Date of Report: 9-21-07
10-11-07

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[**X**] 1. Funding request for estimated emergency stabilization funds
[ ] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

[ ] 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)

[**X**] 2. Interim Report #1
[ ] 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: **Castle Rock Fire**

B. Fire Number: **ID-STF-002132**

C. State: **Idaho**

D. County: **Blaine**

E. Region: **04 - Intermountain**

F. Forest: **14 - Sawtooth**

G. District: **03 Ketchum**

H. Fire Incident Job Code: **P4DW44 (0414)**

I. Date Fire Started: **August 16, 2007**

J. Date Fire Contained: **September 4, 2007**

K. Suppression Cost: **$30,000,000 (est.)**

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): **97.6 miles total and 25 miles on Forest Service lands**
2. Fireline seeded (miles): **97.6 miles total and 18 miles on Forest Service lands**
3. Other (identify):

M. Watershed Number(s): (6^{th} level hydrologic units, percent of watershed acres within fire perimeter):

HU Number	HU Name	% in Fire	HU Number	HU Name	% in Fire
170402190805	Greenhorn Creek	62.70	170402191001	Warfield-West FK Warm Spring	88.19
170402190901	Cold Spring-Clear	8.05	170402191002	Barr Gulch-Rooks	67.02
170402190902	Adams-Big Wood	74.44	170402191005	Thompson Creek	0.98
170402190903	Fox-Leroux	35.81	170402191102	Baker Creek	1.18

N. Total Acres Burned: **48,520**

NFS Acres(**45,894**) Other Federal (**1,373**) State (**32**) Private (**1,221**)

O. Vegetation Types: Forested vegetation is described using potential vegetation groups (PVGs) that share similar environmental characteristics, site productivity, and disturbance regimes. PVG's refer to the potential climax vegetation as an indicator of environmental conditions.

PVG Acres in the Castle Rock Fire

Potential Vegetation Group	Acres
PVG 3 – Cool Moist Douglas-fir	177
PVG 4 – Cool Dry Douglas-fir	7,161
PVG 7 – Cool Dry Subalpine Fir	22,481
PVG 10 – Persistent Lodge pole Pine	488
PVG 11 – High Elevation Subalpine Fir	1,569
PVG 98 - Rock	575
PVG 99 – Sagebrush/grassland	13,138

Douglas-fir is the dominant tree species within PVG's 3 and 4, with small clones of aspen and minor amounts lodgepole pine also present. In PVG 7 Douglas-fir is again the dominant tree species, with minor amounts of aspen, lodgepole pine and subalpine fir present. Lodgepole pine is the dominant tree species in PVG 10, with other species rarely present. PVG 11 is dominated by subalpine fir, with Engelmann spruce and whitebark pine occurring in minor amounts. PVG 98 is comprised of mountain big sagebrush, montane shrub groups which include bitterbrush, alpine meadow and dry meadow groups.

P. Dominant Soils: The dominant soils are derived primarily from the Challis Volcanic and Wood River formations. The forested volcanic and sandstone derived soils have fine-grained loamy textures with large amounts of coarse fragments and are moderately erodible. Soils on north facing slopes are mostly skeletal – they have high quantities of larger rock (greater than ¾ inches) on the surface and through the soil profile. Soils on south facing slopes have similar amounts of rock which are more gravel-sized. Soils that have developed over the Batholith are weathered and fractured with sandy loam textures. These are well-drained, non-cohesive soils with little horizon development, moderate to low fertility, and inherent moderate to high erosion hazard. Cool, moist, moderately deep sandy loam soils occupy north and east aspects and support forest vegetation. Batholith soils on south-facing slopes are typically, single-grain, coarse sandy soils that are mostly dry and sparsely vegetated. Soils that have developed over the Quaternary Glacial Alluvial Deposits are more developed sandy loam or loamy soils with high coarse rock contents. Most all the soils have moderate to high infiltration and permeability rates. The primary factor limiting soil productivity is the lack of moisture available during the growing season.

Q. Geologic Types: Three geologic rock formations occur within the fire area: the Cretaceous Wood River Formation, Tertiary Challis Volcanics, and the Idaho Batholith. In addition, Glacial Alluvial Deposits comprised of the three geologic formations exist as moraines near the bottom of many of the mountain slopes. The major geologic bedrock is the carboniferous sedimentaries of the Wood River Formation and Challis volcanic basalts. These formations have granitic intrusions of the Idaho Batholith, mostly in the extreme western perimeter of the burn area.

R. Miles of Stream Channels by Order or Class: **Perennial: 49.8 miles Intermittent: 65 miles**

S. Transportation System: **Trails: 90 miles Roads: 23.2 miles**

PART III - WATERSHED CONDITION

Burn Severity on National Forest Lands (acres): **9,554** (low) **16,888** (moderate) **10,946** (high)

Burn severity for example microsheds with potential BAER concerns

Microsheds	Severity (acres and percent within Hydrologic Unit)				
	High	Moderate	Low	Unburned	Total
Huffman Drive Draw	30.69 (49.8%)	26.20 (42.5%)	4.74 (7.7%)	--	61.63
Limekiln–Unnamed Draw	26.44 (36.3%)	42.54 (58.5%)	2.17 (3.0%)	1.61 (2.1%)	72.76
Hot Springs Gulch	30.50 (16.9%)	78.77 (43.6%)	47.25 (26.1%)	24.33 (13.4%)	180.85
Upper Summer Recreation	10.33 (36.6%)	15.44 (54.7%)	2.44 (8.7%)	--	28.21
Tony Robbin's House	19.69 (65.3%)	2.97 (9.8%)	0.63 (2.1%)	6.87 (22.8%)	30.16
Lower Baord Ranch	46.61 (25.1%)	82.02 (44.2%)	56.93 (30.7%)	--	185.56

B. Water-Repellent Soil (acres):**16,594**

C. Soil Erosion Hazard Rating (acres):
846 (low) **25,627** (moderate) **19,122** (high)

D. Erosion Potential: **6.1** ton/acre

E. Sediment Potential: **4,724** cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): **2 to 5**

B. Design Chance of Success, (percent): **50%**

C. Equivalent Design Recurrence Interval, (years): **2, 5, 10, and 25**

D. Design Storm Duration, (hours): **1 hour**

E. Design Storm Magnitude, (inches):

- **2 yr event - 0.4**
- **5 yr event - 0.6**
- **10 yr event - 0.7**

F. Design Flow, (cubic feet / second/ square mile): **see table**

G. Estimated Reduction in Infiltration, (percent): **21%**

H. Adjusted Design Flow, (cfs per square mile): **see table**

Microsheds	Design Flow (cfs per square mile)[1]					
	Pre-fire*			Post-fire**		
	2 Year	5 Year	10 Year	2 Year	5 Year	10 Year
Huffman Drive Draw	5.3	7.3	8.7	> 1	10	51
Limekiln – Unnamed Draw 2	3.7	5.3	6.5	> 1	8	55
Hot Springs Gulch	13	17	20	> 1	8	74
Upper Summer Recreation Cabin	0.2	0.3	0.5	> 1	0	9
Tony Robbin's House	--	--	--	> 1	7	30
Lower Board Ranch North	5.8	8.5	10.4	1	15	107

* Snowmelt driven – will influence surface flows, ** Thunderstorm driven - will influence overland flow/debris flows

PART V - SUMMARY OF ANALYSIS

Background: On August 16, 2007 a lightning storm crossing the Sawtooth National Forest ignited a fire near Castle Rock Peak, southwest of Ketchum, Idaho. The new start was reported around 4:00 p.m. and initial attacked by smokejumpers en route to another fire. The fire escaped initial attack efforts and burned into dense Douglas fir, grass, and sagebrush. The fire burned actively day and night, and by the third day it was 600 acres. The Sawtooth National Forest ordered a Type 1 Incident Management Team to manage the fire.

The California Interagency Incident Management Team 3, Jeanne Pincha-Tulley, Incident Commander, assumed command of the incident on Monday, August 20. During the course of the incident, the city of Ketchum, Idaho, as well as portions of the Sun Valley Ski Resort were threatened. Evacuations in parts of Ketchum were put into effect and an area closure on the forest put into place. There were no structures burned during the incident and only two minor firefighter injuries. At the height of the incident, there were 1,701 people committed, including firefighting crews, engines, bulldozers, overhead (support personnel), etc. Federal, state, local, and private resources came from 40 states and Puerto Rico.

The fire was 100% contained on Tuesday, September 4, 2007. The final acreage of the fire was 48,520 acres on the Sawtooth National Forest, and lands managed by the Bureau of Land Management and the Idaho Department of Lands. The following day, an Eastern Great Basin Type 2 Team, led by Incident Commander, Tom Suwyn, took command of the incident as firefighters continued mop-up and suppression rehabilitation (removal and camouflage of handlines and bulldozer lines).

A. Describe Critical Values/Resources and Threats:

Summary of Issues:

Human Life and Safety

The Castle Rock fire caused high and moderate intensity burns in headwater streams and midslope areas that drain directly to homes in Ketchum, Lower Board Ranch, Upper Board Ranch, Frenchman's Bend and Greenhorn Creek. These steep confined channels are likely to concentrate increased flows and debris flows into year round occupied homes threatening human safety. Many homes are built into alluvial debris fans where increased flows can migrate across the fan impacting multiple homes. A thunderstorm on September 5 activated several debris flows in the Frenchman's Bend area impacting one recreational cabin and residential home. This highlighted the increased risk which many homes below the fire now face.

Trails and road within the fire perimeter are heavily used by the public that come to visit the world destinations around Sun Valley and Ketchum. The high volume of trail use coupled with increased fire and post-fire effects

[1] Design flow based on single 10-year event for pre-fire (vegetated) and post-fire conditions.

puts many users at risk from falling snags, downed trees, burned stumps that have collapsed trail treads, debris flows, and increased runoff.

Property

Forest Roads Rooks Cr Road #70021, West Fork Warm Spring Creek Road #70049, Limekiln Gulch Road #70101, and Ketchum Featherville Road #70227 and over 90 miles of trail occur within or below the burned area. Culverts, bridges and drainage structures sited along these routes are at risk of damage from floods, erosion, sediment, debris, and debris flows generated from within the burned area. Some homes and the road system along the main stem Warm Springs Creek may also be subject to flooding due to increased peak flows and debris flows that may block the channel. Warm Springs Creek was blocked after the September 5 storm raising the channel several feet. Flooding along this stream may result in road washouts trapping home owners. It may also inundate homes as the stream ponds around the obstruction. Many homes in Warm Springs and Greenhorn Creeks are built within a few feet of the channel increasing the risk of flooding.

Trails may capture increased surface runoff caused by the presence of water repellent soils and suffer severe erosion and mass failures impacting trails, water quality, and fish habitat downslope. Many trails within the fire perimeter parallel streams or cross multiple debris fans, increasing the risk of damage. In particular, Greenhorn and Warm Springs Creek drainages are areas of concern because of the large amount of terrain with high and moderate severity burns increasing the potential for floods and debris flows. The areas that have the greatest risk are located in Red Warrior, Rooks, Warfield, Cow, W.F. Warm Springs Creeks, and Adams Gulch.

Critical Natural Resources

Water Quality – The threat of erosion has increased over much of the fire as a result of the high intensities, scoured channels from the debris flows, and hillslopes hit by the thunderstorm on September 5. Trails and roads are likely to be impacted by higher hillslope runoff and debris flows, scouring treads and increasing sedimentation to streams. This increased sediment and ash will affect water quality in streams directly below the fire and in the Big Wood River. There are numerous domestic water sources in Warm Springs Creek and the intake for Sun Valley snow making system that could be impacted be degraded water quality. The Big Wood River ran turbid for several days after the September 5 storm depositing fine sediment along shallow depositional areas.

The Big Wood River watershed management plan was developed by Idaho Department of Environmental Quality (IDEQ) to address water bodies that have been placed on the "303(d) list" and to comply with Idaho's TMDL schedule. The Big Wood River TMDL was approved in 2002. Pollutants of concern in the TMDL included suspended sediments, substrate sediments, total phosphorus, pathogens (*Escherichia coli*), and temperature. Every waterbody within this subbasin has to meet the specifications for those pollutants defined in the TMDL whether they're listed on the 303(d) list or not.

Fish Habitat - The threat of erosion has increased over much of the fire as a result of the high intensities, scoured channels from the debris flows, and hillslopes hit by the thunderstorm on September 5. Trails and roads are likely to be impacted by higher hillslope runoff and debris flows, scouring treads and increasing sedimentation to streams. Drainages with the highest risk for increased erosion and/or debris torrents include the mainstem of Warm Springs Creek, the Warm Springs tributaries of Rooks, Warfield, and Red Warrior Creeks. Many of these streams support key populations of Wood River sculpin Region 4 "Sensitive" species and important recreational fishery for rainbow trout. Red Warrior Creek support one of the few remaining redband populations in the Wood River subbasin.

Long-term Soil Productivity – In high and moderate soil burn severity areas the fire completely consumed the vegetation canopy and the effective ground cover that dissipates rainfall and regulates snowmelt runoff. Even with average precipitation, erosion rates will be accelerated in combination with higher surface runoff

efficiencies. A 2- or 5-year rainstorm event occurring during the first two years following the fire will greatly increase the potential for loss of topsoil, including the ash from the burned plant litter and duff that also replenish the soil nutrient pool, and reduce the soil productivity of these sites. The potential soil loss due to snowmelt and thunderstorm runoff jeopardizes the natural vegetation recovery.

Natural revegetation to establish vegetative ground cover to protect the soil surface in high and moderate soil burn severity areas will vary. The non-forest cover types (mostly south facing slopes) will likely be 2-5 years, while forested lands may take up to 10 or more years to establish pre-fire vegetative ground cover. Lack of vegetative cover and litter can contribute to chronic erosion and perpetual hillslope instability. Also of concern is native plant diversity due to the large populations of noxious weeds and cheatgrass adjacent to high severity burn areas.

Soil productivity can be severely impacted in the burned area due to the spread of noxious weeds from existing populations and the introduction of noxious weeds and invasive species into new areas as a result of fire suppression efforts and emergency stabilization treatments. In addition, recreational use of the roads and trails leaves the burned area highly susceptible to the expansion and introduction of noxious and invasive plant species.

B. Emergency Treatment Objectives:

The goal of the burned area emergency rehabilitation is to:

- Reduce threats to personal injury and/or human life of homeowners in select areas in Ketchum, Lower Board Ranch, Frenchman's Gulch by completing berms, mulching, straw wattles, seeding, planting below or in moderate and high severity burn areas.
- Reduce threats to personal injury and/or human life of homeowners in Greenhorn, Adams Gulch, Warm Spring Creek by installing remote automated weather stations, warning signs, and road storm patrols.
- Mulch and vegetation treatments are intended to mitigate soil loss. Elevated soil erosion, sedimentation, runoff, and stream flows are expected to occur at decreasing rates over two to five years after the fire, until vegetation has sufficiently recovered to restore the surface soil-hydrologic function and processes of the watersheds that burned at moderate and high severity. These treatments will allow native grasses to recover to a point where they will out compete invasive species such as cheatgrass and other noxious weeds. Vegetative recovery and early detection of invasive and noxious weed species (monitoring) are needed to determine if soil productivity objectives are being achieved.
- Control expected invasion of noxious weeds within the area, especially along and adjacent to Forest roads and dozer lines used by fire equipment and in existing populations within the Castle Rock fire boundary.
- Minimize damage to system roads and trails within the Castle Rock fire boundary by cleaning existing or installing new drainage structures.
- Reduce sediment delivery into Warm Spring and Greenhorn Creeks, Adams Gulch, and the Big Wood River to protect water quality and fish habitat by obliterating non-system roads, closing roads and trails, repairing and installing drainage features on roads and trails, and removing a portion of the debris flow in Warm Springs Creek below Rooks Creek.
- Warn users of Forest roads and trails of hazards present in the burned area.
- Identify appropriate monitoring activities that estimate the effectiveness of emergency stabilization treatments and identify necessary maintenance and continuation of other approved BAER activities.

Objective:

C. Probability of Completing Treatment Prior to Damaging Storm or Event:

Land **80** % Channel **90** % Roads/Trails **75** % Protection/Safety **90** %

D. Probability of Treatment Success - (with no storm intensities greater than a 2yr reoccurrance interval). Short duration high intensity storm events of greater than a 2 yr event can overwelm most hillslope treatments. Berms should function up to a 5yr reocccurance event. Berms would need to be maintained/cleaned to remain effective.

	Years after Treatment		
	1	3	5
Land (noxious weeds)	75	80	80
Land (planting)	65	75	75
Land (mulch/wattles)	75	80	80
Channel (grade control)	70	70	70
Roads/Trails (drainage & snags)	95	95	95
Protection/Safety (berms)	90	80	75
Protection/Safety (road/trail warning signs)	90	90	90

E. Cost of No-Action (Including Loss): **$32,571,400**
The values at risk directly lost through No-Action includes: damage to water quality, loss of soil productivity (as impacted by noxious weed potential and erosion), homes, recreational opportunities, roads, trails, utilities, and human life due to changed hydrologic and hillslope conditions.

F. Cost of Selected Alternative (Including Loss): **$8,406,707**
It was assumed the primary treatments (hillslope, noxious weeds, road drainage, etc.) would be successful in reducing resource values lost through No-Action by 80 percent. The remaining resource values lost (as a factor of success) were added to the cost of the primary land treatment.

G. Skills Represented on Burned-Area Survey Team:

[**X**] Hydrology	[**X**] Soils	[ ] Geology	[**X**] Range
[**X**] Forestry	[**X**] Wildlife	[**X**] Fire Mgmt.	[**X**] Engineering
[ ] Contracting	[ ] Ecology	[**X**] Botany	[ ] Archaeology
[**X**] Fisheries	[**X**] Research	[ ] Landscape Arch	[**X**] GIS

Team Leader: **John Chatel, Forest Fisheries Biologist**

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Team Members:
Terry Hardy, Soil Scientist, Boise and Sawtooth National Forest
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Mark Manda, Trails, Humboldt-Toiyabe
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Susan Marzec, Public Information Officer
Venetia Gempler, Communications Director, Fire Program Analysis
Tina Beehle, Public Information Officer

The following personnel from the National Weather Service (NWS) Pocatello Office, the Rocky Mountain Research Station - Forest Service (RMRS), and Idaho Fish and Game (IDFG) were of invaluable assistance in assisting with the BAER survey and plan development:
Doug Megargle, Fisheries Biologist, IDFG, Jerome
Mark Fleming, Wildlife Habitat Manager, IDFG, Jerome
Charlie Luce, Research Hydrologist, RMRS, Boise
Pete Robichaud, Research Engineer, RMRS, Moscow
Sherrie Hebert, Hydrologist, NWS, Pocatello

H. **Treatment Narrative:**

Protection/Safety Treatments:

Debris Flow Deflection Berm

Purpose of Treatment: A berm would be constructed at the upper end of the debris fan where the fan is at its narrowest point. The berm would direct future debris flows away from the cabin by sending flows to the right of the fan. The berm would be designed to withstand a 5 year rainstorm event.
General Description: A thunderstorm on September 5 caused debris flows in Upper Board Ranch and Frenchman's Bend residential areas. This storm caused some damaged to a yard and back of a recreation cabin on National Forest administered lands. The cabin is built at the toe of an alluvial fan and there is the potential for more debris flows to route into the structure.
Location (Suitable) Sites: Upper Summer Recreation Cabin
Design/Construction Specifications: Construct protective berm behind cabin on south side of Warm Springs Cr. The estimated size of the berm is 175 feet long X 5-6 feet wide X 4-5 feet high. Material located on site will be used so cost will be for a suitable piece of excavation equipment with operator for two days. Also included is the cost of a laborer for this period of time.

Road Hazard Signs

Purpose of Treatment: Ensure maximum visibility and readability of signs warning visitors of the hazards to human life and safety that exist in burned area. Signs are intended to emphasize the increased hazards from debris flows and flooding.
General Description: Install signs at key roads that enter or the burned area.
Location (Suitable) Sites:

1) One hazard sign on the E.F. Baker Creek Road #168.
2) One hazard sign on Adams Gulch Road #141.
3) One hazard sign on the Ketchum-Featherville Road #227 just west of Ketchum.
4) One hazard sign on the Ketchum-Featherville Road #227 just west of the Barr Gulch #019 road.
5) One hazard sign on the Greenhorn Road #117 just west of Limekiln Gulch Road.

Design/Construction Specifications:

1) Road Signs: Reflectorized wood backed signs (2' x 2') with letter size according to USFS Handbook specifications mounted on 4" x 4"x 8' posts at heights and distances mandated in USFS Handbook.

Trail Hazard Signs

Purpose of Treatment: Ensure maximum visibility and readability of signs warning visitors of the hazards to human life and safety that exist in burned area. Signs are intended to emphasize the increased hazards from falling burned trees, and potential for debris flows and flooding.

General Description: Install signs at all trailheads and junctions that enter or provide access to trails in the burned area and dispersed sites. Install signs at all campsites, recreation sites and trailheads that enter or are within the burned area or provide access to trails within the burn and install carsonite posts to protect watersheds by deterring cross country travel through open burned areas.

Location (Suitable) Sites: (see map in BAER report)

1) 60 signs in Adams Gulch, Warm Springs Road, Greenhorn Trailhead as well as trailheads surrounding the burned area.

Design/Construction Specifications:

1) Trail Signs: Vinyl reflectorized 12"X18" trail signs, mounted on 4"x4"x8' posts at heights and distances mandated in USFS Handbook.
2) Vinyl reflectorized stickers, 4"X12", mounted on carsonite posts.

Remote Automated Weather Station

Purpose of Treatment: Several steep drainages above homes in Warm Springs Creek burned at high intensity increasing the risk of debris flows. A thunderstorm on September 5 caused debris flows in Upper Board Ranch and Frenchman's Bend residential areas. This storm damaged yards and roads, but fortunately no homes. Remote automated weather stations (RAWS) will provide for better early detection and warning of intense precipitation events to the Blaine County Sheriff's dispatch center. This information would then be sent to residence in the Warm Spring drainage. RAWS information would also be integrated into the National Weather Service (NWS) flash flood prediction forecasts. The NWS Pocatello office has been part of our BAER assessment and has been provided burn severity maps to track storms with radar to provide residence and the county with additional long range tracking.

General Description: RAWS stations will be provide by the National Fire Center (NIFC) in Boise. NIFC will install and maintain each RAWS station annually. They will also program trigger points for precipitation warnings. Requested funds would cover the installation and maintenance by NIFC for the first year. However, additional request for two more years will be needed until enough vegetative hillslope recover has occurred.

Location (Suitable) Sites: Two RAWS stations would be installed to the west and southwest of Warm Springs Creek. Currently there are no weather stations to track storms in these locations. The first station would be installed in Deer Creek just south of the fire perimeter. The Second will be installed above Rooks Creek just west of the fire perimeter in Upper Warm Springs Creek.

Design/Construction Specifications: Remote Automated Weather Station consists of a 6 ft tripod, meteorological sensors, and an aluminum environmental enclosure that houses and protects a CR1000M module and a 12 V battery. The battery is recharged via a solar panel or an AC transformer. Each RAWS-F station is pre-programmed to comply with the National Fire Danger Rating System (NFDRS) weather station standards. RAWS will measure wind speed and direction, air temperature and relative humidity, and precipitation. The RAWS-F includes a CR1000KD for on-site communications. Telecommunications options are our GOES satellite transmitter. The RAWS station is compatible with communication equipment such as telephones, digital cellular transceivers, and RF.

Land Treatments:

Aerial Mulching

Purpose of Treatment: This treatment is to protect life and property located down-gradient of burned slopes by reducing the potential for erosion, sedimentation, and debris flow initiation. Mulching will reduce downstream peak flows by absorbing and slowly releasing overland runoff which is likely to be increased due to reduced soil cover and hydrophobic soil conditions. Mulching also helps to protect the native seedbed and retain moisture on the burned slopes to facilitate quick vegetative recovery of the treatment areas. Mulching treatments in the headwaters of the streams would be anticipated to protect a much larger downstream area from cumulative runoff and sedimentation.
General Description: Wood strand erosional control mulch and agricultural straw mulch will be applied to the ground surface by helicopter (and spread with hand crews as necessary) in a continuous cover of uniform thickness to replace vegetative ground cover lost in the fire. Mulch will reduce erosion, sediment delivery, and reduction in the potential for debris flow initiation to downslope values at risk associated with: 1) life and property: 2) Ketchum City, Blaine County, and Sawtooth National Forest roads; 3) Warm Springs stream with important native and valuable nationally recognized recreational fisheries (rainbow and brown trout).

Wood strand erosional control mulch is preferred on two treatment units (89 acres) above Ketchum. Additional field reviews with John Thornton and Pete Robichaud indicated that wood mulch is the best treatment because the sites above Ketchum are prone to wind erosion and have no surface vegetation that can breakup wind velocities or capture lighter wind blown agricultural mulch. Heavier wood straw can withstand wind speeds up to 40 mph vs. agricultrual straw that can withstand windspeeds only up to 15 mph (personal communication Pete Robichaud). Although the cost for wood straw is higher than agricultural straw, it will likely remain on site longer and provide for a more effective ground cover helping to minimize downslope hazards to the high value properties at risk. It is realized that agricultural straw could be reapplied if it was blown off site. However, it is uncertain whether it could be applied quickly enough before summer thunderstorms hit the area. The remaining treatment areas (334 acres) will be treated with agricultural straw. **Cost for wood straw and aerial application is higher than agricultural straw. This is because wood straw costs $600/ton vs. $200/ton for agricultural straw. It is also because the aerial application costs $4,000/acre for wood straw vs $775/acre for agricultural straw due to the increased tons per acre needed for wood straw.**
Location (Suitable) Sites: - Six treatment units totaling 432 acres have been identified for treatment. The selected sites have been identified based on the post-fire increased streamflow and potential to initiate and translate debris flows down stream to critical values at risk. Two sites (Hoffman Drive area) are face drainages located directly above urban neighborhoods within the city of Ketchum. One site (Lower Board Ranch North) is a first order drainage located directly above two rural homes in the Warm Springs drainage upstream from the city of Ketchum. Another site in Lower Board Ranch South will treat a first order drainage leading to the backyard of several homes. The final sites are the lower and upper basin of Hot Springs Gulch which has direct delivery to Warm Springs drainage upstream from the Warfield Hot Springs that has recently initiated a debris flow resulting in the complete blockage of Warm Springs road and stream channel and filled in a large portion of the Warfield Hot Springs pools. Refer to BAER Treatment Map for exact locations.
Design/Construction Specification(s):

1) Site selection criteria - Provide 70% ground cover that is evenly distributed on the hillslopes.
2) Straw application rate - Wood or agricultural strand erosional control mulch at a rate of 3.44 tons/acre to achieve 50% ground cover or agricultural straw mulch at a rate of 1.4 ton/acre to achieve 70% ground cover. Aerial application may not achieve desired ground cover. Therefore, hand crews will be necessary in select locations in each treatment unit.

3) Use straw that conforms to Idaho State Department of Agriculture (ISDA) certified noxious weed free standards. Suitable sources include barley, rice and wheat straw which is required to be dry for application.

Seeding and Planting

Purpose of Treatment: To seed with native grasses in high severity burn to minimize spread of adjacent cheatgrass and noxious weeds and to ensure native plant diversity is not lost to invasive species. Additionally, seeding with native grasses will aid in preventing soil productivity loss, erosion, debris flows to private land and residences.

Planting of bitterbrush seedlings in areas that are not treated with wood/straw mulching (approximately 43 acres) will aid in soil retention and vegetation establishment. Bitterbrush seedling planting has been shown to have higher success in establishment than seeding with bitterbrush seed and is estimated to be effective within 2 years.

General Description: Aerially or drill seed with native grasses in conjunction with mulch treatments to increase the likelihood of success for soil stabilization, establish vegetation in high severity burn and to prevent additional soil productivity loss. To more successfully establish vegetation and to aid in soil retention in the Hot Springs gulch area, bitterbrush seedlings with well established roots (obtained from Lucky Peak Nursery) will be planted in areas not treated with wood/straw mulch.

Location (Suitable) Sites:

1) Within the Warm Springs drainage, mulching locations (Hot Springs Gulch, Sage Road, Lower Board North, and Huffman Drive Gulch) will also be seeded. Seed rate will be 29 PLS pounds/acre on 331 acres of moderate to high severity burn on steep slopes.

2) In Hot Springs Gulch, approximately 12,000 bitterbrush seedlings will be planted to aid in soil stabilization, vegetation retention, and to prevent additional erosion. Planting will occur in areas that are not treated with wood/straw mulching.

3) In Limekiln Gulch, 72 acres will be drill seeded at a rate of 29 PLS pounds/acre. This treatment will be used to minimize the spread of noxious weeds and cheatgrass into the Castle Rock Burned area. Several noxious weeds not currently known in the northern portion of the District are known from this area. Drill seeding with native grasses will provide natural diversity of plant species and will be used to prevent invasion of noxious weeds and cheatgrass.

Design/Construction Specifications:

Species		**PLS lb/ acre pure live seed**
Idaho fescue	*Festuca idahoensis*	3
Mountain brome	*Bromus marginatus*	7
Bluebunch wheatgrass	*Pseudoroegneria spicata*	6
Basin wildrye	*Leymus cinereus*	6
Sandberg bluegrass	*Poa secunda*	2
Bottlebrush squirrel tail	*Elymus elymoides*	5
TOTAL		**29 PLS pounds/acre**

Hillslope Wattles

Purpose of Treatment: This treatment is intended to mitigate the expected increases in overland flow and surface water runoff from the 2-year post-fire storm event and spring snowmelt. The watershed response analysis indicates a 200 percent increase in overland runoff efficiency which results in flood hazards to private homes below. Additionally, the combined treatments will more rapidly restore soil-hydrologic processes and functions by promoting more rapid revegetation of the burned area and stabilization of the hillslopes, thereby reducing the short term risk to loss of soil productivity.

General Description: Install straw wattles to mitigate wildfire impacts that are likely to result in flood and debris flow hazards that ultimately threaten human lives, private property, and infrastructure; and to stabilize hillslopes to minimize the loss of soil productivity due of continued erosion.

Location (Suitable) Sites: Upper Hot Springs Gulch, Lower Board Ranch North, Sage Road, and Hoffman Draw (about 295 acres). Specifically, south facing slopes in these locations where values-at-risk are threatened by flooding and debris flow hazards. Wattles will be installed on slopes up to 70 percent having predominantly moderate and high soil burn severity. South facing, non-forested slopes are long, continuous slopes with minimal roughness and essentially no hillslope obstructions to break up slope length and reduce runoff velocities. Compared to north facing slopes that have a large amount of coarse surface rock (greater than ¾ inch), the south facing slopes have gravel-sized surface rock with varying amounts of top soil still in place.

Design/Construction Specifications: Stake wattles on hillslopes in a continuous line on the hillslope contour and approximately 30 feet slope distance separation. Three-step site preparation is crucial for optimum effectiveness: 1) shallow "cup" trenching to provide additional stability and continuous ground contact – without compromising above-ground effectiveness; 2) anchoring wattles with 5 wooden stakes per wattle; and 3) limited backfilling along the upslope edge to prevent undercutting by surface runoff. Where wattles dissect a swale or ephemeral drainage, wattles should be "stacked" 3 or 4 deep across the feature in an upslope arch.

Noxious Weeds

Purpose of Treatment: Reduce the potential for expansion of known noxious weed infestations in susceptible burned areas due to fire related disturbance and prevent increase in weed density in existing infestations. Field reviews by Forest Service BAER team specialists indicate that there is a substantial risk of noxious weed invasion. Over 2300 acres of known infestations have been recorded within or adjacent to the Castle Rock Fire. These threats include a high likelihood that noxious weed seeds were brought into the area by fire suppression equipment that came to the Castle Rock Fire directly from another wildfire without proper equipment cleaning, suppression activity (including mechanical lines, hand lines, staging, helibases, spike camps) within known noxious weed occurrences, and a large variety for known noxious weed seed sources within the burn.

General Description: The district will treat approximately 285 of 2300+ acres of known existing noxious weeds that have resprouted and new infestations resulting from fire suppression activities in the burned area. The 285 acres were directly impacted by suppression activities (helibase, inident camps, dozerlines, handlines, droppoints). Monitoring is proposed for the remainder of the acres effected by the fire. Any noxious weed infestations found as a result of the fire will be targeted for immediate eradication using appropriate application techniques and herbicides. All treatments will take place in accordance with the Forest Noxious Weed Management Plan. Treatment of new infestations will be based upon what is found during monitoring one year after the fire. Several trips may be needed to appropriately treat weeds given the variable life history characteristics of the known noxious weeds in the burned area. This allows for the immediate treatment and eradication of known infestations at the appropriate life stage and is most effective.

Location (Suitable) Sites: Known noxious weed populations (Spotted Knapweed, Diffuse Knapweed, Yellow Toadflax, Dalmatian Toadflax, Rush Skeleton weed, Canada thistle, and Cheatgrass) exist within and immediately adjacent to the burned area. Most populations to date occur along existing road systems, decommissioned roadways, trails, and in the Greenhorn, Limekiln, Warms Springs, Fox Creek, and Oregon Gulch drainage bottoms. Spotted and Diffuse Knapweed and Yellow toadflax were scattered along the road ways used by engines to access the fire. The original Incident Camp, the type III incident camp, and all Helibase locations have large infestations of Spotted Knapweed. Canada Thistle and Spotted and Diffuse Knapweed are located within riparian areas that burned. Cheatgrass exists in patches along roads, trails, parking areas, and on private property within and adjacent to the fire.

Design/Construction Specifications: Select herbicide, application rate, and application based upon specific weed being treated, and access to the location of the infestation.

Channel Treatments:

Removal of Stream Debris Flow Deposition

Purpose of Treatment: Sediment deposited from a debris flow has increased the risk sediment inundation of fish habitat and impacts to water quality in Warm Springs Creek. Some of this sediment has already been eroded downstream when the channel worked around the debris fan. However, the rest of the deposition is likely to erode downstream as high flows break trough the sediment plug.
General Description: The debris flow deposited a 4 foot high by 100 feet long sediment wedge. This deposition raised the water elevation of Warm Springs Creek for 300 feet above the deposition. A front end loader would remove debris flow material deposited below Hot Spring Gulch.
Location (Suitable) Sites: Portion of debris flow in the north side of Warm Springs Creek below Hot Spring Gulch
Design/Construction Specifications: None

Hand Constructed Stream Channel Log grade stabilizers

Purpose of Treatment: Hand constructed stream channel "log grade stabilizers" are implemented to assist in preventing further channel scour, reducing the volume of sediment-bulking in debris flows, especially during the first three years following the wildfire. The log grade stabilizers are intended to inhibit the further entrenchment of stream channels associated with increased post-fire runoff. These structures are not intended to trap or store sediments but assist in reducing further upstream and upslope erosional processes.
General Description: Log grade stabilizers are companion treatments, or supplements to additional hillslope treatments occurring further up in the same drainage (e.g. mulching, straw wattles). Log grade stabilizers are not designed to withstand excessive flood flows and therefore are appropriate for smaller drainage basins (ephemeral or first order channels). They are intended to stabilize inner gorge sediments within smaller channels by deterring the further entrenchment of a stream up the drainage. They can be used to assist in rebuilding the original base of stream channels in smaller basins previously entrenched buy recent debris flows. They can be used to impede future entrenchment thereby reducing the suspension of new sediments caused by channel scour. Log grade stabilizers will not deteriorate for several years allowing for recovery of the watershed hillslopes to pre-fire watershed response and therefore will be in equilibrium with the channel system. There is no need to remove these structures the geotextile fabric will breakdown with UV light and the structures will be overgrown with riparian vegetation.
Location (Suitable) Sites: Log grade stablizers are usually located higher up in the stream system due to less stream power of flood waters. They can be used to assist in rebuilding the original base of stream channels in smaller basins (less than 400 acres in area). Where stream channels have entrenched to depths more than 2 feet, hand constructed log grade stablizers are not feasible.

Log grade stablizer structures are most effective when: 1) constructed in drainage areas with a high percentage of moderate to strongly water repellant soils; 2) post-fire effective vegetative ground cover is less than 40%; 3) constructed and placed appropriately in zero and first order stream channels; 4) channel bottom gradients less than 15%; 5) located in channel material that can be excavated with hand tools; 6) approximately two log grade stabilizers per 100 feet of channel length depending on stream channel gradient and channel material.
Design/Construction Specifications: Proper design and crew leader experience are critical in making these structures function effectively and . The following specifications meet the intent of appropriate placement but field conditions will dictate final installation. A Forest Service employee skilled in installing the log grade stabilizers is recommended during installation. Log grade stabilizers are constructed into the streambed to a depth of 0.5 times the depth of the entrenchment. Correspondingly, the height of the log grade stabilizer should not exceed 0.5 times the depth of entrenchment. Numerous small log grade stabilizers are preferable to a few larger ones. The width of the log grade stabilizers should be 2.0 times the width of the channel at the depth of entrenchment. The top log should have a

small V notch cut into the top log to assist in maintaining stream flow over the center of the structure. Geotextile fabric (GTF 200) is placed starting two feet downstream of the log grade stabilizer on the downstream section of the channel continuing over the log(s) placed in the channel (and into the excavated channel sides) continuing upstream approximately 3 feet where the upper 1 foot of geotextile fabric is buried in a cutoff trench (approximately 0.5 feet in depth. The geotextile fabric is stapled into the log grade stabilizer on both the up and downstream face of the structure. The geotextile fabric lying on the bottom of the stream channel is then completely covered with a layer of larger stream alluvium material (greater than 4 inches as measured by the intermediate axis). The side channel trenches are backfilled with stream alluvium (preferably 50% of this material by volume is greater than 1 inch minus and compacted by hand tools. The adjacent timber stand that burned at high severity can act as a source for the log grade stabilizers. This material will need to be sawed down and cut into appropriate lengths.

Roads and Trails Treatments:

Road Drainage Maintenance

Purpose of Treatment: The purpose of these treatments is to increase culvert capacities to accommodate increased water flows and associated bedload and debris, and restore road template drainage. The objectives for accommodating increased flows are to: 1) stabilize and protect the existing transportation facilities; 2) decrease the chances of washing road fill into adjacent streams; and 3) minimize road failure induced flooding that could impact human life and safety.

General Description: The emergency stabilization recommendations for Rooks Cr Road #70021, West Fork Warm Spring Creek Road #70049, Limekiln Gulch Road #70101, and Ketchum Featherville Road #70227 located in the fire perimeter are as follows:

1) Remove debris in a small portion of W.F. Warm Springs and re-establish channel
2) Construct 5 drain dips per standard.
3) Clean 7 culverts that are partially plugged.
4) Remove and replace 3 culverts

Location (Suitable) Sites: Rooks Cr Road #70021, West Fork Warm Spring Creek Road #70049, Limekiln Gulch Road #70101, and Ketchum Featherville Road #70227 located in the fire perimeter.

Design/Construction Specifications:

1) Survey, design, and contract administration by USFS.
2) Forest Service Specifications for Construction of Roads and Bridges and Special Contract Provisions.
3) Specifications include partial cost, operation and maintenance of a mobile vehicle washing station to clean support vehicles needed for this treatment.

Removal Roadside Debris Flow Material

Purpose of Treatment: Debris flow residue would be moved to a new stockpile area outside the fire perimeter. A ditchline would also be reconstructed.

General Description: An intensive thunderstorm on September 5 occurred in the Frenchman's Bend and Rooks Creek area of Warm Springs Creek. This resulted in multiple debris fans across the Ketchum Featherville Road (#70227). Blaine County moved much of the debris to stock piled areas in pullouts or along the road. Unfortunately, many of piles are still directly below where the debris fans spilled out onto the road. Future debris flows would mobilize this material and push it into Warm Springs Creek which is only a few feet below the road. This further impact water quality in a TMDL subbasin listed for sediment and fish habitat downstream.

Location (Suitable) Sites: 1 mile along the Ketchum Featherville Road (#70227) between Warfield Hot Springs and Rooks Creek

Design/Construction Specifications: None

Barrier Rock

Purpose of Treatment: To ensure boulders will remain in place for a sufficient time to allow for the regrowth of vegetation and to minimize hillslope erosion and spread of noxious weeds by ATV's and 4x4 vehicles.
General Description: Install barriers at dispersed campsites and trailheads in the Warm Springs drainage and at trails originating from the East Baker Creek Road to prevent illegal off-road 4X4 vehicle and ATV use to protect burned slopes and cultural sites in the area. Native rock that can be harvested on site or in the vicinity will be used. Barriers will be left in place to allow vegetation to continue to reoccupy the open burned areas.
Location (Suitable) Sites: Dispersed designated campsites (approx. 14) in the Warm Springs drainage, Rooks Creek and the Fox Peak and Warm Springs Ridge Trailheads on East Baker Creek Road.
Design/Construction Specifications: Boulders, approx. 180 cubic yards total, set 24" or .33% of the total volume below ground.

Road Obliteration

Purpose of Treatment: Road would be obliterated so that it would no longer erode sediment off the road surface and route flows down the road down into the creek. Project would benefit soil productivity, water quality, fish habitat, and public safety since the debris flow crossed the road to get to the creek. The upper and lower half mile of this road would be obliterated.
General Description: An intensive thunderstorm on September 5 occurred in the Frenchman's Bend and Rooks Creek area of Warm Springs Creek. This resulted in concentrated flows running down the road and onto the hillslope. These flows produced multiple debris fans across the Ketchum Featherville Road (#70227) and into Warm Spring Creek.
Location (Suitable) Sites: Non-system road is just west of Rooks Creek (4N 16E Section 23 and 26)
Design/Construction Specifications: Excavator would be used to pull back the fill slope and restore slope gradient and in stall some drainage features to an old road.

Trail Drainage Maintenance

Purpose of Treatment: The maintenance is needed to provide for maximum effectiveness of existing water bars to efficiently route water and sediment from the trails, thereby preventing erosion of trail surface and minimizing impacts to water quality and fish habitat. Predicted increases in surface runoff/overland flow are expected to erode soils from the burned area and deliver sediment to adjacent streams. Trails within burn perimeter are excellent conveyors for routing significant volumes of sediment to nearby streams if drainage facilities are not adequate to process increased runoff. In addition, the increased flows can erode trail tread, delivering even greater amounts of sediment to nearby steams.
General Description: Clean existing trail drainage structures on 83 miles of trails within RCA and in high and moderate severity burned areas to ensure increased runoff will not destroy trail tread and contribute sediment to steams impacting water quality and habitat for sensitive fish species.
Location (Suitable) Sites: Trails within burn perimeter are likely to contribute significant volumes of sediment to stream system if drainage facilities are not adequate to increased runoff. Within the fire perimeter, 30 miles of trail are within the RCA and 53 are in areas of high or moderate severity burns.
Design/Construction Specifications:

1) As per FSH 2309.18

Trail Drainage Construction

Purpose of Treatment: To ensure drainage structures sufficiently divert water given expected increased runoff/overland flow, accelerated erosion, and increased sediment delivery. The need for erosion control is to protect trail resource investment, water quality, and fish habitat.
General Description: Install 1,325 log and rock water bars and/or water dips on 83 miles of trails within RCAs and high and moderate burn areas to ensure water is diverted to prevent erosion and to prevent

failure of trail bed. The need for erosion control is to protect life, property, and high value watershed values such as Sensitive species spawning and rearing habitat.
Location (Suitable) Sites: Trail sections within high and moderate severity burned areas that are greater than 5% grade and/or lie within the Resource Conservation Area where existing erosion control facilities are not sufficient to handle increased runoff.
Design/Construction Specifications:
1) According to USFS Trails Handbook 2309.18, 5, exhibit 15.

I. **Monitoring Narrative:**

A vegetation recovery monitoring activity will integrate assessing the effectiveness of the emergency hillslope and channel stability treatments. The integrated monitoring will include methods and parameters that evaluate: seeding and planting, mulch cover, straw wattles, noxious weeds and invasive species, and channel log grade stabilizers. A key element of the integrated monitoring is to evaluate if ground cover objectives are being met. Achieving the ground cover objectives should mitigate most, if not all of the short term hazards and concerns associated with the loss of vegetative cover in the burned area. The benefits of early (or rapid) revegetation and ground cover will: 1) reduce the impacts of "normal" and 2-year precipitation events on erosion and surface runoff/overland flow; 2) decrease the flood hazard and debris flow potential; 3) minimize the spread of existing noxious weed and invasive plant species; and 4) decrease the possibility of new infestations of undesirable plant species in the burned area. Overall, the combined treatments of native seeding, shrub planting, mulching, wattles, and channel log grade stabilizers are intended to address the hazards that put lives and property at risk, through the related advantage of maintaining soil productivity by keeping soil on site and establishing desirable vegetation for short and long term ecosystem sustainability.

A monitoring plan will incorporate metrics that address the objectives for each of the emergency hillslope and channel treatments as well as identification of noxious weeds and invasive plants. The intent is to collect the essential information and avoid multiple visits to the treatment locations. While the underlying assumption for the integrated monitoring is the emergency stabilization treatments were correctly installed in the appropriate locations, maintenance needed to ensure the treatments continue to operate and function properly will also be documented.

Noxious Weed Monitoring

The purposes of the monitoring are to prevent known noxious weed infestations from spreading and/or increasing in density, to detect and rapidly respond to new infestations associated with fire suppression/fire effects of the Castle Rock Fire and to prevent potential new infestations resulting from BAER emergency response action.

Monitoring will be at an intensity and frequency to identify the spread or occurrence of weed infestations following the fire event and recovery. This monitoring will be funded in part by BAER and in part through other authorities where pre-fire management has taken place through the Forest Service or CWMA. Monitoring will be conducted for the next three growing seasons (starting 2008) under BAER authorization. Monitoring needs following this period will be conducted under normal program authorities. A minimum of five years of monitoring should be implemented in combination between BAER and other program authorities. The following areas will be monitored for establishment or spread of noxious weed, if noxious weed infestations are identified an appropriate treatment will be implemented to eradicate or control the infestation (i.e. hand pulling, herbicide application, biological agent control, seeding of native species). Monitoring within the burned area will focus on areas with existing noxious weed infestations and adjacent areas.

1) Area Disturbed by Suppression Actions and the Burned Area:
    a. Initial Fire camp located at Rough Creek, spike camps (Boyle Mtn. Spike, Mahoney Spike, Echo Spike, Pat's Spike, Heber Spike, and Ruby Spike), and camps associated with helispots.
    b. Placer Creek and North fork Helibases (including the flats along Hwy 75 where heavy helicopters were staged)
    c. Roads (refer to specific roads listed on Specification Sheet in BAER report).
    d. Trailheads within and adjacent to the fire perimeter trailheads (refer to specific roads listed on Specification Sheet in BAER report).
    e. All stock ties, outfitter camps, and group sites along trails named under section 2b.
    f. All dozer line associated with suppression. Helispots (7 designated), drop sites (12 designated) and water dip sites (11 designated).
    g. Selected locations within the sheep grazing allotments. Locations to be determined and implemented by Range Staff, Ketchum Ranger District.
    h. Wildland Urban Interface (Hulen Meadows, Warm Springs, Greenhorn)
2) Monitoring areas disturbed by BAER and other recovery actions.
    a. Wood/Straw mulch treatment areas and straw storage/staging areas will be monitored for noxious weed establishment (4 locations - Hoffman Drive Draw, Hot Springs Gulch, Lower Board Ranch North, and Sage Road).

    b. Road and culvert emergency response actions will be monitored following their implementation for noxious weed introduction and/or spread. For roads and culverts, 15 sites have been identified for emergency response actions.
    c. Recreation treatments including water bars, trail reconstruction, and other necessary trail activities associated with BAER. Emergency response activities for trails and recreational facilities will include: installation of 1325 water bars and 82.5 miles of trail maintenance/repair.
    d. Wash station site associated with BAER activities will be monitored for 3 years following emergency response activities.

<u>Seeding/Planting</u>

Determine the percentage of seed establishment in areas seeded and compare with un-seeded areas. Monitor for noxious weed establishment and cheatgrass invasion. Determine if additional seeding/treatment are necessary. The use of transects and fixed plots will be used to sample vegetation.

<u>Road Storm Patrols</u>

The purpose of the monitoring is to evaluate effectiveness of the emergency stabilization treatments completed on West Fork Warm Spring Creek Road #70049, Limekiln Gulch Road #70101 and Ketchum Featherville Road #70227 roads and to identify additional work needed to maintain and/or repair treatments. Engineering and hydrology personnel will survey these roads four times.

<u>Aerial Mulching and Wattles</u>

The purpose of this monitoring is to determine if ground cover objectives for mitigating raindrop impact erosion and accelerated surface runoff are being met. The primary indicator is ground cover resulting from aerial application and condition of wood strand or agricultural straw mulch. At least 15 transects would be completed within each of the four treatment areas using a pace-step or point intersect methodology.

<u>Trail Drainage Monitoring</u>

The purpose of the monitoring is to identify maintenance and/or repairs necessary for ensuring effectiveness of the trail drainage maintenance and water bar construction in meeting objectives of minimizing damage to the trail resource and reducing sediment delivery to adjacent streams. Trail/recreation personnel will survey 83 miles of trails located within the high or moderate burn severity areas, and specific trail segments where new water bars were constructed after Spring snow-melt. Monitoring will evaluate trail tread erosion and efficiency of water bars to route surface flows from trails into areas were sediment is not delivered to nearby streams.

<u>Hand Constructed Stream Channel Log Grade Stabilizers</u>

The purpose of this monitoring is to determine if the effectiveness of the hand constructed stream channel log grade stabilizers were met and properly functioning. Monitoring should occur in early summer (following snow melt runoff and after thunderstorm rainfall events exceeding the 2 year frequency (as identified through the National Weather Service's Doppler radar estimates.

Instream Sediment Monitoring

The purpose of this monitoring is to determine how much sediment is being deposited in Warm Springs Creek below hillslope treated with mulch, wattles, and seeding. Pools and riffles would be sampled immediately above and below treated channels before and after treatment. These habitat units would be sampled three times over the first year (fall, early summer, and late summer). Two channel areas would be surveyed where hillslope treatments areas delivery directly to Warm Springs Creek.

Part VI – Emergency Stabilization Treatments and Source of Funds **Interim # 1**

A. Land Treatments										
Noxious Weed Treatment	Acres	100	285	$28,500	$0		$0		$0	$28,500
Hillslope Wattles	Acres	2,769	0	$0	$0		$0		$0	$0
Protection Berm	Each	7,782	1	$7,782	$0		$0		$0	$7,782
Aerial Mulch Wood Straw	Acres	6,064	89	$539,696	$0		$0		$0	$539,696
Aerial Mulch Ag. Straw	Acres	1,015	334	$339,070	$0		$0		$0	$339,070
Planting	Acres	221	0	$0			$0		$0	$0
Seeding	Acres	270	403	$108,810	$0		$0		$0	$108,810
Subtotal Land Treatments				$1,023,858	$0		$0		$0	$1,023,858
B. Channel Treatments										
Grade Control Structrure	Each	11,000	1	$11,000	$0		$0		$0	$11,000
Debris Flow Removal	Each	7,782	0	$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Channel Treat.				$11,000	$0		$0		$0	$11,000
C. Road and Trails										
Road Drainage Maintenance	Each	14,691	1	$14,691	$0		$0		$0	$14,691
Removal Of Road Debris Flow	Each	9,708	0	$0	$0		$0		$0	$0
Road Obliteration	Each	4,500	1	$4,500	$0		$0		$0	$4,500
Barrier Rock	Each	6,644	1	$6,644	$0		$0		$0	$6,644
Trail Drainage Maintenance	Miles	161	83	$13,363	$0		$0		$0	$13,363
Trail Drainage Construction	Each	110	1325	$145,750	$0		$0		$0	$145,750
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road & Trails				$184,948	$0		$0		$0	$184,948
D. Protection/Safety										
Road Hazard Signs	Each	5	550	$2,750	$0		$0		$0	$2,750
Trail Hazard Signs	Each	122	60	$7,320	$0		$0		$0	$7,320
RAWS	Each	2500	2	$5,000	$0		$0		$0	$5,000
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Structures				$15,070	$0		$0		$0	$15,070
E. BAER Evaluation										
Assessment Team	Report	123,125	1	---			$0		$0	$0
Subtotal Evaluation				---	$0		$0		$0	$0
F. Monitoring										
Noxious Weeds/Seeding	Report	16,544	1	$16,544	$0		$0		$0	$16,544
Aerial Straw Mulch	Report	7,000	1	$7,000	$0		$0		$0	$7,000
Trail Drainage	Report	6,000	1	$6,000	$0		$0		$0	$6,000
Instream Sediment	Report	2,000	1	$2,000	$0		$0		$0	$2,000
Grade Control	Report	2,500	1	$2,500	$0		$0		$0	$2,500
Road Storm Patrols/Drainage	Report	700	4	$2,800	$0		$0		$0	$2,800
Subtotal Monitoring				$36,844	$0		$0		$0	$36,844
G. Totals				$1,271,720	$0		**$0**		**$0**	**$1,271,720**
Previously approved				$11,200						
Total for this request				**$1,260,520**						

PART VII - APPROVALS

1. /s/ Jane P. Kollmeyer — 10/12/2007
   Forest Supervisor (signature) — Date

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