United States Department of Agriculture | Forest Service | Bitterroot National Forest | 1801 N. First St. Hamilton, MT 59840

REPLY TO: 2520

Date: February 10, 1995

SUBJECT: Final BAER Report for Ann Fire

TO: Regional Forester

Enclosed is the signed hard copy of the final BAER Report for the Ann Fire. A map showing completed BAER treatments is also included. Note that one part of the project has not yet been completed as explained in the document. Another final report will be submitted after the entire project has been completed. An electronic copy of this report was also submitted to Bill Putnam, RO Engineering, earlier today.

If you have any questions about the report please call Gary Decker at (406) 363-7158.

Roy Grant

for STEPHEN K. KELLY
Forest Supervisor

Encl

FS-2500-8 (8/93)

USDA-FOREST SERVICE Date of Report: 2/10/95

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[ ] 1. Funding request for estimated EFFS-FW22 funds
[X] 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 and design analysis
[ ] Status of accomplishments to date

[X] 3. Final report - following completion of work
NOTE: One part of the work is unfinished (see section V.H.). Completion dates and costs are estimated.

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Ann B. Fire Number: P11152

C. State: Montana D. County: Ravalli
E. Region: R1 F. Forest: Bitterrroot
G. District: Darby & Stevensville

H. Date Fire Started: 8/16/94 I. Date Fire Controlled: 9/5/94
J. Suppression Cost: $ 3,850,000 as of 9/8/94

K. Fire Suppression Damages Repaired with EFFS-PF12 Funds:
1. Fireline waterbarred (miles) 23.5 est.
2. Fireline seeded (miles) 0.1 est
3. Other (identify) _____

L. Watershed Number: 1701020504C and 07A

M. NFS Acres Burned: 2980 Total Acres Burned: 2980
Ownership type:
( )State ( )BLM ( )PVT ( )_____

N. Vegetation Types: Subalpine fir/beargrass; subalpine fir/woodrush; subalpine fir/fool's huckleberry; whitebark pine/subalp. fir.
O. Dominant Soils: Andic Cryochrepts, LSK; Andic Cryoboralfs, LSK; Lithic Cryochrepts, LSK; Rock Outcrop and Talus
P. Geologic Types: Volcanic ash cap over carbonatic precambrian sedimentary rocks; volcanic dike inclusions
Q. Miles of Stream Channels by Order or Class:
Order I = 9.0 II - 4.1 III - 1.2 _____
R. Transportation System:
Trails: 5..1 miles Roads: 8.3 miles

PART III - WATERSHED CONDITION

A. Fire Intensity (acres): 1610 (low) 180 (moderate) 1190 (high)

B. Water-Repellent Soil (acres): 1370

C. Soil Erosion Hazard Rating (acres):
1624 (low) 274 (moderate) 1082 (high)

D. Erosion Potential: 380 tons/acre
E. Sediment Potential: 112,000 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period: 4 years
B. Design Chance of Success: 80 percent
C. Equivalent Design Recurrence Interval: 10 years
D. Design Storm Duration: 6 hours
E. Design Storm Magnitude: 1.5 inches
F. Design Flow: 16 cubic feet per second per square mile
G. Estimated Reduction in Infiltration: 31 percent
H. Adjusted Design Flow: 408 cubic feet per second per square mile

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency: The fire burned intensively over extensive areas (5 to 200 acre blocks) within the fire perimeter. Within these intensively burned areas the tree canopy has been completely destroyed and the standing trees have been killed. The understory has also been consumed but beargrass, huckleberry, and whortleberry fine roots and rhizomes appear live and intact. The litter and duff layers have been completely consumed, leaving bare soil and surface cobbles/gravels exposed to erosion. These areas are extremely hydrophobic, consisting of volcanic ash surface soil material that is particularly subject to hydrophibicity from moderate to high intensity fires. Slopes dominantly are 25 to 50 percent and 1/4 to 1/2 mile in length. In addition, approximately 150 acres of high intensity burn occur on slopes showing evidence of past slumping and earthflow; one recent slump occurs on one of the slopes. The slump/earthflows occur in clayey soils that are retaining large amounts of soil water. As a result of this combination of factors, the soils are presently in a highly erodible condition. If a high intensity rain storm occurs on these hydrophobic soils before the water repellancy is ameliorated by natural processes and before adequate natural vegetative cover returns, there is a very high likelihood of major overland flow occurring. This would result in very large amounts of soil erosion and consequent loss of the ability of the soils to produce the kinds and amounts of natural vegetation that they normally support. With the loss of vegetation to transpire soil water, the slump prone slopes may experience renewed slumping due to excessive soil water over the next several decades.

There is a high potential for flooding in three drainages due to the conditions described previously. Many roaded stream crossings are incapable of passing floods of this magnitude, including one crossing on State Highway 38. In the event of a flood, downstream roads, irrigation systems, domestic water supplies and ultimately human life would be threatened.

Almost all of the burned area is located in the Daly Creek drainage. None of the Daly Creek tributaries which drain the burned area are known to contain fish above State Highway 38 due to steep reaches which form fish barriers. However, Daly Creek contains one of the most productive trout fisheries on the Forest. Population densities of both bull trout and westslope cutthroat trout are relatively high. Both species are classified as Sensitive by the Forest and as "species of special concern" by the Montana Department of Fish, Wildlife and Parks. Bull trout are also classified as a C1 species by the U.S. Fish and Wildlife Service, which is defined as "substantial biological information on file to support the appropriateness of proposing to list as Threatened or Endangered".

Daly Creek and upper Skalkaho Creek into which it flows are designated as a "core area" for bull trout in the Bitterroot drainage, which means this streams are considered very important for maintaining viability of this species in the drainage. Bull trout are known to be sensitive to increased amounts of fine sediment in bottom substrates. There is a concern that sediment inputs to Daly Creek tributaries could increase considerably due to increased erosion in intensively burned areas. In a worst case scenario (a storm event which would generate enough runoff and sediment to overwhelm existing culverts and wash out numerous road crossings including the Skalkaho Highway), it is conceivable that direct impacts to bull trout populations and indirect impacts to bull trout habitat would be severe enough that viability of this population could be jeopardized. Up to eight miles of Daly Creek could suffer severe impacts, and lesser impacts could occur for several more miles downstream in Skalkaho Creek.

B. Emergency Treatment Objectives:

The objectives of the treatment is to promote infiltration, reduce erosion and provide quick revegetation of the sites with the highest risk of soil loss and slope instability through seeding and placement of logs along the contours at the heads of drainages. In-channel scour and erosion would be minimized by placement of single log structures in the headwater channels of the areas most at risk. To minimize the threat to lives, property and downstream fisheries, undersized culverts and road fills will be removed and roads stabilized where the roads aren't needed in the near future and one large culvert would be replaced on the State Highway.

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 (seed)	60	100	100
(felling)	70	90	90
Channel	60	80	100
Roads	100	100	100
Other			

E. Cost of No-Action (Including Loss): $ 3,910,000

F. Cost of Selected Alternative (Including Loss): $ 590,000

G. Skills Represented on Burned-Area Survey Team:

[x] Hydrology	[x] Soils	[x] Geology	[ ] Range
[ ] Timber	[x] Wildlife	[x] Fire Mgmt.	[x] Engineering
[ ] Contracting	[x] Ecology	[ ] Research	[ ] Archaeology
[ ] _____	[x] Fisheries	[ ] _____	[ ] _____

Team Leader: Gary Decker
Phone: 406-363-7158 Electronic Address: R01F03A

H. Treatment Narrative:

Roads and Stream Crossings

Purpose: Prevent failure of roads at stream crossings where culverts are inadequate to pass expected flows or where the risk of plugging by debris is high. Also improve infiltration in road surfaces in high risk areas and to stabilize potential slope failures on cutslopes.

Treatment: On roads that are not needed in the near future, remove culverts and road fill. Lay the slopes of fills back to stable angle and treat with erosion blanket and seed. Stabilize stream bed with rock and logs. This treatment was applied to 11 stream crossings. Two planned stream crossings were modified by installing inlet structures and overflow channels rether than remove the culverts. It was determined after the intitial report that the road was needed in the near future for access.

Treatment: On two roads that traverse a severly burned drainage with unstable slopes, deep rip the road perpendicular to the slope and install water bars. Where the cutslope is failing (slumping), pull a portion of the fill into the cut to buttress the toe of the cutslope. Seed all disturbed areas with cereal rye. This treatment was applied on about 1.1 miles of road.

Treatment: On road to remain open, install trash racks on culverts where culvert capacity is large enough to pass the design storm but floatable debris could plug the culvert. This treatment was applied to five culverts

Treatment: Replace one culvert on State Highway 38 that is at high risk of failure. The existing 30 inch culvert will be replaced by a 72 inch culvert with inlet structure to pass the design storm adequately. Fill stabilization and culvert outlet energy dissapation is incorporated in the treatment.

NOTE: This part of the project could not be completed before the area was snowed in. The plan is to complete the installation in mid to late April, before snowmelt runoff in the high elevation area. The project is designed and an agreement with the State has been made to have the Montana Department of Transportation do the construction through a State administered contract. This alleviates our liability for safety and maintenance on the State Highway. The contract is ready to be advertized at this time. No delays are anticipated at this time. The costs for this portion of the project are the latest estimates.

Channel Treatments

Grade Stabilization
Purpose: Single logs were placed across intermittent channels at the very heads of the high risk drainages to trap sediment and prevent channel scour during runoff events. They would decrease the erosive potential of this runoff and thus limit the sediment yield to area streams. This would be both a preventative and control treatment.

Treatment: Single log grade stabilization structures were installed along intermittent stream channels located within high intensity burn areas. Some of the larger trees on site which were killed by the fire would be felled across these channels and notched in the middle so that they would sag down and contact the ground within the channels. Logs would not be keyed in, but would be felled behind standing trees or stumps whenever possible to prevent movement. A total of approximately 120 structures were installed along approximately one mile of intermittent channels.

Land Treatments

Contour felling
Purpose: Install log barriers along the contour in upper concave drainage basins to help shorten slope lengths on steeper slopes, store sediment, increase infiltration and slow down anticipated increases in runoff and overland flows. A reduction in overland flows would result in less soil movement from the steeper, high intensity burned areas. This would retain soil nutrients on site, limit the amount of sediment yield to streams and decrease the risk of gully formation. This would be a preventative treatment.

Treatment: Fall trees on the contour and position them to help slow surface runoff. Wedge fallen trees above standing trees or stumps to create stable log barriers. Manipulate soil and duff above log barriers to increase bole contact with the ground and maximize sediment storage potential. Log barriers would be spaced approximately 50' apart in rows along contours, with rows approximately 50' apart up and down the hillside. Logs and gaps in adjacent rows would be staggered, so runoff moving down the fall line would be intercepted by a log in every other row. The application rate could vary depending on slope length and steepness, but the average rate would be approximately 20 logs per acre. Treatment would be limited to identified critical areas within the high intensity burn area. Total treatment area was approximately 73 acres.

Slash sediment buffers
Purpose: Slash along the bottom of two existing harvest units at the bottom of an large intensively burned area would slow runoff and filter some sediment before it was deposited in a tributary of Daly Creek. This would be a control treatment.

Treatment: Numerous small (20-40 feet tall) sub-alpine fir between a tributary of Daly Creek and the bottom of existing harvest units located below Road #62616 were killed by the fire. Most of these fir were felled in a narrow row parallel to both the contour and the stream. Branches were left intact to serve as sediment filters. Some of the larger fir were left standing to provide woodpecker foraging habitat. Total distance of this treatment is approximately one-half mile.

Seeding

Purpose: Seeding with cereal rye will provide a protective cover of living plants and litter on highly erosive soils over the first and second post-fire years. This cover will reduce raindrop impact, provide roots and organic matter to help bind soil particles, improve infiltration, retain soil moisture and nutrients onsite, and slow the movement of any overland flow and thus reduce surface erosion.

Treatment: There was not enough cereal rye available to complete the order so winter wheat was substitutued for half the order. The 50:50 mixture of winter wheat and cereal rye was aerial seeded by helicopter at a rate of 20 pure live seed per square foot on approximately 229 acres of land that is especially prone to overland flow, erosion, and slumping due to effects of the fire. The total area was reduced from the planned 258 acres after further field investigation. These areas are highly hydrophobic and show evidence of both recent and historic slumping. The seed mix is expected to occupy these sites for 2 to 3 years after which it will not provide any significant amounts of volunteer plants. These species were selected because of their short term viability plus very effective erosion control capability for the critical first two years after fire. Native vegetation is expected to occupy these sites with a reasonable certainty after one or two years.

PART VI - EMERGENCY REHABILITATION TREATMENTS AND SOURCE OF FUNDS BY LAND OWNERSHIP

			NFS Lands			Other Lands			All
Line Items	Units	Unit Cost $	Number of Units	EFFS-FW22 $	Other $ ident.	Number of Units	Fed $ ident.	Non-Fed $ ident.	Total $
A. LAND TREATMENTS									
Seeding with cereal rye	acre	26.2	229	6004	-				6004
Felling/placement of contour log steps	acre	14	73	1037					1037
Slash sediment filters	mile	630	0.5	315					315
B. CHANNEL TREATMENTS									
Grade Stabilization	each	7	120	781					781
C. ROADS AND TRAILS									
remove culverts and fill	each	637	11	7011					7011
rip, drain, stab. road	mile	345	1.1	380					380
trash racks	each	86	5	428					428
replace large culvert	each	51000	1	51,000	est				51000
				58 819					

D. STRUCTURES									
E. BAER EVALUATION/ ADMINISTRATIVE SUPPORT									
Evaluation	16	200	16	3200					3200
Administration, est				4228	est				4228
F. TOTALS									74384

PART VII - APPROVALS

1. Roy Grant /s/~~Jeff Amoss~~ for STEPHEN K. KELLY — 2/10/95 ~~1-27-95~~
Forest Supervisor — Date

2. _____ _____
Regional Forester — Date