Date of Report: 09/08/2010

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[X] 1. Funding request for estimated emergency stabilization funds
[ ] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

[X] 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 Fire

B. Fire Number: MT-HNF-000080

C. State: Montana

D. County: Lewis and Clark

E. Region: 1

F. Forest: Helena NF

G. District: Lincoln RD

H. Fire Incident Job Code: P1FS9B

I. Date Fire Started: 08/26/2010

J. Date Fire Contained: 09/02/2010

K. Suppression Cost: $2.5 (as of 09/05/2010)

L. Fire Suppression Damages Repaired with Suppression Funds
1. **Fireline waterbarred (miles)**: Handline: 2.0 miles
2. **Fireline seeded (miles):**
3. **Other (identify):**

M. Watershed Number: Virginia Creek (100301011804)

N. Total Acres Burned:
[1426] NFS Acres [161] Other Federal [ ] State [354] Private

O. Vegetation Types: Ridgetops primarily consist of subalpine fir-whitebark pine/grouse whortleberry with hillslopes dominated by lodgepole pine/grouse whortleberry, subalpine fir/beargrass and subalpine fir/grouse whortleberry and/or huckleberry

P. Dominant Soils: Typic Cryochrepts, Typic Cryoboralfs, Mollic Cryoboralfs

Q. Geologic Types: Granitic/granodiorite ridges and ridge tops. Hillslopes are generally underlain by argillites and siltites and quartzites with interspersed areas of colluvium derived from basalt, metasedimentary and sandstone parent material. Drainage bottoms are mantled with glacial till and dispersed mill tailings

R. Miles of Stream Channels by Order or Class: 3.5 miles 1st-order, 2.1 mi 2nd-order

S. Transportation System (NFS)
Trails: The Continental Divide National Scenic Trail traverses the western edge of the burn
Roads**:** 2.9 miles NFS roads, 3.1 miles county administered roads on private land within Forest boundary—FS has maintenance agreement with county

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 434 **(low)** 1241 **(moderate)** 265 **(high)**

B. Water-Repellent Soil (acres):

C. Soil Erosion Hazard Rating (acres): Slight (1620 ac), Moderate (291 ac), Severe (30)

D. Erosion Potential: 8-14 tons/acre (ERMiT, 10% exceedance value)

E. Sediment Potential: exists—not quantified

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 5

B. Design Chance of Success, (percent): 60

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

D. Design Storm Duration, (hours): 6

E. Design Storm Magnitude, (inches): 1.1

F. Design Flow, (cubic feet / second/ square mile): 29

G. Estimated Reduction in Infiltration, (percent): 40

H. Adjusted Design Flow, (cfs per square mile using HY-8yielded 86): adjusted to125*

*****Following the Cave Gulch Fire located in the Big Belt Mountains approximately 20 air miles east of the Davis Fire the USGS measured three post fire debris entrained flows. These yielded 26,160, and 443 CFS/square mile (USGS Water-Resources Investigations Report 03-4319). The design prescribed for the Davis Fire culvert replacements are 8' pipe (squashed to 7 x 10' with beveled inlets) that will cary approximately330 cfs or about 125 cfs/square mile. Rip-rap protection will be given to fill slopes should overtopping of the culvets occur. These culverts will be imbeded in the channel bed to meet Regional aquatic organism passage criteria.

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:
The primary values at risk resulting from the Davis Fire are transportation infrastructure (roads and culverts), water quality, and native vegetation communities.

Infrastructure: Due to fire effects, the Gould Creek watershed is likely to generate higher stormflows in the first few years following the fire. Larger flow events in part are a function of increased surface runoff from bare hillslopes. Furthermore, burned and exposed soils are more susceptible to entrainment and transport to stream channels. This combination of increased runoff and greater susceptibility to erosion threatens transportation infrastructure. Poorly drained roads and undersized culverts are more likely to fail in the post-fire hydrologic setting. Within the fire perimeter, a Lewis & Clark County road (1884/1885) crosses Forest Service and private land. The Forest Service has an agreement with the County to assist with road maintenance. This road is important for access by FS personnel to the Gould and Bear Creek drainages, for short-term BAER and other post-fire restoration work, as well as long-term management. Three culverts on this road are undersized for post-fire 25-year flow volume. Additionally, County Road 1884/1885 as well as Forest Road 1848 (within the burn perimeter) are likely to convey greater runoff volume than in pre-fire conditions during snowmelt and rain events over the next few years. These segments of road are currently poorly drained, and are at risk of severe erosion. In addition to the road infrastructure, there is a cabin on a private inholding near the Forest boundary which is situated downslope from a steep (30-40%) draw that was burned at moderate to high

severity on NFS land. A debris flow originating in this draw would most likely damage the cabin.

Water quality: Gould Creek has not been assessed for impaired status by Montana Department of Environmental Quality (DEQ). However, extsensive past mining in this drainage has left large waste rock piles and extensive mill tailing deposits throughout the private (patented) land along the stream. While most of the waste rock piles are probably relatively low in contaminants, some of the deposits were determined to contain high levels of certain metals (Cd, Cu, Pb, Zn, Hg) in DEQ analyses done in 1995. Although many of the waste rock piles are below burned hillslopes, most were judged to be stable even in the face of potential debris flows. An exception is the waste rock pile at the Astor mine site (T13N R7W Section 23, NWNE), which is at the base of a burned hillslope concavity, and is bisected by a stream flowing from a collapsed adit roughly 200 yards upslope. A debris flow originating in this draw would likely entrain and transport some waste rock material to Gould Creek. Additionally, some of the potentially contaminated mill tailing deposits are located along Gould Creek, and are at risk of entrainment in a large flow event. Movement of mine waste materials from either of these areas threatens water quality in Gould Creek, as well as Virginia Creek downstream. Virginia Creek is on the Montana 303(d) list of impaired water bodies, with elevated metals concentrations (Cu, Pb, Zn). Hillslope failures or debris flows originating on any of the burned hillslopes in the Gould Creek drainage are likely to entrain at least some contaminated materials.

Native vegetation: Native vegetation communities and soil productivity are at risk from rapid expansion of noxious weeds from existing populations in the burn area vicinity. Roads within and leading to the burn perimeter, as well as private land along Gould Creek are heavily infested with noxious weeds. Known weed species include: Spotted knapweed, Dalmatian Toadflax, Canada thistle, and Musk Thistle.

B. Emergency Treatment Objectives:

Emergency treatment objectives are to protect roads and culverts within and immediately downstream of the burned area, to reduce the likelihood of hillslope runoff and stream flow entrainment of contaminated sediments, and to prevent the expansion of noxious weeds in areas burned in the fire, while providing for BAER implementation worker safety.

The HNF proposes to upgrade these undersized culverts to convey the post-fire 25-year event.

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

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

D. Probability of Treatment Success

	Years after Treatment		
	1	**3**	**5**
Land	80%	70%	60%
Channel	N/A		

Roads/Trails	80%	70%	50%
Protection/Safety	90%	70%	50%

E. Cost of No-Action (Including Loss): >$500,000 (est.)
The potential cost of no action includes the loss of three culverts on Gould Creek, severe erosion damage on several public roads needed for FS and public access, and transport and scouring of contaminated mining waste rock and tailings below FS hillslopes and along Gould Creek. The cost of repairing roads and stream crossings, remediation/clean-up of hazardous materials, and potential payments to private landowners for damage to lands along the Gould Creek valley bottom would most likely exceed the cost of the selected alternative.

The value of protecting the ecological integrity and soil productivity of the burned area from noxious weed infestation likely exceeds the cost of weed treatment and monitoring, although this was not quantified.

F. Cost of Selected Alternative (Including Loss): $312,800

G. Skills Represented on Burned-Area Survey Team:

[X] Hydrology	**[X] Soils**	**[X] Geology**	**[X] Range**
[ ] Forestry	**[ ] Wildlife**	**[ ] Fire Mgmt.**	**[X] Engineering**
[ ] Contracting	**[ ] Ecology**	**[X] Botany**	**[X] Archaeology**
[ ] Fisheries	**[ ] Research**	**[ ] Landscape Arch**	**[X] GIS**
[X] Weeds			

Team Leader: Dave Callery

Email: dcallery@fs.fed.us **Phone**: 406-495-3710 **FAX**: 406-449-5436

H. Treatment Narrative:
(Describe the emergency treatments, where and how they will be applied, and what they are intended to do. This information helps to determine qualifying treatments for the appropriate funding authorities. For seeding treatments, include species, application rates and species selection rationale.)

Land Treatments:
Areas within steep (>25%) hillslope concavities (draws) that burned at moderate to high severity are proposed for treatment using mulch and seeding. These areas are generally difficult to access and will require the use of a helicopter delivery system. The area above the Mannix cabin will be treated by hand crews due to the dense canopy in this area. These treatments will greatly reduce the probability of debris flow occurance in the critical first year following the fire, and facilitate the regrowth of native vegetation that will provide long-term site stability. Additionally, steep burned hillslopes above Forest Service (1848) and Lewis & Clark County (1884-1885) roads will be treated with mulch and seed delivered by a truck-mounted straw blower. This treatment will greatly reduce the probability of hillslope failure and subsequent road washout. These routes provide the only FS and public access to the

Gould Creek drainage, and are required for BAER treatments in 2010-2011, and likely out-year post-fire silvicultural work. In compliance with the Wyden Amendment, an MOU will be confirmed with Lewis & Clark County prior to implementation. Mulch and seed will adhere to the following parameters:

- Mulch will be woodstraw or certified weed-free straw
- Seed mix will be either (or a mix of) winter wheat or cereal rye, 7-10 lbs/acre, certified weed-seed-free, pure live seed

Areas infested with noxious weeds will be treated within the burn perimeter to reduce the probability of spread into uninfested burned areas. Treatment will include known populations on FS and private inholdings using the Wyden authority. MOUs with landowners are not complete, and so this request does not include funds to treat private lands—this will be included in a supplemental request. Treatment of land in private inholdings is critical to prevention of weed spread to FS land, as the private lands are most heavily infested and are surrounded by burned FS land. All of this work will be accomplished using ground-based equipment. In 2010-11, existing weed populations will be treated. If subsequent monitoring identifies weeds populations not effectively removed with initial treatment, additional treatment will be planned, and funds requested in an interim request. Treatment will include the following:

- Spraying in spring/early summer 2011 before weeds begin to seed
- Using approved herbicides and application techniques based on weed species, topography and environmental factors, in compliance with HNF Weeds EIS

BLM-managed land within the burn perimeter will also be treated for weeds through the BLM BAER program in conjunction with the FS effort.

Channel Treatments: No channel treatment prescribed at this time.

Roads and Trail Treatments:
Three culverts on the county road will be upgraded to allow the passage of the post-fire ten-year flow event. Two of these culverts are on county ROW—one on private and one on FS. The third culvert is in a private inholding immediately upstream of the FS pipe. The county culvert is about 1/8 mile downstream from the Forest boundary. The county pipe will be replaced in keeping with a maintenance MOU with the county. The private culvert will be replaced in order to protect FS resources—the failure of this upper culvert would likely result in a surge of flood debris and sediment that would likely cause the failure of the lower two culverts to be replaced (breach hydrology), in addition to impacting water quality in a FS-managed portion of Gould Creek and downstream. MOUs exist for both non-FS pipes in compliance with the Wyden Amendment authority.

Protection/Safety Treatments:
To provide for worker safety during implementation of roadside mulching, hazard trees along the routes mentioned above will be removed.

I. Monitoring Narrative:
(Describe the monitoring needs, what treatments will be monitored, how they will be monitored, and when monitoring will occur. A detailed monitoring plan must be submitted as a separate document to the Regional BAER coordinator.)

Monitoring of hillslope and road treatments will occur during and after implementation in 2010 to ensure that treatment objectives are met. Hillslope and road treatments will be monitored again after snowmelt and during the summer to evaluate effectiveness. In September 2010, one or more tipping-bucket rain gauges will be installed to monitor precipitation in the drainage, and a recording pressure transducer will be installed in Gould Creek near the Forest boundary. These instruments will provide useful data when compared to assessments of treatment effectiveness following subsequent precipitation and runoff events.

In 2011 all of the known areas of infestation will be re-surveyed by HNF Weeds staff. Any noxious weed populations not effectively treated during initial treatment efforts will be targeted for additional herbicide application.

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

			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											
herbicide application	Acre	130	90	$11,700	$0			$0		$0	$11,700
heli-mulch/seed	Acre	1100	190	$209,000	$0			$0		$0	$209,000
road-based mulch/see	Acre	200	50	$10,000	$0			$0		$0	$10,000
hand-crew mulch/seed	Acre	500	8	$4,000	$0						
straw-bale check dam	each	400	12	$4,800	$0			$0		$0	$4,800
Insert new items above this line!				$239,500	$0			$0		$0	$235,500
Subtotal Land Treatments											
B. Channel Treatments								$0		$0	$0
Insert new items above this line!				$0	$0			$0		$0	$0
Subtotal Channel Treat.				$0	$0						
C. Road and Trails								$0		$0	$0
upgrade 3 culverts	each	16,800	3	$50,400	$0			$0		$0	$50,400
waterbars on roads	each	300	35	$10,500	$0			$0		$0	$10,500
				$0	$0			$0		$0	$0
Insert new items above this line!				$60,900	$0			$0		$0	$60,900
Subtotal Road & Trails											
D. Protection/Safety								$0		$0	$0
removal of hazard tree	miles	4000	1	$4,000	$0			$0		$0	$4,000
				$0	$0			$0		$0	$0
Insert new items above this line!								$0		$0	$0
Subtotal Protection/Safety				$4,000	$0			$0		$0	$4,000
E. BAER Evaluation											
Assessment	lump	6300	1	$6,300				$0		$0	$0
Insert new items above this line!				---	$0			$0		$0	$0
Subtotal Evaluation				$6,300	$0			$0		$0	$0
F. Monitoring											
instruments	each	500	3	$1,500	$0						
watershed monitoring	days	600	10	$6,000	$0						
weed monitoring	Acre	20	150	$3,000	$0			$0		$0	$3,000
Insert new items above this line!				$0	$0			$0		$0	$0
Subtotal Monitoring				$10,500	$0			$0		$0	$3,000
G. Totals				$321,200	$0			**$0**		**$0**	**$303,400**
Previously approved				$0							
Total for this request				**$321,200**							

PART VII - APPROVALS

1. _____ _____
Forest Supervisor (signature) Date

2. _____ _____
Regional Forester (signature) Date