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BURNED AREA REPORT DATE: 4/2/92

PART I - TYPE OF REQUEST

1. (List as appropriate) A. Funding Request X B. Accomplishment report
2. A. Initial __ B. Interim X C. Final

PART II - FIRE LOCATION

1. Fire name: Thompson Creek
2. Supervisors Fire Number: MT-GNF-1038
3. State: MT
4. County: Park
5. Region: 11
6. Forest: 1
7. Ranger District: 2
8. Date Started: 7/16/91
9. Date Controlled: NA
10. Estimated suppression costs: $7,000,000
11. Fire suppression damage repaired with FFF 102 funds:
    a. 7.1 miles of firelines waterbarred
    b. 0.0 acres of firelines seeded
    c. other (identify) Slash disposal, Helipad rehab
12. Fire intensity 55% low 3850 40% medium 2800 5% high 350

PART III - NATIONAL FOREST SYSTEM PROBLEM INVENTORY

1. Watershed Number: 10-07-00-02-28
2. NFS acres burned: 7700
3. Water repellant soil: 5% of NFS acres burned
4. Vegetation types: DF 55.8%, LP 20.5%, S-F 7.7%, WB 5.8%, Sage-Grass 1.7%, Rock 5.5%, Avalanche 1.8%
5. Geologic types: Livingston Volcanics and Hard Crystalline
6. Soil erosion hazard rating: 85% low 9950 15% medium 0% high
7. Erosion potential: 69cu.yd./sq.mi. 1050
8. Miles stream channel by regional order or class: 1st-7.0, 2nd-1.5, 3rd-3.9
9. Miles FS trails: 7.0
10. Miles FS roads by maintenance level:
    a. 14 (level I) b. 0 (level II) c. 15 (level III, IV, V)

PART IV - CALCULATED RISK AND CLIMATIC EVALUATION

1. Est. veg. recovery period: 5 years
2. Chance of success desired by management: 80%
3. Equivalent design recurrence: 25 years
4. Related design storm duration: 30 minute convective
5. Related design storm magnitude: 0.78 inches
5. Related design flow: 13.8 cfsm
7. Estimated reduction in infiltration: 10%
8. Adjusted related design flow: 15.2 cfsm

PART V SUMMARY OF SURVEY AND ANALYSIS

1. Skills represented on burned area survey team (list as appropriate):
hydrology, soils, silviculture, wildlife, range, engineering, fisheries

2. Describe emergency: The Thompson Creek fire burned 7,700 acres in the West Fork of Mill Creek, Wicked Creek, Snowbank Creek, and Passage Creek drainages. This resulted in a considerable reduction in protective ground cover which could lead to additional accelerated erosion and sedimentation if not treated. A localized intensive thundershower on 8/1/91 caused 11 moderate to large debris flows in the West Fork of Mill Creek resulting in considerable road damage and approximately 5,850 tons of sediment deposition into the West Fork of Mill Creek stream channel. Projected sediment increase for the first year is 6200 tons delivered to Mill Creek, which supports Yellowstone Cutthroat trout and a new 2 million dollar irrigation project. Cumulative impacts of this fire could prohibit and/or defer planned timber harvest in the area due to exceedance of sediment thresholds and related adverse fishery habitat impacts.

3. Emergency rehabilitation objectives: Reduce sedimentation and erosion associated with vegetative damage, stabilize road damage and restore road drainage, and clean debris flow debris and sediment from West Fork Mill Creek. The treatments are estimated to result in about a 60% reduction in new sediment delivered to the stream channels, and about a 50% reduction in the debris flow sediment deposited in the West Fork of Mill Creek channel.

4. Probability of completing treatment prior to first major damage producing storm:
a.) Land 70% b.) Channel 0% c.) Roads 0% d.) Other %

5. Net Environmental-quality benefit index: Significant

6. Net Social-well-being benefit: Significant

7. Benefit/cost ratio: 6.2

8. Net benefits: $533,000

9. Cost effectiveness index (choose one): a. X I b. II c. III d. IV

PART IV

ELIGIBLE EMERGENCY REHABILITATION MEASURES OR TREATMENTS AND SOURCE OF FUNDS

(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 LAND			
	Units	Unit cost	units #	FFF 094 $	other $	units #	federal $	non-fed $	total $
A. LAND									
Seeding and mulch	Acres	130.	10.	1300.					1300
Gully log check dams	Miles	.5100.	2.	15,000.					15,000
Catch basin trash racks	Each	160.	0.	0.					0
Log erosion barriers	Acres	67.	75.	5025.					5025
Trail erosion control structure burned in fire		.4100.	1.	4100. 25425					4100
B. CHANNELS									
Clearing debris flows in W.Fork	Each	14000.	1.	14,000.					14,000
C. ROADS & TRAILS									
Road stabiliz & culvert replacement	Each	13944	1	13,944					13,944
Closures	Each	320.	31.	9900. 23814					9900
D. OTHER Survey team				3000					3000
E. TOTAL				66,269.					66,269

F. PREVIOUSLY APPROVED	86,300
G. TOTAL UNDERSPENT	20,031

Narrative For Completion Report

Summary of Fire and Emergency

This emergency fire rehabilitation proposal included watershed rehabilitation for Gallatin National Forest lands damaged by the Thompson Creek Fire. The fire burned lands within a 7700 acre perimeter. Drainages affected wereportions of the West Fork of Mill Creek, Snowbank Creek, Wicked Creek and Passage Creek. Approximately one-third of the burned area was within the Absaroka-Beartooth Wilderness.

The burned area included Management Situation 5 and some Management Situation 2 grizzly bear habitat. Managment Situation 5 included areas in which maintenance of grizzly bear habitat is an option, and bears involved in human/bear conflicts are controlled. Management Situation 2 lands are areas which lack distinct grizzly bear population centers and in which high quality habitat does not occur. Also affected were streams with Yellowstone cutthroat trout, a sensitive species on the Gallatin National Forest and a species of special concern by the State of Montana. Another concern of Management is a new two million dollar irrigation project which lies just below the fire.

Most of the burned area had a moderate to low burn intensity and an overall low soil erosion hazard rating. Of particular concern in the initial funding request of 7/29/91 was emergency stablilization of first order drainages and ephemeral draws in the Wicked-Snowbank area. This initial request and associated rehabilitation work remain valid. On August 1 the western part of the fire, in the West Fork of Mill Creek, was impacted by a locally intensive thundershower which caused 11 debris flows of which 4 were quite massive, blocking the West Fork road, covering culverts and ditches, and depositing an estimated 5,850 tons of sediment in the stream channel (considerable debris flow material was also deposited on the floodplain and adjacent terraces). A high probability existed for very incised draws in Wicked Creek and Snowbank Creek to produce major amounts of sediment during a 30 minute convection storm. The upper slopes of the West Fork of Mill Creek were also potential sources of additional sediment, however these slopes were not included in the funding request because they were too coarse textured for seeding effectiveness, and judged to be too steep, rocky, an inaccessible for (safe and economically feasible) log erosion barriers. Projected sediment increases for the first year is 6,400 tons delivered to Mill Creek.

Vegetative Recovery Period

A five year vegetation recovery period is expected for the area. Most of the area consists of warm to cool and moist habitat types. Only about 4% of the area is hot and dry or cold and thus will have extended revegetation periods. Soils are not deeply burned in most places (95%) and quick resprouting is

expected. The lack of a current conifer seed crop in some portions of the area will cause some delay and reduction in tree stocking levels. Tree planting will be required in some areas that lack an adequate seed source (ex. old harvest areas).

Fisheries

The Yellowstone Cutthroat trout population within the Mill Creek drainage is sparse with very few young fish. Mill Creek lacks suitable spawning gravel and fish have difficulty surviving the winter in the creek. A lack of natural pools is also a primary limiting factor for Yellowstone Cutthroat trout in Mill Creek. A recent study concluded that Mill Creek contains only 2 to 6% pools by area, well below the 35 to 60% recommended for Class A streams in the Management Guidelines for Gallatin National Forest. Mitigation for fire effects on fish will consisted of cleaning out debris and sediment in the West Fork and reducing increased, unnatural erosion and resulting stream sedimentation.

Threatened and Endangered Species

Bald Eagle (Endangered): Bald Eagles are occasionally seen along the lower sections of Mill Creek and infrequently observed roosting along the creek. There is no verification of nesting in the Mill Creek drainage.

Grizzly Bear (Threatened): Verified grizzly bear sightings are sparse in Mill Creek as sufficient spring and summer habitat is limited. There are small pockets of whitebark pine providing potentially good fall habitat.

Emergency mitigation of fire effects does not appear necessary for either the bald eagle or the grizzly bear. The fire did consume a small component of whitebark pine, which has been described as a "threatened food source for a threatened species" (Jonkel, pers. comm.). This may constitute a long-term adverse affect for the grizzly bear, but the extent of whitebark pine burned and the affect on grizzly bears is unknown at this time.

Elk

Mill Creek drainage is an important elk hunting area for both residents and non-residents. While individual elk are scattered throughout the fire area, distinct herds have not been identified in the Mill Creek drainage. With the exception of a calving area in the upper reaches of Wicked Creek, there have been no large calving areas identified in the Mill Creek drainage. Mill Creek does not appear to have the potential to support a large wintering population of elk because of high elevations and deep snows.

Habitat effectiveness in the Wicked/Snowbank subcompartment is currently .50 (this is well below the forest plan standard of .70). Since habitat effectiveness declines with increased road density, and the fire exposed approximately 1.16 miles/section of jammer roads previously brushed in, habitat effectiveness has undoubtedly declined as a result of the fire.

Cover is a secondary component of habitat effectivness which has also declined due to the fire. The amount of decline, and its effect on habitat

effectiveness, has not been quantified. It is likely, however, that habitat effectiveness will further decline due to loss of cover.

To mitigate the effects of the fire on elk habitat, the jammer roads exposed by the fire could be closed. This would be an inexpensive and effective mitigation measure which would help maintain elk habitat effectiveness at pre-fire levels. Trying to mitigate cover loss would be virtually impossible.

Alternatives

Three alternatives were evaluated in preparing the initial funding request of 7/29/91, including (1) No Action, (2) Minimum recommended projects to protect the Wicked-Snowbank area, and (3) Sediment reduction and slope stabilization to reduce sediment levels for protection of Yellowstone cutthroat trout and irrigation projects.

Alternative #3 was selected by the Gallatin National Forest Management Team. As part of this alternative, it was felt by the Management Team and the Rehabilitation Team that it was imperative to close roads in the Wicked-Snowbank area to protect investments in the emergency measures. This is consistant with the Burned-area Emergency Rehabilitation Handbook FSH 2509.13 (25.5). Also included in this alternative are measures to reduce sediment levels in the West Fork of Mill Creek.

One additional alternative (add-on) was developed for the 8/6/91 interim funding request. This consisted of 4 additions and 1 deletion to the initial request including:

1) unit cost adjustment to the initial request

2) cost for the Emergency Rehabilitation Survey team

3) stabilization and restoration of road drainage on the West Fork Road damaged by the 8/1 debris flows.

4) cleaning of debris and sediment, and re-establishing bankful discharge capacity in the stream channel of the West Fork sections (about 2000' total) which were impacted by the 8/1 debris flows.

5) deletion of clearing of the debris fan in the West Fork of Mill Creek.

An examination of the costs listed in the initial funding request revealed that project coordinator salary was not included. In addition, no provision was made for food and lodging for rehabilitation crews. An additional $11,600 was spread through the unit costs of for projects listed in the initial request, thereby raising these unit costs by an average of 34%.

The initial request did not include the cost for the Emergency Survey team. This cost $3000 was added to listed in this interim request.

Road drainage on the West Fork of Mill Creek road was severely disrupted as 6 of the 11 debris flows hit the road, filling road ditches, gullying cut and fill slopes, and burying 3 culverts. If untreated, the destabilized and disrupted road drainage system poses additional erosion and sedimentation damage to the West Fork stream channel. The proposed treatment for this area was compatible with road measures listed in section 24.3 of the FSH 2509.13 BURNED AREA EMERGENCY REHABILITATION HANDBOOK including berm removal, increasing ditch capacity, and installing a larger culvert (for one of the debris flow channels which remains particularly unstable).

The debris and sediment treatments listed in this interim request for the West Fork of Mill Creek was developed after site reviews by a Hydrologist, Fishery Biologist, 2 Engineering Technicians, and consultations with a Montana Division of Fish Wildlife and Parks Fishery Biologist and with 2 stream reclamation specialists with Inter-Fluve, Inc. The primary objective of this proposed treatment was to restore the active bankful channel capacity of West Fork and reduce, to the extent reasonably feasible, downstream sediment transport to the lower West Fork and mainstem of Mill Creek. Two types of approaches were considered in this proposal--blasting and excavation. This request consisted of blasting most of the desired channel capacity then achieving final channel dimensions (bankful discharge cross sectional area of about 70 ft2) with a track excavator. Extremely intensive channel restoration (such as constructing pools and riffles, reducing nickpoint grades, riprap of stream outcurves and establishing meandering sequences, and floodplain shaping) is not included in this interim funding request as it was felt such "fine tuning" was beyond the scope of emergency burned area rehabilitation.

Final Accomplishment

The final accomplishment expenditures totaled $66,269 which is $20,031 less than authorized. The seeding and mulching accomplished about 50% more than planned because when the original intended acres were completed, some seed and mulch were left over which were then distributed onto additional areas. The gully log check dams were completed on 50% more miles than originally planned because during the installation phase, several additional adjacent steep burned draws were observed, and sufficient crew and sawyer time was available to extend the crews into these areas. The gully log check dams only accomplished 75 of the originally intended 100 acres because sections of the targeted acres were too rocky to make log erosion barriers feasible or necessary. The trail erosion control structure and road stabilization & culvert replacement accomplished all intended areas but cost slightly less than anticipated. The road closures and survey team expenditures were the same as the funding request. The clearing of the debris flows in West Fork was complicated by difficult hand drilling to set charges and very difficult log clearing conditions. However 700' of the most critical areas were cleared and blasted, and bankfull discharge channel dimensions were restored to the most critical areas in the West Fork of Mill Creek. No tracked excavator was used so the channel clearing work spent only $14,000 of the $20,000 planned.

The original survey team conducted a Thompson Creek Fire Rehabilitation BMP review on 10/4/91 to evaluate if the rehabilitation work was completed to the specifications envisioned by the survey team and evaluate project effectiveness in soil and water protection. This review was documented in a 2520 memo to the

Livingston District Ranger on 10/4/91. The team concluded that the rehabilitation work was successful in achieving the objectives of the rehabilitation ;lan. The team felt that future emergency funding requests should include more specific directions, maps, and assistance to the implementation coordinator.

Monitoring

Fish spawning core samples were collected at several locations along the main stem of Mill Creek and the West Fork of Mill Creek during the fall of 1991 for baseline comparison after the anticipated sedimention during snowmelt runoff of 1992 and subsequent years. Core samples will be gathered during the summer and fall of 1992 at the same sites.

The Gallatin National Forest Water Quality Monitoring Program for 1992 includes several sites for continued monitoring of the Mill Emigrant timber sales. Parameters measured include discharge, suspended and bedload sediment, turbidity, and a streamgage on the mainstem of Mill Creek. During 1989 and 1990 "pretreatment" effectiveness monitoring established "baseline" water quality conditions at 8 sites. This "pre-fire" baseline baseling in Wicked Creek and Snowbank Creek will allow a comparison of the 1989 and 1990 water quality data vs 1992. The 1992 monitoring will also allow a comparison to the predicted R1R4 sediment modeling estimates of post fire effects disclosed in the Thompson Creek Fire Recovery Project EA.