



United States
Department of
Agriculture

Forest
Service

Northern Region

200 E. Broadway
P.O. Box 7669
Missoula, MT 59807

File Code: 6520/2520-3

Date: October 23, 2000

Route To:

Subject: Elizabeth Fire, Burned Area Emergency Rehabilitation (BAER)

To: Forest Supervisor, Clearwater National Forest

Enclosed is the approved Initial Burned Area Rehabilitation (BAER) for the Elizabeth Fire. You are authorized to spend up to \$39,400 for the assessment, land, road treatments and monitoring activities shown in Part VI of the report. Only one year of monitoring can be approved at this time. For out year monitoring needs, you must submit an annual interim request that describes monitoring needs based on previous year's results.

The job code for this action is P10092. Please provide me with your Final Accomplishment Report (FS 2500-8), describing actual costs and accomplishments, within 60 days of project completion. Based on your monitoring schedule, a monitoring report is due by September 15, 2001. Contact Bruce Sims (406-329-3447) if you have any questions.

/s/ Kathleen A. McAllister for

DALE N. BOSWORTH
Regional Forester

Enclosure



Date of Report: October 16, 2000

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

- ☒ 1. Funding request for estimated WFSU-SULT 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 or design analysis
 - ☐ Status of accomplishments to date
- ☐ 3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Elizabeth

B. Fire Number: P10092

C. State: Idaho

D. County: Clearwater

E. Region: One

F. Forest: Clearwater

G. District: North Fork Ranger District

H. Date Fire Started: August 4, 2000

I. Date Fire Contained: October 10, 2000

J. Suppression Cost: \$78,200

K. Fire Suppression Damages Repaired with Suppression Funds

- 1. Fireline water barred (miles):
- 2. Fireline seeded (miles):
- 3. Other (identify):

L. Watershed Number: 1706030730 (170603073010, 17060307300010)

M. Total Acres Burned: 3293
NFS Acres (3293) Other Federal () State () Private ()

N. Vegetation Types: Grand Fir (28.1%), Mountain Hemlock and Subalpine Fir (22.9%), Douglas-Fir (17.7%), Western Redcedar (8.4%), Lodgepole Pine (5.8%), Engelmann Spruce (4.9%), Subalpine Fir (2.8%), Western White Pine (1.5%), Ponderosa Pine (0.4%), Western Larch (0.1%), Non-Forest (1.2%)

O. Dominant Soils: Soils in the fire area are shallow to moderately deep. Textures are generally loams, sandy loams, and silt loams in the fine-earth fraction with many soils being skeletal (loamy-skeletal, sandy-skeletal) due to frost-churning weathering processes, colluvial mixing, and shallow depths. Dominant parent materials are Border Zone metamorphosed rocks. The Mazama volcanic ash layer ranges from absent to depths up to 16". Temperature regimes are frigid in the lower elevations, stream bottoms, and warm aspects (south and west) and cryic at higher elevations and cool aspects (north and east). Moisture regimes range from xeric on dry, breakland landforms to udic on gentler landforms with deeper soils. Mineralogy is mixed. Dominant subgroups are Typic Cryochrepts and Typic Dystrochrepts. Soil erosional hazards range from low to high, dependent primarily on geology and landform. Steep landforms result in high to very high sediment delivery efficiencies across much of the area. (See attached landtype map that contains landform, geologic parent material, soil, and vegetation classification units).

P. Geologic Types: Geology is primarily Belt Series quartzite with small inclusion of Border Zone micaceous schists. The ash layer varies in thickness from 16" to absent or mixed over the remainder of the area with rocky soils to the surface.

Q. Miles of Stream Channels by Order or Class: Order 1 = 12.74 Miles, Order 2 = 3.51 Miles, Order 3 = 1.21 Miles, Order 4 = 3.63 Miles Total = 21.09 Miles.

R. Transportation System:

Miles of Trails and Roads

	Trails	Roads	Total
NFS	0.6 Miles	2.3 Miles	2.9 Miles
Private	0.0 Miles	0.0 Miles	0.0 Miles
Total	0.6 Miles	2.3 Miles	2.9 Miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): (See attached map)

Low: 2925 (88.8%) Moderate: 311 (9.4%) High: 57 (1.7%)

B. Water-Repellent Soil (acres): 161 Acres (4.9%)

C. Soil Erosion Hazard Rating: (See attached maps)

Mass Wasting Potential 30.3%(low) 25.5% (moderate) 25.5%(high) 18.7%(very high)

Burn Intensity (%) by Mass Wasting Potential Class

Mass Wasting Class	Low Burn Intensity %	Mod. BurnIntensity %	High Burn Intensity %
Low (30.3% of area)	85.4	9.4	5.3

Mass Wasting Class		Low Burn Intensity %	Mod. BurnIntensity %	High Burn Intensity %
Moderate	(25.5% of area)	88.0	11.7	0.2
High	(25.5% of area)	90.7	8.8	0.5
VeryHigh	(18.7% of area)	90.0	9.8	0.2

Debris Avalanche Potential 24.3%(low) 39.8%(moderate) 35.9%(high)

Burn Intensity (%) by Debris Avalanche Potential Class

Debris Avalanche Class		Low Burn Intensity %	Mod. Burn Intensity %	High Burn Intensity %
Low	(24.3% of area)	90.1	8.3	1.6
Moderate	(39.8% of area)	91.3	8.4	0.3
High	(35.9% of area)	83.9	12.6	3.5

Surface Erosion Potential 51.8%(low) 19.4%(moderate) 28.8%(high)

Burn Intensity (%) by Surface Erosion Potential Class

Surface Erosion Class		Low Burn Intensity %	Mod. Burn Intensity %	High Burn Intensity %
Low	(51.8% of area)	90.4	8.8	0.7
Moderate	(19.4% of area)	87.6	12.0	0.3
High	(28.8% of area)	84.9	10.4	4.7

Sediment Delivery Efficiency 3.0%(low) 19.5%(moderate) 19.1%(high) 58.5%(very high)

Burn Intensity (%) by Sediment Delivery Efficiency Class

Sediment Delivery Class		Low Burn Intensity %	Mod. Burn Intensity %	High Burn Intensity %
Low	(3.0% of area)	88.1	6.9	5.0
Moderate	(19.5% of area)	91.0	7.8	1.2
High	(19.1% of area)	93.0	6.8	0.2
Very High	(58.5% of area)	85.9	11.6	2.4

D. Erosion Potential: Fix Creek Watershed: 0.33 tons/acre¹ Elizabeth Creek Watershed: 0.17 tons/acre²

E. Sediment Potential: Fix Creek Watershed: 249 cubic yards / square mile³
Elizabeth Creek Watershed: 127 cubic yards / square mile⁴

¹ WATBAL for Fix Creek. Post fire produces 104.8 t/mi²/yr = 209.5 t/mi²/two years = 0.33 t/acre/two years.

² WATBAL for Elizabeth Creek. Post fire produces 53.5 t/mi²/yr = 106.9 t/mi²/two years = 0.17 t/acre/two years.

³ WATBAL for Fix Creek. Post fire produces 209.5 t/mi²/two years x 1.19 yd³/t = 249.3 yds³/mi².

⁴ WATBAL for Elizabeth Creek. Post fire produces 106.9 t/mi²/two years x 1.19 yd³/t = 127 yds³/mi².

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years):

The effects of the Elizabeth Fire on recovery of vegetation within its boundaries will vary primarily by the intensity of the burning that took place and the available seed sources. The intensity of the burning has been influenced by both slope and aspect and the resulting vegetative cover (fuel) present when the fire burned.

Low intensity Burn Areas: In areas where the burn intensity was non-existent to low, recovery would be expected to occur within one growing season. Vegetative Recovery is considered to be any vegetation which providing more than 80% cover which effectively intercepts rainfall and provides an extensive root mass as defined on page II-26 of the Clearwater National Forest Plan. These low intensity burn areas are expected to maintain adequate live tree stocking levels in most cases. Perennial grasses, forbs, and shrubs generally will resprout after low intensity burns and a duff/litter layer will reform within several years. Tree planting would be planned for some areas (> 3 acres) where fire has removed over 80% of the live tree cover. All areas requiring tree planting will have trees established and free to grow within five growing seasons. Vegetative recovery will vary from 0 to 5 years.

Moderate Intensity Burn Areas: In areas where the burn intensity was moderate an average of 50% of the trees are expected to die as a direct result of the fire. Continuing mortality should be expected for up to ten years due to root scarring, insect attack, and increased susceptibility to the pathogenic effects of native root diseases. Tree planting will occur on all areas of National Forest Land. All areas requiring tree planting will have trees established and free to grow within five growing seasons. Vegetative recovery will vary from 3-15 years. Some of the larger areas that burned at moderate intensity are a greater distance from surviving seed sources. This will slow the recovery time. Existing seed of shrubs and forbs, stored deeper in the soil, should provide some vegetation regeneration in these areas

High Intensity Burn Areas: In areas where the burn intensity was high, nearly all of the trees were killed or are expected to die as a direct result of the fire. Tree planting will occur on all areas of National Forest Land. All areas requiring tree planting will have trees established and free to grow within five growing seasons. Vegetative recovery will vary from 3-20 years. The largest areas that burned at high intensity are surrounded by medium intensity burn areas and thus are at a greater distance from seed sources. This will slow the vegetative recovery time. The heat produced in the high intensity burning in these areas has destroyed much of the existing seed stored in the soil.

One portion of high intensity burn in Section 30, 41 acres is in a location that was determined by field review to have a very high hazard for landslides. Tree mortality has significantly increased the probability of landslides due to the loss of root strength and curtailed evapotranspiration, which removes excess water from the soil. Consequently, the fire has increased the likelihood of mass wasting in this location. To reduce the mass wasting hazard, the establishment of a new stand of trees via planting will have the greatest likelihood of success. As the new stand develops a new root mat will develop stabilizing the site and evapotranspiration will increase as the trees grow. Within 15 to 20 years, the landslide hazard should be reduced to pre-burn levels.

Vegetative Recovery Period - Years

Burn Intensity	Total Acres	Reforestation Period	Vegetative Recovery Period *
None to Low	2925	0-5 years	0-5 years
Medium	311	3-5 years	3-15 years
High	57	3-5 years	3-20 years
Total	3293		

*Vegetative Recovery is considered be any vegetation which provide >80% cover which effectively intercept rainfall and provides an extensive root mass.

B. Design Chance of Success, (percent):

80%

C. Equivalent Design Recurrence Interval, (years):

25 Year

D. Design Storm Duration, (hours):	<u>24 Hours</u>
E. Design Storm Magnitude, (inches):	<u>4.20 Inches</u>
F. Design Flow, (cubic feet / second/ square mile):	<u>25.00 cfs⁵</u>
G. Estimated Reduction in Infiltration, (percent):	<u>10%</u>
H. Adjusted Design Flow, (cfs per square mile):	<u>34.16 cfs⁶</u>

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency:

The Elizabeth Fire burned 3293 acres in the Upper North Fork Clearwater watershed. Major burned tributaries include Elizabeth Creek and Fix Creek. Ownership within the burn is entirely NFS. There is no residential property within the burned area.

The watersheds are important for both timber production and watershed management so soil productivity is a critical component of this report. Elizabeth and Fix Creeks are occupied by westslope cutthroat trout and are open to bull trout. Westslope cutthroat trout and bull trout occupy the North Fork Clearwater River. This is a very important spawning and rearing stream for these species. Bull trout is listed as threatened under ESA. .

A total of 57 acres (1.7%) burned at high intensity. These areas generally had high to extreme hydrophobic conditions. Moderate intensity burn covered 311 acres (9.4%). These burned areas generally developed minor hydrophobic conditions. Low intensity burn areas covered 2925 acres (88.8%) of the fire area.

Forest Road 720 travels through much of the burn area in both Fix and Elizabeth Creek watersheds. Due to past erosional events, ditches and culverts are filled with sediment. It is highly probable that increased runoff due to fire impacts will add sediment to ditches and culverts, resulting in road failures. We recommend road drainage restoration work to remove existing sediment before failures occur.

The Elizabeth fire burned down to the 250 Road in many places along the 1.8 mile stretch of road between Elizabeth and Can Creeks along the southeast edge of the burn. The 250 Road is a heavily used recreational corridor. Within this area, approximately 50 fire-damaged trees were observed that pose a significant safety risk to travelers on the road. These trees were weakened through extensive tree bole or root reduction by the fire and will likely fall onto the 250 Road within the next few years. We recommend that these hazard trees be removed to protect public safety.

Fix Creek had mostly a low intensity burn with small inclusions of moderate and high intensity burns. Using the WATBAL model, we have determined that sediment production will increase from 40% to 194% over natural in the Fix Creek watershed as a result of the fire. We also estimate that peak flow will increase from 4% to 5% over natural. Based on the burn intensity and the expected sediment production and increase in peak flows, it is our judgment that treatments in the Fix Creek watershed are not necessary to maintain soil productivity and downstream water quality. Peak flow and sediment increases will remain within the channels dynamic equilibrium. We do not expect significant impacts to the fisheries resources in Fix Creek.

Elizabeth Creek had mostly a low intensity burn with inclusions of moderate to high intensity burn. Using the WATBAL model, we have determined that sediment production will increase from 0% to 143% over natural in the Elizabeth Creek watershed as a result of the fire. We also estimate that peak flow will increase from 0% to

⁵ Snake River Adjudication data and USGS Magnitude and Frequency of Instantaneous Peak Flow at Gaging Stations in Idaho. 10.15 cfs bank full flow at the North Fork Clearwater gage x 2.46 (ratio of Q25 to Q1.5) = 25.0 cfs.

⁶ 4.2" = 116.54 cfs of rain (25 year storm for 24 hours). Runoff from the design storm is 25.0 cfs so infiltration is 91.54 cfs. If infiltration were decreased by 10%, it would be 82.38 cfs and therefore 34.16 cfs of runoff.

1% over natural. Peak flow and sediment increases from surface erosion in the moderate and high intensity burned areas will not alter conditions in the channel. However, mass wasting events generated by high burn intensity areas in the fire could negatively alter the channel, thus impacting Westslope cutthroat trout and possibly bull trout. In addition, soil productivity could be negatively impacted by both surface erosion and mass wasting events in a large area (41 acres) of high intensity burn in sections 7 and 18 above Elizabeth Creek. Based on the burn intensity, expected sediment production, and increased mass wasting hazard due to fire induced mortality, it is our judgment that treatments are needed in the Elizabeth Creek watershed to maintain soil productivity.

B. Emergency Treatment Objectives:

The emergency treatment objectives will be to reduce landslide hazards, maintain soil productivity and downstream water quality, and provide for public safety concerns. Specifically, we are concerned with the potential for:

- 1) Public safety concerns from fire killed trees above the 250 Road.
- 2) Loss of soil productivity, surface erosion, sediment delivery, and mass wasting in Elizabeth Creek; and
- 3) Drainage problems associated with increased runoff onto the 720 Road.

Treatments designed to reduce the risk of the potential adverse effects of the fire include:

- 1) Removal of fire killed hazard trees above the 250 Road.
- 2) Planting of trees in the high intensity burn areas of the Elizabeth watershed where the risk of mass wasting is high, and
- 3) Repair Road 720 to eliminate risk of road failures.

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

Parts of the land treatments include planting trees to reduce the mass wasting hazard. Generally mass wasting events occur on a frequency of once every twenty years. The sooner trees can be planted, the less risk we have of the design storm event producing mass wasting. The trees should be planted in the spring of 2001. There is a 50 percent probability of a fall sediment producing event. The other possible scenario would be a spring snowmelt sediment producing event. The land treatment probability is based upon this analysis.

Land 60 % Channel n/a % Roads 90 % Other n/a %

Probability of Treatment Success – Years After Treatment

¹ Tree Planting is recommended to reduce the risk of mass wasting. Generally, on the Clearwater National Forest, storm events that produce mass wasting occur on a frequency of once every twenty years.

F. Cost of Selected Alternative (Including Loss): \$57,855 (See Appendix A)

<input checked="" type="checkbox"/> [X ⁷] Hydrology	<input checked="" type="checkbox"/> [X ⁸] Soils	<input type="checkbox"/> [] Geology	<input type="checkbox"/> [] Range
<input checked="" type="checkbox"/> [X ⁹] Forestry	<input type="checkbox"/> [] Wildlife	<input checked="" type="checkbox"/> [X ¹⁰] Fire Mgmt.	<input checked="" type="checkbox"/> [X ¹¹] Engineering
<input type="checkbox"/> [] Contracting	<input checked="" type="checkbox"/> [X ¹²] Ecology	<input type="checkbox"/> [] Botany	<input type="checkbox"/> [] Archaeology
<input checked="" type="checkbox"/> [X ¹³] Fisheries	<input type="checkbox"/> [] Research	<input type="checkbox"/> [] Landscape Arch	<input checked="" type="checkbox"/> [X ¹⁴] GIS

FAX: (208) 476-8329

(Describe the emergency treatments, where and how they will be applied, and what they are intended to do. This information helps to determine qualifying treatments for the appropriate funding authorities. For seeding treatments, include species, application rates and species selection rationale.)

Tree Planting: It is estimated that 360 acres will require tree planting within the perimeter of the Elizabeth Fire. Approximately 41 acres of this planting is needed to protect soil and watershed resource values on areas prone to mass wasting where burn intensity was high. Planting will be done with seedlings of a species typically found on the various habitat types present. Tree spacing will vary from 7' x 7' (889 trees/acre) to 8' x 8' (680 trees/acre).

¹⁴ Stephanie Grubb, North Fork District GIS Specialist

Tree planting on National Forest Land needed to meet National Forest Management Act and/or Idaho Forest Practices Act requirements would be financed by congressionally appropriated money. Planting needed for watershed protection would be funded with Emergency Watershed Rehabilitation Funds (WFSU).

Hazard Tree Removal: The proposed treatment is to hand fall those fire damaged hazard trees that could fall onto the 250 Road. Due to the steepness of the terrain, this should involve any hazard tree within 200 feet slope distance of the 250 Road. Hazard trees which are felled onto the 250 Road shall be piled outside of the road travel way. In general, slash consisting of limbs and tree bole pieces shall be scattered outside of the road prism. In areas where slash would be concentrated to the point of being a fire hazard or visual “eye sore”, it should be piled for burning or hauled to a disposal site. Cut stumps which can be seen from the road should be re-cut as near to the ground as possible to reduce the visual impact. The estimated cost for this work is \$2500. Funding sources for hazard tree removal would be the same as listed above for planting needed to protect watershed values.

Watershed Treatments Proposed – Acres and Costs

	Planting Total (Acres)	Planting for Watershed Protection Only (Acres)	Watershed Protection Planting Cost/Acre (total cost)
National Forest Land	360	41	\$600/acre (\$24,600)

Channel Treatments:

None

Roads and Trail Treatments:

Drainage Repairs to 720 Road. Repair ditchlines and clean out culverts along the 720 Road in both Elizabeth Creek and Fix Creek watersheds. Many culverts and ditchlines are currently filled with sediment. If culverts and/or ditchlines overtop and the road fill fails, there would be potential impacts to westslope cutthroat fisheries in the watersheds and possibly bull trout fisheries in the North Fork Clearwater River. Cleaning of culverts and ditchlines would eliminate this risk and thus the risk of potential damage to fisheries as a result of the fire and subsequent peak flow increases. The estimated cost of culvert removal is \$4000.

Structures:

None

I. Monitoring Narrative:

(Describe the monitoring needs, what treatments will be monitored, how they will be monitored, and when monitoring will occur. A detailed monitoring plan must be submitted as a separate document to the Regional BAER coordinator.)

I

Proposed Monitoring Activities:

- (1) Monitor hillside, and road conditions for BAER treatment implementation and effectiveness. Tree planting, road repairs, and hazard tree removal areas will be monitored via on the ground surveys in 2001 to assess proper execution to ensure the treatments were satisfactorily completed. Estimated cost is \$1000.

Part VI – Emergency Rehabilitation Treatments and Source of Funds by Land Ownership

Line Items	Units	Cost	Units	SULT \$	\$	units	\$	Units	\$	\$
A. Land Treatments										
Tree planting	Acres	600	41	\$24,600			\$0		\$0	\$24,600
Hazard Tree Removal	Total	2500	1	\$2,500			\$0		\$0	\$2,500
				\$0			\$0		\$0	\$0
				\$0			\$0		\$0	\$0
<i>Subtotal Land Treatments</i>				\$27,100			\$0		\$0	\$27,100
B. Channel Treatments										
None		0	0	\$0			\$0		\$0	\$0
				\$0			\$0		\$0	\$0
				\$0			\$0		\$0	\$0
				\$0			\$0		\$0	\$0
<i>Subtotal Channel Treat.</i>				\$0			\$0		\$0	\$0
C. Road and Trails										
Road Repairs	Each	4000	1	\$4,000			\$0		\$0	\$4,000
				\$0			\$0		\$0	\$0
				\$0			\$0		\$0	\$0
				\$0			\$0		\$0	\$0
<i>Subtotal Road & Trails</i>				\$4,000			\$0		\$0	\$4,000
D. Structures										
None				\$0			\$0		\$0	\$0
				\$0			\$0		\$0	\$0
				\$0			\$0		\$0	\$0
				\$0			\$0		\$0	\$0
<i>Subtotal Structures</i>				\$0			\$0		\$0	\$0
E. BAER Evaluation										
Personnel Costs		7000	1	\$7,000			\$0		\$0	\$7,000
Per Diem		100	1	\$100			\$0		\$0	\$100
Vehicle Use		200	1	\$200			\$0		\$0	\$200
G. Monitoring Plan	Each	1000	1	\$1,000			\$0		\$0	\$1,000
H. Totals				\$39,400			\$0		\$0	\$39,400

PART VII - APPROVALS

1. /s/ James L. Caswell 10/16/00
Forest Supervisor (signature) Date

2. Regional Forester (signature) Date