FS-2500-8 (8/93)

USDA-FOREST SERVICE Date of Report: **March 21, 1995**

BURNED-AREA REPORT
(Reference FSH 2509.13)
Star Gulch Fire

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

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: **Star Gulch Fire** B. Fire Number: **P41904**

C. State: **Idaho** D. County: **Boise**

E. Region: **Intermountain R-4** F. Forest: **Boise**

G. District: **Mountain Home and Idaho City Districts**

H. Date Fire Started: **August 19, 1994** I. Date Fire Controlled: **Oct. 3, 1994**

J. Suppression Cost: **$8,500,000**

K. Fire Suppression Damages Repaired with EFFS-PF12 Funds:
1. Fireline waterbarred (miles) **50**
2. Fireline seeded (miles) **50**. The Idaho Dept. of Lands has broadcast seeded approximately 15 miles of fireline. The Forest purchased seed for the remaining 35 miles of fireline. This seed was applied later in the season when there was a higher probability of successful germination and establishment.
3. Other (identify) **road work and retardant mix station rehab**

L. Watershed Number: **Boise River - 17050111, Mores/Grimes Cr. - 17050112**

M. NFS Acres Burned: **21,958** Total Acres Burned: **30,546**
Ownership type:
(**7,979**) State ( ) BLM (**609**) Pvt. ( )

N. Vegetation Types: **DF/PP 57%, PP/sage/grass 43%**

O. Dominant Soils: **Typic Xerorthent, Typic Haploxeroll, Typic Cryorthent, Typic Cryorcrept, Lithic Haploxeroll and Typic Xeropsamment**

P. Geologic Types: **Idaho batholith granitics with some basalt flows along the south edge.**

Q. Miles of Stream Channels by Order or Class:
1st order: **61.6 miles** 2nd order: **24.2 miles**
3rd order: **8.8 miles** 4th order: **5.5 miles**

R. Transportation System:
Trails: **7.5** miles Roads: **39.4** miles

PART III - WATERSHED CONDITION

A. Fire Intensity (acres): **11,032** (low) (50.2%) **5,811** (moderate) (26.4%) **4,748** (high) (21.7%)
367 (unburned) (1.7%)

B. Water-Repellent Soil (acres): **1,268** (low) **1,470** (moderate)
(by burn intensity) **2,775** (high) **5,513** (total acres)

C. Soil Erosion Hazard Rating (acres):
915 (low) **2,666** (moderate) **18,377** (high)

D. Erosion Potential: **6.6** tons/acre
E. Sediment Potential: **197.4** cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period: **5** years

B. Design Chance of Success: **60** percent

C. Equivalent Design Recurrence Interval: **10** years

D. Design Storm Duration: **6** hours

E. Design Storm Magnitude: **1.5** inches

F. Design Flow: **10.9** cubic feet per second per square mile

G. Estimated Reduction in Infiltration: **25** percent

H. Adjusted Design Flow: **11.8** cubic feet per second per square mile

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency:

Based on the BAER team field survey and analysis, the following emergencies exist as per FSH 2509.13:

A total of 30,546 acres were burned in the Star Gulch fire: 7,979 acres of State land, 609 acres of private land and 21,958 acres of National Forest System land.

1. Loss of Soil and Onsite Productivity:

About 84 percent (18,377 acres) of NFS lands burned have a high erosion hazard rating. Hydrophobic soils occur on 25 percent of NFS lands burned (5,513 acres) and about 48 percent (10,559 acres) burned at moderate to high intensity, basically eliminating effective ground cover. The average soil loss over NFS land in the burn area is expected to be approximately 6.6 tons per acre during the first 2 years. This greatly exceeds the approximated annual rate of soil formation. There is a high concern that soil productivity due to accelerated soil erosion from high and moderate burn intensities on 48 percent of the area could be significantly reduced as a result of the fire. Reductions in soil productivity will significantly impact commercial timber production and other resource uses. The value of soil and productivity losses is estimated at $25 per ton for a total of $5,040,090.

2. Loss of Water Control and Deterioration of Water Quality:

The watersheds in the burn area have a high potential for increased sedimentation and its adverse effects on water quality. Potential for long-term and short-term sediment related damage exists as a result of the fire. Perennial streams within the burned area include Thorn Creek, Minneha Creek, Cottonwood Creek, Badger Creek, Willow Creek, Birch Creek, and Lambing Creek. The beneficial uses of these creeks include salmonid fisheries (valued at approximately $527,000), livestock watering, and recreational use (valued at approximately $116,200) at campgrounds, picnic areas, fishing, and sightseeing. These streams provide a cold water source for salmonid fisheries in Mores Creek, Middle Fork Boise River, and Arrowrock Reservoir. They also provide water to Lucky Peak and Arrowrock Reservoirs which serve as major recreational areas for the Treasure Valley, flood control, irrigation, and hydroelectric power generation. Impacts to the reservoirs include contributions of sediment which would reduce storage, increases in nutrients affecting vegetation and weed management in downstream irrigation systems, and impacts to reservoir recreational uses.

3. Threats to Human Life and Property Onsite and Offsite:

Flooding and sediment bulked flows could occur which would threaten human life in residences located in the Thorn Creek watershed (25 percent NFS and 75 percent State and private ownership). In addition, there are about 39 miles of roads within the burned area. The Thorn Creek Road (#377) is situated in burned watersheds and has significant amounts of public use which could result in threats to life if flood or debris flows are generated from burned areas. Public use of about 7.5 miles of the Cottonwood Trail (#189) would also be vulnerable to flood or debris flows.

Structures at risk were identified by Earl Ruby and John Thornton. The values of these structures were obtained using the Boise County Assessor's records. Improvements such as houses, sheds, barns, etc., were considered. Private ownership of road facilities, culverts/bridges were also considered. Only the structures that would be influenced to some degree by areas burned upstream on National Forest Lands were considered in determining the total property values at risk. These structures are located within the Thorn Creek watershed.

About 25 percent of the Thorn Creek watershed that was burned is NFS lands. State lands and a small portion of private lands make up the remaining 75 percent. The proportion of the value of property at risk associated with the NFS land was prorated based on land ownership of the burned area. This is appropriate as the burn intensity/severity was similar on all land ownership. Therefore, 25 percent of the total of property values at risk can be attributed to the NFS lands cost/risk assessment. The total value of property at risk is $121,900. The NFS portion of this value is $30,500.

About 7.5 miles of trail in the Cottonwood drainage have a high probability of being washed out due to increased flows from the burned area. The trail is valued at approximately $75,000 based on current reconstruction costs.

There are 39.4 miles of roads and three bridges at risk in the burned area. Of these, 29.3 miles are under Forest Service jurisdiction. The value of these NFS roads and bridges is estimated at approximately $435,000. These roads will act as collectors for increased overland flows. Road damage will be compounded where existing culverts are inadequate to handle increased flows and debris. The failure of road drainage systems may also trigger debris torrents in drainages below the roads. To protect the road network, treatments are needed on approximately 12 miles of road segments.

B. Emergency Treatment Objectives:

To address the above emergencies identified by the BAER team, the following objectives were identified:

Provide for the protection of life and property (residences, structures, roads, trails, etc.) within the burn and potential downstream impact areas using a variety of land, channel, road, and slope stability treatments which have been demonstrated to be effective in similar burned areas (see narrative treatments).

Provide information to general and specific publics and Forest users about the potential threats to life and property.

Retain soil onsite to maintain the long-term productivity of the ecosystem, minimize degradation of water quality and related beneficial uses, and maintain control of water by using a variety of land, channel, road, and slope stability treatments which have been demonstrated effective in similar burned areas (see narrative treatments).

Provide relevant information collected in this process to land owners and other State and Federal agencies which are involved in related activities on State and private lands burned in the Star Gulch fire.

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

Land 100% Channel 100% Roads 100% Other _____%

D. Probability of Treatment Success

	<----Years after treatment-----> 1	3	5
Land	60%	70%	70%
Channel	60%	70%	70%
Roads	80%	90%	100%
Other			

E. Cost of No-Action (Including Loss): **$ 6,261,066**

F. Cost of Selected Alternative (Including Loss): **$ 5,405,309**

G. Skills Represented on Burned-Area Survey Team:

[X] Hydrology	[X] Soils	[X] Range	[X] Fisheries
[X] Timber	[X] Wildlife	[X] Fire Mgmt.	[X] Engineering
[X] Plant Mtls	[X] Ecology	[X] Research	[X] Archaeology
[X] S.C.S.	[X] State Lands	[X] ID F&G	[X] F.S. Research
[ ] Contracting	[ ] Geology		

Incident Commander: **Terry Sexton**
Phone: **208-364-4330** DG Address: **T.Sexton:R04F02D03A**
Team Leaders: **Monte Williams, John Thornton, Leah Juarros, Warren Ririe**

H. Treatment Narrative:

Land Treatments:

Contour Felling. Trees will be dropped along slope contours (less than 70 percent slopes) in order to trap eroded material and decrease hydraulic slope length which reduces the erosional energies of the water. Additional benefits occur with the breakup of the water repellant soil layer due to the trenching of the soil for the installation of the contour felled logs. This serves as a "sink" for the water to infiltrate to the subsoil thereby reducing the volume of runoff. Trees should be 8 to 12 inches in diameter at the largest end and 30 feet in length with 30 trees per acre. Treatment costs are estimated at $200 per acre.

Seeding. A significant portion of the burned acres will not recover to 50 percent ground cover density in the next 2 years under natural vegetative recovery conditions. Some areas of the fire may not recover for up to 5 years. Areas treated in high drainage basins with high burn intensities in the County Line fire and Foothills fire in 1992 show very little recovery to date.

Natural recovery will be augmented through the aerial seeding of native grass cultivars. Seed will be applied for spring germination at the rate of 15 to 20 pure live seed per acre. Application rates and species selected were determined based on criteria including cost, availability, and potential competition with conifer regeneration (natural and plantation).

(from data prepared for Idaho City Complex fires by Greg Lind)

"NATIVE" CULTIVAR MIX		RATE lbs/ac
Bromar Mountain Brome	Bromus marginatus	1 lbs PLS
Pryor Slender Wheatgrass	Agropyron trachycaulum	1 lbs PLS
Critana Thickspike Wheatgrass	Agropyron dasystachum	1 lbs PLS
Goldar Bluebunch Wheatgrass	Agropyyron spicatum	1 lbs PLS
	Total	4 lbs PLS

Note: This application rate and mix would give a total of 15.3 pure live seed (PLS) per square foot. This is a lower application rate than is normally used for aerial seedings. The lower rate is designed to reduce conflicts with conifer regeneration/plantations and to augment recovery of native species on nontimber sites. The cost of the seed mix is estimated at $3 per pound or $12 per acre. Application costs are estimated at $8 per acre for a total cost of $20 per acre.

alternates

Sodar Streambank Wheatgrass	Agropyron riparium
Sodar Streambank Wheatgrass	Agropyron riparium
Goldar Bluebunch Wheatgrass	Agropyron spicatum
Secar Bluebunch Wheatgrass	Agropyron spicatum
Whitmar Bluebunch Wheatgrass	Agropyron inerme
Rosanna Western Wheatgrass	Agropyron smithii
Hard Fescue (fire lines only)	

Seeds per Square Foot at 1 Pound per Acre Application Rate

Cultivar	Seed/sq foot
Bromar Mountain Brome	2.1
Pryor Slender Wheatgrass	3.7
Critana Thickspike Wheatgrass	3.1
Durar Hard Fescue	13.0
Sodar Streambank Wheatgrass	3.6
Goldar Bluebunch Wheatgrass	3.2

Seed mixes will be noxious weed seed free in accordance with noxious weed laws for the State of Idaho. Seed batches for each seed mix must have been tested and labeled prior to purchase for purity, germination, and weed seed content. Germination tests shall be no more than 6 months old from date of delivery. Seed batches will be tested upon receipt by the Idaho Seed Lab. Acceptability and payment will be based on pure live seed content, purity and weed content tests from the Idaho Seed Lab.

Channel Treatments:

Base Level Control. These structures are a second line of defense with four objectives (in order of priority): (1) to reduce stream downcutting; (2) to increase the lag time of runoff by routing through small basins; (3) to protect runoff through culverts; and (4) to act as small sediment reservoirs (approximate capacity is 10 cubic yards per structure).

These structures may be constructed from adjacent logs or straw bales, constructed and placed appropriately in zero and first order stream channels. The criteria for treatment is as follows: 0 to first order channels; less than 15 percent channel bottom gradient; located in or directly downstream from moderate to high burn intensity/severity areas; approximately one structure per 100 feet of channel length (52/mile). Installation specifications are detailed in the contract.

Approximately 6.6 miles of stream channels need to be treated in the Thorn Creek Watershed with approximately 345 structures. Approximately 4.4 miles of stream channels need to be treated in the Cottonwood Creek Watershed with approximately 230 structures. Construction costs are estimated at $175 per structure.

Transportation System Treatments:

Roads. The value of the roads and the potential increase in sediment load created by fill failures, stream routing down inside ditches and eventual blowouts into new channels, as well as the loss of service roads make treatments to ensure road drainage and protection of crossings a critical treatment. Accelerated runoff, due to the newly formed hydrophobic layers and bare surfaces, put culverts and existing road drainage at risk. The mechanism of road failure from overflow conditions is typically debris blockage of culverts or other drainage structures and increased peak runoff due to hydrophobic soils and loss of ground cover. This allows water flows to generate enough volume and velocity to erode the roadway at drainage crossings, ditch lines, or road surface. Treatment prescriptions are designed to alter the structure of the road, or the drainage system to prevent this occurrence.

The treatment strategy employed is to provide backup for all drainage structures in the event of failure, rather than increase structure water capacity. These roads require intensive treatment to ensure their structural integrity through anticipated higher runoff from thunder storms (by as much as ten times). Culverts will be replaced when the existing culvert cannot be conditioned or where inadequate culverts cannot be replaced with minimal earth work. General removal of culverts is considered an excessive measure due to the expense of re-installing them based on the need for the road facilities for future resource management.

Blockage or overflow of culverts and other structures will be accommodated by installation of rolling dips or cross-ditches. Dip/ditch installation is much faster and less expensive than culvert modification and serves the purpose of removing water from the roadway before flow volumes and velocities create erosion. They can also be easily removed from the roadway once the risk of increased runoff diminishes. Work on some sections of these roads may include (as needed) removal and or scarification of the road surface (could be by ripping), outsloping, and installation of waterbars every 100 feet to prevent flow volumes from running down the road. The drainage system of the original road is thus preserved to resume normal use when runoff decreases to original design levels. In addition, other road treatments include: catch basin clearing and cleaning and down spout rocking for water energy dissipation. All of the treatments have been previously proven effective in burned areas.

Failure of these roads could have disastrous effects on streams and arterial collector roads further down slope. It is important to fortify these roads, whether opened or closed, to accommodate additional runoff.

The total mileage listed for this prescription is 12 miles. The total cost for anticipated work is $18,000 or $1,500 per mile.

Trails. Approximately 7.5 miles of the Cottonwood Creek Trail are in the burned area. Five of these miles are subject to extreme erosion. In a flood event, it is likely that the trail would be significantly eroded requiring replacement. Improving drainage would protect the trail and significantly reduce sedimentation. Drainage improvement would include construction of water bars and placement of cribbing. Approximately 5 miles of trail would be treated at a cost of $2,500 per mile.

Other Treatments:

Livestock Grazing Controls. The Forest will establish recovery criteria which will be met before livestock grazing will be allowed on the burned area. Sheep will be routed around the burned area until recovery criteria are met. The permittee on the Mores Creek Cattle allotment will be required to take nonuse for resource protection until the criteria are met. The criteria may include measurements of soil cover, riparian vegetation recovery, seeding establishment, impacts to conifer regeneration and repair of range improvements. Grazing management strategies may also need be altered at least in the short-term once grazing resumes. Protection fencing will not be required.

Timber Salvage Lop-and-Scatter Requirement. Where salvage sale logging is approved in the burn area, contractors will be required to lop-and-scatter slash. This will help increase soil cover, reduce micro-site soil temperatures which inhibit seedling germination and establishment, break up overland flow energy, and reduce surface erosion.

Timber Salvage - BAER Treatment Coordination. BAER treatments and structures destroyed or damaged during harvest actions will be repaired or replaced in a timely manner. Sale contract clauses will be established to ensure this occurs.

Mud and Flood Patrols. Given the identified risks in the burn area, and the potential for plugged culverts, etc., the patrol would be used to identify problems needing immediate treatment. Backhoes or other equipment would need to be available to respond to these situations. Cost for this activity is estimated at $5,000 and is included as an administrative cost.

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

Line Items	Units	Unit Cost $	NFS Lands Number of Units	NFS Lands EFFS-FW22 $	NFS Lands Other $ ident.	Other Lands Number of Units	Other Lands Fed $ ident.	Other Lands Non-Fed $ ident.	All Total $
A. LAND TREATMENTS									
Contour Felling	acres	130	4258+	554251		480	61210*	1190#	616,65
Aerial Seeding	acres	25	4970+	124477		660	14320*	2180#	140,97
									757,620
				67,728					
B. CHANNEL TREATMENTS									
Base level structures	each	237@	402	95146		180	16870*	3120#	137,80
Clean Above Culverts									
C. ROADS AND TRAILS									
Road Prescription	miles	785	16	$12,550		5	3140 *	785#	
Trail Prescription	miles	1676	3	$ 5,028					
				17578					
D. STRUCTURES									
E. BAER EVALUATION/ ADMINISTRATIVE SUPPORT									
InterDisciplinary Team		250	115	$28821					2882
Administration	days	250	46	$16367~				2570	1136
				45188					
F. TOTALS				836,640			95,540	8845	

+Of the 2,125 acres of contour felling initially planned, the BAER implementation team determined additional acres requiring treatment. Early snow that made conditions unsafe so that it was impossible to continue. Conditions will be analyzed this spring to determine if an emergency still exists. If a watershed emergency is documented, we will request additional BAER funding to complete additional contour felling. Of the 575 base level structures planned, only 402 were completed because of the weather. These will al be evaluated this spring to determine if an emergency still exists that would be treated with structures.

*This money was provided with the assistance of Natural Resources Conservation Service 4 program.

#This money came from State and private landowners.

~This amount includes Mud and Flood Patrol.

@Substantial higher cost on structures than was originally anticipated. Building materials were not sufficient quality.

FS-2500-8 (8/93)

USDA-FOREST SERVICE

Date of Report: **March 22, 1995**

BURNED-AREA REPORT
(Reference FSH 2509.13)
Star Gulch Fire

PART VII - APPROVALS

1. **/s/ Laurie Tippin** — **3-29-95**
Cathy Barbouletos — Date
Acting Forest Supervisor

2. _____ _____
Dale N. Bosworth — Date
Regional Forester