

BURNED-AREA REPORT
(Reference FSH 2509.13)**PART I - TYPE OF REQUEST****A. Type of Report**

- ☒ 1. Funding request for estimated WFSU-SULT funds
☐ 2. Accomplishment Report
☐ 3. No Treatment Recommendation

B. Type of Action

- ☒ 1. Initial Request (Best estimate of funds needed to complete eligible rehabilitation 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:** Battle Creek**B. Fire Number:** P21449**C. State:** South Dakota**D. County:** Pennington**E. Region:** 02**F. Forest:** Black Hills**G. District:** Mystic**H. Date Fire Started:** 8-16-02**I. Date Fire Contained:** 8-25-2002**J. Suppression Cost:** \$7,000,000**K. Fire Suppression Damages Repaired with Suppression Funds**

1. Fireline waterbarred (miles): 50
2. Fireline seeded (miles): 3
3. Other (identify): Flume Trail drainage

L. Watershed Numbers: 101201090604, 101201090502, 101201090501**M. Total Acres Burned:** 13,700

NFS Acres(10,399) Other Federal () State () Private (3301)

N. Vegetation Types: Ponderosa pine (85%), grass (10%), bur oak (4%), other hardwoods (1%)**O. Dominant Soils:** Various complexes comprized of combinations of Pactola, Virkula, Vanocken, Citadel, Sawdust, Buska, Paunsaugunt, Gurney, Hapdraw, Lakoa**P. Geologic Types:**Madison (Pahasapa) limestone and Englewood formation, Deadwood formation, Minnelusa formation, metamorphosed graywacke.**Q. Miles of Stream Channels by Order or Class:**

Order 1: 28.4 miles, Order 2: 14.3 miles, Order 3: 11.0 miles, Order 4: 5.4 miles, Order 5: 1.7 miles

R. Transportation System

Trails: 1 mile Roads: 55 miles system roads, 31.8 non-system roads

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 5199 (low) 2808 (moderate) 2392 (high)

B. Water-Repellent Soil (acres): 2423

C. Soil Erosion Hazard Rating (acres):

1307 (low) 6995 (moderate) 4149 (high)
10% 56% 33%

D. Erosion Potential: 63 tons/acre

E. Sediment Potential: 1620 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 3-5

B. Design Chance of Success, (percent): 73

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

D. Design Storm Duration, (hours): 1 yr

E. Design Storm Magnitude, (inches): 1.86

F. Design Flow, (cubic feet / second/ square mile): 12

G. Estimated Reduction in Infiltration, (percent): 24

H. Adjusted Design Flow, (cfs per square mile): 280

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency:

Threats to Life and Property

Field reviews within the burned area and downstream of the burned area confirm that threats to life are unlikely except for ashflows and rock on Highway 16. Threats to property are somewhat likely. There are several homes and outbuildings that are located in or near the floodplain or at the mouth of a drainage. The impact will be wet foundations and ash and sediment deposits. There are numerous culverts on State Highway, County Roads and Forest Service roads that could be impacted. Tourist traffic crosses Foster Gulch to get to Rushmore Cave.

Threats to Long-Term Soil Productivity and Ecosystem Integrity

Field reviews indicate potential threats to long-term soil productivity and ecosystem integrity. Observations from this and other fires suggest that there will likely be an increase in noxious weed infestation, from Canada Thistle and Leafy Spurge. All burned areas and especially those with moderate and high burn severity that are invaded by noxious weeds will cause a decline in soil quality and productivity. Degradation of soil quality generally leads to increased erosion rates and sediment yield, causing further impacts to soil productivity and water quality.

Maintaining soil quality is necessary for long-term soil productivity and ecosystem integrity. Key soil quality factors include infiltration, absorptivity, water holding capacity, ion exchange capacity, carbon and nitrogen cycling, and soil food web status.

Threats to Water Quality

Water quality in Battle Creek, Tepee Gulch and Foster Gulch will be impacted. Battle Creek is 303(d) listed for pH, temperature, and ammonia. The fisheries in Battle Creek could also be impacted. Salmonid species present at a South Dakota Game, Fish and Parks fisheries survey

point south of Hayward on Battle Creek in 1994 included: brook, brown, hatchery brown, rainbow, hatchery rainbow, and unidentified young of the year trout. Non-salmonid fish consisted of: fathead minnow, longnose dace, mountain and white sucker. The impact and increase of sediment is expected to be short-term.

B. Emergency Treatment Objectives:

- 1) To reduce erosion and sedimentation from burned areas.
- 2) To protect crews installing drainage and erosion control measures along roads and trails and increase public safety by removing hazard trees.
- 3) To reduce concentration of water and subsequent erosion on Forest system roads and reduce erosion and sedimentation on the downslope side of roads.
- 4) To prevent expansion of noxious weeds in the burned area.

C. Probability of Completing Treatment Prior to First Major Damage-Producing Storm:

Land 90 % Channel 90 % Roads 90 % Other %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	70	80	90
Channel	80	90	100
Roads	80	90	100
Other			

E. Cost of No-Action (Including Loss): 387,955

F. Cost of Selected Alternative (Including Loss): 325,944

G. Skills Represented on Burned-Area Survey Team:

<input checked="" type="checkbox"/> Hydrology	<input checked="" type="checkbox"/> Soils	<input type="checkbox"/> Geology	<input checked="" type="checkbox"/> Range
<input checked="" type="checkbox"/> Forestry	<input checked="" type="checkbox"/> Wildlife	<input checked="" type="checkbox"/> Fire Mgmt.	<input checked="" type="checkbox"/> Engineering
<input type="checkbox"/> Contracting	<input type="checkbox"/> Ecology	<input type="checkbox"/> Botany	<input checked="" type="checkbox"/> Archaeology
<input type="checkbox"/> Fisheries	<input type="checkbox"/> Research	<input type="checkbox"/> Landscape Arch	<input checked="" type="checkbox"/> GIS

Team Leader: Mark Story

Email: mtstory@fs.fed.us

Phone: (406) 587-6713

FAX: (406) 587-6758

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:

- *Noxious Weeds*

Method

Previously weed-free areas adjacent to known populations will be treated with hand pulling or herbicides for next 3 years (approximately 233 acres).

Expansions of noxious weed infestations identified by noxious weed monitoring will be hand pulled or treated with herbicides for up to 3 years. Interim funding requests to treat any expansion of noxious weeds will be submitted in subsequent years.

Objective

Due to disturbance by the fire, weed expansions are likely. Treatments will reduce expansions into previously unpopulated areas.

- *Early Warning System*

Method

Install an automated rain gage and Data Collection Platform (DCP) with GOES telemetry within the burn area on the watershed divide between Foster Gulch and Deadman Gulch. The rain gage will be installed and operated by the USGS.

Objective

The rain gage will augment the existing telemetry rain gage system in South Dakota which provides data to the National Weather Service. The gage will be very useful in allowing the National Weather Service to forecast flood events originating in the burned area above the largest concentration of values at risk associated with the Battle Creek fire. The gage will enhance warning/watch/forecast capability for the National Weather Service and Pennington County Emergency Services to evacuate the area when flood hazards are imminent.

Channel Treatments:

- *Straw Bale Check Dams*

Method

Install 4 strawbale check dams above the Highway 16 culvert above Rockerville.

Objective

To protect a Highway 16 culvert above Rockerville.

Roads and Trail Treatments:

- *Culvert and Ditch Cleaning*

Method

Clean all ditches, outlets and drainage structures in 55.5 miles of system roads and 20 miles of unclassified roads for a total of 75.5 miles.

Objective

This treatment will improve the existing structure's ability to handle storm runoff.

- *Install Grade Dips*

Method

Overflow grade dips are installed just downgrade of road/stream crossing structures or at the lowest elevation of a through fill to insure the over topping stream flow is safely (i.e. armored outflow if necessary) directed back into its natural channel. The grade dips will be designed to drain water off of the road, but still allow motorized vehicle crossing. The dips are typically skewed 30 degrees and the outlets will be armored with riprap in most areas, particularly those in close proximity to the streams or on a vulnerable fill slope. An estimated 6 dips are needed.

Standard grade dips are additions to the existing grade dips and are designed to handle increased runoff by dispersing the flows quickly. An estimated 140 dips are required.

Grade dips with armor are similar to grade dips with the addition of rock on the bottom and outlet to limit erosion. An estimated 140 dips are required.

Objective

This treatment will decrease the threat from flood damage on roads and delivery of sediment to down slopes and streams by draining water from road surfaces in moderate and high severity burn areas.

- *Drop Inlet installation*

- Method

- Install one drop inlet on the Boulder Hill Road #358.

- Objective

- This treatment will ensure water flow through the culvert on the Boulder Hill Road if the culvert becomes plugged from increased sediment flow due to the burned area.

- *Template Restoration*

- Method

- Modify the traveled way template of the Baretta Rd #366 to conform to the undamaged portion (14ft) for approximately 1.5 miles.

- Objective

- This treatment will divert the increased flow of water and sediment from the existing road template.

- *Signing replacement and installation*

- Method

- General warning signs, trail sign, and road signs will be installed/replaced.

- Objective

- This treatment will provide warning and direction to users in the burned areas.

- *Hazard tree removal and analysis*

- Method

- Obvious hazards trees will be removed along all open roads and trails within the burned areas. About 1400 hazard trees occur on about 28 miles of road that are imminent safety hazards to crews doing BAER work and to the public. Additionally a hazard tree assessment will be conducted to determine further needs.

- Objective

- This treatment reduces the chance for damage to life or property by reducing the risk of trees falling on employees or the public.

- *Unclassified road assessment*

- Method

- Thirty-two (32) miles of unclassified roads are located within the burned area. Twelve (12) miles of these roads are within the moderate and high severity areas. These roads that are currently not on the transportation system, are typically very poorly constructed and have a high likelihood of contributing to erosion and sedimentation due to insufficient drainage. An assessment needs to be conducted to determine the extent of stabilization treatment.

- Objective

- This treatment will restore slope hydrology and facilitate the storage of water on the slopes, to help eliminate the overall water yield and threat of flooding. This treatment also decreases the threat of soil erosion and sediment delivery to streams by reducing the chance of road fill failure onto slopes or streams

- *Flume trail mitigation (cultural resource protection)*

- Method

- One (1) mile of the historic flume trail lies within the burned area. One silt fence or hay bale silt barrier is recommended immediately upslope from the structure. Approximately 100 hazard trees need to be felled.

- Objective

- This treatment will help protect a historic rock drainage structure that is threatened by increased siltation and damage from falling trees from the burned area.

- *Cultural resource assessment*

Method

Map and/or ground review for cultural resource clearance of road and trail BAER implementation. This will occur for each of the ground disturbing road BAER treatments at approximately 250 sites.

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.)

Cultural Resource Monitoring

The purpose of monitoring this treatment is to determine the effectiveness of proposed treatments for the flume trail which will be implemented for heritage resource protection and to determine additional impacts to the site due to the fire. The monitoring will be completed by conducting site visits in the spring of 2003, 2004, and 2005. It will be performed by two U.S. Forest Service archeologists. A detailed monitoring plan and request for funding will be submitted each year.

Noxious Weed Monitoring

The purpose of monitoring this treatment is to monitor areas near existing weed infestations to determine if spreading is occurring. Monitor areas for up to three years for presence and persistence of invasive species including but not limited to Canada thistle, leafy spurge, and common mullein.

Known noxious weed sites within the fire perimeter totals approximately 1,099.64 Acres. Rate of spread could be as high as 30 to 40 percent in areas with ground disturbance.

Monitoring will be conducted from mid May through mid October of 2003, 2004, and 2005 by two U.S. Forest Service technicians and one leader. A detailed monitoring and request for funding will be submitted each year.

Part VI – Emergency Rehabilitation Treatments and Source of Funds by Land Ownership

			NFS Lands				Other Lands			All	
		Unit	# of	WFSU	Other \$		# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	SULT \$		units	\$	Units	\$	\$	
A. Land Treatments											
weed treatments	acres	233	127	\$29,591			\$0		\$0	\$29,591	
hazard trees	each	10	1400	\$14,000			\$0			\$14,000	
hazard tree assmt	each	1	1000	\$1,000			\$0		\$0	\$1,000	
Early wrng pcp gage	each	23125	1	\$23,125			\$0		\$0	\$23,125	
Subtotal Land Treatments				\$67,716			\$0		\$0	\$79,142	
B. Channel Treatments											
straw bale ck dams	each	325	4	\$1,300			\$0		\$0	\$1,300	
				\$0			\$0		\$0	\$0	
				\$0			\$0		\$0	\$0	
				\$0			\$0		\$0	\$0	
Subtotal Channel Treat.				\$1,300			\$0		\$0	\$1,300	
C. Road and Trails											
clvrt and dtch clng	miles	298	75.5	\$22,499			\$0		\$0	\$22,499	
overflow drain dips	each	1300	6	\$7,800			\$0		\$0	\$7,800	
standard grade dips	each	321	140	\$44,940			\$0		\$0	\$44,940	
armored grade dips	each	693	140	\$97,020			\$0		\$0	\$97,020	
drop inlet	each	800	1	\$800			\$0		\$0	\$800	
safety sign replmt	each	430	5	\$2,150			\$0		\$0	\$2,150	
template restoration	each	6600	1	\$6,600			\$0		\$0	\$6,600	
unclassifd rd asmt	each	5000	1	\$5,000			\$0		\$0	\$5,000	
trail silt barrier	each	500	1	\$500			\$0		\$0	\$500	
storm patrols	each	200	4	\$800			\$0		\$0	\$800	
cultural resource prot	each	6426	1	\$6,426			\$0		\$0	\$6,426	
cultural resc assemnt	each	20	250	\$5,000			\$0		\$0	\$5,000	
Subtotal Road & Trails				\$199,535			\$0		\$0	\$199,535	
D. Structures											
				\$0			\$0		\$0	\$0	
				\$0			\$0		\$0	\$0	
				\$0			\$0		\$0	\$0	
				\$0			\$0		\$0	\$0	
Subtotal Structures				\$0			\$0		\$0	\$0	
E. BAER Evaluation											
BAER team	each	54700	1	\$54,700			\$0		\$0	\$54,700	
F. Monitoring											\$0
cultural resource	each	3045	1	\$3,045							\$3,045
weeds		24000	1	\$24,000							\$24,000
G. Totals				\$350,296							\$350,296

PART VII - APPROVALS

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|----|-------------------------------|------------------|
| 1) | <u>/s/ John C. Twiss</u> | <u>9/03/02</u> |
| | Forest Supervisor (signature) | Date |
| | | |
| 2) | <u>/s/Richard Stem (for)</u> | <u>9 Sept 02</u> |
| | Rick D. Cables | Date |
| | Regional Forester (signature) | |