk derived through geospatial analysis of soil burn severity and transportation networks. Following guidance in Interim Directive 2520-2013-1, the BAER assessment team evaluated this list of values through field assessment and subsequent analysis to identify the critical values (FSM 2523.1 – Exhibit 01) that may be treated under the BAER program. The critical values were then assigned a level of risk defined by the probability of damage or loss coupled with the magnitude of consequences using the risk assessment matrix (Table 4). The critical values with unacceptable risks signify a burned-area emergency exists. The characterization of the probability of damage or loss is based on the watershed response analysis completed by the BAER Assessment.

Table 4: 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):

Potential threats to visitors/recreating public, residents of private lands, & Forest Service employees include flooding, hazard trees and rock fall, and loss of ingress and egress. These threats exist along roads, at recreation areas, and to permitted uses downstream or downslope of burned slopes, particularly in areas with a high or moderate soil burn severity. Risk is increased with higher probability in places having greater access and more frequent concentrations of people. Locations with increased risk include: road and trail systems within the high and moderate burn severity.

- a. **High** risk to travelers along routes (roads and trails) within and downslope from hillslopes burned at a moderate to high severity due to an increased threat of falling trees/snags, rocks, erosion, flooding, and other debris. National Forest System Road (NFSR) routes having the greatest concerns are to be determined, but estimated to represent approximately 6.2 miles of road where roads intersect areas of moderate and high severity. National Forest System Trail (NFST) routes having the greatest concern are estimated to represent 1.6 miles of trails where trails intersect areas of moderate and high severity. Treatment recommendations are installation of hazard warning signage, improve trail drainage, and monitoring to ensure treatments are functioning as intended.

- b. **High** risk to public and administrative personnel at trailheads due to the presence of hazard trees in areas of likely concentrated use. Treatment recommendations are, removal of site specific imminent hazard trees, and installation of hazard tree warning signage at the site to warn of potential threats.

2. Property (P):

There are 9.3 miles of National Forest System Roads (NFSR) within the fire area. There are 2.1 miles of National Forest System Trails (NFST) within the fire area. Post-burn conditions and the predicted watershed response indicate the potential for an increase in runoff and movement of sediment and debris downslope into roadway and trail drainage features, such as water bars, roadside ditches, culvert inlets, roadway dips and run outs. If these drainage features become impacted and overwhelmed by the increased runoff, their function can fail allowing uncontrolled water to divert, resulting in damage to the invested road and trail improvements, loss of road and trail function, and loss of access along road and trail segments.

- a. **Intermediate** risk to roads and associated infrastructure with damage expected because of flooding and erosion. The highest risk is associated with 6.2 of the 9.3 miles of NFSRs located in areas of moderate to high burn severity. Treatment recommendations are to improve road drainage features, install warning signage, and storm inspection and response monitoring to ensure treatments are functioning as intended.
- b. **Intermediate** risk to trail infrastructure with damage expected because of flooding, debris flows, and erosion. The highest risk is associated with 1.6 of the 2.1 miles of NFSTs located in areas of moderate to high burn severity. Visitor safety (being able to find trail) due to multiple crossing of trails by fire lines and extensive road work, and changed condition of trailheads used for staging or drop points. Treatment recommendations are improving drainage on sections of trail and install warning signs, along with monitoring to ensure treatments are functioning as intended.

3. Natural Resources (NR):

- a. **High** risk of expansion of noxious weed infestations at known locations along roadsides, logging decks, dozerlines and landings. Treatment recommendations are to spray and monitor these locations per the Early Detection Rapid Response treatment protocol.

4. Cultural and Heritage Resources: NA

5. Other non-BAER Values: NA

B. Emergency Treatment Objectives:

As noted above, threats to life, property, and natural resources from loss of water control, increased sediment delivery, and establishment of invasive weeds exist as a result of the fire. For these reasons the primary treatment objectives are:

- Mitigate and protect, to the extent possible, threats to personal injury or human life of forest visitors and Forest Service employees by raising awareness through posting hazard warning signs on roads, clearly marking trailheads and trail locations through the fire area, improving stream crossings, and communicate hazard of flooding, debris flows, and rock fall. Provide safe access to the burned area for personnel implementing authorized BAER response actions and communicate threats to cooperating agencies and community groups.
- Protect or minimize damage to NFS investments in roads infrastructure by installing drainage features capable of withstanding potential increased stream flows and/or debris flows. Minimize damage to key NFS travel routes.
- Protect or mitigate potential post-fire impacts to critical natural resources within the burned area. Implement treatments that minimize threats to naturalized ecosystems by minimizing the potential for expansion of non-native invasive species (NNIS) into the burned area; minimize expected

invasion of NNIS within and adjacent to the area where soils and vegetation was disturbed as a result of fire suppression activities.

- Evaluate authorized BAER treatments and existing infrastructure to determine effectiveness in post-fire flow conditions. Monitor weeds for effectiveness of BAER treatments and to identify need for future treatments.
- Assist cooperators, other local, State, and Federal agencies with the interpretation of the assessment findings to identify and address potential post-fire impacts to communities and residences, domestic water supplies, public utilities (including power lines, roads, and other infrastructure).

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

Land: 70%

Roads/Trails: 70%

Channel: N/A

Protection/Safety: 90%

D. Probability of Treatment Success

Table 5: Probability of Treatment Success

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

E. Cost of No-Action (Including Loss):

F. Cost of Selected Alternative (Including Loss):

F. Skills Represented on Burned-Area Survey Team:

- | | | | | |
|---|--|---|---|---|
| <input checked="" type="checkbox"/> Archaeology | <input checked="" type="checkbox"/> Botany/Weeds | <input type="checkbox"/> Ecology | <input type="checkbox"/> Economist | <input checked="" type="checkbox"/> Engineering |
| <input checked="" type="checkbox"/> Fisheries | <input type="checkbox"/> Forestry | <input checked="" type="checkbox"/> GIS | <input checked="" type="checkbox"/> Hydrology | <input type="checkbox"/> Range |
| <input checked="" type="checkbox"/> Recreation | <input checked="" type="checkbox"/> Soils | <input checked="" type="checkbox"/> Team Lead | <input checked="" type="checkbox"/> Wildlife | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Team Leader: Kenny Kindel

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Forest BAER Coordinator: John Carlson

Email: jwcarlson01@fs.fed.us **Phone:** 406-283-7634

Core Team Members:

Table 6: BAER Team Members by Skill

Skill	Team Member Name
Team Lead	Kenny Kindel
Archaeology	Cindy Hemry
Botany/Weeds	Matt Bienkowski
Engineering	Tim Rusdal
Fisheries	John Carlson
GIS	Annora Nelson
Hydrology	Kenny Kindel
Recreation	Mary Laws
Soils	John Gier
Wildlife	Jeremy Anderson

H. Treatment Narrative:**Land Treatments:****LT-1 Noxious Weed**

Invasive plants are known to spread into burnt fire areas. Early detection and rapid response (EDRR) will be used to minimize the potential for new noxious weed infestations and ensure the natural recovery of native perennial grasses and forbs. Invasive noxious weeds known to exist in and around the fire area include spotted knapweed, St. Johnswort, meadow and orange hawkweed, and oxeye daisy. Critical areas to consider for treatment include roads, fire lines, and trails. Treatments adjacent to roads used to access the fire perimeter or dozer fire line are the highest priority. These locations contain the seed source for weed spread into the burned area. The immediate need is to treat 45 acres within the fire area. The forest would implement EDRR following this year since invasive plant pressure can remain for many years after the fire.

Channel Treatments: None.

Roads and Trail Treatments:

RT-1 Road Drainage Maintenance (storm proofing): In areas with high and moderate burn severity there is an elevated threat to National Forest system roads, associated with increased runoff on burned slopes and stream channels. As runoff increases, there is a likely risk to road prism surfaces, drainage structures, and Human Life and Safety unless drainage maintenance treatments are used to minimize the effects of post-fire flows. Based on the high probability of drainage issues and magnitude of consequences with respect to replacement costs, and risk to Human Life and Safety, this treatment is seen as a preventative method to significantly mitigate associated risks of road failures.

This treatment is designed to mitigate threats to Human Life and Safety, National Forest system property, and other additional values, including emergency access, access for forest visitors and local residents, and potential risks to watershed values including water quality, aquatic habitat, and soil productivity. Approximately 9.3 miles of National Forest system roads are located within the fire perimeter. Road treatments would be done on open or seasonally open National Forest roads within these moderate and high severity areas, in total, 6.2 miles of road.

Treatment prescriptions for road drainage maintenance include: Cleaning and shaping all road drainage features such as drain dips, culvert inlets and outlets, and ditch cleaning. Cross drainage or additional ditch relief may be necessary to handle the additional movement of water. Culvert removal, water bars, stream rehabilitation, seeding, and weed treatment as appropriate.

Hazard trees would be removed that threaten human life and safety in areas where volunteers, partners, and FS personnel will be working for extended periods of time. Removal of hazard trees up to 2.5 tree lengths where appropriate

RT-2 Road Storm Inspection and Response: Road storm inspection may be needed the following spring and summer as many roads that are vulnerable to damage from post-fire runoff and erosion were not specified for maintenance treatments or culvert protection and upgrades downstream of high and moderate soil burn severity areas. On these roads, the proposed treatment is to evaluate the roads during or immediately after significant runoff-producing events in order to remove obstructions to road drainage and otherwise ensure that road drainage is functioning well enough to avoid severe damage or loss to the infrastructure. The success of this treatment will be monitored. If the treatment of storm inspection is unsuccessful alternatives will be developed for consideration and submitted under an interim request.

RT-3 Trail Drainage Maintenance: Many of the trails in the burned area are at high risk due to the burning of stabilizing brush, roots and logs. Current trail drainage features are not adequate to address

the anticipated increased runoff. Treatments are needed to provide sustainability of the trails and to prevent off-site impacts, should the trails erode or fail for the initial 1.6 miles.

Trail features will be constructed to standard as defined by USFS Trails Handbook 2309.18. Installation should be designed to last no more than 3 years. Permanent structures are not part of this treatment. If safety risks (e.g. hazard trees) cannot be mitigated for work crews, work will be delayed until threat is reduced or stabilized. Install drainage feature depending on steepness of trail in areas of moderate or high severity or those areas directly below moderate or high soil burn severity. Focus on sections of trail that have continuous gradient for a length of greater than 50 feet and are either insloped (cupped) or show evidence of routing water (rills, gullies). Hazards within or along the trail route that restrict efficient and safe access to work sites will be mitigated (rocks, trees). This treatment is designed to stabilize trails for anticipated increases in runoff. The stabilization methods may vary by site but are designed to reduce trail erosion or damage.

Treatment prescriptions for trail drainage maintenance include:

- Clean existing drainage features
- Installation of rolling grade dips and non-structure water bars
- Berm removal, bank stabilization and the installation of non-structure stream crossing
- Hazard trees would be removed that hazard trees that threaten human life and safety in areas where volunteers, partners, and FS personnel will be working for extended periods of time. Removal of hazard trees up to 2.5 tree lengths where appropriate.

Protection/Safety Treatments:

Working, travelling, and recreating in burned areas poses an elevated risk to Human Life and Safety.

PS-1 Hazard Warning and Location Signs: The purpose of this treatment is to acknowledge and alert forest employees and visitors to the existing threats associated with traveling routes (roads and trails) within and downstream of burned areas.

“Entering Burned Area” signs are needed to alert the public to possible threats to life and safety. These signs should contain language addressing risks that warrant heightened awareness such as falling trees, rolling rocks, and flash floods.

These warning signs should be posted in site-specific locations to alert travelers to upcoming dangers such as falling rocks, and “Flood Risk – No Parking or Standing”, etc. These signs will be located in strategic intersections to inform the traveler of their current location on the Forest Visitor Map and Motor Use Vehicle Map (MVUM). In most cases, these areas are located adjacent to the fire perimeter.

Administrative Closures: NA

BAER Evaluation

Assessment & Implementation Consultation and Coordination: Associated activities obligated under ID-FSM2520-2015-1 need to be considered in the BAER funding request when emergency response actions are authorized. These are accumulated tasks above the normal program of work and generally not accounted for in out-year program planning. Because implementation of approved BAER response actions trigger these required tasks and the unit’s allocated budget does not account for these obligations, BAER funding is the appropriate authorization to ensure this coordination and consultation is completed

I. Monitoring Narrative: To be developed

PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS

Kootenai National Forest

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									
LT-1 EDRR	acre	\$ 125	45	\$5,625	\$0		\$0	\$0	\$5,625
<i>Insert new items above this line!</i>				\$0	\$0		\$0	\$0	\$0
<i>Subtotal Land Treatments</i>				\$5,625	\$0		\$0	\$0	\$5,625
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-1 Road Drainage Mainte	mile	2,000	6.2	\$12,400	\$0		\$0	\$0	\$12,400
RT-1 Road Contract Design	each	1,500	1.0	\$1,500	\$0		\$0	\$0	\$1,500
RT-1 Road Hazard Tree Rem	mile	800	6.2	\$4,960	\$0		\$0	\$0	\$4,960
RT-2 Road Storm Inspection	days	700	5.0	\$3,500	\$0		\$0	\$0	\$3,500
RT-3 Trail Drainage Mainte	mile	3,050	1.6	\$4,880	\$0		\$0	\$0	\$4,880
RT-3 Trail Hazard Tree Rem	mile	630	1.6	\$1,008	\$0		\$0	\$0	\$1,008
<i>Insert new items above this line!</i>				\$0	\$0		\$0	\$0	\$0
<i>Subtotal Road and Trails</i>				\$28,248	\$0		\$0	\$0	\$28,248
D. Protection/Safety									
PS-1 Road hazard signs	each	150	10	\$1,500	\$0		\$0	\$0	\$1,500
PS-1 Trail hazard signs	each	150	12	\$1,800	\$0		\$0	\$0	\$1,800
<i>Insert new items above this line!</i>				\$0	\$0		\$0	\$0	\$0
<i>Subtotal Protection/Safety</i>				\$3,300	\$0		\$0	\$0	\$3,300
E. BAER Evaluation									
Initial Assessment	each	\$5,000	1	---	\$5,000		\$0	\$0	---
<i>Insert new items above this line!</i>				---	\$0		\$0	\$0	\$0
<i>Subtotal Evaluation</i>				\$0	\$5,000		\$0	\$0	\$0
F. Monitoring									
				\$0	\$0		\$0	\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0	\$0	\$0
<i>Subtotal Monitoring</i>				\$0	\$0		\$0	\$0	\$0
G. Totals				\$37,173	\$5,000		\$0	\$0	\$37,173
Previously approved									
Total for this request				\$37,173					

PART VII - APPROVALS

1. /s/ Quinn Carver (for): 10/04/2018
Chad Benson, Kootenai National Forest, Forest Supervisor Date
2. /s/ William E. Avey (for): 10/08/2018
Leanne Marten, Region 1, Regional Forester Date

