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: Snow Creek Fire, Burned Area Emergency Rehabilitation (BAER)

To: Forest Supervisor, Clearwater National Forest

Enclosed is the approved Initial Burned Area Rehabilitation (BAER) for the Snow Creek Fire. You are authorized to spend up to $7,100 for the assessment, land treatment 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 P10091. 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

USDA-FOREST SERVICE FS-2500-8 (7/00)

Date of Report: October 16, 2000

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[X] 1. Funding request for estimated WFSU-SULT funds
[ ] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

[X] 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: Snow Creek

B. Fire Number: P10091

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: $53,650

K. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline water barred (miles): 0.125 Miles.—All handline.
2. Fireline seeded (miles):
3. Other (identify):

L. Watershed Number: 170603071020 (17060307102020, 17060307102030)

M. Total Acres Burned: 1037
NFS Acres (1037) Other Federal ( ) State ( ) Private ( )

N. Vegetation Types: Grand Fir (41.9%), Douglas-Fir (27.4%), Western Redcedar (12.3%), Lodgepole Pine (11.8%), Western Larch (3.4%), Engelmann Spruce (1.0%), Ponderosa Pine (0.8%).

O. Dominant Soils: Soils in the fire area are shallow to moderate in depth. Textures are generally loams and sandy 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 with small inclusions of Border Zone and sedimentary rocks. The Mazama volcanic ash layer is generally discontinuous ranging in depth from absent to over 14". 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 Xerochrepts 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 (74%) with small inclusions of Border Zone micaceous schists (19%) and sedimentary rocks (6%). The ash layer is variable in thickness, but generally does not comprise a uniform layer over the landscape due to previous erosional events. Rock outcrops.and surface coarse fragments are common.

Q. Miles of Stream Channels by Order or Class: Order 1 = 4.54 Miles, Class 2 = 1.66 Miles, Class 4 = 0.02 Miles, Class 6 = 0.10 Miles, Total = 6.32 Miles.

R. Transportation System:

Miles of Trails and Roads

	Trails	Roads	Total
NFS	1.3 Miles	0.0 Miles	1.3 Miles
Private	0.0 Miles	0.0 Miles	0.0 Miles
Total	1.3 Miles	0.0 Miles	1.3 Miles

PART III - WATERSHED CONDITION

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

Low: 883 (85.6%) Moderate: 133 (12.9%) High: 16 (1.6%)

B. Water-Repellent Soil (acres): 61 Acres (5.9%)

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

Mass Wasting Potential 3.9%(low) 31.7% (moderate) 9.2%(high) 55.2%(very high)

Burn Intensity (%) by Mass Wasting Potential Class

Mass Wasting Class		Low Burn Intensity %	Mod. BurnIntensity %	High Burn Intensity %
Low	(3.9% of area)	100.0	0.0	0.0

Mass Wasting Class	Low Burn Intensity %	Mod. BurnIntensity %	High Burn Intensity %
Moderate (31.7% of area)	80.9	17.3	1.8
High (9.2% of area)	91.4	6.9	1.7
Very High (55.2% of area)	85.0	13.2	1.8

Debris Avalanche Potential 13.1%(low) 33.0%(moderate) 53.9%(high)

Burn Intensity (%) by Debris Avalanche Potential Class

Debris Avalanche Class		Low Burn Intensity %	Mod. Burn Intensity %	High Burn Intensity %
Low	(13.1% of area)	92.6	5.9	1.5
Moderate	(33.0% of area)	85.4	13.2	1.4
High	(53.9% of area)	83.0	15.2	2.0

Surface Erosion Potential 46.1%(low) 34.3% (moderate) 19.6%(high)

Burn Intensity (%) by Surface Erosion Potential Class

Surface Erosion Class		Low Burn Intensity %	Mod. Burn Intensity %	High Burn Intensity %
Low	(46.1% of area)	87.4	11.2	1.4
Moderate	(34.3% of area)	90.2	8.4	1.1
High	(19.6% of area)	68.5	28.3	3.3

Sediment Delivery Efficiency 0.0%(low) 0.0% (moderate) 13.1%(high) 86.9%(very high)

Burn Intensity (%) by Sediment Delivery Efficiency Class

Sediment Delivery Class		Low Burn Intensity %	Mod. Burn Intensity %	High Burn Intensity %
Low	(0.0% of area)	N/A	N/A	N/A
Moderate	(0.0% of area)	N/A	N/A	N/A
High	(13.1% of area)	92.6	5.9	1.5
Very High	(86.9% of area)	83.8	14.4	1.8

D. Erosion Potential: Snow Creek at Mouth: 0.20 tons/acre[1] Skull Creek Trib 20: 0.85 tons/acre[2]

E. Sediment Potential: Snow Creek at Mouth: 152.8 cubic yards / square mile[3]
Skull Creek Trib 20: 644.2 cubic yards / square mile[4]

[1] WATBAL for Snow Creek at Mouth. Post fire produces 64.2 t/mi^2/yr = 128.4 t/mi^2/two years = 0.20 t/acre/two years.
[2] WATBAL for Skull Creek Trib 20. Post fire produces 270.6 t/mi^2/yr = 541.3 t/mi^2/two years = 0.85 t/acre/two years
[3] WATBAL for Snow Creek at Mouth. Post fire produces 128.4 t/mi^2/two years x 1.19 yd^3/t = 152.8 yds^3/mi^2.
[4] WATBAL for Skull Creek Trib 20. Post fire produces 541.3 t/mi^2/two years x 1.19 yd^3/t = 644.2 yds^3/mi^2.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years):

The effects of the Snow Creek 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 may be planned for some areas 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 at the top of Section 30, 4 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 probability 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	883	0-5 years	**0-5 years**
Medium	133	3-5 years	**3-15 years**
High	16	3-5 years	**3-20 years**
Total	1032		

*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): 90%

C. Equivalent Design Recurrence Interval, (years): 25 Year

D. Design Storm Duration, (hours): 24 Hours

E. Design Storm Magnitude, (inches): 3.8 Inches

F. Design Flow, (cubic feet / second/ square mile): 25.00 cfsm[5]

G. Estimated Reduction in Infiltration, (percent): 10%

H. Adjusted Design Flow, (cfs per square mile): 32.72 cfsm[6]

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency:

The Snow Creek Fire burned 1037 acres in the Skull Creek watershed. Major burned tributaries include Tributary 20 and Snow Creek. Ownership within the burn is entirely NFS. There is no residential property within the burned area.

The watersheds are important for elk winter range, timber production, and watershed management so soil productivity is a critical component of this report. Snow Creek is occupied by westslope cutthroat trout and possibly bull trout. Tributary 20 is not believed to be fish-bearing. Westslope cutthroat trout and bull trout occupy Skull Creek. This is a very important spawning and rearing stream for these species. Bull trout is listed as threatened under ESA. .

A total of 16 acres (1.6%) burned at high intensity. These areas generally had high to extreme hydrophobic conditions. Moderate intensity burn covered 133 acres (12.9%). These burned areas generally developed minor hydrophobic conditions. Low intensity burn areas covered 883 acres (85.6%) of the fire area.

Skull Creek Trail 286 travels through 1.3 miles of the burn area. Within this distance numerous trees (20+) were burned and fell over, blocking the trail. Removal of the tree portions blocking the trail are needed to open this trail for public use.

The fire spotted over to a slope on the east side of Skull Creek on a northwest aspect where the fire burned with high intensity over a 4-acre area in Section 30. Field review showed this area to be highly susceptible to mass wasting due to the fire-induced mortality. Mass wasting risks increased by high burn intensities could negatively alter the channel, thus impacting Westslope cutthroat trout and possibly bull trout. Based on the burn intensity and increased mass wasting hazard due to fire-induced mortality, it is our judgment that treatments are needed in this area to reduce landslide hazards and maintain soil productivity

Tributary 20 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 0% to 298% over natural in the Tributary 20 watershed as a result of the fire. We also estimate that peak flow will increase from 0% to 4% 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 Tributary 20 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 Tributary 20.

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

[6] 3.8" = 102.18 cfsm of rain (25 year storm for 24 hours). Runoff from the design storm is 25.0 cfsm so infiltration is 77.18 cfsm. If infiltration were decreased by 10%, it would be 69.46 cfsm and therefore 32.72 cfsm of runoff.

Snow Creek had a small area of low intensity burn with inclusions of moderate intensity burn. Using the WATBAL model, we have determined that sediment production will increase from 0% to 7% over natural in the Snow Creek watershed as a result of the fire. We also estimate that peak flow will not increase 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.

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 along Trail 286. Specifically, we are concerned with the potential for:

1) Public safety concerns from fire killed trees along Trail 286, and
2) Loss of soil productivity, surface erosion, sediment delivery, and mass wasting in Skull Creek.

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

1) Removal of portions of tree blocking Trail 286, and
2) Planting of trees in the high intensity burn areas of the Skull Creek watershed where the risk of mass wasting is high.

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

Part 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 if possible. 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 **n/a** % Other **n/a** %

D. Probability of Treatment Success

Probability of Treatment Success – Years After Treatment

	Years after Treatment		
	1 Year	3 Years	5 Years
Land	\\	\\	\\
Tree Planting[1]	0	20	40
Hazard Tree Removal	100	100	100
Channel	\\	\\	\\
N/A			
Roads	\\	\\	\\
N/A			
Other	\\	\\	\\
N/A			

[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.

E. Cost of No-Action (Including Loss): $20,146 (See Appendix A)

F. Cost of Selected Alternative (Including Loss): $5,628 (See Appendix A)

G. Skills Represented on Burned-Area Survey Team:

[X[7]] Hydrology	[X[8]] Soils	[ ] Geology	[ ] Range
[X[9]] Forestry	[ ] Wildlife	[X[10]] Fire Mgmt.	[ ] Engineering
[ ] Contracting	[X[11]] Ecology	[ ] Botany	[ ] Archaeology
[X[12]] Fisheries	[ ] Research	[ ] Landscape Arch	[X[13]] GIS

Team Leader: James M. Mital

Email: jmital@fs.fed.us Phone: (208) 476-8348 FAX: (208) 476-8329

H. **Treatment Narrative:**
(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.)

Land Treatments:

Tree Planting: Approximately 4 acres of 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 habitat types present. Tree spacing will vary from 7' x 7' (889 trees/acre) to 8'x 8' (680 trees/acre).

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, or have fallen, onto Trail 286. Cut stumps which can be seen from the trail should be re-cut as near to the ground as possible to reduce the visual impact. The estimated cost for this work is $1000. 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 for Watershed Protection Only (Acres)	Watershed Protection Planting Cost/Acre (total cost)
National Forest Land	4	$600/acre ($2400)

Channel Treatments:

None

[7] Dick Jones, Clearwater Forest Hydrologist; Dave Schoen, Biological Technician (WATBAL)
[8] Jim Mital, Forest Soil Scientist/Ecologist.
[9] Tam White, North Fork District NEPA Prep Forester.
[10] Mike Lubke, North Fork District AFMO
[11] Jim Mital, Forest Soil Scientist/Ecologist.
[12] Pat Murphy, Forest Fisheries Biologist
[13] Stephanie Grubb, North Fork District GIS Specialist

Roads and Trail Treatments: None

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.)

Proposed Monitoring Activities:

(1) Monitor hillside, and trail conditions for BAER treatment implementation and effectiveness. Tree planting and trail hazard tree removal areas repairs will be monitored via on the ground surveys in 2001 to assess proper execution to ensure the treatments were satisfactorily completed. Estimated cost is $500.

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	4	$2,400			$0		$0	$2,400
Hazard Tree Removal	Total	1000	1	$1,000			$0		$0	$1,000
				$0			$0		$0	$0
				$0			$0		$0	$0
Subtotal Land Treatments				$3,400			$0		$0	$3,400
B. Channel Treatments										
None		0	0	$0			$0		$0	$0
				$0			$0		$0	$0
				$0			$0		$0	$0
				$0			$0		$0	$0
Subtotal Channel Treat.				$0			$0		$0	$0
C. Road and Trails										
				$0			$0		$0	$0
				$0			$0		$0	$0
				$0			$0		$0	$0
				$0			$0		$0	$0
Subtotal Road & Trails				$0			$0		$0	$0
D. Structures										
None				$0			$0		$0	$0
				$0			$0		$0	$0
				$0			$0		$0	$0
				$0			$0		$0	$0
Subtotal Structures				$0			$0		$0	$0
E. BAER Evaluation										
Personnel Costs		3000	1	$3,000			$0		$0	$3,000
Per Diem			1	$0			$0		$0	$0
Vehicle Use		200	1	$200			$0		$0	$200
G. Monitoring Plan	Each	500	1	$500			$0		$0	$500
H. Totals				**$7,100**			**$0**		**$0**	**$7,100**

PART VII - APPROVALS

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

2. _____ — _____
   Regional Forester (signature) — Date