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

**File Code:** 6520/2520-3 **Date:** September 22, 2000
**Route To:**

**Subject:** Rye/Burke Fire, Valley Complex Burned Area Emergency Rehabilitation Request

**To:** Chief

Enclosed is the Initial Burned Area Rehabilitation (BAER) request for the Rye/Burke Fire, Valley Complex on the Bitterroot National Forest. This request is for $896,310.

This fire burned 41,606 acres of which 21,519 was on National Forest lands. Key issues include: risk to private property for from flooding and debris torrents, noxious weed control, channel stabilization, and road drainage. Treatments include: seeding, tree planting, contour felling, straw wattles, armoring bridge and culverts, installation of larger culverts, hydro-mulching, and instream channel stabilization structures. Also requested is funding for an early warning system to provide residents early warning of possible debris flows and flooding.

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

*/s/ Kathleen A. McAllister*

DALE N. BOSWORTH
Regional Forester

Enclosure

cc:
Max Copenhagen, WO

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

Date of Report: 9/23/13

**This is an interim report for the Valley Complex that includes the Rye and Burke drainages only.**

**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
[x] Updating the initial funding request based on completion of another fire within the Valley Complex.
[ ] 3. Final Report (Following completion of work)

## PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Valley Complex **Rye/Burke**

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 9/17/2000 $29,300,000 (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: 1701205 - 08-01, 08-05

M. Total Acres Burned: 41,606 acres (total Valley Complex = 212,030 acres)
NFS acres (21,519) DNRC (890) Private (19197)

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

O. Dominant Soils: Typic Ustochrepts/Lithic Ustochrepts, Andica Cryochrepts/Dystric Cryochrepts.

P. Geologic Types: Granitics (80%), Gneissic (10%), Volcanic [Rhyolite, Andesite] (10%),

Q. Miles of Stream Channels by Order or Class: 1st: 79 2nd: 19 3rd: 12 4th: 10 (1:100K layer)

R. Transportation System

Trails: ~5 miles Roads: 263 miles (FS: 212 miles; Ravalli Co.: .5; MT State: 0; Private: 50)

## PART III - WATERSHED CONDITION

A. Burn Severity (acres): 17,006 (low), 14,515 moderate, 10,082 (high)

B. Water-Repellent Soil (acres): 25,000 acres

C. Soil Erosion Hazard Rating (acres):
23,014 (low) 12,133 (moderate) 6,459 (high)

D. Erosion Potential: 5.3 tons/acre

E. Sediment Potential: 631 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): 9 summer storm flow
13 snowmelt

G. Estimated Reduction in Infiltration, (percent): 20

H. Adjusted Design Flow, (cfs per square mile): 67 summer storm flow
36 snowmelt

## 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:

One residence in Main Rye Creek
One irrigation ditch in Main Rye Creek
Three bridges in Main Rye Creek
Four residences in North Fork Rye
Eight bridges in North Fork Rye
Two residences in Dougout Gulch
One residence in Burke Creek
One residence in Stella Creek
Head gate irrigation ditch in Moonshine subwatershed
One residence at mouth of Mike Subwatershed (T4N, R21 W. Sec 35)
Road crossing at Burke Creek on private road # 702.

Threat to state property within Rye/Burke: Specific sites at risk include:

Road #311 from 2% Saddle to Rye Creek – Bridge at Road #311 junction with Rye Creek (T4N R20W S36)

Threats to federal property and life within Rye/Burke:

USGS Gaging station at T3N, R20W. Section 25 on Rye Creek
Snags along formerly closed road #13254 that has been reopened as a result of the fire

Threats of soil loss:

High and moderate severity burn (95% of watershed) in Moonshine subwatershed
High severity burns (93% of subwatershed) in Bear Gulch
High and moderate severity burn (98% of subwatershed) in Cathouse
High and moderate severity burn (74% of subwatershed) in North Rye
High severity burn (73% of subwatershed) in Mike

High severity burn (48% of subwatershed) in Dugout
High severity burn within inner gorge creating threat to soil loss in riparian habitat conservation area in Rye Creek above the North Fork which will retard the recovery of the riparian area vegetation.

Threat of water quality deterioration: Rye Creek watershed is currently listed on the 305b list for impaired water quality due to sediment. The fire will likely result in continued deterioration of water quality from both chronic erosion and debris torrents. Key streams considered to be at risk from increased sediment yield are: Moonshine Creek, North Rye Creek, Deer Mt. South tributary, Mike Creek, Bear Gulch, Burke Gulch and downstream effects to the Bitterroot River. In addition in North Rye there are several burned residences that have propane tanks, septic systems, and outbuildings which are within the flood prone area. Lower Rye Creek has the potential for channel migration due to upstream effects frm sediment bulking as a result of the increased erosion and flooding from areas within the high and moderate severity burns.

Threat to aquatic ecosystem integrity: Bull and westslope cutthroat trout (TES fish species) inhabit N. Fork Rye Creek and mainstem Rye Creek downstream of a rock slide in S22, T3N,R19W. There is a threat to these species from 1) acute impact to the population from turbidity caused by suspended solids; and 2) chronic impairment of breeding, feeding and sheltering habitat due to increased sediment delivery and elevated water temperatures.

Threat to terrestrial ecosystem integrity: Spotted knapweed is prevalent throughout the area affected by the fire. It is expected that the loss of forest canopy, soil distrubance from severe fires, and potential for accelerated erosion will increase the spread of knapweed in areas where it was not previously found. Spread of knapweed is a threat to long term soil productivity in several ways. Knapweed is not a good source for stabilization because it stems from a single root system and tap root rather than having a fibrous and dense rooting mass like native grasses and forbs. This effect will leave bare soil with few natives which can contribute to soil erosion.

In addition there is a loss of seed source within the ponderosa pine/Douglas-fir forest communities where high severity fires occurred in Moonshine and Bear Creek. Because this high severity area is very large in size, there is concern with the ecosystem integrity of losing the seed source (particularly with ponderosa pine). The lack of seed source will slow the recovery process in these high and some moderate severity burn subwatersheds.

Threat to heritage resources: Over two dozen cultural resource surveys have revealed only one heritage site in the Rye/Burke area. Nearly all the high probability sites have been surveyed and the probability of finding a significant site on the dry steep hills or in the already logged and roaded area seems low. Therefore, there is no real threat to heritage resources.

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.). Many of the treatments are also intended to reduce overall soil erosion which will limit adverse impacts to water quality, fish habitat, and a variety of additional values.

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 |
| | | | |
| Other | N/A | N/A | N/A |

E. Cost of No-Action (Including Loss): $26,529,125

F. Cost of Selected Alternative (Including Loss): $7,555,539

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 Members and Contributors**

| | |
|---|---|
| Eric Schroder | Soil Scientist |
| Judy Hallisey | Hydrologist |
| Bob Logar | Forester (NRCS) |
| Ken Andrews | Engineer |
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| Mary Williams | Archeologist |
| Mike Kellett | Fisheries Biologist |
| Amber Kamps | Silviculturist |
| Lynne Dickman | Geologist |
| Dave Romero | Wildlife Biologist |
| Nick Hazelbaker | Recreation/Trails |
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## H. Treatment Narrative

The following are the proposed emergency treatments for the Rye/Burke watersheds within the Valley Complex. 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

*Aerial Seeding for Rye/Burke Private Lands*

Objective
This treatment is designed to be used only in high severity burn areas where native plant recovery will be too slow for effective erosion control, and when there are threats to downstream structures such as private residences or other facilities. The goal is to improve vegetative ground cover, reducing the amount of bare soil and to minimize surface sheet and rill erosion.

Methods
This is for 1580 acres of private lands in Sections 24, 29, 31, 32, 33 of T4N R20W as proposed by NRCS and 80 acres on DNRC land in S36, T4N, R20W. Aerial seeding will be completed with contract aircraft and pilots. Seed will be tested for purity and germination rates, and will be certified noxious weed-seed -free. Slender wheatgrass, bluebunch wheatgrass, and thickspike wheatgrass will be seeded at a rate of 12 pure live seed #/acre (50 pure live seed/square foot).

*Hydro-mulch on Private Lands*

Objective
There is a risk of sediment and debris damage to a house at the bottom of a draw from a tributary of North Fork of Rye Creek. Increase in stream flow, soil movement, and debris movement down slope is of concern.

Methods
Utilize the hydro-mulch to slow movement of soil and protect the house from sediment and debris movement. Treat approximately 30 acres around the homesite focusing on upslope treatments in addition to the hydro-mulch.

*Contour Tree Falling, Large Debris Alignment, Lop and Scatter, and Hillslope Straw Wattles*

Objective
Decrease the threat of soil erosion, increased overland flow, and slow the transport and delivery of sediment to streams.

Methods
Contour tree falling, large debris alignment & wattles - Fall trees or place wattles along the contour as determined by the slope steepness, 20-30 for low density and 40 for high density. Trees and wattles need to be in contact with soil surface, but extensive trenching is not necessary. The steeper the slope, the closer the spacing between fallen trees. Large debris alignment accomplishes the same goals as contour tree falling, however felling of trees is not necessary. Contour felling will be limited to slopes less than 60% for safety purposes.

Lop and Scatter – Felling and scattering in areas where small trees are the only material available, such as plantations or previously harvested areas. Fall trees along the contour as determined by the slope steepness, 20-30 for low density and 40 for high density. Trees need to be in contact with soil surface, but extensive trenching is not necessary. The steeper the slope, the closer the spacing between fallen trees. The specification sheets will include implementation specifics.

*Straw Wattle Check Dams for Rye/Burke*

Objective
Decrease the threat of soil erosion, increased overland flow, and slow the transport and delivery of sediment to streams.

Methods
Straw wattle check dams will be placed in zero order channels (low energy ephemeral swales in headwater reaches). Wattles will be contoured across swales with a row spacing of 15 feet.

*Tree Planting*

*Objective*

There is a high potential that high severity burned areas that were forested will convert to non-native species within the next few years due to spotted knapweed and sulfur cinquefoil. These areas did not have noxious weeds prior to the fire except along roadsides. Native under story species are already resprouting, however knapweed is expected to be very competitive. The loss in terms of ecosystem integrity, ecosystem function, and in non-native species conversion is quite great. All of the above factors could lead to site conversion dominated by knapweed.

Spotted knapweed has several disadvantages in forested or reforested sites. When conifers are planted after site preparation and have established height dominance, they have the competitive edge over shrubs and forbs. Depending on the size of the seedlings, height dominance usually occurs between 2 to 10 years. Woody trees and shrubs accumulate growing space by adding new growth to that gained in previous years. Unlike herbaceous perennials (like knapweed) they do not need to expand each year to reoccupy the same growing space; they maintain this space and expand farther each year. Woody shrubs and knapweed also do

not sustain rapid height growth like trees species and later become overtopped and often killed by taller-growing tree species.

Stem exclusion or canopy coverage from conifers also has an impact on knapweed survival. Losensky suggests that crown development restricts light passage that affects the weed's reproductive abilities. Both Losensky and Mullin agree that improving brush and tree canopy cover can reduce spotted knapweed density and slow invasion.

Weeds are very successful at replacing other plants because they are efficient in obtaining moisture and nutrients on marginal sites as well as being allelopathic. Willard and others found only a slight allelopathic effect from spotted knapweed on conifers. Current knowledge does not indicate that noxious weed competition is a problem for conifer establishment or growth.

Methods

Tree planting will be used to prevent the spread of noxious weeds where practical and prevent site conversion. The first and preferred method is vegetative, planting some desirable and native species that will out compete the noxious weeds. Trees and shrubs are the best native competitors, planting of these species is highly preferable. The following criteria will apply to the use of planting for noxious weed control:

1. Unacceptable spread - There are noxious weeds in the vicinity, however not a pre-existing problem. The area has a potential for noxious weed invasion due to high severity soil disturbance, lack of vegetative canopy, habitat type, aspect, and elevation.
2. Lack of seed source – Where the fire has burned stand replacing (includes areas of moderate to high severity) and there is a lack of seed source; there is a concern about the area regenerating naturally in the immediate future (1 – 5 years).
3. Size – The size of the area is great enough where seed source from the seed walls will not meet natural regeneration needs. If the seed wall doesn't include desirable species, a smaller area in size may also be considered.

Highest Priority:

1. Ponderosa Pine Restoration – To meet the long-term ecosystem management objectives on steep unstable slopes, the first priority for treatment areas would be where ponderosa pine restoration can be achieved.
2. Presence of Sensitive Plants – Particularly those associated with drier habitat types.

Planting specifications in terms of spacing and species mix will be developed after a pre-planting examination and written in a site-specific treatment prescription and approved by either a silviculturist or culturist. Generally a mix of ponderosa pine and Douglas fir at a 12x12 spacing will be used.

A first year reforestation exam will be necessary to assess seedling survival and determine need for subsequent replanting or seedling protection (use of netting for animal damage control or browse damage).

The steep or dry habitat areas to be planted are in the Moonshine and Bear Gulch drainages. These areas burned with high severity leaving no seed source in this ponderosa pine/Douglas-fir site. Noxious weeds are expected to increase in these areas. This will result in a loss of vegetative ground cover, increases in bare soil, surface sheet erosion and subsequent stream sedimentation. It is anticipated that more tree planting will be needed in these areas using non-emergency funding.

## CHANNEL TREATMENTS

*Large Woody Debris Placement*

Objective

To dissipate energy and trap sediment and debris during high flows associated with increased runoff from areas of high-intensity burn. The addition of large woody debris will help protect stream habitat occupied by bull trout and westslope cutthroat trout, and replace or enhance certain critical habitat elements (i.e., deep pools with complex cover) that were adversely affected by the fire. Another objective is to reduce the threats to private residences and capital improvements from debris flows.

Methods

Under the direction of a fisheries biologist or hydrologist, large logs ($\geq$35' in length, $\geq$12" in diameter) will be felled or placed in small accumulations (3-4 logs each) in depositional reaches of Rye Creek and N. Fork Rye Creek as identified on the treatment map. Log placement can be accomplished by cable and winch and/or excavator operated from the road. It is not intended that machinery be operated in the stream channels or floodplains to accomplish this task. Typical drawings are attached to the specification sheet.

*Rock Vanes or Brush Layers*

Objective

This treatment is designed to protect road fill slopes from increased stream peak flows as a result of the fire. These structures reduce hydrologic stress in the near-bank region by redirecting stream energy from the outside edge of meanders to the central part of the channel. This treatment will also improve fish habitat by creating deep pools in the central part of the channel downstream from each vane.

Methods

This treatment will be applied on private lands within the Rye Creek analysis area. Under the direction of a fisheries biologist or hydrologist, rock/log vanes will be constructed immediately upstream of several sites where meanders of Rye Creek are immediately adjacent to road fill slopes. Vanes will be constructed by an excavator using 2' diameter rock. Vanes will be oriented upstream at a 20-30° angle to the bank, and project 1/3 of the way across the actve channel. These structures will be keyed 6-8' into the bank, and slope down (4-10%) into the channel from 1' above bankfull height. Designs are shown on the specification sheet.

*Pond Protection for Private Land*

Objective
The treatment will ensure that the emergency spillways are constructed properly to provide a safe passage of design flows in order to reduce the threat of structure failure and subsequent release of sediment to streams. For breached ponds the treatments are needed where site conditions are not suitable for emergency spillway construction and anticipated sedimentation will significantly deplete pond storage.

Methods
This treatment will be applied on private lands within the Valley Complex. The spillways will be designed to pass the peak flow expected for a 25 year – 24 hour storm for dams with an effective height of 20 feet or less and 50-year – 24 hour storm for all others. Specific designs are in the pond Specification sheets.

*Bank Stabilization on Private Land*

Objective
Stream banks will be stabilized in areas of high severity burn 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, and to reduce risk of failure from instream ponds.

Methods
Woody debris, rocks, shrubs, and grass seeding will be used to help stabilize soils on stream banks.

*Streamside Straw Wattles*

Objective
Decrease the threat of soil erosion, increased overland flow, and slow the transport and delivery

of sediment to streams.

Methods
Wattles will be placed in the North Fork of Rye Creek where the high severity fire occurred up to the stream channel. Two rows of wattles will be placed on toeslope directly adjacent to flood plain. Rows will be spaced at 15 feet apart.

*Clean Debris from Channel on Private Land*

Objective
Fire affected areas in the Main Rye Creek watershed will create an increase in stream flow in Rye Creek. This increase in flow will create the possibility of the bridges and culverts to be overtopped by stream flows. At one particular spot there is risk of Rye Creek damaging a bridge if clean debris treatments are not applied to stop or reduce this damage

Methods
Utilize the Clean Debris from Channel specification to remove debris that may become a blockage at the bridge protect the bridge from washing away or damaging part of it as a result of increased flows in Rye Creek. This blockage may remove or create damage to the bridge. Clean and remove debris 10 feet above and below the bridge.

## Road and Trail Treatments

*Road Maintenance for Private Land*

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, and reestablish drainage on roads that are shown on display maps, in the EXCEL spreadsheet and on road logs.

*Road Redesign for Private Land*

Objective
Fire affected areas in the Dugout Creek watershed will create an increase in stream flow in Dugout Creek. This increase in flow will create the possibility of Dugout Creek coming out of its channel and running down the road and possibly removing the road. Approximately one mile of Dugout Creek is at risk. There are several areas of high fire intensity along the Dugout Creek road. The fire created dead and damaged trees that pose a risk and /or threat to life if not removed. Approximately 2 miles of Dugout Creek is at risk.

Methods
Utilize the Road Maintenance specification to protect the Dugout road from washing away or

damaging part of it as a result of increased flows in Dugout Creek. Place approximately a mile of Jersey barriers along this section of Dugout Creek at risk or move the road further away from Dugout Creek. Remove approximately 100 feet of trees on the up slope side of the road for approximately 2 miles. Treat spot areas down slope from the road if trees present themselves at risk.

*Bridge and Culvert Armoring for Erosion*

Objective
Protect bridges and culverts 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.

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.

*Replace Culverts*

Objectives
Culvert need to be replaced because of current physical condition and other culverts require replacement with larger culverts to handle increase flows. Increased flows from drainages will also require that some new culverts be installed for additional roadway cross drainage.

Methods
The size of culvert to be placed will be designed to simulate the natural stream to true bank full width in accordance with INFISH (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 when in fish bearing streams.

*Hydro-mulch Road*

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 with tackifier 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.

About 6 miles along road 321 in North Fork Rye creek and about 5 miles along roads 5612 and 5613 in Moonshine and Bear Gulches are proposed for hydro-mulch. Where applicable, hydro-mulching will be applied to both side of the road in areas of high severity burn. Areas where rock outcroppings and needle cast will be excluded. These areas are specifically located on steep slopes with high severity burns where there is the potential for high sediment delivery to perennial channels. All areas of hydro-mulch will also be treated with herbicide.

*Roadside Herbicide Treatment*

Objective
The purpose of the treatment is to restore ecosystem integrity, which will likely be threatened due to the spread of knapweed into severely burned areas. By reducing the amount of weed seed in the area, native species will have an opportunity to take advantage of the post-fire nutrient flush without competition from noxious weeds.

Methods
Phase 1 - Treat severely burned areas with picloram or clopyralid where known noxious weed populations are likely to encroach on previously forested sites.

Selected sites include roadside spraying along the Moonshine Connection road 5612 and Bear Gulch road 5613 where heavy canopy loss and high severity has increased the risk of knapweed spreading. All three areas will also be hydromulched. Because the hydromulch will include seed mix, these areas need to follow up with herbicide treatment to insure the seeding for bank and cuts and fills are stabilized. Spotted knapweed will compete with the seeded grasses if not treated. Knapweed is not a good source for stabilization because it stems from a single root system and tap root rather than having a fibrous and dense rooting mass as grass.

Effects of herbicides treatments at the proposed rates using clopyralid or picloram is addressed in the Bitterroot National Forest 1997 Noxious Weed Environmental Assessment**.**

*Remove Culverts and Road Fills*

Objective
Emergency conditions in high severity burn areas have been modeled for increased flows. Where roads are going to be put in long term storage, culverts will be removed to ensure the channel is capable of handling flood flows and stream banks will be layed back to the original stream bank contour, stream gradient, and natural stream alignment.

Method
The fill material will be removed and placed on the road prism. Stream banks will be recontoured to natural stream bank slope contour to prevent scouring and sediment

entrainment. For B channel types, road prisms will be removed to the natural flood plain elevation.

*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.

*Rubber Belt Drains*

Objective

Heavy rubber flappers will be built to improve road drainage to accommodate the threat of increased flows on steep roads that are out sloped where regular waterbars cannot be used.

Method

Construct water bars using heavy rubber matting material between lumber cut to road width. Skew at 45 degrees with a small angle at the uphill side. Structure is buried 8 inches in the road.

*Rehab Ditch*

Objective

The objective of the treatment is to reconstruct ditches on roads to handle additional runoff from high severity burn areas.

Methods
Construct outlet ditches as needed. Clear debris and sediment from existing ditches.

*Removal Hazard Tree*

Objective

This treatment reduces the chance for damage to life or property by reducing the risk of trees falling on vehicles or persons on roads.

Methods

Fell and remove any hazardous burned trees that are located along roads.

## OTHER TREATMENTS

*Canal and Ditch Protection on Private Land*

Objective
The purpose of this treatment is to ensure that the canal capacity is maintained to ensure continued delivery of irrigation water and to reduce the threat of being unable to maintain the capacity for increased runoff from high severity burn areas to the irrigation system.

Methods
This treatment will take place on private and state lands where irrigation canals and ditches occur. Trees and debris will be removed from the canals and disposed of by placing cross slope to assist in erosion prevention. Trees and shrubs that are weakened along the canal will be removed, and the cut slopes will be seeded for erosion.

*Structure Protection on Private Land*

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 wattles, debris torrent deflectors, contour log falling, hand seeding, aerial seeding and jersey barriers to divert mud flows away from private homes and residences. Treatments would be designed for each site.

*Erosion Control on Skid Trails*

Objective
Decrease the threat of soil erosion (particularly gully erosion), increased overland flow, and slow

the transport and delivery of sediment to streams. Although the skid trails are an existing condition, treatments are necessary to compensate for increased fire induced run-off.

Method
Skid trails are located in Moonshine Gulch. Hand dig water bars with spacing determined by the slope which will be described further in the specification sheets.

*Early Warning System*

Objective
Residents will need warning of debris flow and flooding in the Rye Creek drainage in case of major rainfall events that may cause threat to life and property.

Method
Install a remote access weather station in the headwaters of the Rye Creek drainage calibrated to rainfall intensity to forewarn residents of possible debris flows and flooding threats. This system would coincide with a predefined evacuation/warning plan with emergency services and the sherriff's office.

**I. Effectiviness 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 Rye Creek monitor the effects of a mix of treatments by re-establishing a stream gage and monitoring water yield and sediment yield. In 10 reference sites measure changes in channel morphology and substrate at established cross sections within the Rye/Burke area. This monitoring will be done with BAER funds for the first year only then continued in subsequent years with other project funds.

The USGS gaging station downstream of the Moonshine Gulch confluence on Rye Creek should be reinstated and include sediment sampling (both bedlad and fine sediment) to monitor effectiveness of treatments.

Soils: Measure effectness of slope treatments (log erosion barriers, large debris alignment, log and scatter, straw wattle check dams, hillslope wattles, hydro-mulch, hand waterbared skid trails, contour tree felling, and seeding) by measuring erosion above and below burned and unburned areas.

Fisheries: Revisit FWP sites in Rye/Burke area for fish populations. Check fish passage on culverts which FISHING model predicts could become barriers. Check for presence of fish above new culverts.

Vegetation: Monitor 1$^{st}$ 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.

General: Establish long term photo points: In order to establish a permanent and continuing visual record of the effectiveness of BAER treatments and natural recovery of forest and grassland ecosystems, 100 photo points should be established within the Valley Complex according to the protocol prescribed in Sampling Vegetation Attributes, 1996 (Publication BLM/RS/ST-96/002+1730). The points need to show proposed treatment areas on hill slopes, in riparian areas and along roads. There should be good representation from close-up to landscape views with consideration for comparing treated and untreated sites.

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

| | | | | | | Other Lands | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | NFS Lands | | State Lands | | Private Lands | | | |
| Line Items | Trmt. Site | Units | Unit Cost $ | # of units | cost $ | # of units | Cost $ | # of units | Cost $ | Total Cost | Total Units |
| **Slope Treatments** | | | | | | | | | | | |
| Aerial Seeding | AS | acres | $70 | 0 | $0 | 80 | $5,600 | 1580 | $110,600 | $116,200 | 1660 |
| Hydromulch/Seed | HM | acres | $1,800 | 0 | $0 | 0 | $0 | 30 | $54,000 | $54,000 | 30 |
| Broadcast Seeding | BS | acres | $300 | 0 | $0 | 0 | $0 | 0 | $0 | $0 | 0 |
| Contour Tree Falling | CTF | acres | $350 | 273 | $95,550 | 0 | $0 | 184 | $32,200 | $127,750 | 457 |
| Tree Planting | TP | acres | $275 | 90 | $24,750 | 0 | $0 | 0 | $0 | $24,750 | 700 |
| Lop & Scatter | LS | acres | $100 | 43 | $4,300 | 0 | $0 | 0 | $0 | $4,300 | 43 |
| Straw Wattle Check Dam | WCD | acres | $750 | 12 | $9,000 | 0 | $0 | 0 | $0 | $9,000 | 12 |
| Straw Wattles Hillslope | SWH | acres | $750 | 58 | $43,500 | 0 | $0 | 130 | $97,500 | $141,000 | 188 |
| Large Debris Alignment | LDA | acres | $150 | 283 | $42,450 | 0 | $0 | 440 | $66,000 | $108,450 | 723 |
| **Total Slope Treatments** | | | | | **$219,550** | | **$5,600** | | **$360,300** | **$585,450** | |
| **Channel Treatments** | | | | | | | | | | | |
| Bank Stabilization | BK | feet | $25 | 0 | $0 | 0 | $0 | 1100 | $27,500 | $27,500 | 1100 |
| Pond Protection | PP | each | $1,425 | 0 | $0 | 0 | $0 | 1 | $1,425 | $1,425 | 1 |
| Streamside Straw Wattles | | acres | $750 | 3 | $2,250 | 0 | $0 | 60 | $45,000 | $47,250 | 63 |
| Rock/Log Vanes | | each | $440 | 18 | $7,920 | 0 | $0 | 6 | $2,640 | $10,560 | 24 |
| Brush Layering | | each | $300 | 0 | $0 | 0 | $0 | 6 | $1,800 | $1,800 | 6 |
| Large Woody Debris Placement | LWD | acres | $123 | 45 | $5,535 | 0 | $0 | 3 | $369 | $5,904 | 48 |
| Clean Debris from Channel (ft.) | DE | feet | $25 | 0 | $0 | 0 | $0 | 620 | $15,500 | $15,500 | 620 |
| **Total Channel Treatments** | | | | | **$15,705** | | **$0** | | **$94,234** | **$109,939** | |
| **Road/Trail Treatments** | | | | | | | | | | | |
| Road Maintenance | RM | miles | $200 | 0 | $0 | 0 | $0 | 0 | $0 | $0 | 0 |
| Road Redesign | | miles | $10,000 | 0 | $0 | 0 | $0 | 1 | $10,000 | $10,000 | 1 |
| Bridge/Culvert Armoring | BA | each | $750 | 5 | $3,750 | 0 | $0 | 22 | $16,500 | $20,250 | 27 |
| Replace Culvert | CV | each | $3,974 | 62 | $246,388 | 0 | $0 | 0 | $0 | $246,388 | 62 |
| | CV | each | $3,100 | 0 | $0 | 0 | $0 | 5 | $15,500 | $15,500 | 5 |
| Hydromulch Cut and Fill | HY | acres | $1,800 | 105 | $189,000 | 0 | $0 | 0 | $0 | $189,000 | 105 |
| Herbicide along Road | HE | acres | $110 | 53 | $5,830 | 0 | $0 | 0 | $0 | $5,830 | 53 |
| Culvert/Fill Removal | FR | each | $1,478 | 8 | $11,824 | 0 | $0 | 0 | $0 | $11,824 | 8 |
| Drive through Dips | DD | each | $331 | 15 | $4,965 | 0 | $0 | 5 | $1,655 | $6,620 | 20 |
| Water Bars | WB | each | $150 | 1 | $150 | 0 | $0 | 10 | $1,500 | $1,650 | 11 |
| Belt Water Bars | BWB | each | $924 | 16 | $14,784 | 0 | $0 | 0 | $0 | $14,784 | 16 |
| Rehab Ditch | RHD | miles | $396 | 36.4 | $14,414 | 0 | $0 | 0 | $0 | $14,414 | 36.4 |
| Hazardous Tree Removal | HTR | miles | $1,000 | 0 | $0 | 0 | $0 | 3.5 | $3,500 | $3,500 | 3.5 |
| **Total Rd/Trail Treatments** | | | | | **$491,105** | | **$0** | | **$48,655** | **$539,760** | |
| **Other Treatments** | | | | | | | | | | | |
| Canal/Ditch Protection | OT-CDP | miles | $500 | 0 | $0 | 0 | $0 | 1 | $500 | $500 | 1 |
| Structure Protection | OT-SP | each | $3,200 | 0 | $0 | 0 | $0 | 12 | $38,400 | $38,400 | 12 |
| Erosion Control on Skid Trails | OT-EC | feet | $2.25 | 0 | $0 | 0 | $0 | 4000 | $9,000 | $9,000 | 4000 |
| Early Warning System | | each | $25,000 | 3 | $75,000 | 0 | $0 | 0 | $0 | $75,000 | 3 |
| **Total Other Treatments** | | | | | **$75,000** | | **$0** | | **$47,900** | **$122,900** | |
| **Monitoring** | | | | | | | | | | | |
| Water Quality Effectiveness | OT-M | each | $6,800 | 3 | $20,400 | 0 | $0 | 0 | $0 | $20,400 | 3 |
| Rye Creek Stream Gage | OT-M | each | $1,000 | 2 | $2,000 | 0 | $0 | 0 | $0 | $2,000 | 2 |
| Culvert Check Fish | OT-M | each | $240 | 0 | $0 | 0 | $0 | 0 | $0 | $0 | 0 |
| Soil Erosion Treatments | OT-M | each | $9,600 | 1 | $9,600 | 0 | $0 | 0 | $0 | $9,600 | 1 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Noxious Weeds | OT-M | each | $10 | 105 | $1,050 | 0 | $0 | 0 | $0 | $1,050 | 105 |
| Reforestation | OT-M | each | $10 | 700 | $7,000 | 0 | $0 | 0 | $0 | $7,000 | 700 |
| Vegetative Recovery | OT-M | each | $10 | 1000 | $10,000 | 0 | $0 | 0 | $0 | $10,000 | 1000 |
| Road Drainage Inspection | OT-M | each | $200 | 0 | $0 | 0 | $0 | 0 | $0 | $0 | 0 |
| Photo Points | OT-M | each | $100 | 100 | $10,000 | 0 | $0 | 0 | $0 | $10,000 | 100 |
| **Total Monitoring** | | | | | **$60,050** | | **$0** | | **$0** | **$60,050** | |
| | | | | | | | | | | | |
| **Total Treatment Cost** | | | | | $861,410 | | $5,600 | | $551,089 | $1,418,099 | |
| **BAER Costs** | | | | | $34,900 | | $200 | | $10,900 | $46,000 | |
| | | | | | | | | | | | |
| **GRAND TOTALS** | | | | | **$896,310** | | **$5,800** | | **$561,989** | **$1,464,099** | |

## PART VII - APPROVALS

Recommended by:

| | |
|---|---|
| /s/ Wayne Patton | 9-20-00 |
| BAER Overhead Team Leader (signature) | Date |
| */s/ Jeffrey S. Amoss, for Rodd Richardson* | 9-21-00 |
| Forest Supervisor (signature) | Date |
| */s/ Kathleen A. McAllister* | 09/22/00 |
| Regional Forester (signature) | Date |

# Valley Complex BAER

Interim Report I

# RYE/BURKE ANALYSIS AREA

## Description of Analysis Area

The Rye/Burke area is located in the upper Bitterroot River Sub basin in Ravalli County, Montana on the Darby and Sula Ranger Districts of the Bitterroot National Forest and on private lands. The attached Initial Burned Area Report (Form 2500-8) for the Rye/Burke area is Interim Report I of the Valley Complex BAER effort. This name was applied b y the Burned Area Emergency Rehabilitation (BAER) team to differentiate it from other areas under assessment in the Valley Complex. It includes the entire Rye Creek drainage and several streams draining directly into the Bitterroot River between Deer Hollow and Jerry's Gulch. The total burned area assessed in this report is about 43,600 acres, a portion of the total Valley Complex area of 212,030 acres.

The assessment area ranges in elevation from about 3,800 feet at the mouth of Jerry's Gulch to about 7,300 feet at Deer Mountain. The upper 20 percent of Rye Creek has glaciated slopes with volcanic wind blown ash cap soils. The middle and lower elevation drainage are residual and colluvial soils. Predominate rock types are granitics from the edge of the Idaho Batholith. The general soil texture is sandy loams on the surface and loamy sands below. Soil surface erosion hazard rating is generally high, mass failure hazard is low, and soils have 50 percent or more rock.

Forest vegetation ranges from mixed grassland and ponderosa pine at lower elevations, continuous stands of Douglas-fir and other species at mid-elevations, and subalpine fir/spruce at higher elevations. Wildlife species of special importance include Rocky Mountain elk, mule deer, white-tailed deer and lynx. Fish species of special note include westslope cutthroat and bull trout. Lynx and bull trout are listed as threatened under the Endangered Species Act. No other threatened or endangered species are known to inhabit the area.

Timber harvest on National Forest lands was extensive from the 1950s through the 1980s and has resulted in a high road density over much of the area and a mix of timber stand conditions.

About 28,000 acres of the headwaters of Rye Creek burned in the 1961 Sleeping Child Creek fire with large areas of severe burn. The Sleeping Child burn area was salvage logged with low standard roads and abundant tractor skid trails. Much of the burned area is now covered with 20 foot tall, dense stands of lodgepole pine. A small fluorspar mine located in the headwaters of Rye Creek operated until about the mid 1970s. This open pit mine on patented land has never been reclaimed.

Former Burlington Northern Railroad, later Plumb Creek Timber Company land, was acquired by Darby Lumber and intensively roaded and tractor logged in the late 1990s. The Darby Lumber checkerboard lands are in near clearcut condition. Low standard roads with poor drainage, and high density skid trails abound. There are two sections of Montana Department of Natural Resources and Conservation (DNRC) land within the Rye/Burke analysis area. Private lands in lower Rye Creek include scattered houses in Dugout Gulch, North Fork of Rye Creek and main Rye Creek.

## Valley Complex Fire History

The Valley Complex began as a number of individual lightning strikes on July 31, 2000. Several fires escaped initial attack and by August 3, the complex exceeded 30,000 acres. Major fire runs on August 6 and 7 resulted in growth to 117,200 acres. The Rye/Burke area fire also started on August 3, most significant growth occurred between August 6 and 9. The fires continued to spread, though at a reduced rate, until September 1, when a series of moist weather fronts resulted in significant and widespread precipitation.

At its peak, the firefighting force assigned to the Complex totaled about 1,800, including firefighters from many government jurisdictions, the US Army, Australia and Canada. The fire was either first or second in size in the country during most of August and into September, whether measured by area or size of the firefighting force. Suppression costs to date are about $30 million. The fire burned 64 of 1,070 homes considered threatened by the fire. Twelve of the 64 homes destroyed were in North Fork Rye Creek and Dugout Gulch in the Rye/Burke analysis area.

## BAER Assessment Process

The BAER effort for Valley Complex initiated on August 28, 2000 with a briefing at the Natural Resources Conservation Service (NRCS) Office in Hamilton, Montana. Three BAER field teams were organized under the supervision of a BAER overhead team based in Missoula and representatives of the Bitterroot National Forest. In addition to Forest Service employees, the BAER field teams consisted of employees of the Montana DNRC and NRCS.

Initially, three teams were set up to assess portions of the Valley Complex: 1) Rye Creek/Burke Gulch; 2) Lower East Fork (mouth to Sula); and 3) Upper East Fork (Sula to Tolan Creek). The initial report combined the efforts of the Lower and Upper East Fork teams. BAER teams have been formed to assess the Far East (Tolan Creek to headwaters of East Fork) and the West Fork portions of the Complex.

Field work by the Rye/Burke BAER team began on August 31, and was completed on September 16. The draft initial BAER report (Interim Report I of the Valley Complex) was presented to the Forest Supervisor, NRCS Area Conservationist, and DNRC administrators for review on September 20 and the initial report was submitted to the Regional Office and Washington Office on September 23.

An aerial mapping team was formed to map burn severity for the entire Valley Complex, the Blodgett fire and Skalkaho Complex. This effort began on August 29 and was completed on September 5. The aerial mapping was ground-truthed for the Rye/Burke area and maps were revised accordingly.

Based on input received from the Forest and other local sources, field work was done at a high level of detail and included assessment of potential fire impacts on road and trail systems, private developments, slopes-at-risk, stream channels, key fish and wildlife habitat, vegetation recovery, and heritage resources. Sites of concern were documented with field notes, photographs, and annotations on 1:24,000 scale topographic maps. The field assessment included federal, state and private lands.

## Findings

The Rye/Burke area burned at a range of intensities, resulting in a burn severity mix of 41% low and unburned, 35% moderate and 24% high. Although a quantitative analysis was not performed, it appears that the fire burned through a wide range of fuel types with roughly equal mix of severity. The fire spread through native timber stands in unroaded areas, heavily developed commercial forest lands, and developed rural private lands. Fire entered only the edges of the 1998 North Rye fire. The ecological and social effects of this mix of burn severities ranges from beneficial to highly detrimental. In the case of the loss of homes and other private developments, the effects were tragic. The teams have determined that a burned area emergency exists in certain areas.

In areas where the fire burned with low intensity, the ecological effects are generally expected to be beneficial. Under natural conditions, the low elevations and south aspect mid elevation have a relatively short fire return interval with generally low to moderate intensity burning expected. The regime has been partially interrupted by fire suppression. Very little of the Ry3/Burke area retains a mosaic of unburned or low severity burns. A small piece of the headwaters of Rye Creek, and some lower slope areas in lower Rye Creek and Dugout Gulch (an area of bitterbrush grassland) burned with low severity. Over 3,000 acres of the unburned area was in the North Rye fire that experienced a high severity burn in 1998. The higher elevations and north aspect mid-elevations have a less frequent, but higher intensity natural fire regime. Some high elevation stands were burned with high severity. Relatively infrequent stand-replacing fires are a natural part of the high elevation landscape pattern.

The survey teams concentrated a considerable effort in areas burned with moderate to high severity. The largest contiguous patches of these areas are found at low to mid-elevations in the North Fork of Rye Creek, and in the high basins of Moonshine (84% high) and Bear Gulch (93% high). The headwaters of Burke Gulch and Mike Creek also have extensive areas of high burn severity. The areas show 100% canopy kill of trees and complete consumption of understory vegetation. Duff, wood and rock provide some ground cover. Root crowns from beargrass are often currently the only visible signs of vegetation cover in upper elevations. The fine root systems of rhizomotous species, such as pinegrass, are often found below the soil surface on even the most severely burned areas. The severely burned areas represent most of the geomorphic and timber stand conditions found in the area.

The NRCS evaluated private lands and found that 12 homes, 2 outbuildings and 12 other structures are at risk from future flow events. Roads, culverts, bridges, and hazard tree areas were also assessed. Another 19 homes were evaluated and not considered at risk from future flow events.

It is within and below the severely burned areas that a post-fire emergency was deemed to exist. This emergency includes threats to homes and private property, soil resources, water resources, road and trail developments, vegetation, wildlife and fisheries. Burned area treatments were prescribed to address these concerns.

## BAER Treatment Recommendations

The areas where life and property are at risk have the highest priority for emergency treatment. Private developments and key natural resource components affected by the high and moderate severity burned areas were given preferential consideration. The next priority is those areas affecting listed species and water quality limited streams.

Given the priorities listed above, the team focused initially on areas where previous ground disturbances, such as roads and skid trails, were impacted by fire. This combination of conditions is often the most critical when considering downslope and downstream impacts related to the fire. The next priority was slope areas and channels where the fire effects could impact instream and downstream values. The following values apply to all land ownerships within the analysis area.

Prescribed slope treatments include 1660 acres of aerial seeding, 30 acres of hydromulching, 515 acres of contour log falling or wattles and 700 acres of reforestation.

Prescribed channel treatments include 1100 feet of bank stabilization, 18 acres of rock/log vanes, 6 brush layering treatments, 48 acres of large woody debris placement, 620 feet of floatable debris removal above culverts and stabilization of 2 private ponds.

Prescribed road and trail treatments include culvert upgrades at 102 sites, 15 drainage dips, installation of 27 water bars, 3.5 miles of hazardous tree removal, 105 acres of roadside hydromulching and 53 acres of roadside herbicide application.

Other prescribed treatments include about 1 mile of irrigation ditch protection and private structure protection at 12 home sites.

## BAER Treatment Costs

The total estimated cost of the prescribed treatments is $1.5 MM. Of this, $970 M is for national forest lands, $557 M for private land and $5.6 M for state lands.

## Implementation and Other Considerations

Implementation priority for BAER treatments for fall 2000 should be those prescriptions that protect life and property and those locations that will be most vulnerable to fall rains and spring snowmelt. Within the assessment area moderate and high severity burned sites are more sensitive to additional land disturbances than they were prior to the fire. For example, access for off-highway vehicles (OHV) has increased because the fire reduced vegetation on roads formerly closed by vegetation. Restricting OHV travel in burned areas could reduce impacts to soil and water resources.

The areas of greatest immediate BAER treatment needs are listed below:

### Private Lands

1) Private residences and outbuildings at risk from debris flows include those in Dugout Gulch, North Fork of Rye Creek, Mike Creek and along the main stem of Rye Creek,
2) Roads and bridges at risk from storm flows in Burke Gulch, North Fork Rye Creek and Dugout Gulch,
3) Travel ways and houses in danger from hazard trees in North Fork Rye Creek and Dugout Gulch,
4) An irrigation ditch and head gate structure at risk from increased flows in Rye Creek, and
5) Slope stability treatment above homes in North Fork Rye Creek and Dugout Gulch.

***State Lands***

1) Sediment control structures on Road #311 in Rye Creek,
2) Culvert replacement on Road #321 in S36, T4N, R20W, and
3) Aerial seeding of 80 acres in S36, T4N, R20W.

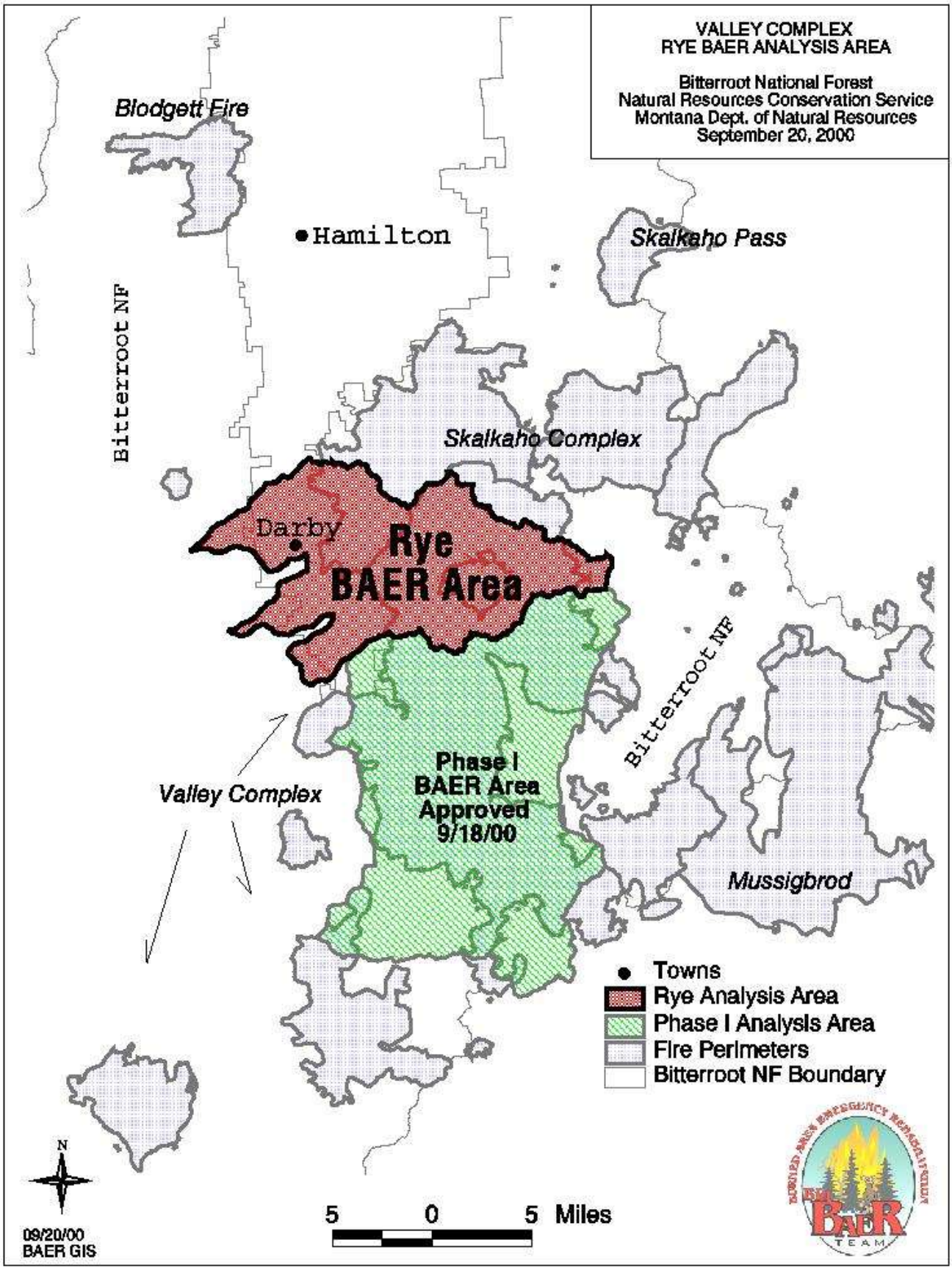
***National Forest Lands***

1) Slope treatments prescribed for high severity burn areas in North Fork Rye Creek, Moonshine Creek and Bear Gulch including: contour falling (and debris alignment), straw wattles, and lop and scatter saplings; should be completed as soon as possible to maximize their effectiveness in protecting downstream values,
2) Roads #321, 311, 5612, 5613 and 1126 need culvert upgrades, cleaning, hydromulching and constructed dips to reduce risk of mass failure of the road and protect downstream values,
3) Placement of large woody debris in depositional reaches of North Fork Rye Creek, Moonshine Creek and Bear Gulch to modify the energy release of high flows and protect downstream resources, and
4) Remote Automated Weather Stations should be placed at the head of Moonshine Gulch, North Fork Rye Creek and at Deer Mountain to provide an early warning system for downstream residents.

Many of the recommended treatments are relatively complex and will require technical design and field refinement prior to implementation. Engineers, hydrologists, fisheries biologists, soil scientists, botanists and other technical experts need to help accomplish the mission of implementation of prescribed treatments.

Adjustments will occur in the BAER treatment package during design and implementation. Some prescriptions will change in scale, some may be dropped, and others may be added. The team leaders and members can be contacted if questions arise during implementation. Local team members should be involved in implementation.

The team of resource specialists from several agencies and geographic areas assembled to complete the assessment and treatment prescriptions for the Rye/Burke area worked extremely well together to produce treatment prescriptions that will reduce risk of after fire effects. The treatments were concentrated on high risk watersheds with special attention to cost effectiveness.
The result of the cooperative interdisciplinary effort is a package of treatment prescriptions that will fulfill ecosystem objectives and meet public expectations.


VALLEY COMPLEX
RYE BAER ANALYSIS AREA
Bitterroot National Forest
Natural Resources Conservation Service
Montana Dept. of Natural Resources
September 20, 2000
Blodgett Fire
Hamilton
Skalkaho Pass
Bitterroot NF
Skalkaho Complex
Darby
Rye
BAER Area
Bitterroot NF
Phase I
BAER Area
Approved
9/18/00
Valley Complex
Mussigbrod
Towns
Rye Analysis Area
Phase I Analysis Area
Fire Perimeters
Bitterroot NF Boundary
N
5 0 5 Miles
09/20/00
BAER GIS