

BURNED-AREA REPORT  
(Reference FSH 2509.13, Report FS-2500-8)

PART I - TYPE OF REQUEST

A. Type of Report

- ☒ 1. Funding request for estimated EFFS-FW22 funds  
☐ 2. Accomplishment Report  
☐ 3. No Treatment Recommendation

B. Type of Action

- ☒ 1. Supplemental Request (Best estimate of funds needed to complete eligible rehabilitation measures) Initial Request dated 8/16/94  
☐ 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: Tyee Creek Complex B. Fire Number: P68536  
C. State: Washington D. County: Chelan  
E. Region: R-6 F. Forest: Wenatchee  
G. District: Entiat  
H. Date Fire Started: 7/24/94 I. Date Fire Controlled: Est.10/31/94  
J. Suppression Cost: \$44,000,00 (9/11/94 ICS 209 report)  
K. Fire Suppression Damages Repaired with EFFS-PF12 Funds:  
    1. Fireline waterbarred (miles) 150 miles  
    2. Fireline seeded (miles) 150 miles  
    3. Other (identify) 50 miles of secondary cat lines completed  
L. Watershed Number: 1702000902; 1702001003; 1702001008; 1702001107  
M. NFS Acres Burned: 105,600 Total Acres Burned: 140,195 (9/14/94)  
    Reported 8/16/94: 92,500 Reported 8/16/94: 123,150  
Ownership type:  
    (10,500 ) State ( 2,700 ) BLM (21,500) PVT ( ) \_\_\_\_\_  
N. Vegetation Types: Lower elevations--Ponderosa pine overstory associated with bitterbrush/grass. Upper elevations--Lodgepole pine  
O. Dominant Soils: Mantle of volcanic ash and pumice overlying coarse grained weathered granitic (decomposed), very erosive  
P. Geologic Types: Medium to fined grained Granitic (quartz diorite), highly weathered (decomposed) on old erosional surfaces, alluvial fans filling valley bottoms.

Q. Miles of Stream Channels by Class:\*

I-- 28

II-- 25

III-- 80

IV-- 207

- \* Miles identified from USGS records, grossly under estimates class IV streams

R. Transportation System: \*

Trails: 65 (miles)

Roads: 518 (miles)

- \* 250 miles of road parallels class II or III streams. Approximately 75 % of streams have roads within 300 feet of channel.

PART III - WATERSHED CONDITION

A. Fire Intensity (Acres): 48,931 (low) 39,729 (moderate) 44,411 (high)  
unburned: 7,124

B. Water Repellant Soil (Acres): 16,430.0

C. Soil Erosion Hazard Rating (Acres):  
21,0290 (low) 42,0580 (moderate) 77,108 (high)

D. Erosion Potential: \* 677 tons/acre

E. Sediment Potential: \* 203 cu. yds/sq. mile

- \* For High and Moderate Burn Intensity. Numerous alluvial fans filling valley bottoms.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period: 3 years.

B. Design Chance of Success: 70 percent.

C. Equivalent Design Recurrence Interval: 10 years.

D. Design Storm Duration: 0.5 hours.

E. Design Storm Magnitude: 0.6 inches.

F. Design Flow: <1.0 cfs/m.

G. Estimated Reduction in Infiltration: 30 percent.

H. Adjusted Design Flow: 273 cfs/m.\*

- \* A short duration, high intensity (convective) storm event has been identified as the storm type most likely to cause damage in the burned area. The adjusted design flow represents an approximation of a potential short-term flow from an intermittent channel typical of the area given degraded infiltration conditions. The fire area has had a history of storm events triggering floods one to two years following large burns.

PART V - SUMMARY OF ANALYSIS

A. Describe Emergency: The Tyee fire area contains many important factors that were considered in determining the proposed course of action. List on the next page and in the appendix are conditions that warrant emergency rehabilitation efforts.

1. Loss of site productivity- The fire area has a history of serious flooding following 1 to 2 years after fires. Area contains highly erodible soils and landforms that effectively deliver sediment.
2. Threat to human life- High risk for flooding will originate in the upper portions of tributary watersheds, resulting in deposition on private property on alluvial fans in the lowlands. High risk exists for public safety and extensive property damage. Public life has been lost from past flood events adjacent to the Tyee fire area.
3. Loss of water quality- The burned area encompasses a large portion of the Entiat and Mad River watersheds which provide habitat for anadromous fish and bull trout. During 1989 floods, the lower reach of Entiat River experienced 100% fish kill. The northern portion of the fire area drains into Lake Chelan, a large pristine lake. Developed and dispersed recreation is significant along the Entiat and Mad Rivers and Lake Chelan. These areas are major recreation destination sites.

B. Emergency Treatment Objectives:

The emergency treatment objective is to provide immediate soil cover and improve infiltration by establishing vegetation through seeding and fertilization. Road and land treatments are intended to reduce erosion and sedimentation onto private property and fish habitat.

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

Land 90 %      Channel 90 %      Roads 90 %      Other 90 %

D. Probability of Treatment Success

	<----Years after treatment----->		
	1	3	5
Land	80%	85%	90%
Channel	80%	90%	90%
Roads	80%	80%	80%
Other	80%	80%	80%

E. Cost of No-Action (Including Loss): \$ 158,489,000

F. Cost of Selected Alternative (Including Loss): \$ 39,457,492

G. Skills Represented on Burned-Area Survey Team:

<input checked="" type="checkbox"/> Hydrology	<input checked="" type="checkbox"/> Soils	<input checked="" type="checkbox"/> Geology	<input checked="" type="checkbox"/> Range
<input checked="" type="checkbox"/> Timber	<input checked="" type="checkbox"/> Wildlife	<input checked="" type="checkbox"/> Fire Mgmt.	<input checked="" type="checkbox"/> Engineering
<input checked="" type="checkbox"/> Contracting	<input checked="" type="checkbox"/> Ecology	<input checked="" type="checkbox"/> Research	<input type="checkbox"/> Archaeology
<input checked="" type="checkbox"/> PIO	<input checked="" type="checkbox"/> Unified Command structure		

Team Leader: \s\ Carl Davis

Phone: (509) 662-4335      DG Address: C.Davis:R06F17A

H. **Emergency Treatments** Treatments are directed at those flood hazard areas identified in the burned area survey and associated down slope areas. Appendix-3 identifies the changes in treatments from the 8/16/94 request.

1. Land Treatments (See Appendix 1 for summary of seed mixes)

**Current Situation:** Every 6 years, since 1970, the area has had a large fire followed by severe flooding. Flooding has claimed 4 lives and extensive property damage. Highly erodible areas exist in the tributary watersheds to the Entiat River and Lake Chelan.

**Purpose:** To minimize soil erosion by providing vegetative soil surface cover and sub-surface root mass. This should help maintain site productivity and reduce sediment delivery to streams, Lake Chelan, and private property.

**Treatment:** Aerial seed and fertilize all high and moderate intensity burn areas. Seed channel (debris chutes) to reduce potential for debris delivery into the Entiat and Mad Rivers and Lake Chelan.

**Treatment:** Contour fell trees (log terraces) in high intensity burn areas to form sediment traps and reduce sediment delivery.

2. Channel Treatments

**Existing Condition:** Most channels are in confined valleys with gradients ranging from 5 to greater than 12 percent. A tremendous amount of sediment is collected in these class IV drainageways. These class IV drainageways have a high hazard for mud flows.

**Purpose:** Trap sediment in upper watersheds and reduce sediment delivery to critical downstream reaches.

**Treatment:** Install small sediment trapping structures (rock, logs, and straw bales) in low gradient drainage ways in upper watersheds. Install large rock sediment trapping structures in low gradient valleys in lower watersheds.

3. Road and Trail Treatments

**Existing Condition:** 250 miles of road parallel class II or III streams. Approximately 75% of streams have roads within 300 feet of channels. Roads cross many alluvial fans or old debris-chutes. The risk of flooding somewhere within the Tyee Fire area is 100 percent. Current road drainage structures on most system roads are grossly inadequate. Without road treatments, likelihood of road washouts is 100%. Sediment generated by roads will cause threat to life and extensive property damage. See appendix-2 for back ground information.

**Purpose:** Prevent materials from plugging culverts to reduce the hazard of channel blockage and road washouts into class II and III streams. Construct drainage features into roadways to keep floods from washing out roads.

**Treatment:** Improve existing culverts and drain dips. Install new culverts and driveable drain dips. All drain dips will be armoured with rock with straw bales set below roads to help dissipate run off

water. Improve existing ditch and road prism drainage. In areas of extreme flooding hazards, culverts will be removed to reduce risk of culvert failure and road washout. New road improvement work will be seeded to help stabilize loose soils.

4. Other emergency actions:

**Current Situation:** An important part of protecting human life is creating public awareness, assessing critical slope stability hazards, and monitoring high intensity storms.

**Treatment #1:** Provide emergency public awareness by working with the Chelan County Department of Emergency Services on flood hazards.

**Treatment #2:** Develop an early warning system for flood prediction. The Wenatchee NF. will participate with the National Weather Service and the Chelan County Department of Emergency Services on an early warning system. A network of telemetered rain and stream gauges will be installed. Funding, operation, and maintenance will be shared.

**Treatment #3:** Roads with high risks for flooding will have all culvert structures removed. This will cause steep ravines in excess of 15 feet deep in the road ways. In order to provide public safety, temporary road closures are necessary. When the threat of road washouts lessens, roads will be reopened.

5. B.A.E.R. Evaluation and Administrative Support:

**Current Situation:** The assessment of the fire effects on the watersheds, identification of values at risk, and development of a emergency treatment strategies required an inter-agency effort.

**Team Leaders and Team Members:** Approximately 50 people participated in the field and office survey at different stages. A group of 10 interagency technical specialists provided overhead assistance. An interagency command staff included approximately 5 Forest Service personnel.

**Archaeologist and Biologist Support:** In order to complete the emergency treatments, archaeological assessments and biological evaluations have to be completed. A group of 6 archaeologist and 8 biologist/ecologists completed field and office reviews over a two week period.

**Administrative Support:** Due to the fire size and complexity, a Incident Command organization was formed to help expedite treatments. The organization includes: a logistics section to order resources; a finance/administration section to keep time; an planning section to prepare shift plans and modified prescriptions; a contracting section; and an operations section to implement the emergency treatments.

Part VI introduction: Figures listed in the 2500-8 form are a supplement to the initial 8/16/94 request (see appendix--3 for explanation). Supplemental increases will be show in the EFFS-FW22 column as a (+) and decreases with a (-). Unit costs will be the same. Additional treatments have been added.

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

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

Line Items	Units	Unit Cost \$	NFS Lands			Other Lands			All Total \$
			Number of Units	EFFS-FW22 \$	Other \$ ident.	Number of Units	Fed SCS/County ident.	Fed \$ BLM ident.	
A. LAND TREATMENTS									
1. hand seed/fert	ac	70	550	38500					
2. aerial seed/fertS2F	ac	30	42,478	-473910		14175	765450	58018	
3. aerial seed/fertS1F	ac	54	16,312	+288648		3544	177200	28386	
4. aerial seed/fertS3	ac	76	6,074	-450349		618	46982	2346	
5. aerial fert only F	ac	21	2,553	+ 35742		484	10164		
6. aerial seed S4	ac	21	9,675	+461624		6358	133518	13797	
7. log terrace	ac	293	15000	+4190000		1343	362610		
sub-total change				+4051755			1495924	102547	
B. CHANNEL TREATMENTS									
1. large check dams	str	5000	79	+345000		112	618371		
2. small check dams	str	500	1450	+451000		1614	813490	5000	
sub-total change				+324000			1431861	5000	
C. ROADS AND TRAILS									
1. culvert grade sags	str	3200	46	-172800					
2. driveable dip/armor	str	2000	2000	+3200000					
3. erosion dip/armor	str	500	66	-467000					
4. culvert/dip improv.	str	450	244	- 47200					
5. culvert replacement	str								
large		12000	16	-132000					
small		5000	25	-275000					
6. ditch & prism drain	mi	800	100	- 80000		14	58260		
7. road rehab/reveg	ac	900	100	+ 90000					
sub-total change				+1164000			58260		
D. OTHER EMERGENCY ACTIONS									
1. public awareness	each	5000	2	+ 5000		2	5000		
2. early warning syst	each	8000	3	+ 24000		3	38000		
3. temp road closures		500	20	+ 10000					
sub-total				+ 39000			43000		
E. BAER EVALUATION/ ADMINISTRATIVE SUPPORT									
1. BAER SURVEY AND FIRE REHAB PLAN				+108700				10000	
2. IMPLEMENTATION OF REHAB ADMIN SUPPORT				+468666					
F. TOTALS									
				+6061721			3038145	117547	

**PART VII - APPROVALS**

1. /s/ \_\_\_\_\_  
Forest Supervisor (Signature) Date \_\_\_\_\_

2. /s/ \_\_\_\_\_  
Regional Forester (Signature) Date \_\_\_\_\_

# APPENDIX--1

## TYEE FIRE SEEDING RECOMMENDATION

Seeding Rational: Will require certified seed with no noxious weeds. Rely on sterile annual grasses or grains as a nurse crop. Expect this nurse crop to be gone in 1-2 years. Short lived perennials will provide added soil protection for 1-2 years after the annuals disappear. During this time native perennials should start filling in. Objective of the seed mix: provide immediate cover but no long lasting carry over.

### --CHANNEL MIX (S3)--

SPECIES	PLS LBS/AC	PLS SEEDS/ SQ. FT.	SEEDS/LB
soft white winter wheat (Madsen)	50	15	12,000
Slender wheatgr. (Pryor)	12	42	150,000
Yellow sweetclover	2	12	262,000

### --NON-FOREST MIX (S1F)--

SPECIES	PLS LBS/AC	PLS SEEDS/ SQ. FT.	SEEDS/LB
soft white winter wheat (Madsen)	50	15	12,000
Annual ryegrass	3	15	217,000
Alfalfa (ladak) (prilled-Innoculated)	1	5	255,000

Fertilize with Ammonium Nitrate Sulfate (ANS=30% N) to get 20 lbs of N/ac.

### --FOREST SEED MIX (S2F)--

SPECIES	PLS LBS/AC	PLS SEEDS/ SQ. FT.	SEEDS/L
soft white winter wheat (Madsen)	35	10	12,000
Slender wheatgr. (Pryor)	6	18	150,000
Red clover	1.0	6.5	282,000

Fertilize with Ammonium Nitrate Sulfate (ANS=30% N) to get 20 lbs of N/ac.

### --WHEAT ONLY SEEDING (S4)--

## APPENDIX--2

### LANDSCAPE SETTING:

1. The upper forested watersheds are steep with alluvial fans on lower slopes. Flooding upon these alluvial fans is a natural process. The upper watersheds are administered primarily by the Forest Service, Bureau of Land Management, and the Washington Department of Natural Resources.
2. Alluvial fans are in private ownership. Approximately two to five homes are located on each alluvial fan. Many alluvial fans have high quality apple orchards with expensive storage warehouses. There are more than two dozen of these alluvial fans located in the Entiat Valley alone.
3. Burn intensities in the upper watersheds is moderate to high. Hence, much of the vegetation has been removed from these watersheds.
4. The watersheds are in the rain shadow of the Cascades. Within a span of less than 20 miles precipitation ranges from 20-140 inches.
5. Every 6 years since 1970, large fires in the area have all had major flooding one to two years after the fire. Records indicate that as much as 1-2 inches of rain occurred in less than 1 hour. Given the burned conditions, extensive flooding occurred. Four fatalities occurred with one of these floods. Given the size and scale of this fire, the risk of fatalities is extremely high.
6. Lower watershed valley bottoms become quite constricted just above the gentle sloping alluvial fans. These constricted locations become the site of debris dams which blow out with tremendous force and little warning..
7. Roads entering watersheds parallel within 300 feet of stream channels. All roads dissect alluvial fans in valley bottom positions. Without drainage improvements these roads will washout adding significantly to debris deposition to narrow stream channels. With the amount of debris generated, debris jams are extremely probable.

### SUMMARY:

The emergency rehabilitation effort needs to be a comprehensive package that includes the entire watershed. The land treatment, channel treatments, and road drainage improvements are all necessary. If any one treatment is not implemented, life and private property is at high risk.



### APPENDIX--3

Listed below is a summary of the changes from the 8/16/94 initial funding request. The initial request was submitted while the B.E.A.R surveys were only 50 percent complete.

#### A. LAND TREATMENTS

1. hand seed/fert--no change
2. aerial seed/fert S2F--acreage of treatment reduced by 15,797 acres.
3. aerial seed/fert S1F--acreage of treatment increased by 5,212 acres.
4. aerial seed S3--acreage of treatment reduced by 2,485 acres.
5. aerial fert only F--acreage increased by 2553 acres.
6. aerial seed S4--acreage increased by 9,675 acres.
7. log terrace--increased by 14,300 acres.

Note. The log terracing was a major change. In many areas this treatment is the only immediate protection from storms and concentration of surface run off this fall through next spring. These treatments are being implemented in upper watershed catchment basins that have a severe risk of triggering concentrated run off and causing flooding to down stream housing developments.

#### B. CHANNEL TREATMENT

1. Large check dams--structures increased by 69 structures.
2. small check dams--structures increased by 902 structures.

#### C. ROADS AND TRAILS

1. culvert grade sags--structures reduced by 54 structures.
2. driveable dip/armour--structures increased by 1600 structures.
3. erosion dip/armour--structures reduced by 964 structures.
4. culvert/dip improv--structures reduced by 106 structures.
5. culvert replacement
  - large--structures reduced by 11 structures
  - small--structures reduced by 55 structures
6. ditch & prism drainage--miles reduced by 100 miles
7. road rehab/revveg--acres increased by 100 acres.

#### D. OTHER EMERGENCY ACTIONS

1. public awareness--increase to work with county to contact residences at risk of flooding.
2. early warning system--increase to cooperate with Chelan County Emergency Services, WA. Department of Ecology, and National Weather Service to install a early warning system for flood hazards.
3. Temporary road closures--increase to temporary closure roads where drainage structures (culverts) have been removed to prevent road washouts.

#### E. BEAR EVALUATION/ADMINISTRATIVE SUPPORT

1. BEAR survey and fire rehab plan--increase to reimburse actual and completed survey work.
2. Implementation of rehab admin. Support--increase to reimburse actual and projected administration support.

TO: Bob Devlin  
Director, NR

DATE: September 12, 1994

SUBJECT: Malheur NF - Jordan Springs Fire rehabilitation

Bob:

A copy of the Malheur's request for \$38,476 of EFFF FW22 for emergency rehabilitation on the Jordan Springs fire is attached. I recommend approving this request using existing Regional authority.

BRUCE MCCAMMON  
Regional Hydrologist

Concurrence:

\_\_\_\_\_  
Bob Devlin

\_\_\_\_\_  
Date