USDA-FOREST SERVICE FS-2500-8 (7/00)

Date of Report:

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[x] 1. Funding request for estimated WFSU-SULT funds
[ ] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

[x] 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: Magpie Fire

B. Fire Number: P1BB3A

C. State: ND

D. County: Billings

E. Region: 01

F. Forest: Dakota Prairie Grasslands

G. District: Medora Ranger District

H. Date Fire Started: August 15, 2004

I. Date Fire Contained: August 18, 2004

J. Suppression Cost: $180,000

K. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): .25
2. Fireline seeded (miles): 0
3. Other (identify): Dozer lines will be rehabilitated by grading berms across disturbed areas. Approximately 1.25 miles of dozer lines were bladed. A cultural site disturbed by suppression efforts will be mitigated.

L. L. Watershed Numbers: (1) HUC 8: 10110203 (Middle Little Missouri River)
HUC 10: 1011020312 (Whitetail Creek)
HUC 12: 101102031203 (Lower Whitetail Creek)
(2) HUC 8: 10110205 (Lower Little Missouri River)
HUC 10: 1011020501 (Magpie Creek)
HUC 12: 101102050102 (unnamed)

M. Total Acres Burned: 1525
NFS Acres(930) Other Federal ( ) State (560) Private (35)

N. Vegetation Types: Rocky Mountain juniper woodlands, Green ash woodlands, needle-and-thread/thread-leaved sedge grasslands, little bluestem/thread-leaved sedge grasslands, prairie sandreed grasslands,

O. Dominant Soils:

Map Unit Name (mapped as soil assemblages by NRCS)	COUNT	SUM_ACRES
Badland	2	54.0000
Badland-Arikara-Cabbart-complex--15-to-75-percent-slopes	5	621.0000
Badland-Cabbart-complex--6-to-50-percent-slopes	9	172.0000
Badland-Patent-complex--6-to-25-percent-slopes	1	18.0000
Boxwell-Kremlin-loams--1-to-6-percent-slopes	1	4.0000
Cabbart-Badland-complex--6-to-70-percent-slopes	2	115.0000
Cabbart-Boxwell-Arikara-complex--9-to-50-percent-slopes	2	144.0000
Cabbart-Boxwell-Arikara-complex--9-to-70-percent-slopes	3	227.0000
Lonna-Cabbart-silt-loams--6-to-35-percent-slopes	1	28.0000
Patent-Badland-Cabbart-complex--6-to-45-percent-slopes	9	259.0000
Rhame-Chinook-fine-sandy-loams--6-to-15-percent-slopes	2	88.0000
Rhame-Fleak-fine-sandy-loams--15-to-50-percent-slopes	7	238.0000
Rhame-Maltese-Kremlin-complex--1-to-15-percent-slopes	1	22.0000

Brief description of major soil map units:

Badland—areas of outcrop, see Geologic Formations below, especially Sentinel Butte and Bullion Creek formations

Arikara—Shallow soil on steep slopes, generally vegetated with stands of juniper and/or green ash

Cabbart—Shallow, well drained, weakly developed (Aridic Ustorthents) soils on steep slopes formed in material derived from semiconsolidated loamy seidmenetary beds, generally vegetated in grass.

Lonna—Very deep, well drained (Aridic Haplustepts) soils formed in alluvium derived from semiconsolidated loamy sedimentary beds and found associated with alluvial fans, terraces, and pediments. Slopes are gentle to moderate, and primary vegetation is grass.

Patent—Very deep, well drained (Aridic Ustorthents) soils formed in recent alluvium deposited on fans and pediments. Slopes are gently to moderate, and primary vegetation is grass and shrubs.

Rhame—Moderately deep, well drained (Aridic Haplustolls) soil formed in material weathered from soft sandstone. Rhame soils are found on gentle to steep uplands, and the primary vegetation is grass and upland sedges.

P. Geologic Types: Geologic Formations:

a. Sentinel Butte Formation and Bullion Creek Formation, both Paleocene age: These Paleocene formations are interbedded deposits of bentonite, lignite, sandstone, siltstone, claystone, and clinker. Units are weakly lithified, easily weathered, and readily eroded by wind and/or running water. Much of the steep, badlands slopes are unvegetated or sparsely vegetated outcrops of these two formations.
b. Modern alluvium and Holocene alluvium in floodplains, beneath terraces, and on fans: The alluvial fill is readily eroded. Many headcuts and gullies have formed in the alluvium of the burnt watersheds. The headcuts and gullies are vulnerable to expansion until the burnt areas acquire adequate vegetal cover.
c. Landslide deposits, primarily on north-facing slopes.

Q. Miles of Stream Channels by Order or Class: Order 2: 5 miles, Order 3: 3 miles

R. Transportation System

Trails: 0 miles Roads: 7 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 20 (low) 60 (moderate) 20 (high)

B. Water-Repellent Soil (acres): None observed

C. Soil Erosion Hazard Rating (acres):
40% (low) 40% (moderate) 20% (high)

A. D. Erosion Potential: Erosion Potential: Average of 10-50 tons per acre. 5-10 tons per acre is susceptible to wind erosion given the ubiquitous cover of silt on ground surface. Steep, severely burned hillsopes are likely to have 50 tons/acre of erosion related to rilling. Moderate and lightly burned areas have enough root structure remaining to limit soil loss to wind erosion and light loss due to running water.

B. E. Sediment Potential: Not calculated. Sediment yield will be high due to steep topography throughout burn area. Estimate sediment-yield delivery ratio of greater than 50% of sediment detatched.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 1 year on slopes with grass vegetation types or valley bottoms with mixed grassland and decidous woodland vegetation types. 2 year on slopes with Rocky Mountain Juniper due to lack of living root material left in soil.

B. Design Chance of Success, (percent): 75%, i.e. 3 out of four years ordinary precipitation patterns will permit vegetation to re-establish and will generate runoff events that will not exceed capacity of existing culverts and reservoirs.

C. Equivalent Design Recurrence Interval, (years): For the purpose of sizing culverts on FS system and county roads, 50-yr and 100-year storms are used.

D. Design Storm Duration, (hours): For Anderson Coulee (largest drainage within burn area at 1590 acres) the time of concentration is less than one-hour. A thirty-minute storm is used as the design storm.

E. Design Storm Magnitude, (inches): From Herschfield, 1961, the magnitude of 50-year, 30 minute, and 100-year, 30-minute is 1.8 and 2.0 inches, respectively

F. Design Flow, (cubic feet / second/ square mile): For Anderson Coulee: 1520 to 2380 cfs in Anderson Coulee (1590 acres) for 50-yr, 30-minute storm (using SCS-TR-55 method) and for 100-yr, 30-minute storm (using Rational Method, respectively). These flows, normalized to one square mile, are 610 to 960 cfs/square mile.

G. Estimated Reduction in Infiltration, (percent): 40% [NOTE: approximately 20% to 25% of burn area was unvegetated outcrop and hence had no change in infiltration capacity. All of the moderately and severely burned juniper stands will have reduced infiltration capacity because of the loss of duff on the ground and interception by the trees above ground. Areas covered by graminoid vegetation will show modest reduction in infiltration capacity, but not much of a reduction overall.

H. Adjusted Design Flow, (cfs per square mile): None. Steep topography, thin soils, and high percentage of impervious outcrop lead to already high runoff estimates, with or without vegetation

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency:

The wildfire burned through an area with several access roads leading to oil facilities. Increased sediment and runoff pose threats to several points along these roads. Current culverts will not be able to handle additional water or sediment. Without road access, oil wells and associated facilities could potentially be impacted, resulting in costly lost oil production.

The area also provides access to public recreation destinations. Because of new trails created by suppression vehicles, some areas now appear accessible to the public and access in the newly burned areas poses a threat to humans and resources.

B. Emergency Treatment Objectives:

Improve drainage adjacent to roads to reduce sedimentation, damage to roads, and threats to public safety. Reduce threat from hazard trees on road. Maintain road network leading to oil and gas facilities. Reduce noxious weed invasion from one known noxious weed population. Prevent public access off roads in the area in order to reduce threats to public safety and reduce compaction and resource damage from unathorized vehicles.

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

Land **80** % Channel 60 % Roads **60** % Other 60 %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	75%	75%	100%
Channel	75%	75%	100%
Roads	60	80	100
Other			

E. Cost of No-Action (Including Loss): **$61,000**

F. Cost of Selected Alternative (Including Loss): **$22,736**

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Darla Lenz

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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:

Cutting of hazard trees. $300 to cut and place hazard trees to reduce safety threat and stabilize slope above oil access road. (T 144 N/R 101 W, se Sec. 21)

Treat Canada thistle infestation. $150

Placement of area closure signs and fencing of unauthorized access points. 10 signs needed, plus appropriate stickers. Fencing supplies. $1570.

Channel Treatments:

Repair of breached dam to create sediment trap and to attenuate runoff (T144N/R101W, se Sec. 9); (estimated cost $1250) Seeding $100

This obsolete stock pond (now replaced with stock tank) is breached. Repair will help to attenuate discharge and trap sediment before reaches the culvert on FS road 712 in the nw1/4sw1/4 of Section 10. FS road 712 is a major artery through a heavily traveled oil field and recreation area of the Medora ranger district.

Culverts on Anderson Coulee with glory hole on downstream side and high debris pile on upstream side (1600 acres) (No treatment prescribed)

Calculations for peak discharge from 50- and 100-year storms would generate discharge of an estimated 1520 to 2380 cfs at the culvert beneath FS road 711A8. At present there is a 96-inch culvert at this road crossing in Anderson Coulee. Even at a water velocity of 6 feet per second, this culvert may be grossly undersized to handle the increased discharge from a moderate- to high-intensity storm. This is a private oil road and is not heavily traveled by the public.

Repair breached dam on east side of Anderson Coulee ($1175) Seeding $100

Another small stock dam will protect the culvert on FS road 711A6 in T144N/R101W, se Sec. 9. The dam's spillway is breached. Also, the spillway has a stabilized headwall. The additional expected sediment and runoff will likely activate the headwall and threaten the integrity of the culvert. A better strategy would be to remove a berm that separates the spillway from the culvert that handled the pre-dam drainage beneath the road. The material from the berm could be used to patch an eroded part of the spillway along the dam, fill the headwall in the spillway beneath the dam, and direct water back toward the culvert along the pre-dam drainageway. This drainage way does not have any headwalls, has more protective vegetation cover on the banks and is geomorphically more stable than the drainageway that conveys discharge from the current spillway.

Roads and Trail Treatments:

Repair 4 Culverts on road with hazard trees and downslope from hazard trees. $1100 to repair culverts.

A road with steep gradient (>6%) is cut across a steeper slope that suffered severe burning of a juniper stand. Small landslides indicate that the slope is not stable and erosion from hillslope will likely be very high (> or = 50 tons/acre). The road has four culverts. The roadway must be re-graded to remove a suppression-line berm and to expose the inlet of the four culverts. At least one of the culverts is partially bent and should be pried open on the inlet side. Downstream end of at least one culvert is a few feet above the ground surface. Surface hardening beneath this end of the culvert is recommended to prevent excess erosion on the burnt hillside. The ground beneath the culvert opening could be hardened with rock or a geo-textile.

Rehabilitate dozer lines and road berms (Dozer lines $875, water bars $750, and road berms $850. Funded with fire suppression $)

The dozer lines and roads that were dozed to widen the fire line should be re-graded to provide proper roadway drainage. Water bars should be placed on the dozer line anywhere that the slope exceeds 5% or the where slope length exceeds a combination of 250 feet and 3% slope.

Structures:

Placement of silt fence/bales above oil and gas access road. $600 to purchase and $500 to place silt fence and bales (T 144 N/R 101 W, se Sec. 21)
A road with steep gradient (>6%) is cut across a steeper slope that suffered severe burning of a juniper stand. Small landslides indicate that the slope is not stable and erosion from hillslope will likely be very high (> or = 50 tons/acre). The road has four culverts. The roadway must be re-graded to remove a suppression-line berm and to expose the inlet of the four culverts. The hillslope above the culverts and road should contain some sediment control features, either downed trees oriented parallel to contours, or a sedimentation fence and/or staked straw bales. At least one of the culverts is partially bent and should be pried open on the inlet side.

I. Monitoring Narrative:

The burn area has a relatively high density of Forest Service, county, and private oil roads. The area should be patrolled after the spring snowmelt and after every rainstorm of a quarter-inch of precipitation or more. All culverts should be examined to determine if sediment and woody debris are clogging the inlets. The ground surface below outlets of culverts should be examined for signs of excessive erosion. Post-storm patrols will most likely be needed during the next two years or until the density of vegetation cover approximates that of pre-fire conditions.

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

A. Land Treatments										
Cutting hazard trees	1	300	1	$300	$0		$0		$0	$300
Treat noxious weeds	1	150	1	$150	$0		$0		$0	$150
Closure signs	1	150	10	$1,500	$0		$0		$0	$1,500
Fencing	1	160	1	$160						
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$2,110	$0		$0		$0	$1,950
B. Channel Treatments										
Sediment dam	1	1250	1	$1,250	$0		$0		$0	$1,250
Sediment dam	1	1175	1	$1,175	$0		$0		$0	$1,175
Seed	1	100	2	$200	$0		$0		$0	$200
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Channel Treat.				$2,625	$0		$0		$0	$2,625
C. Road and Trails										
Repair culverts	1	275	4	$1,100	$0		$0		$0	$1,100
Rehabilitate roads	1	150	3		$450		$0		$0	$450
Water bars	1	50	15		$750					
Rehabiliate dozer lines	1	583	1.5		$875		$0		$0	$875
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road & Trails				$1,100	$2,075		$0		$0	$2,425
D. Structures										
Silt fence/bales	1	1100	1	$1,100	$0		$0		$0	$1,100
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Structures				$1,100	$0		$0		$0	$1,100
E. BAER Evaluation										
Salary	1	300	12	$3,600	$0		$0		$0	$3,600
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Evaluation				$3,600	$0		$0		$0	$3,600
F. Monitoring										
Salary	1	300	2	$600	$0		$0		$0	$600
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring				$600	$0		$0		$0	$600
G. Totals				**$11,135**	**$2,075**		**$0**		**$0**	**$12,300**

PART VII - APPROVALS

1. /s/Charles Betz Jr.)____ August 27, 2004
   for Dave Pieper, Grasslands Supervisor (signature) Date

2. _____ _____
   Regional Forester (signature) Date