United States Department of Agriculture | Forest Service | Rocky Mountain Region | 11177 W. 8th Avenue Box 25127 Lakewood, CO 80225-0127

Black Hills Shirttail 1991

Reply to: 2520 **Date:** APR 16 1991

Subject: Shirttail Emergency Burn Rehabilitation Request

To: Forest Supervisor, Black Hills National Forest

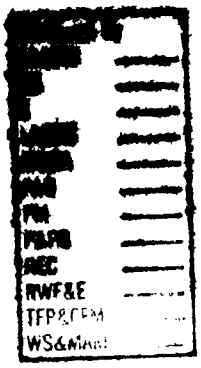
I have reviewed your request for Emergency Burn Rehabilitation funds for the Shirttail Incident. Your request is approved in the amount of $24,800 for seeding, additional road maintenance needs, and ID Team cost.

Emergency Burn Funds have strict requirements as defined in FSH 2509.13. Please use code FFFS-FW22 when expending these funds. A final accomplishment report is required on Form FS-2500-8 thirty (30) days after completing rehabilitation measures.

GARY E. CARGILL
Regional Forester

cc: Schmidt:W01A
MSA
O&F Mary Brown
S.Libby:R02F03A

JF/bet



United States Department of Agriculture | Forest Service | Black Hills National Forest | Highway 385 North RR 2, Box 200 Custer, SD 57730

Reply to: 2520 **Date:** April, 11, 1991

Subject: Shirttail Fire Burned Area Survey Report

To: Regional Forester, R-2

Attached is the Burned Area Survey Report and request for emergency rehabilitation funds for the Shirttail Fire.

for DARREL L. KENOPS
Forest Supervisor

Enclosures

cc:J. Freeouf, R.O.- WSMAM

JM:jm

SHIRTTAIL FIRE
BLACK HILLS NATIONAL FOREST

I. LOCATION OF FIRE (see attached map)

The fire was located in portions of the following 4 townships:

T5S, R4E, Section 36
T5S, R5E, Sections 27,28,31-35
T6S, R4E, Section 1
T6S, R5E, Sections 1-6, 11 & 12

II. CAUSE OF FIRE

The fire was started by lightening on April 3, 1991 and detected April 4.

III. DESCRIPTION OF AREA

The area is typical of the southern portion of the Black Hills. It is characterized by moderately sloping to very steep timbered sideslopes, interspersed with grassy meadows, small stands of decidious trees, and rock outcrops. Open grasslands and parks dominate the lower elevations. Dissection is strong. Geologically, the area is dominated by Minnelusa and Minnekahta limestone, sandstone, and shale. A small portion of the crystalline core protrudes into the northern portion of the fire. Dominant soils are Vanocker and Sawdust. In Wind Cave National Park, much of the area is grassland, with a transition into ponderosa pine as elevations increase. On National Forest System lands, ponderosa pine is the dominant vegetative type. Typical understory species include bluestem, and common snowberry. National Forest System lands within the fire have been designated as Management Area 5C in the Black Hills National Forest Land and Resource Management Plan. Management emphasis is on wood fiber production and elk habitat (forage and cover).

IV. SIZE OF BURNED AREA

The fire burned approximately 2500 acres of National Forest System lands, 1100 acres of Wind Cave National Park, and 600 acres of private lands for a total of 4200 acres.

V. EXTENT OF RESOURCE DAMAGE

High intensity burns (area completely blackened, with all foliage removed from the trees). Most of the high intensity burns are on slopes ranging from 25 - 60%.

661 acres of National Forest System lands
89 acres of Wind Cave National Park.
31 acres of private lands.

Moderate intensity burns (understory burned, and some discoloration and loss of overstory foliage:

1643 acres of National Forest System lands
337 acres of Wind Cave National Park
169 acres of private lands

Low intensity burns (only understory or open meadows and grasslands burned).

196 acres of National Forest System lands
674 acres of Wind Cave National Park
400 acres of private lands

No structures were lost in the fire. Structural engines and burning out were used to protect both private structures and facilities (housing, campground areas, and Park Headquarters within Wind Cave National Park.

Portions of a boundary fence (approximately 1/4 mile) surrounding the water supply area for Wind Cave National Park were burned or damaged by falling trees, and will require repair or replacement. Other damaged fence sections within Wind Cave National Park include approximately 3/4 mile of boundary fence that was burned, and another 1/4 mile damaged to allow access to heavy equipment. A 1/4 mile of buffalo exclosure fence around Elk Mountain Campground was also burned. Several areas of range fence on National Forest and private lands were damaged to provide access for firefighting equipment. These will also be repaired.

Much of the burned area is adjacent to or visible from Highway 385 and roads within Wind Cave National Park. Both of these areas receive heavy visitation by tourists and the local public using the Park. The Park receives approximately one million visits annually.

VI. AFFECTED RESOURCES

Visual quality and esthetics are an immediate concern, especially within foreground areas in Wind Cave National Park and along Highway 385. Much of this area is grassland that was intentionally burned out during the fire control efforts to prevent the fire from damaging structures and crossing Highway 385. Due to the timing of the fire, and the relatively lighter nature of these burns, it is expected that these areas will green-up quickly, mitigating much of the visual quality concerns. Background areas with more heavily damaged timber will require longer to recover. There have been several other large fires within the Black Hills in recent years, and the cumulative effects of these fires will influence visual quality for several years.

The area supports several hundred head of bison, elk, and deer. There will be few, if any, adverse effects on these species in the short-term. Buffalo actually seem to be attracted to burned grasslands. Due to the time of the year when the fire occurred, green-up is expected to be rapid and result in improved forage conditions within meadows and grassland areas. Long-term management of this area will have to address the availability and distribution of cover to insure that this improved forage base can be used effectively by elk and deer.

The short term loss of ground cover will reduce nesting habitat availability for wild turkey, sharp-tailed grouse, and other early season ground nesting birds during the current year. Natural regeneration and rehabilitation efforts will offset this loss within a few growing seasons. The loss of ground cover also makes this area vulnerable to infestation by noxious weeds, especially Canada Thistle. Within the Black Hills, Canada Thistle is an aggressive invader that readily colonizes areas of bare or exposed soil. Control measures taken after Canada Thistle becomes established are expensive and show little effect beyond controling the rate of spread. Eradication on a particular site is seldom achieved. Aggressive management to restore desirable vegetation on disturbed sites is showing promise at reducing the number of new Canada Thistle infestations.

Potential soil loss from erosion will affect much of the area's ability to regenerate and eventually produce timber again. The severely burned areas are characterized by relatively thin and rocky soils, making any soil loss a potentially severe problem. Erosion and siltation are also potential threats to the Wind Cave National Park water supply area, and the Cold Spring drainage, a source of domestic and livestock water for one of the private landowners in the area. No fishery resources are expected to be impacted by the fire.

VII. REHABILITATION STRATEGY

The proposed rehabilitation strategy calls for seeding 661 acres of National Forest System lands that received high intensity burns. The steep to very steep sideslopes have little or no effective ground cover remaining to reduce or prevent soil erosion. These high intensity burned areas also have no needles left on the blackened pines, consequently there will be no needle cast to provide ground cover. Most of this high intensity burn occurred on steep to very steep slopes above the two water supply areas described above. Rehabilitation is recommended to minimize soil losses on these sensitive areas and maintain long-term site productivity, as well as mitigate some of the adverse visual impacts associated with the fire. It is also needed to reduce the possibility of infestation by noxious weeds. There will be some unavoidable on-site displacement of soil until adequate ground cover is re-established.

In addition, about 31 acres of high intensity burns will be seeded on private lands.

The proposed rehabilitation seeding mixture is presented below.

Annual Ryegrass	5 pounds/acre
Slender Wheatgrass	5 pounds/acre
Timothy	3 pounds/acre
Alsike Clover	3 pounds/acre
Total	16 pounds/acre

Aerially seeding with a helicopter is planned and included in the seeding costs presented in the report.

In addition to the soil protection efforts described above, the Rehabilitation Plan includes funding for additional road maintenance on 13.9 miles of system roads. It is expected that sediment from burned areas will increase road maintenance needs and frequencies in this area.

USDA-Forest Service

Date or Report
4/10/91

BURNED AREA REPORT

(Reference FSH 2509.13, Report FS 2500-A)

PART I - TYPE OF REQUEST

1. Type of Report
   A. [X] Funding (Request for estimated FFF funds) B. [ ] Accomplishment Report

2. Type of Action
   A. [x] Initial (estimated funding is first requested)
   B. [ ] Interim
      a. [ ] Updating the initial funding request
      b. [ ] Supplying information for accomplishments to date on emergency work underway
   C. [ ] Final
      a. [ ] Best estimate for funds needed to complete eligible rehabilitation measure
      b. [ ] Following completion of funded work

PART II - FIRE LOCATION

1.Fire Name (From Form FS-5100-29)	2.Forest Supervisor's Fire No. (From FS-5100-29)	3.State	4.County
SHIRTTAIL	SD-BKF-004	S.D.	Custer

5.Region	6.Forest	7.Ranger District	8.Date Fire Started	9.Date Fire Controlled	10.Estimated Suppression
02	Black Hills	Custer	4/3/91	4/8/91	$ 600,000+

11.Fire Suppression Damages Repaired with FFF 102 Funds
   a. 9.9 miles (firelines waterbarred) b. 14.5 acres (firelines seeded) c. Other (identify) 10 acre fire camp

12.Fire Intensity
   a. 30 %(low) b. 50 %(medium) c. 20 %(high)

PART III - NATIONAL FOREST SYSTEM PROBLEM INVENTORY

1.Watershed No.	2.NFS Acres Burned	3.Water Repellant Soil
10120109	2500	26 %of NFS acres burned

4.Vegetation Types	5.Geologic Types
Ponderosa Pine/Little Bluestem/Snowberry Aspen, & Bluegrass Meadows	Minnelusa limestone and sandstone Minnekahta limestone/Opeche shale

6.Soil Erosion Hazard Rating #
   a. 10 %(low) b. 70 %(medium) c. 20 %(high)

7.Erosion Potential # 12,907 cu.yds/sq.miles

8.Miles of Forest Stream Channels By Regional Order or Classes
   1st Order - 9.9 3rd Order - 0.9
   2nd Order - 2.7

9.Miles of Forest Service Trails: 0

10.Miles of Forest Service Roads By Maintenance Levels #
   a. 0 miles (Level I) b. 13.9 miles (Level II) c. 0 miles (Level III, IV, V)

PART IV - CALCULATED RISK AND CLIMATIC EVALUATION

1.Estimated Design Recurrence Period (Years)	2.Chance to Success Desired By Management (Percent)
5 years	85%
3.Equivalent Design Recurrence Period (Years)	4.Related Design Storm Duration (Hours)
33 years	30 minutes
5.Related Design Storm Magnitude (Inches)	6.Related Design Flow (cfsm)
1.75 inches	150 cfsm
7.Estimated Reduction In Infiltration (Percent)	8.Adjusted Related Design Flow (cfsm)
15%	175 cfsm

Previous edition of this form is obsolete. FS-2500-8 (11/82)

PART V - SUMMARY OF SURVEY AND ANALYSIS

1.Skills Represented on Burned Area Survey Team (x appropriate boxes)

a.[X] Hydrology b.[X] Soils c.[ ] Geology d.[ ] Range e.[X] Timber f.[X] Wildlife
g.[ ] Fire Mgmt. h.[X] Eng. i.[ ] Contr. j.[X] Local Mgmt. k.[ ] Research i.[X] Other

National Park Service
(identify)

2.Describe Emergency: Protection of site productivity on thin soils and steep slopes within area burned by fire. Rehabilitation needed to prevent erosion and noxious weed infestations.

3.Emergency Rehabilitation Objective: Maintain soil productivity by meeting soil loss tolerance limits of Forest Plan. Reduce likelyhood of Canada Thistle invasion requiring costly control measures in future years.

4.Probability of Completing Treatment Prior to First Major Damage Producing Storm

a. 60 %(land) b. 60 %(channel) c. 60 %(roads) d. _____ %(other)_____
(identify)

5.Net Environmental Quality Benefit Index	6.Net Social Well Being Benefit Index
a.[X] Significant b.[ ] Not Significant	a.[ ] Significant b.[X] Not Significant

7.Benefit/Cost Ratio	8.Net Benefits	9.Cost Effectiveness Index
		a.[ ] I b.[X] II c.[ ] III d.[ ] IV
3.5:1	$62,345	

PART VI - ELIGIBLE EMERGENCY REHABILITATION MEASURES OR TREATMENTS & SOURCE OF FUNDS

Note: Emergency rehabilitation is work done promptly following a wildfire and is not to solve watershed problems that existed prior to the wildfire.

			NFS LANDS			OTHER LANDS			ALL LANDS
Line Items	Units	Unit Cost	No.of Units	FFF 092	Other $ Identify	No.of Units	Federal $ Identify	Non-Federal State & Pvt Identify	Total $
(1) A. LAND	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
a. Seeding	Acres	$25	661	$16,525					$16,525
b. Seeding pvt land	Acres	$25				31		$775	$ 775
c.									17,300
d.									
e.									
(1) B. CHANNELS									
a. Opening water courses	Miles								
b. Stabilizing Streambanks	Miles								
c. Sediment fence	struct								
d. Sediment barrier	struct								
e. Tree Felling	acres								
(1) C ROADS & TRAILS									
a.Maintain drainage	miles		13.9	$ 5,500					$ 5,500
b.									
c.									
d.									
e. ID Team costs				$ 2,000					$ 2,000
D. MAJOR STRUCTURES									
a. Preplanned - from Forest Plans									
E. TOTAL				$24,025		31		$775	$24,800

PART VII - APPROVALS

1. FOREST SUPERVISOR (Signature)	2. DATE	3. for REGIONAL FORESTER (Signature)
for Forest Supervisor	4/11/91	

EXAMINING IMPACTS OF MANAGEMENT ALTERNATIVES FOR AN EMERGENCY PROGRAM

(Reference FSH 2509.13)

Fire Name: Shirttail

Date of Report: 4/10/91

A. ENVIRONMENTAL QUALITY BENEFIT INDEX

Environmental Factor (a)	Weight Factor (b)	Without Treatment Actual (c)	Without Treatment Weighted (d)	With Treatment Actual (e)	With Treatment Weighted (f)	Difference Actual (g)	Difference Weighted (h)
1. Erosion and sediment *	10	1	10	0	0	1	10
2. Aesthetic land quality *	2	1	2	1	2	0	0
3. Water quality *	1	1	1	0	0	1	1
4. Site productivity *	4	2	8	1	4	1	4
5. Wildlife habitat *	4	1	4	1	4	0	0
6. Fish habitat *							
7. Other *(Noxious Weeds)	3	2	6	1	3	1	3
8. TOTAL *	24		31		13		18
9. Average weighted index *			1.29		0.54		0.75
10. Net environmental quality benefit index*							0.75

B. SOCIAL WELL-BEING BENEFIT INDEX

Social Criteria (a)	Weight Factor (b)	Without Treatment Actual (c)	Without Treatment Weighted (d)	With Treatment Actual (e)	With Treatment Weighted (f)	Difference Actual (g)	Difference Weighted (h)
1. Life, health, safety *	1	0	0	0	0	0	0
2. Employment *	1	0	0	0	0	0	0
3. Recreational opportunity *	2	1	2	0	0	1	2
4. Economic stability *	1	0	0	0	0	0	0
5. Income distribution *	1	0	0	0	0	0	0
6. Preserve special sites *	1	0	0	0	0	0	0
7. Other *							
8. TOTAL *	7		2		0		2
9. Average weighted index *			0.28		0		0.28
10. Net social well-being benefit index *							0.28

C. REMARKS

No net differences in wildlife habitat conditions are displayed because of conflicting habitat needs between wildlife species. Big game species, and others needing early successional habitat will benefit from improved conditions, but ground nesting birds and wildlife needing mature forest habitats will be negatively impacted due to habitat losses.

D. EXPECTED DAMAGE REDUCTION BENEFIT SUMMARY

Note: At current Water Resources Council interest rate 8.875 percent

Economic Benefit Indices	Units of Measure	Damage Expected Without Treatment		With Treatment		Expected $ Damage Reduction
		No. of Units	Present Value($)	No. of Units	Present Value($)	
(a)	(b)	(c)	(d)	(e)	(f)	(g)
I. Watershed Impacts Sediments						
1. Downstream water storage *						
2. Sediment removal *						
3. Fish habitat *						
4. Water quality *						
II. Flood Water						
1. Land *						
2. Water Improvements *						
3. Subtotal, Watershed *						
III. Resource Related Impacts						
1. Range *						
2. Wildlife and recreation *	WFUDS	142	$13,464	-472	-$44,755	$58,219
3. Timber *						
4. Subtotal, Resource Related *			$13,464		-$44,755	$58,219
IV. Other Impacts						
1. SOIL FERTILITY	TONS	9659	$44,447	3,133	$15,521	$28,926
2. Subtotal, Other *			$44,447		$15,521	$28,926
V. TOTAL DOLLARS *			$57,911		-$29,234	$87,145

E. REMARKS

Wildlife values represent the dollar value of WFUDS expected as a result of the increased availability of forage in the first year following the fire. It is assumed that forage is limiting in this area and an increase in forage will result in an increase in big game populations. A value of 1.35 WFUDS/1000 pounds of forage was used based on Forest TSPIRS calculations. Values in the "with treatment" columns are displayed as negative values to reflect "negative damage", ie positive benefits, over pre-burn conditions. The negative values are used to make the mathematical difference (column d minus column f) between the without and with treatment options reflect the expected benefits to wildlife from the increase in forage production. Soil erosion values were based on erosion losses over a 9 year period and discounted to present values.

USDA-Forest Service

ON-SITE AND OFF-SITE DEVELOPMENTS SUBJECT TO HAZARDS[1]

(Reference FSH 2509.13)

Fire Name			Date of Report
Shirttail			4/10/91
Line Items (a)	Type of Units (b)	Number of Units (c)	Estimated Value $ (d)
1. Community and urban development	People	0	0
2. Municipal and domestic water supply	People Served	0	0
3. Transportation systems	Miles	0	0
4. Water distribution system (irrigation)	Miles	0	0
5. Agricultural development (crops, facilities)	Acres	0	0
6. Industrial development (dams, power, manufacturing)	Number	0	0
7. Power and communication lines	Miles	0	0
8. Recreation development	PAOT	0	0
9. Fish habitat	Miles	0	0
10. Other (specify)		0	0
11. Total Hazard Potential[2]	XXXXXXXXX	XXXXXXXXXX	0
	XXXXXXXXX	XXXXXXXXXX	

12. Narrative (Optional- if additional space is needed, attach another sheet).

No developments on or off site subject to flooding or other damage as a result of the fire.

[1] Hazards from floods, floating debris, erosion, or sediment because a watershed is impaired by wildfire. (Do not include value of resources damaged or destroyed by the fire reported on FS-5100-29.)

[2] Indicates values threatened by design storm. Does not enter into the B/C.

USDA-FOREST SERVICE FS-2500-8c (11/82)

SUMMARY OF EMERGENCY REHABILITATION NEEDS BY LANDOWNERSHIP
(Reference FSH 2509.13)

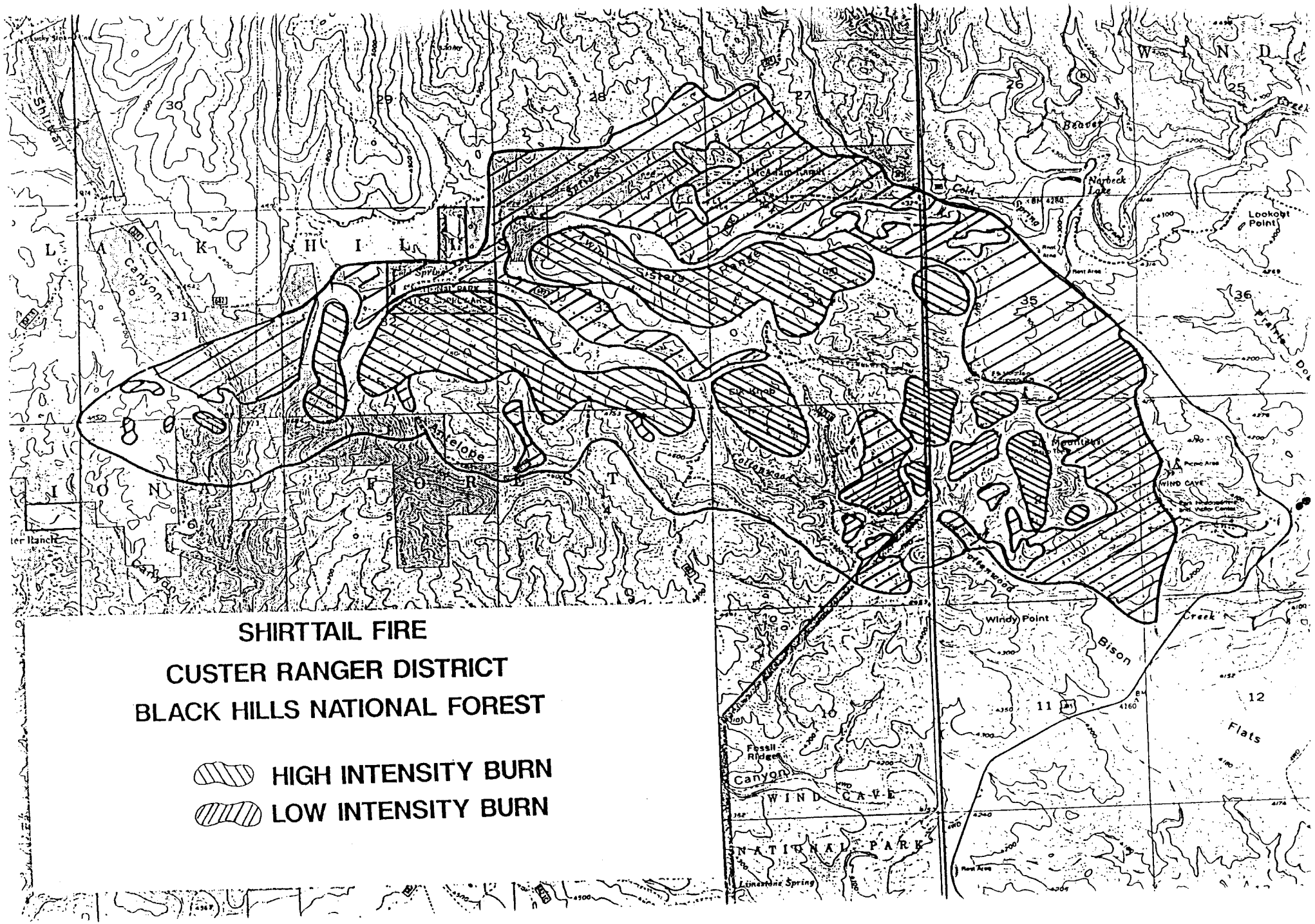
Fire Name: Shirttail
Date of Report: 4/10/91

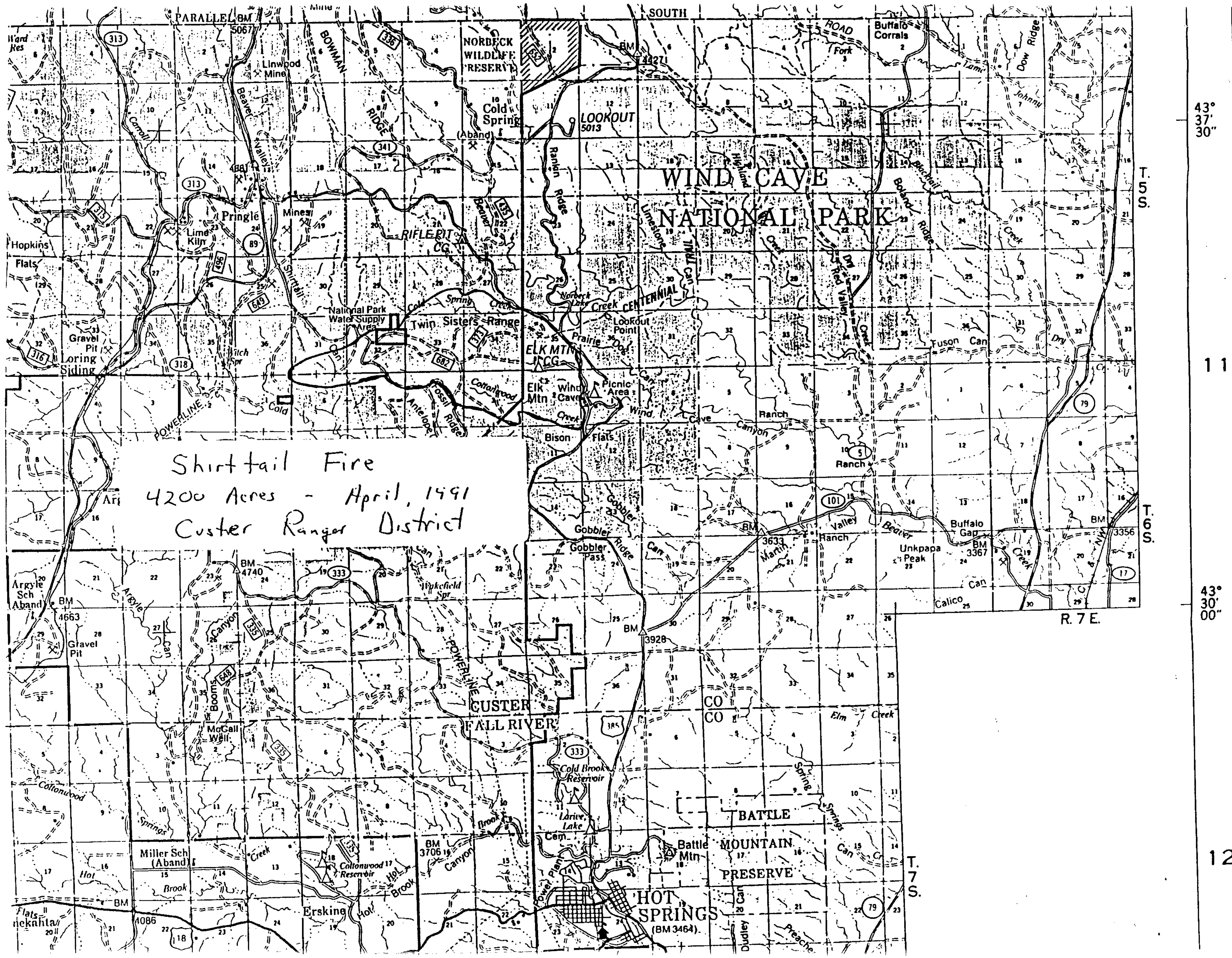
Landownership	A. Acres Burned	B. Emergency Rehabilitation Needs (1) Land (acres)	(2) Channel (miles) structures	(3) Road & Trail (miles)	(4) Other
Federal (NFS) *	2,500	661			
Other (specify) *					
Subtotal (NFS) *	2,500	661			
Non-Federal (State & County) *					
Indian reservation *					
Private *	600	31			
Subtotal (Non-Federal) *	600	31			
TOTAL *	3,100	692			

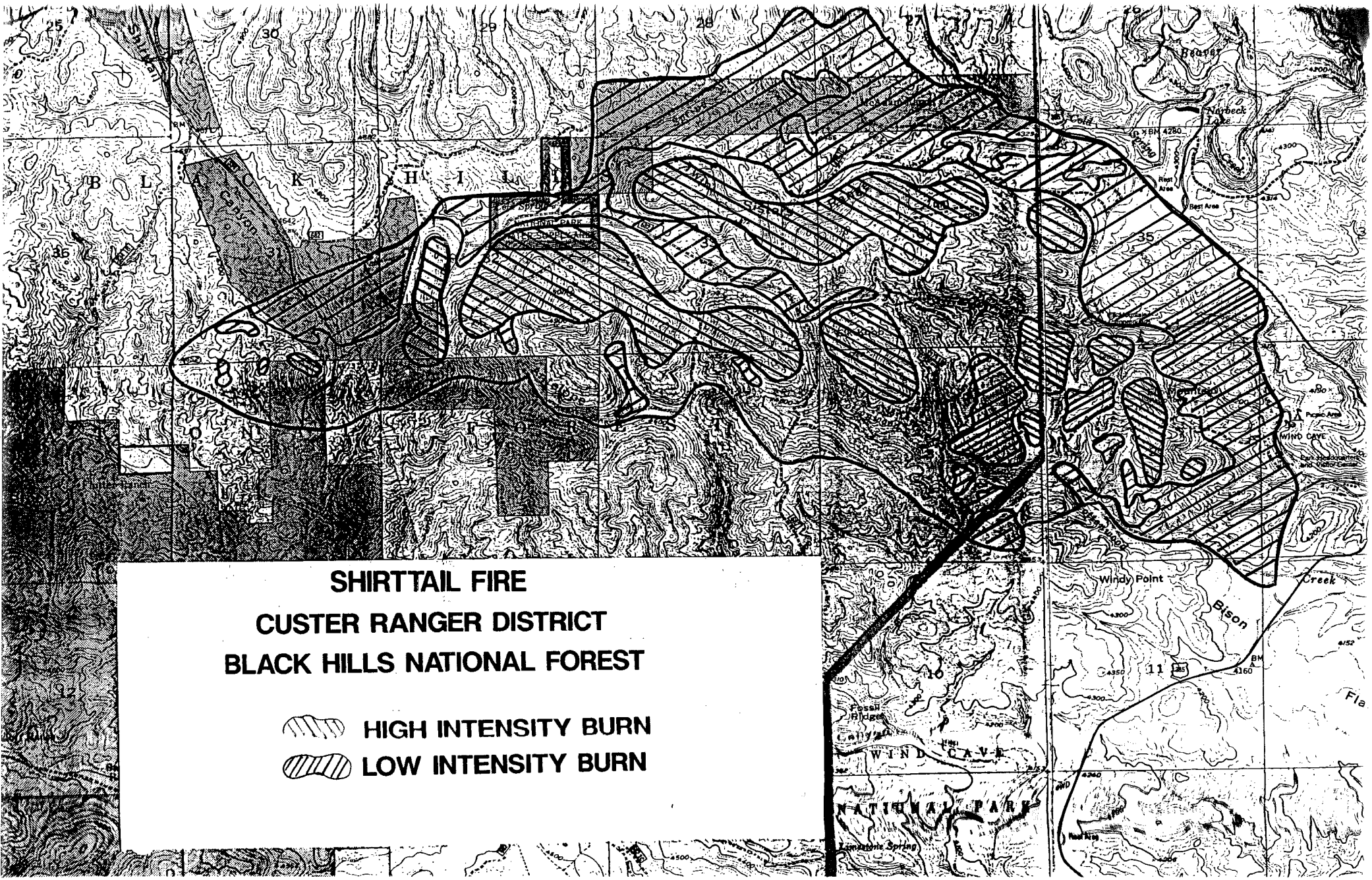
C. Source of Emergency Rehabilitation Funds for Needed Work ($)

Landownership	1. FFF (a) 092	1. FFF (b) 102	2. Emergency Flood Prevention	3. FR & T	4. Other Federal (Enter fund)	5. Non-Federal (Enter fund) State & Pvt	6. Total
Federal (NFS) *	$24,025						$24,025
Other (specify) *							
Subtotal (NFS) *	$24,025						$24,025
Non-Federal (State & County) *							
Indian reservation *							
Private *						$775	$ 775
Subtotal (Non-Federal) *						$775	$ 775
TOTAL *							$24,800

D. Remarks


SHIRTTAIL FIRE
CUSTER RANGER DISTRICT
BLACK HILLS NATIONAL FOREST
HIGH INTENSITY BURN
LOW INTENSITY BURN
BLACK HILLS
Antelope
Beaver
Norbeck Lake
Lookout Point
Windy Point
Bison
Flats
Fossil Ridge
Canyon
WIND CAVE
NATIONAL PARK
Limestone Spring
Cold
Creek


Shirttail Fire
4200 Acres - April, 1991
Custer Ranger District
WIND CAVE NATIONAL PARK
NORBECK WILDLIFE RESERVE
LOOKOUT 5013
Rankin Ridge
BOWMAN RIDGE
RIFLE PIT CG
Twin Sisters Range
National Park Water Supply Area
ELK MTN CG
Elk Mtn
Wind Cave
Picnic Area
Lookout Point
Prairie Dog
CENTENNIAL TRAIL
Limestone
Highland Creek
Boland Ridge
Red Valley
Buffalo Corrals
Cold Spring
Pringle
Lime Kiln
Linwood Mine
Beaver Valley
Shirttail
Hopkins Flats
Loring Siding
Gravel Pit
Gobbler Ridge
Gobbler Pass
Bison Flats
Buffalo Gap
Unkpapa Peak
Calico Can
Tuson Can
CUSTER
FALL RIVER
POWERLINE
McGall Well
Booms Canyon
Argyle
Argyle Sch Aband
Miller Sch (Aband)
Erskine
Cottonwood Reservoir
Cold Brook Reservoir
BATTLE MOUNTAIN PRESERVE
Battle Mtn
HOT SPRINGS (BM 3464)
Minnekahta Flats
T. 5 S.
T. 6 S.
T. 7 S.
R. 7 E.
43° 37' 30"
43° 30' 00"
11
12


SHIRTTAIL FIRE
CUSTER RANGER DISTRICT
BLACK HILLS NATIONAL FOREST
HIGH INTENSITY BURN
LOW INTENSITY BURN
Beaver
Norbeck Lake
Best Area
Picnic Area
WIND CAVE
Windy Point
Bison
Creek
Fossil Ridge
WIND CAVE
NATIONAL PARK
Limestone Spring