United States Department of Agriculture
Forest Service
Region 1
200 East Broadway
P. O. Box 7669
Missoula, MT 59807

File Code: 6520/2620-3 **Date:** November 6, 2000
Route To:

Subject: Far East Fire, Burned Area Emergency Rehabilitation Request

To: Chief

Enclosed is the Initial Burned Area Rehabilitation (BAER) request for the Far East Fire on the Bitterroot National Forest. This request is for $644,959.

This fire burned 83,208 acres of which 59,605 are on National Forest lands. Downstream flooding is of special concern with several bridges, homes and outbuildings at risk from post fire flooding. Noxious weeds, long-term soil productivity, water quality, two TES fish species, and roads and trails are at risk. Treatments include Herbicide application, culvert upsizing, water bars, signing to reduce ATV impacts to recovering soils, a flood warning system to protect downstream residents, and monitoring.

Contact Bruce Sims (406-329-3447) if you have any questions.

/s/ KATHLEEN A. McALLISTER (for)

DALE N. BOSWORTH
Regional Forester

Enclosure

cc: Max Copenhagen, WO

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

Date of Report: 9/23/13

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

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

[x] 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: Valley Complex (Phase I) **Upper East Fork Bitterroot R./Mussigbrod Valley Complex (Far East team)**
B. Fire Number: MT-BRT-11445
C. State: Montana
D. County: Ravalli

E. Region: 01 (Northern)
F. Forest: Bitterroot

G. District: Darby/Sula
H. Date Fire Started: July 31, 2000

I. Date Fire Contained: 60% as of 9/12/2000

J. Suppression Cost: As of 9/**22**/2000 $**31,120,000** (Total Valley Complex)

K. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline being recontoured (miles): approximately 100 miles (total Valley Complex)
2. being seeded (miles): approximately 100 miles (total Valley Complex)
3. Other (identify): not identified at this time (9/14/2000)

L. Watershed Number: For Phase I, 17010205-05-02 through 17010205-02-06
Far East 170102050401-170102050405,170102050501,170102050503
M. Total Acres Burned: 83,208 acres (total Valley Complex = 212,030 acres)
NFS Acres (59,605) Other Federal ( ) State (13,246) Private (10,357)

N. Vegetation Types: Ponderosa Pine, Douglas Fir, Lodgepole Pine, Englemann Spruce

O. Dominant Soils: Dystric Cryochrepts, Lithic Cryochrepts, Andic Cryochrepts, Typic Ustochrepts, Lithic Ustochrepts, Typic Argiborolls

P. Geologic Types: Granitics (**90**%), Gneissic (10%)

Q. Miles of Stream Channels by Order or Class: 1st: **332** 2nd: **128** 3rd: **78** 4th: **38** 5th **10** 6th**14** (gis)

R. Transportation System

Trails: ~100 miles Roads: 691 miles (FS: 433 miles; Ravalli Co.: 8; MT State: 100; Private: 150)

PART III - WATERSHED CONDITION

A. Burn Severity (acres): **82176** (**62**%) (unburned); **24674**(**18**%) (low); **8983**(**7**%) (moderate); **17659** (**13**%) (high) **Several watersheds on the southern portion of this analysis area were completely burned over, with little burned area to the north of the East Fork of the Bitterroot River.**

B. Water-Repellent Soil (acres): 23,700 acres

C. Soil Erosion Hazard Rating (acres):
24352 (**47%**)(low) **11704** (**22%**) (moderate) **16215** (**31%**) (high)

D. Erosion Potential: **6.49** tons/acre

E. Sediment Potential: **2746** cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 5yrs for the understory, 15-30 yrs for conifers

B. Design Chance of Success, (percent): 80

C. Equivalent Design Recurrence Interval, (years): 10

D. Design Storm Duration, (hours): 24

E. Design Storm Magnitude, (inches): 2.5

F. Design Flow, (cubic feet / second/ square mile): **13.5**

G. Estimated Reduction in Infiltration, (percent): **8**

H. Adjusted Design Flow, (cfs per square mile): **17.4**

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency:

This portion of the Valley Complex burned through federal, state, and private lands. Specific threats are listed below:

Threat to life and private property: On private lands, **several homes, out buildings, and bridges** are considered at risk from high runoff and/or sediment flow events. **Increased runoff from fire affected areas in the Upper East Fork Bitterroot River (UEFBTR) watershed will create the possibility of the bridges and culverts to be over topped by stream flows, resulting in damage to these structures and the road prism which supports them and risk to human life if people are in the vicinity. Increased flows in the UEFBTR will cause scouring and bank erosion along the stream banks, putting several homes at risk.** Specific sites at risk include:

Jennings Campground, sites in UEFBTR floodplain
Needle creek, two culverts, several footbridges, one home
Guide Creek one culvert
UEFBTR, several homes, bridges

Threat to **life and** state property: **State Highway 472 is considered to be at risk at several locations where The East Fork Bitterroot River flows in close proximity to the roadbed. Increased flows at a higher frequency will cause stream bank erosion, undermining road fill, and put the road at risk of failure and lives at risk if this happens while people are in the vicinity.**

Threat to federal property: On federal lands, several roads **and trails** are considered to be at-risk from additional runoff and sediment expected from post-fire conditions **blocking drainage structures and causing failures of roadbed and fill. A threat to human life exists from the above mentioned failures if they occur while people are in the vicinity. There is also a threat to human life from falling snags if people are hunting, hiking and camping within the burned area, and while fishing and wading streams where increased flows are likely to occur at an unexpected magnitude from spring snowmelt and summer rainstorm events.**

Trail users will see an increased threat from narrowed tread and deep holes where stumps burned out adjacent to the tread. Failed rock cribbing in fill slopes will reduce tread width. Where rolling rock or falling trees have come in contact with cribs damage has occurred. Increased water flow, concentration of water in the trail and associated gullying may force users from the original tread onto a less stable surface or rock slide. An increased number of snags in areas of high burn intensity will continue falling for years and pose a threat, especially during high wind events and when ground conditions are wet.

The property in this case would be the trail prism itself described as a tread average 18" width, cleared height of 10' above tread, cleared width of 8' centered on trail tread including cut slope and fill which may include rock cribbing, rock or compacted fill. Uncontrolled and channeled water in the tread will lead to gully formation, excess sedimentation to nearby streams where erosion control devices have been partially and

completely burned out. Burned out cribbing has failed in places reducing tread width or taking its full width out. Some cross drain pipes are in place but may not serve increased water quantities from adjacent, burned side slopes that exceed 60% grade.

Forest Development trails in the report area, which pose threats to human life and loss of property in high and moderate burn intensity areas, include the following:
Trails:
-CDNST #9, 4 miles
-Clifford Creek #169, 1 mile
-Swift Creek #170, 1 mile
-Meadow-Bugle #171, .5 mile
-Elk Ridge #172, .5 mile
-Buck Creek #198, 6 miles (3 hi, 3 mod)
-Bitterroot-Rock Cr Divide #313, 3.5 miles
-Hidden Lake #401, .5 mile
-Tolan-Reimel Cutoff #403, .5 mile
-Faith Lake #421, .5 mile
-Hope Lake #424, 1 mile
-East Fork #433, 9 miles (4 hi, 5 mod)
-Hole in the Wall #434.2, 1 mile
-Meadow Cr Ridge #462, 4 miles.
Total: 33 miles

Roads:
- **#13337, .49 miles**
- **# 5790, 1.89 miles**
- **# 5785, 1.66 miles**
- **#73609, .89 miles**
- **#73614, 1.64 miles**
- **# 5762, 1.95 miles**
- **# 5740, 9.64 miles**
- **# 5782, 3.85 miles**
- **# 311, 2.45 miles**
- **# 723, 8.35 miles**
- **# 725, 10.10 miles**
- **#73261, 0.30 miles**
- **#73260, 1.0 miles**
- **#73259, 2.0 miles**

Total: 47 miles

Threat of **significant loss of soil productivity**: **A long-term threat to soil productivity is not predicted, based on the WEPP model, which was used for this analysis.** Certain areas of moderate to high severity burn are at **increased** risk of soil erosion and **there is an increased risk of localized mudflows from increased runoff. However, the predicted rate of soil erosion does not exceed the long-term rate of soil formation. The risk of excessive soil erosion is mitigated by: a large amount of residual standing dead trees which will become a source wood which will reduce overland flow velocities and soil erosion rates (a number of these trees are already falling down and making contact with the ground surface), large areas have extensive fine unburned root mat to hold soil in place, and**

recovery of perennial beargrass and other grasses is expected to occur rapidly. The greatest predicted loss of soil is from failure of roads and hill slopes associated with failure of the road drainage system increased, debris laden, runoff. Specific areas include **those areas identified for road treatments above.**

Threat of water quality deterioration: Sediment yield is expected to increase from moderate and high severity burn areas. **However, most streams within this analysis area have low gradient reaches with extensive functional floodplain/ meadow areas**, which **appear to be mostly intact. These areas should have adequate storage for sediment and debris associated with storm runoff. Stream channels have adequate room to migrate if necessary, to accommodate additional flows or obstructions from debris. Sediment released from road and associated hill slope failures is the most apparent threat to water quality, and likely to become the most chronic source if gullies form from misplaced concentrated flow.** Key streams considered to be at risk from increased sediment yield are **Tolan, Meadow, UEFBTR, Orphan, Carmine, Kurtz, Star, Clifford, Martin, Bertie Lord, Jennings Camp, and Guide** creeks. The sites at risk contributing to this downstream concern are previously listed above.

Threat to aquatic ecosystem integrity: Two TES fish species inhabit streams throughout the **Upper** East Fork Bitterroot drainage. Bull trout is a Threatened species under the Endangered Species Act, and Westslope cutthroat trout is a Sensitive species in the Northern Region. **Tolan, Meadow, UEFBTR, Orphan, Carmine, Kurtz, Star, Clifford, Martin, Bertie Lord, Jennings Camp, and Guide** creeks are tributaries with known bull trout within the **burn affected** analysis area.

Westslope cutthroat trout densities are low in many watersheds with high burn severity. Migratory cutthroat trout are believed to be rare in tributary streams throughout the analysis area, so potential for rebounding is likely very low. The risk of local extirpation is high for populations in many of the burned tributary streams. The only INFISH core habitat area within this BAER analysis is **Tolan, Meadow, UEFBTR, Orphan, Carmine, Kurtz, Star, Clifford, Martin, Bertie Lord, and Needle Creeks.**

These streams have remnant fluvial components of Bull Trout and Westslope Cutthroat populations in the Bitterroot River Drainage. Should these streams and populations become disconnected, the life strategy of these species can be threatened in spots within the Bitterroot River.

Threat to terrestrial ecosystem integrity:

a) **Threats from exotic species: Post-fire invasion and/or spread of weedy exotic plant species such as spotted knapweed, leafy spurge, and Canadian thistle can reduce habitat quality for a number of wildlife species by out competing native plant species and changing the vegetative character of an area (thus potentially altering forage, cover, and nesting habitats). The likelihood of introduction/invasion of exotics generally increases in disturbed areas. The concern over spread of knapweed is particularly high in the designated Wilderness area.**
b) **Threats to vegetative recovery: Vegetative recovery to pre-fire habitat will be slow, especially at the high elevations areas that experienced high/moderate severity burns, due to short growing seasons and infertile soils. Lodgepole pines that came in after the 1961 Sleeping Child fire in the area are still only 30' tall. Due to slow**

recovery and the current openness of the area, the area is at added risk from vehicle disturbance. In many areas, lack of undergrowth now provides open access to vehicles. If vehicle use on the recently burned soils were to occur, especially in moderate/high severity, further increases erosion and reduces soil/slope stability. This, in turn, slows vegetative recovery by preventing germination and plant establishment.

Much of the area that burned or that is around the burns has already been disturbed in recent years through timber management projects—the cumulative effects of the fire and pre-existing management activities likely reduce soil stability and soil productivity as well as significantly altering the natural vegetation types toward a much lower seral stage overall or the entire area (*e.g.*, there is probably a higher percentage of habitat at lower seral stages than there would be under natural conditions; the percentage of undisturbed habitat in mature and over mature stands is likely lower than it would be under natural conditions).

An additional concern is the additive effect that cattle grazing would have in these severely impacted areas. Cattle presence, if unmanaged, would further stress native wildlife due to competition for limited resources (forage, water, cover). Additionally, grazing could further increase erosion and decrease soil productivity in the moderate/high severity areas (from trampling, compaction, and grazing of resprouting vegetation. Cattle grazing may also reduce water quality post-fire since they tend to concentrate in riparian areas where vegetative recovery occurs first. Since ground vegetation was effected in all three levels of burn severity, even areas of low severity are vulnerable to impacts of post-fire grazing.

Threats to wildlife populations: With slow vegetative recovery expected, wildlife species in the area are at greater risk. For several years to come, the lack of understory will make interior areas much more accessible and visible. These factors will put increased stress on species already stressed from losses of available habitat for cover, forage, movement corridors, nesting sites, etc. The cumulative effects of disturbance and lack of cover/forage is most significant in the high elevation elk summer range where almost ½ of it burned. This is just for the Upper East Fork analysis area—an analysis of cumulative impacts on elk habitat in the all of the adjacent burned areas might lead to a higher or lower level of concern.

Emergency Determination: Due to the cumulative impacts of the fire, roads, exotic plant species, grazing, and past timber management, there is a threat to ecosystem integrity.

Threat to heritage resources:

Several heritage sites are located within the area affected by the Valley Complex fire. Site types include cambium-peeled Ponderosa pine, trees, tribal trails, pictographs, cultural plant areas, lithic sites, log cabins, homestead sites, and wooden irrigation structures. Sites not directly destroyed or damaged by the fire itself may be at risk from increased post fire erosion, consumption, or from ground disturbance or equipment activity related to other resource rehabilitation treatments. Noxious weeds may invade cultural plant areas. These sites will be monitored to determine if future fire related

emergency actions are needed.

B. Emergency Treatment Objectives:

A major objective of the proposed treatments is to reduce damage to areas and facilities at risk from runoff from burned areas. A focus is to reduce erosion and sedimentation from roads and throughout the burn area with augmented roads and trail drainage and increased culvert size. In addition the treatments are designed to reduce potential adverse runoff effects on several private land facilities (roads, ditches, domestic buildings etc.). **Treatments are also proposed to reduce the risk to human life from increased runoff causing downstream flooding, and from hazards from falling snags and changes in on the ground features within the burned area. Other treatments are to reduce the risk to resources from increased access to the burned area.**

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

Land **80** % Channel **80** % Roads **80** % Other **80** %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	80	90	95
Channel	80	90	95
Roads	80	90	95
educa-tion and warning systems	**80**	**90**	**95**

E. Cost of No-Action (Including Loss): $2,667,320

F. Cost of Selected Alternative (Including Loss): $1,166,443

G.

G. Skills Represented on Burned-Area Survey Team:

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

Team Leaders: Cheryl Mulder

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Team Members and Contributors	Speciality	Agency
Dexter Phillips	Engineering	FS
Jim Carter	Engineering	BLM
Jim Bergman	Hydrologist	FS
Steve Johnson	Hydrologist	FS
Amy Ambuehl	Hydrologist	FS
Bill Mathews	Archeologist	FS
Ray Willis	Archeologist	FS
Mary Williams	Archeologist	FS
Garry Seloske	Fisheries Biologist	FS
Linda Pietarinen	Botanist	FS
Richard Wisehart	Geo Technical Eng.	FS
Robin Butler	Wildlife and Monitoring	FS
Nick Hazelbaker	Recreation Trails	FS
Frank Guzman	Range Conservationist	FS
Bob Logar	Forester	NRCS
Terry Costner	Engineering	NRCS
Paul Vaughn	Engineering	NRCS
Annette Parson	GIS	FS/BLM
John Price	GIS	BLM
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Vel Diemont	GIS	FS
Joyce Mousseau	GIS	FS
Lynn Goolsby	GIS	FS
Donna Hawkins	GIS	FS
John Hawkins	GIS	FS
Rob McLeod	GIS	FS

H. Treatment Narrative

The following are the proposed emergency treatments for the Valley Complex Fires, **Far East analysis area**. These treatments were developed based on the BAER objectives, team recommendations of proven effective treatments (including local experience from the North Fork Rye Fire which occurred in 1998), and the line officer/agency administrator input, as well as interagency cooperative BAER Team effort and discussion. Due to the high values at risk, multiple treatment types may occur in the same area, to address the same emergency situation, thereby improving the overall effectiveness of mitigating the emergency. Preventive treatments are targeted at the high severity burn areas. Treatments with low probability of success were eliminated by use of a preliminary least cost plus risk analysis to refine treatments.

Slope Treatments

Herbicide treatments

Objective
The purpose of the treatment is to restore ecosystem integrity by treating selected sites where sensitive plant populations occur, which will likely be threatened by the spread of knapweed. By

reducing the amount of weed seed in the area, sensitive plants will have an opportunity to take advantage of the post-fire nutrient flush without competition. Slope herbicide treatments are also proposed for drier sites where the loss of canopy due to high burn severity will increase the risk of knapweed encroachment.

Methods
Treat severely burned areas with clopyralid (Transline or Stinger) using a backpack sprayer where known noxious weed populations are likely to encroach on sensitive plant populations. Effects of herbicide treatments at the proposed rates using Clopyralid are addressed in the "Bitterroot National Forest 1997 Noxious Weed Environmental Assessment. Selected sites include areas shown on maps **at Kurtz Flat . This area is located within the Anaconda Pintler Wilderness Area.**

The BNF should conduct post-fire monitoring for selected exotic species that may have been introduced or encouraged by the fire and fire related activities (including spotted knapweed), especially in the Anaconda-Pintler Wilderness (including Kurtz Flats where knapweed has been treated in the past). Monitoring should be systematic. It is possible that exotic species eradication and be proposed if the results of monitoring indicate a need. If monitoring determines a need for herbicide treatments, funding should be requested through an Interim 2500-8 Report (and the BNF should complete the appropriate NEPA analysis if needed). There is also a threat of expansion of knapweed in the Kurtz Flat area along the Far East Trail and a treatment to use herbicides to eradicate or control the knapweed is included under the Range Treatment section of this report.

Additionally, specifications to reduce the likelihood of exotic plant introduction and spread should be developed (if the BNF does not already have them in place) and applied to all activities in the area. This includes washing vehicles, including contractor equipment, entering the areas, guidelines for grazing and equestrian use (use weed-free feed), use of weed-free seed if seeding is proposed, use of weed-free materials such as straw, haybales, rock, etc. A high-power spray wash station should be set up for all equipment entering the burn area during BAER treatment implementation.

Channel Treatments

Bank Stabilization

Objective
Stream banks will be stabilized in areas **downstream** of **the** burn**ed area, in the UEFBTR** to reduce the threat of water quality deterioration, sediment movement into fish bearing streams, and to reduce overall soil loss on stream banks. Another objective is to reduce the threats to private residences from debris flows and flooding to restore natural stream function.

Methods
In the UEFBTR installation of Rock Vanes will be funded by the NRCS on private property to deflect the flow of the river off of the banks and into the center of the river to reduce streambank erosion.

Channel Patrol

Objective: To reduce the risk to streambank stability, water quality and fluvial components of Bull trout and Westslope Cutthroat trout populations by ensuring that bedload is transported efficiently in channels which do not have adequate floodplains to accommodate channel migration due to blockages, causing bank failures and endanger fish habitat and population connectivity.

Method: Post fire channel patrol for 3 years. During post spring runoff, and after isolated storm events, a hydrologist or fisheries biologist will survey stream channels for the development of channel blockages creating bedload passage barriers, to ensure fish population connectivity. Blockage will be modified if determined by the hydrologist or fisheries biologist with hand crews to ensure bedload transport and fish passage. Measures taken in the wilderness will be those that are determined to be adequate and within the management guidelines for the that area, by an interdisciplinary team.

Road and Trail Treatments

Road Drainage Protection for Fire Induced Stream Flows

Objective
The most critical objective is to clear existing drainage structures of debris, drainage ditch cleaning and reshaping, drainage dip repair, and slope stabilization on cut and fill slopes.

Methods
Hydrologists and engineers surveyed roads, and maintenance needs were recorded on roads logs, which are stored with the Forest Engineer on the Bitterroot Forest. Forest road crews will clean culverts, repair ditches, **Clear Catch basins of floatable material** and reestablish drainage on roads that are shown on display maps, in the EXCEL spreadsheet and on road logs. **An additional 44 miles of road within the burn have been surveyed and will receive this treatment under the Far East proposal.**

*Bridge and Culvert **and Road** Armoring for Erosion*

Objective
Protect lives, water quality, and property (bridges and culverts **and fill),** from the threat of damages from flood flows and debris torrents, and to protect the entrance and exits of existing structures from turbulence associated with flood flows. **Protect stream channel morphology and aquatic ecosystem, providing for passage of water and debris during high runoff events, by connecting floodplains upstream and downstream from road crossings .**

Method
Armor bridges and culverts by placing rock riprap where floodwaters could erode fill at the entrance and exits of bridges and culverts. Rock shall extend a minimum of 10 feet on either side of the pipe or bridge entrance, and 30 feet on either side of the down slope side, unless the site is well vegetated. Incorporating existing vegetation in the rock is also desirable. **Construct armored rock dips to function as emergency spillways across roads.**

Replace Culverts in Fish Bearing Streams and Other Perennial Streams

Objective
Emergency conditions in high severity burn areas have been modeled for increased flows. This treatment is to ensure that culverts are capable of passing flood flows and to ensure culverts are designed to accommodate fish passage.

Method
The size of culvert to be placed in perennial fish bearing streams will be designed to simulate the natural stream to true bank full width as described by Rosgen, 1994. As a minimum, the effective cross sectional area should be equal to or greater than channel cross sectional area at bank full. The culverts will be set at natural stream grade or slightly flatter to accommodate fish passage.

Place Culverts in Road Drainage Network

Objective
Protect lives, water quality, soil productivity, and property.
Emergency conditions in high severity burn areas have been modeled for increased flows. This treatment is to ensure that culverts are capable of passing flood flows and to ensure that failure of the road drainage system does not occur.

Four upsized culverts are proposed on roads where additional predicted flows are expected within the Far East analysis area.

Erosion and Water Control on Trails

Objective: Protection of property, reduction of risk of loss of control of water and risk to water quality.
Increased water, lost drain structures and berms will channel more water in trail tread and cause scour and gullying which destroys trail tread. Burned out stumps, slough and rock crib loss reduces tread width and destroys trail tread as well as making travel unsafe.

Method: install new or replace waterbars; spot trail surface stabilization; spot berm removal

Objective: Reduce the risk the risk to water quality and property.
Increased water flow in drainage may scour surface material from some fords and make them impassable to users. Sediment generated from this failure of trail bed will affect water quality.

Method: Armor selected creek crossings with suitable sized material as required.

Public Safety Education

Objective: Reduce threats to life from increased risks do hazards from snags, slope stability for hiking, and increased runoff during precipitation events.
Its recommended the Forest adopt a plan to notify trail users of an increased number of fire-weakened trees adjacent to trail corridors in the analysis area. These trees may pose

an increased hazard, especially during wind events and wet times of the year.

Method: General users of the Forest who may not use trails should also find this information available in various forms.

Objective

The purpose of hydro-mulching and seeding is the rapid establishment of grass cover on severely burned cut and fill slopes where there is potential for water and sediment to contribute to flood flows, impact roads and private property. Eighty percent of the soils are granitics and in many cases sandy, non-cohesive, and often have very little fertility or water holding capacity. Slow release organic fertilizer in the form of Biosol will be used with the hydromulch. These road cut-slopes and fill-slopes are mostly very steep and burned at high severity rates. Many of the road-cuts proposed for hydromulching and seeding were only sparsely vegetated prior to burning, increasing the likelihood of rilling and erosion.

Methods

Hydro-mulching will be accomplished from the road using a truck-mounted applicator with the target treatment area being the cut-slopes and fill-slopes. Hydro-mulching with a tackifier, with a high moisture level to hold seed on the slope will be used. Other types of treatments such as broadcast seeding would not be as successful at holding seed on the steep slope. Hydro-mulching and seeding will also be used in conjunction with herbicide treatments to prevent the spread of weeds along road corridors into susceptible areas of high severity burn.

Drainage Dips

Objectives

This treatment will decrease the threat from flood damage on roads and delivery of sediment to streams by draining water from road surfaces in high severity fire areas.

Methods

The drainage dips will be designed to drain water off of the road, but still allow motorized vehicle crossing. The dips are typically skewed 30 degrees and the outlets will be armored in most areas.

Water Bars

Objective

This treatment will be used to reduce the threat of increased flow of water from severely burned slopes above the road, from running down the road causing rilling and excess sediment to be deposited in stream channels. This treatment will disperse the flow of water over the fill-slope to more stable areas.

Method

Water bar is constructed by excavating road to a depth of one foot at a 30 degree angle and placing the excavated material as a berm immediately adjacent to the excavation on downhill side spread evenly across the road surface.

Recreation Trails

Objective
Reduce the risk to water quality, property, and life from failure of trail drainage system resulting in the failure of trail structure.

Methods

a. **Priority work for this fall will include drainage crossing armoring and trail surface stabilization in high intensity burn areas: 1) #433, East Fork; 2) Buck Creek #198; 3) CDNST #9; 4) Bitterroot-Rock Cr Divide #313; 5) Hidden Lake #401 and 6) Swift Creek #170, by priority.**
    a. **Visitor Information Signing . In an effort to completely address the need for visitors to be aware of the ongoing threat of falling snags and unforeseen trail tread damages**

Other Treatments

*Structures Protection on **Private Land (NRCS, not funded by USDA Forest Service**)*

Objective
This treatment will help decrease the threat of further damage of private homes and structures by decreasing the threat of flooding, debris torrents and mudflows.

Method
This will be a combination of treatment methods such as jersey barriers to divert mudflows away from private homes and residences **drainage structures such as culverts and footbridges will be increased in size**. Treatments would be designed for each site.

Early Warning

Objective
Track development of flow, snow and weather conditions to provide early warnings of potential flooding (primarily spring snowmelt flooding).

Implement a flow-actuated early-warning system to alert the proper authorities of rising waters in the upper East Fork Bitterroot River for all seasons of the year.

Install warning signs in campgrounds and at bridges that are at risk due to flooding on the East Fork Bitterroot River.

Method
An Early Warning system consisting of at least two tipping bucket rain gages, and stream flow warning systems on two bridges, to alert local disaster and law enforcement officials, and residents (including temporary residents in the East Fork Campground), of flood-development conditions in the Upper East Fork Bitterroot River. These systems include telemetry, flow heights and physically signing areas at risk.

Treatments to enhance natural vegetative stabilization of the watershed.

Off Road Vehicles

Objectives: Enhance vegetative stabilization of the watershed.

Method: A restriction/closure of the moderate/high severity burn areas to off route motorized vehicles (including ATVs, snowmobiles, and street-legal vehicles) until a local interdisciplinary team of specialists determine that vegetative recovery is adequate to provide adequate cover.

Grazing

Objectives: Prevent disturbance of natural vegetative recovery of watersheds by ensuring that post-fire grazing is not concentrated in riparian areas. Allow for recovery process enabling natural soil and vegetation recovery and streambank stabilization.

Method: Readiness will be monitored until an interdisciplinary team of specialists determines that vegetative recovery is adequate to sustain grazing without threatening watershed stability. The interdisciplinary team should use the Forest Plan (as amended by INFEST) and Allotment Management Plan minimum forage standards as guidelines for the levels needed to support grazing.

I. Monitoring Narrative:

Monitoring will be focused on first year effectiveness of BAER treatments. The question to be answered is did the BAER treatments provide the needed protection and rehabilitation of the burned area.

Hydrology and Aquatic Resources: In Laird Creek monitor the effects of a mix of treatments by re-establishing a stream gage and monitoring water yield and sediment yield. This will allow us to determine the accuacy of flow modeling conducted to rate erosion and sedimation risks and to size drainage structures.

Soils: Measure effect of slope treatments such as: log erosion barriers, waddles, and seeding. Compare erosion rates on these slopes to **natural recovery of untreated hillslopes within the Far East area,** by measuring erosion above structures and below ares treated and untreated. Silt fences will be used to catch surface erosion and volumes captured will be mesured and recorded.

Fisheries: Revisit FWP sites in Laird Creek for fish populations. Check fish passage on culverts which FISHXING model predicts could become barriers. Check for presence of fish above new culverts.

Vegetation: Monitor 1st year survival of reforestation, noxious weed treatments, and noxious weed populations. Also, monitor natural vegetative recovery in severely burned areas to determine the need for further treatments.

Roads: Road patrols will be necessary during the spring runoff of 2001 and other storm events of 2001 to monitor the effectivness of road drainage systems and to clear debris from culverts and ditches. This would also occur during the fall of 2000 if heavy precipation events occur.

Heritage: More than a dozen recorded sites within the fire perimeter will require monitoring. Some sites beyond the burn perimeter are at risk due to erosion and debris flows, which will also require monitoring Any ground disturbing activities associated with treatments for other resource protection will require monitoring by heritage specialists. Monitoring will consist of site visits, photo documentation, and comparative analysis. Monitoring will occur on high priority areas twice per year where possible and after extreme precipitation and flow events; other sites will be monitored at least once per year and/or after extreme precipitation and flow events.

PART VI - Emergency Rehabilitation Treatments and Source of Funds by Land Ownership

(see attached spreadsheet)

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

					NFS Lands		State Lands		Other Lands: Private Lands			
Line Items	Trmt. Site #	Units	Unit$	Unit Cost $	# of units	cost $	# of units	Cost $	# of units	Cost $	Total Cost	Total Units
Slope Treatments												
Herbicide	HC	acres	195	$150	10	$1,950	0	$0	0	$0	$1,950	10
Vegetative recovery/stabilization monitoring	SM	year					0	$0	0	$0	$47,775	1
Total Slope Treatments						**$1,950**		**$0**		**$0**	**$49,725**	
Channel Treatments												
Bank Stabilization	BK	feet	55	$25	0	$0	0	$0	230	$12,650	$12,650	230
Bridge Abutment Protection	BP	each	7100	$1,425	0	$0	0	$0	7	$49,700	$49,700	7
Channel Patrol	CP	year	8840	$6,800	1	8840	0	$0	0	$0	$26,520	3
Blockage Removal	BR	year	10313	$7,933	1	10313	0	$0	0	$0	$30,939	3
Total Channel Treatments						**$19,153**		**$0**		**$62,350**	**$119,809**	
Road/Trail Treatments												
Road Maintenance	RM	miles	390	$300	9.33	$3,639	0	$0	0	$0	$3,639	9.33
Culvert Inlet Armoring	CA	each	1885	$1,450	20	$37,700	0	$0	0	$0	$37,700	20
Install 24" Culvert	CV	each	4030	$3,100	4	$16,120	0	$0	0	$0	$16,120	4
Upsize Culvert 30"	CV	each	3330	$4,200	0	$0	0	$0	2	$6,660	$6,660	2
Upsize Culvert 48"	CV	each	2050	$4,650	0	$0	0	$0	1	$2,050	$2,050	1
Fill Spillway Relief Dip	RD	each	1885	$1,450	65	$122,525	0	$0	0	$0	$122,525	65
Catch Basin Clearing	RM	miles	260	$200	44	$11,440	0	$0	0	$0	$11,440	44

Erosion Control on Trails	ECT	feet	4.095	$3	11352	$46,486	0	$0	0	$0	$46,486	11352
Water Bars	WB	each	91	$70	1081	$98,371	0	$0	0	$0	$98,371	1081
Armor Creek Crossings	BWB	each	325	0	0	0	0	$0	0	$0	$975	3
Storm Patrol on Roads	SP	each	6500	5,000	1	$6,500.00	0	$0	0	$0	$6,500	1
Total Rd/Trail Treatments						**$342,781**		**$0**		**$8,710**	**$352,466**	
Other Treatments												
Public Safety Signing	RD	each	1.3	$1	3150	$4,095	0	$0	0	$0	$4,095	3150
Range/Riparian Readiness	RR	year	16900	$6,000	1	6,000	0	$0	0	$0	$50,700	3
ATV Signing	OT-SP	each	10400	$8,000	1	$10,400	0	$0	0	$0	$10,400	1
Flood Warning System	OT-SP	each	32500	$25,000	1	$32,500	0	$0	0	$0	$32,500	1
Total Other Treatments						**$56,895**		**$0**		**$0**	**$97,695**	
Monitoring												
Water Quality Effectiveness	OT-M	each					0	$0	0	$0	$18,720	6
Stream Gage	OT-M	each	1300	$1,000	2	$2,600	0	$0	0	$0	$2,600	2
Culvert Check Fish	OT-M	each					0	$0	0	$0	$624	2
Noxious Weeds	OT-M	each	13000	$10,000	1	$13,000	0	$0	0	$0	$13,000	1
Sensitive Plants	OT-M	each	6500	$5,000	1	$6,500	0	$0	0	$0	$6,500	1
Hillslope Vegetative Recovery	OT-M	each	6500	$5,000	1	$6,500	0	$0	0	$0	$6,500	1
Road Drainage Inspection	OT-M	each	260	$200	0	$0	0	$0	0	$0	$10,400	40
Heritage Sites	OT-M	each	13000	$10,000	1	$10,000	0	$0	0	$0	$26,000	1
Total Monitoring						**$38,600**		**$0**		**$0**	**$84,344**	
Total Treatment Cost						$477,754		$0		$71,060	$704,039	
BAER Costs	BC	Each	15,000	$15,000	12	$180,000		$0		$0	$180,000	
Helicopter Flights	HF	Each	930	$930	6	$5,580		$0		$0	$5,580	
GRAND TOTALS						**$644,969**		**$0**		**$71,060**	**$889,619**	

PART VII - APPROVALS

Recommended by:

/s/ Wayne Patton	9/27/00
BAER Overhead Team Leader (signature)	Date
/s/ Jeffrey S. Amoss for	9/27/00
Forest Supervisor (signature)	Date
_____	_____
Regional Forester (signature)	Date