

BURNED-AREA REPORT
(Reference FSH 2509.13)PART I - TYPE OF REQUEST

A. Type of Report

- ☐ 1. Funding request for estimated EFFF-FW22 funds
☒ 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
☒ 3. Final report - following completion of work

PART II - BURNED-AREA DESCRIPTION

- A. Fire Name: THUNDERBOLT B. Fire Number: ID BOF 198
C. State: IDAHO D. County: VALLEY
E. Region: R4 INTERMOUNTAIN F. Forest: BOISE & PAYETTE
G. District: CASCADE & KRASSEL
H. Date Fire Started: 8/8/94 I. Date Fire Controlled: 10/30/94
J. Suppression Cost: \$21,610,000
K. Fire Suppression Damages Repaired with EFFF-PF12 Funds:
 1. Fireline waterbarred (miles) 35
 2. Fireline seeded (miles) 20
 3. Other (identify) Rds Opened 3 mi., Rd Fuel Chipped 3 mi., ICP 5ac
 Safety Zones 4 ac., Helispots 10 ac.
L. Watershed Number: 17060208- 15 & 10 (South Fork Salmon R. & Johnson Cr.)
M. NFS Acres Burned: 27,309 Total Acres Burned: same
 Ownership type:
 (0%) State (0%) BLM (0%) PVT (100%) NFS
N. Vegetation Types: 60% Subalpine fir Habitat Type. 30% Douglas-fir H.T.,
 10% Whitebark Pine H.T.
O. Dominant Soils: Typic Cryorchepts, Typic Cryumbrepts, Alfic Cryop-
 summents, Typic Cryortnents
P. Geologic Types: Idaho Batholith Granitics
Q. Miles of Stream Channels by Order or Class:
 First: 74.56 mi. Second: 41.73 mi. Third: 4.66 mi.
R. Transportation System:
 Trails: 11 miles Roads: 48 miles

PART III - WATERSHED CONDITION

- A. Fire Intensity (acres): 2360 (low) 5224 (moderate) 1925 (high)
9509 (Total)
- B. Water-Repellent Soil (acres): 5842
- C. Soil Erosion Hazard Rating (acres):
1587 (low) 4227 (moderate) 3695 (high)
- D. Erosion Potential: 16.5 tons/acre
- E. Sediment Potential: 689.5 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

- A. Estimated Vegetative Recovery Period: 3 years
- B. Design Chance of Success: 85 percent
- C. Equivalent Design Recurrence Interval: 25 years
- D. Design Storm Duration: 6 hours
- E. Design Storm Magnitude: 2.2 inches
- F. Design Flow: 37.2 cubic feet per second per square mile
- G. Estimated Reduction in Infiltration: 52 percent
- H. Adjusted Design Flow: 42.9 cubic feet per second per square mile

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency:

A total of 9,509 acres of National Forest System lands have burned in the Thunderbolt fire as of September 23, 1994. The burned landscape could cause the loss of human life and property, soil productivity, and spawning/rearing habitat for the endangered Snake River chinook salmon and several sensitive salmonid species.

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

1. Loss of Soil and Onsite Productivity:

About 39 percent (3,695 acres) of the acres that burned have a high erosion hazard rating. Approximately 75 percent (7,149 acres) of the area burned at moderate to high intensity, basically eliminating effective ground cover. Hydrophobic soils occur on 61 percent of the area. The average soil loss in the burn area is expected to be approximately 12.4 tons per acre during the first 2 years. This rate 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 75 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 \$1,665,995.

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

The watersheds in the burn area have a high potential for increased sedimentation and resulting adverse impacts 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 including Goat Creek, Roaring Creek, South Fork Fourmile Creek, Fourmile Creek, Sister Creek, Trout Creek, Rustican Creek, Halfway Creek, Wardenhoff Creek, Coffee Creek, and Ditch Creek, are tributaries either to Johnson Creek or the South Fork Salmon River and contribute cold water for the resident and anadromous fisheries. Johnson Creek and the South Fork Salmon River have been designated critical habitat for the Snake River spring/summer chinook salmon, an endangered species under the Endangered Species Act. The South Fork Salmon River is a Water Quality Limited Segment, with an approved Total Maximum Daily Load (TMDL) for sediment (ID Department of Health and Welfare - DEQ 1992). These major tributaries to the Snake River provide holding, spawning, and rearing habitat (valued at \$10,286,080). Critical spawning areas are located downstream of the fire area at Poverty Flats, and Oxbow on the South Fork Salmon River and Ice Hole on Johnson Creek. Sediment delivered from the fire area could reduce spawning habitat capability. These creeks and rivers also support bull trout (recently upgraded to Category 1 by USFWS), westslope cutthroat trout, redband trout, and/or steelhead trout, which are Region 4 sensitive species. The beneficial uses of these creeks include resident salmonid fisheries (rainbow, brook trout, and cutthroat trout, valued at approximately \$521,142), livestock watering, and recreational use (valued at approximately \$83,058). Streams known to support a resident salmonid fisheries include Ditch Creek, Trout Creek, Roaring Creek, Goat Creek, Fourmile Creek, and South Fork of Fourmile Creek.

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

There are about 48 miles of roads at risk as a result of the burned area. The value of these roads is estimated at \$624,125. 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 20.5 miles of road within the burn area.

Johnson Creek road (#413) and South Fork Salmon River road (#474) are the two main roads. The Johnson Creek road is used for access to the community of Yellow Pine, the main route for all mining traffic to Stibnite mining area, access for private landowners and recreationists (accessing the Idaho Centennial Trail system) and is used for forest administration. During the summer, it supports an average of 115 vehicles per day. Flood and debris flows generated from the burn area is a threat to public life and property. Johnson Creek road connects with the Ditch Creek road (#410) which provides access to the Rainbow/Caton Lake trail, which is probably the second most heavily used trail on the Cascade Ranger District.

The South Fork Salmon River road also provides access to Yellow Pine and Stibnite mining area and for forest users. It supports an average of 100 vehicles per day during the summer. It connects with road #474E which accesses the Goat Creek trail.

The Fourmile trail has potential for flooding on approximately 2 miles (the fire is still active in this area). Reconstruction costs for this trail would be approximately \$22,840. The cost of treating the trails (erosion control) is \$8,000.

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 (roads and trails) within the burn and potential downstream impact areas using a variety of land, 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 prior to the first damage producing storm to minimize downstream effects to life and property, beneficial uses, and long-term productivity of the ecosystem. Minimize degradation of water quality and related beneficial uses. Maintain control of water by using a variety of land, 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 landowners and other State and Federal agencies which are involved in related activities on State and private lands burned in the Thunderbolt fire.

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

Land 85% Channel % Roads 100% Other %

D. Probability of Treatment Success

	<----Years after treatment----->		
	1	3	5
Land	85%	95%	100%
Channel	%	%	%
Roads	85%	100%	100%
Other			

E. Cost of No-Action (Including Loss): \$ 13,186,249

F. Cost of Selected Alternative (Including Loss): \$ 5,533,428

G. Skills Represented on Burned-Area Survey Team:

[X] Hydrology [X] Soils [X] Fisheries
[X] Timber [X] Wildlife [X] Fire Mgmt. [X] Engineering
[X] Archaeology

Incident Commander: Steve Patterson and Chris Savage

Phone: 208-382-4430 ext or 4271 recep. DG Address: R04F02D04A

Team Leaders: Mark Leis, Jennie Fischer, Michelle McCammon, Dale Olson
Steve Kozel, Rob Cordtz Team advisor: W.Wayne Patton

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 erosive energy of the water. Additional benefits occur with the breakup of the water repellent 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 \$350 per acre. (This cost includes helicopter support.)

Mulch. Mulch will only be applied on 15 acres that were previously burned, logged, and contour terraced. As a result of the re-burn of this area, little slash and organic material is available. Certified weed-free straw will be used to provide a micro-habitat for vegetation establishment. The mulch will be applied by hand at a rate of 0.5 ton per acre. Treatment costs are estimated at \$678 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 6 years.

Natural recovery will be augmented through the aerial seeding of native grass cultivars. Seed will be applied for spring germination at the rate of 5.0 pure live seed pounds per acre. Application rates and species selected were determined based on criteria including cost, availability, and potential competition with conifer regeneration (natural and plantation).

"NATIVE" CULTIVAR MIX			<u>RATE lbs/ac</u>
Bromar Mountain Brome	<u>Bromus marginatus</u>		3.0 lbs PLS
Pryor Slender Wheatgrass	<u>Agropyron trachycaulum</u>		1.5 lbs PLS
Covar Sheep Fescue	<u>Festuca ovina</u>		0.5 lbs PLS
Total			5.0 lbs PLS/ac

Note: This application rate and mix would give a total of 18 pure live seeds (PLS) per square foot. The lower rate and the use of bunch grasses 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 \$5 per pound or \$25 per acre. Application costs are estimated (including administration of the contract) at \$10 per acre for a total cost of \$35 per acre.

Alternates species :

Durar Hard Fescue	Pryor Slender Wheatgrass
Canbar Canby Bluegrass	Sherman Big Bluegrass
Joseph Idaho Fescue	Secar Bluebunch Wheatgrass

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.

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. Additional treatments include pulling ditches, cleaning existing culverts, increasing the depth of some roadway ditches, construction lead off ditches, installing trash racks, putting slash on fill banks, and mulch and seed cut banks, construct flavel bars, flare inlets, riprapping, and flood/mud patrol. 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.

Trails. Approximately 7 miles of trail are in the burned area. Two miles of the Fourmile trail are subject to erosion. Drainage improvement would include construction of water bars and removal of debris. Approximately 2 miles of trail would be treated at a cost of \$2,000 per mile. Roads accessing Rainbow/Caton Lake trail and Goat Creek trail are at risk due to run-off.

Other Treatments:

Timber Salvage Lop-and-Scatter Requirement. If 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.

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

Line Items	Units	Unit Cost \$	NFS Lands			Other Lands			All
			Number of Units	EFFS-FW22 \$	Other \$ ident.	Number of Units	Fed \$ ident.	Non-Fed \$ ident.	Total \$

A. LAND TREATMENTS

✓ Contour Felling **	acres	\$ 375	153	\$ 57407					\$ 574
✓ Aerial Seeding	acres	\$ 28	1550	\$ 42779					\$ 427
✓ Mulching	acres	\$ 874	15	\$ 13109					\$ 131
				113295					
									\$ 1132

B. ROADS AND TRAILS

✓ Warning Signs	each	\$ 95	4	\$ 380					\$ 3
✓ Remove Hazard Trees	day	\$ 600	8	\$ 4800					\$ 48
Install Culvert	linft	\$ 22	84	\$ 1848					\$ 18
✓ Replace Culvert	linft	\$ 25	88	\$ 2200					\$ 22
Pull Ditches/Clean Culvs	mile	\$ 428	15.2	\$ 6506					\$ 65
Below ✓ Increase Ditch Depth	hour	\$ 65	14	\$ 910					\$ 9
✓ Lead Off Ditch	ditch	\$ 75	4	\$ 300					\$ 3
✓ Small Trash Racks	each	\$1000	16	\$ 1600					\$ 16
✓ Large Trash Racks	each	\$ 600	4	\$ 3600					\$ 36
Slash/Mulch	acre	\$ 350	10	\$ 3500					\$ 35
Seeding	acre	\$ 100	10	\$ 1000					\$ 10
Flavel Bar	each	\$ 200	9.4	\$ 1880					\$ 18
Flar Inlet	each	\$ 425	4	\$ 1700					\$ 17
✓ Rolling Dips	mile	\$1500	2.7	\$ 4050					\$ 40
✓ Riprap	bank	\$ 500	4	\$ 2000					\$ 20
✓ Remove Culvert	each	\$ 250	6	\$ 1500					\$ 15
✓ Tank Trap	each	\$ 50	4	\$ 200					\$ 2
✓ Flood/Mud Patrol	each	\$5000	1	\$ 5000					\$ 50
✓ Trail Treatment	each	\$2000	2	\$ 4000					\$ 40

C. BAER EVALUATION/ ADMINISTRATIVE SUPPORT

Interdisciplinary Team	days	250	67	\$ 16849					\$ 168
Administration	days	250	219	\$ 54663					\$ 546

F. TOTALS				\$231781 ***					\$ 2317
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**Of the 1,329 acres of contour felling planned, the BAER implementation team has able to completed 153 acres due to 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 planned contour felling. All other treatments were completed.

***Our expenditures were \$231,781 out of the total authorization of \$646,801. The difference results from less contour felling accomplished than was planned.

BURNED-AREA REPORT
(Reference FSH 2509.13)
Thunderbolt Fire

PART VII - APPROVALS

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

2. _____
Dale N. Bosworth Date
Regional Forester

COST-RISK ANALYSIS OF BURNED-AREA REHAB. TREATMENTS

FIRE:

Thunderbolt, BOISE NATIONAL FOREST, 1994

DATE: 10/04/94

ALTERNATIVE: A NO TREATMENT

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PRIMARY TREATMENT.	PROBABILITY OF	(A) SUCCESS	100%
		(B) FAILURE	0%

Treatments	Units	Amount	Unit Cost	Total Cost
-----	-----	-----	-----	-----
1. Admin and IDT Costs		1.0	\$16,849	\$16,849
2. Trails	miles	0.0	\$ 2,000	\$0
3. Roads	total package	0.0	\$42,974	\$0
4. Contour Felling	acres	0.0	\$ 350	\$0
5. Aerial Seeding	acres	0.0	\$ 35	\$0
6. Mulching	acres	0.0	\$ 678	\$0
7. Biosol	acres	0.0	\$ 636	\$0
				=====
	(C) Total =			\$16,849

PROBABLE RESOURCE VALUE LOSS

Item	---Probable Dollar Loss---	
-----	(D) Success	(E) Failure
-----	-----	-----
1. Soil Productivity	\$ 1,654,995	\$0
2. Transportation System	\$ 624,125	\$0
3. Anadromous Fish	\$10,286,080	\$0
4. Resident Fish	\$ 521,142	\$0
5. Recreation	\$ 71,620	\$0
	=====	=====
Total =	\$13,157,962	\$0

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FALLBACK TREATMENT.	PROBABILITY OF	(F) SUCCESS	0%
N/A		(G) FAILURE	0%

Treatments	Units	Amount	Unit Cost	Total Cost
-----	-----	-----	-----	-----
1.				
2.				
3.				
4.				
				=====
	(H) Total =			

PROBABLE RESOURCE VALUE LOSS

Item	---Probable Dollar Loss---	
-----	(I) Success	(J) Failure
-----	-----	-----
1.		
2.		
3.		
4.		
	=====	=====
Total =		

TOTAL ALTERNATIVE COST = \$13,174,811

COST-RISK ANALYSIS OF BURNED-AREA REHAB. TREATMENTS

FIRE: Thunderbolt, BOISE NATIONAL FOREST, 1994 DATE: 10/04/94

ALTERNATIVE: C' HIGH TREATMENT LEVEL - Selected

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 PRIMARY TREATMENT. PROBABILITY OF (A) SUCCESS 85%
 (B) FAILURE 15%

Treatments	Units	Amount	Unit Cost	Total Cost
1. Admin and IDT Costs		1	\$71,512	\$ 71,512
2. Trails	miles	2	\$ 2,000	\$ 4,000
3. Roads	(total package)	1	\$42,974	\$ 42,974
4. Contour Felling	acres	869	\$ 350	\$304,150
5. Aerial Seeding	acres	1547	\$ 35	\$ 54,145
6. Mulching	acres	15	\$ 678	\$ 10,170
7. Biosol	acres	94	\$ 636	\$ 59,784
				=====
	(C) Total =			\$546,735

PROBABLE RESOURCE VALUE LOSS

Item	---Probable Dollar Loss---	
	(D) Success	(E) Failure
1. Soil Productivity	\$1,268,384	\$ 1,654,995
2. Transportation System	\$ 0	\$ 624,125
3. Anadromous Fish	\$1,542,912	\$10,286,080
4. Resident Fish	\$ 78,171	\$ 521,142
5. Recreation	\$ 0	\$ 71,620
	=====	=====
Total =	\$2,889,467	\$13,157,962

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 FALLBACK TREATMENT. PROBABILITY OF (F) SUCCESS 0%
 N/A (G) FAILURE 0%

Treatments	Units	Amount	Unit Cost	Total Cost
1.		0.0	\$0	\$0
2.		0.0	\$0	\$0
3.		0.0	\$0	\$0
4.		0.0	\$0	\$0
5.		0.0	\$0	\$0
				=====
	(H) Total =			\$0

PROBABLE RESOURCE VALUE LOSS

Item	---Probable Dollar Loss---	
	(I) Success	(J) Failure
1.	\$0	\$0
2.	\$0	\$0
3.	\$0	\$0
4.	\$0	\$0
5.	\$0	\$0
	=====	=====
Total =	\$0	\$0

TOTAL ALTERNATIVE COST = \$4,976,476