USDA-FOREST SERVICE FS-2500-8 (6/06)

Date of Report: October 22, 2015

Kettle Complex – Graves Mountain Fire

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

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

B. Type of Action

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

[ ] 2. Interim Report #____

[ ] Updating the initial funding request based on more accurate site data or design analysis
[ ] Status of accomplishments to date

[ ] 3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Kettle Complex – Renner and Graves Mountain Fires

B. Fire Number: Renner: WA-COF-001202
Graves Mountain: WA-COF-001196

C. State: Washignton

D. County: Ferry

E. Region: 06 – Pacific Northwest

F. Forest: Colville NF

G. District: Three Rivers

Renner	Three Rivers RD
Graves Mountain	Three Rivers RD

H. Fire Incident Job Code:

Renner	P6J1RC (0621)
Graves Mountain	P6J1UB (0621)

I. Date Fire Started:

Renner	08/14/2015
Graves Mountain	08/14/2015

J. Date Fire Contained:

Renner	11/15/2015 (estimated)
Graves Mountain	11/15/2015 (estimated)

K. Suppression Cost:

Renner	$3,483,350 (as of 10/20/2015)
Graves Mountain	$3,930,486 (as of 10/20/2015)

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles):
2. Fireline seeded (miles):
3. Other (identify):

Renner Fire	#	Unit	
Hand Line	1	Miles	(exact # of miles waterbarred unknown)
Dozer Line	17	Miles	(~8 miles waterbarred, ~4 miles seeded, ~2 miles chipped)
Helispots	6	Each	
Drop Point	10	Each	
Helibase	1	Each	
CNF Closed Roads Reopened	36	Miles	

Graves Mountain Fire	#	Unit	
Hand Line	9.6	Miles	(8.8 miles waterbarred)
Dozer Line	24.9	Miles	(20 miles waterbarred, ~20miles seeded, ~4 miles chipped)
Helispots	6	Each	
Drop Point	7	Each	

M. Watershed Number: (6th level hydrolgic units, percent of watershed acres within the fire perimeter)

Renner Fire:

HUC12 (6th Field) Name	HUC12 #	% of Watershed in Fire Perimeter
Deadman Creek	170200022003	6%
Hodgson Creek-Kettle River	170200022004	28%
North Fork Boulder Creek-Boulder Creek	170200021906	1%
South Fork Boulder Creek	170200021905	6%

Graves Mountain Fire:

HUC12 (6th Field) Name	HUC12#	% of Watershed in Fire Perimeter
Deadman Creek	170200022003	13%
Upper Sherman Creek	170200011302	20%

N. Total Acres Burned: 22,367

Renner Fire:

Ownership	Acres
Colville NF	11,519
Private	2,293
Grand Total	**13,811**

Graves Mountain Fire:

Ownership	Acres
Colville NF	8,490
State	65
Grand Total	**8,555**

O. Vegetation Types: Renner and Graves Mountain fires include montane pine forest, montane mixed conifer, montane shrublands, marshes, and riparian areas.

P. Dominant Soils: Renner: Edds, Nevine, Oxerine, Pepoon, Rock Land, Shaskit, Springdale, Talls and Togo Dominate Soils

Graves Mountain: Edds, Rock Land,Togo, Merkel, Scar, Growden, Peppon

Q. Geologic Types: Bedrock within the boundaries of the Renner Fire includes Marble, quartzite, orthogeiess, porphyritic orthogneiss, and Fraser age glacial till.

Bedrock within the boundaries of the Graves Mountain Fire includes quartzite, orthogeiess, porphyritic orthogneiss, and Fraser age glacial till.

R. Miles of Stream Channels by Order or Class:

Renner Fire:

Perennial	19.2
Intermittent	40.0
Total	59.2

Graves Mountain Fire:

Perennial	13.5
Intermittent	9.6
Total	23.1

S. Transportation System

Renner Fire:

NFS Roads By Fire	Miles
Total	30.0
NFS Trails By Fire - Motorized (T107)	**Miles**
Total	4.5
Groomed Snowmobile Trails By Fire	**Miles**
Total	2.10
Designated, Groomed	0.25
Designated, Not groomed	1.85

Graves Mountain Fire:

NFS Roads By Fire	Miles
Total	35.4
NFS Trails By Fire	**Miles**
Total	0.0
Groomed Snowmobile Trails By Fire	**Miles**
Total	2.40
Designated, Not groomed	2.40

PART III - WATERSHED CONDITION

A. Burn Severity (acres): ___ (low) ___ (moderate) ___ (high)

Renner Fire:				
Soil Burn Severity	**Colville NF (acres)**	**Private (acres)**	**Total Acres**	**%**
High	193	2	195	<1%
Moderate	1,521	209	1,730	13%
Low	7,175	1,460	8,634	63%
Very Low/Unburned	2,630	623	3,253	24%
Grand Total	**11,519**	**2,293**	**13,811**	

Graves Mountain Fire:				
Soil Burn Severity	**Colville NF (acres)**	**State of Washington (acres)**	**Total Acres**	**%**
High	324	0	324	4%
Moderate	1,193	7	1,200	14%
Low	5,231	57	5,288	62%
Unburned/Very Low	1,743	0	1,743	20%
Grand Total	**8,490**	**65**	**8,555**	

B. Water-Repellent Soil (acres):

Renner Fire:

Soil Burn Severity	Total Acres	%
Hydrophobic	**1925**	14%
Not Hydrophobic	**11887**	86%
Grand Total	**13,811**	

Graves Mountain Fire:

Soil Burn Severity	Acres	%
Hydrophobic	**1524**	**18%**
Not Hydrophobic	**7031**	**82%**
Grand Total	**8,555**	

C. Soil Erosion Hazard Rating (acres):

Renner Fire:

Hazard Erosion	Acres	%
Very Severe	710	5%
Severe	2417	18%
Moderate	9263	67%
Low	508	4%
Other - water	8	<1%
Other - rock	905	7%
Total	**13811**	

Graves Mountain Fire:

Hazard Erosion	Acres	%
Very Severe	1133	13%
Severe	693	8%
Moderate	5258	61%
Low	586	7%
Other - rock	885	10%
Total	**8555**	

D. Erosion Potential: ____ tons/acre

Renner	0.53 tons/acre
Graves Mountain	0.17 tons/acre

E. Sediment Potential: ____ cubic yards / square mile

Renner	5312 yd3/mi2
Graves Mountain	1067 yd3/mi2

PART IV - HYDROLOGIC DESIGN FACTORS

Renner Fire:

A. Estimated Vegetative Recovery Period	**3-7 years**
B. Design Chance of Success	90 %
C. Equivalent Design Recurrence Interval	10 years
D. Design Storm Duration	1 hours
E. Design Storm Magnitude	0.76 inches
F. Design Flow	----------
G. Estimated Reduction in Infiltration	14 %
H. Adjusted Design Flow	----------

No analysis was performed due to the minimal connectivity of the landscape to the stream networks and the location of moderate to high soil burn severity in relation to the values at risk.

Graves Mountain Fire:

A. Estimated Vegetative Recovery Period	**3-7 years**
B. Design Chance of Success	90 %
C. Equivalent Design Recurrence Interval	10 years
D. Design Storm Duration	1 hours
E. Design Storm Magnitude	0.76 inches
F. Design Flow	9.30 cfs / mi^2
G. Estimated Reduction in Infiltration	18 %
H. Adjusted Design Flow*	21.18 cfs / mi^2

*Adjusted Design Flow were calculated using the 10 year 1 hour storm event. Per conversations with the National Weather Service due to the time of year two different types of damaging storms could impact the Renner and Graves Mountain Fire areas. Adjusted Flows were modeled for both events, 10 year 1 hour and 2 year 24 hour.

PART V - SUMMARY OF ANALYSIS

Overview

The Kettle Complex includes three fires – the Stickpin, Renner and Graves Mountain fires – burnt south of the Canadian border, west of Highway 395, north of State Route 20 and east of Highway 21. The total acreage of all fires in the complex is 76,095 acres with 82 percent containment as of October 15, 2015. All of the fires in this complex were lightning caused. Fuels within the burned area varied throughout the complex; transitioning from open stands of Ponderosa Pine and grass to close and open Lodgepole Pine stands. Some areas have experienced recent logging activity and had open canopies; other areas include closed stands of mixed conifer with a large component of dead and down trees. Fire behavior varied based on fuel type.

Watershed Response

Hydrologic Response: Watershed conditions in the burned watersheds have changed significantly as a result of the fire. Vegetation and underlying organic matter slows runoff and protect soils from direct raindrop impact, assists with water infiltration to soil and releases runoff at slower rates. Consumption of organic material and high soil heating can promote the formation of water repellent layers, at or near the soil surface, which can result in significant amounts of soil loss.

Due to the steepness of some of these drainages, the amount of moderate and high burn severity (14% on Renner Fire and 28% on Graves Mountain), and the large areas now devoid of vegetation and groundcover after the fire, large runoff producing storms will likely create increased surface flow volumes and velocities that can transport available sediment from the slopes and along the channel bottoms. These responses are expected to be greatest in initial storm events, and will become less evident as vegetation is reestablished, providing ground cover, increasing surface roughness, and stabilizing and improving the infiltration capacity of the soils. As a result, values at risk are expected to be at an increased risk from post fire flooding and sedimentation until the landscape recovers.

Wildfires result in increased runoff and sediment yield commensurate with burn severity. The concern with increases in annual flood peakflows is that the increase could lead to channel instability and degradation, and to increased property damage in flood-prone areas. Adjusted design flow (post fire flow) is the flow increase expected to occur as a result of decreased infiltration and interception following a wildfire.
A pour point is the outlet of a catchment through which all runoff in the catchment pass through. Several pour points (catchments smaller than the HUC12) were established across the burned area to capture the estimated increase in hydrologic response the fire might produce.

Catchments (Model Used)	Drainage Area (mi2)	Design storm (10 year 1 hr.)				% Increase	Magnitude of post fire increase (post fire/pre-fire cfs)
		Inches Used	Pre-Fire CFS	Post-Fire CFS	Post-Fire CFS with bulking		
Growden Camp (StreamStats)	40.75	0.76	377	708	779	106.5%	2.1x
Hoodoo Canyon (StreamStats)	17.61	0.76	177	515	566	220.0%	3.2x
Elbow Creek (Wildcat 5)	1.28	0.76	1	40	44	8691.2%	87.9x
Milk Creek (Widlcat 5)	1.81	0.76	13	54	59	349.5%	4.5x

Catchments (Model Used)	Drainage Area (mi2)	Design storm (2 year 24 hr.)				% Increase	Magnitude of post fire increase (post fire/pre-fire cfs)
		Inches Used	Pre-Fire CFS	Post-Fire CFS	Post-Fire CFS with bulking		
Growden Camp (StreamStats)	40.75	2.2	169	218	239	41.6%	1.4x
Hoodoo Canyon (StreamStats)	17.61	2.2	78	117	129	65.5%	1.70
Elbow Creek (Wildcat 5)	1.28	2.2	15	67	74	385.1%	4.90
Milk Creek (Widlcat 5)	1.81	2.2	57	135	148	161.3%	2.6x

The WILDCAT5 model is limited to a ground area of 5 mi^2. Due to the rapid assessment, two larger sub-basins were greater than 5 mi^2. They were run through WILDCAT5 to determine the % of change between pre and post fire conditions. Percent of increase from WILDCAT5 for each larger subbasin was applied to USGS pre-fire flows determined through the regression equations.

These relationships should be interpreted with caution. Both approaches (WILDCAT5 and USGS regression equations) include a considerable amount of uncertainty in both input data and assumptions. There are two different datasets to show a general representation of what could occur post fire. The USGS regression analysis is a statistical process for estimating the relationships among variables to determine peak flood frequency. While Wildcat 5 develops a hydrograph using precipitation frequency analysis for each catchment showing the rate of flow (discharge) versus time past a specific point in a river, or other channel. The percent of increase from WILCAT5 should be used in conjunction with local knowledge of the channels/flows to determine expected increases in post fire flows. Due to the change in landscape, channels that previously seldom flowed are expected to see flows with rain events of any size.

Erosion Response: Primary effects of fire on soils are removal of soil cover and soil heating effects, as affected by peak temperatures during the fire front and subsequent smoldering consumption of duff and woody debris. Soil heating effects are below ground, which may compromise soil structure stability and infiltration characteristics, which changes the ability of soils to accept rain events and/or produce runoff. Soil cover is crucial in physically protecting soil from erosion by absorbing raindrop impact, and dissipating energy of surface runoff at the duff/soil interface; in unburned condition this normally limits erosion to small-scale effects, and fines re-deposited on hillslopes prior to reaching a channel. With cover removal by this fire, large contiguous areas are vulnerable to rain and runoff impacts and mobilized sediments will frequently be delivered to streams. Soil Burn Severity mapped for this fire reflects the relative degrees of soil heating effects and cover reduction as a result of this fire. This mapping may be further used to quantify erosion risk and sediment production through various WEPP models.

Multiple representative hillslopes were modeled in ERMiT for this fire and results extrapolated to cover all water sheds affected by the fires. Soil erosion estimates are based upon watershed areas within the fire areas only. Unburned watershed areas outside the fire areas were not modeled. A 5-Year storm was modeled in ERMiT to determine if the estimated soil erosion for the fire areas would affect soil productivity. For the 5-year event (20% probability); an estimated .17 tons/acre and 1,076 cubic yards per square mile of sediment for the Graves Mountain Fire, .53 tons/acre erosion and 5,312 cubic yards per square mile of sediment for the Renner Creek Fire. Increased hillslope erosion is expected to occur throughout the fire area especially within those areas in the high burn severity. Unburned, pre-fire conditions estimated 0 tons of sediment could be produced (0 tons/acre) for a 5-year event (20% probability).

Geologic Response: Within the Graves Mountain and Renner Fire burned area, some watersheds, showed some evidence of past debris slides, debris flows, and rock fall activity that will be increased during future storms. Other areas have little evidence of recent past slope instability. But conditions have changed due to

the Tower and Grease Fire.

As a result of the removal of vegetation by the fire, excessive sediment on the hillslope and readily available material in channels maybe transported through the ecosystem during moderate to high rain events. High runoff response on the landscape has the potential to increase debris-flow in the steep to moderate canyons. Soils are exposed and have become weakened, and rocks on slopes have lost their supporting vegetation. Roads are at risk from rolling rock, plugged culverts, debris slides and debris flows. Stream channels and mountainside ephemeral channels will be flushed of the sediment that in some places is loose and deep, in other places shallow. That sediment will deposit in some channels, choking flow, raising flood levels, and covering roads or eroding road prisms. Risks to human life, roads, trails and natural resources are high to very high. There is a high potential for small to large debris flows within the steep area of the Tower and Grease Creek Fires.

Field and aerial observations of the Graves Mountain and Renner Fires showed numerous debris flows, colluvium slopes and mass wasting slumps. Many of these occur on slopes burned at moderate and high soil burn severity and are at risk for increased activity resulting in large quantities of soil, rock and organic debris moving down slope. When debris flows occur, infrastructure such as roads and trails may be lost and increase quantities of sediment, rock, and vegetation may enter into drainages.

Native Vegetation Recovery Response: The effects of fire on native vegetation and recovery of native vegetation following fire depends upon many variables, including soil burn severity (both maximum soil temperature/heating during fire and loss of organic and soil horizons), pre-fire vegetation composition, proximity of unburned native seed sources, aspect, elevation, and presence of non-native invasive species.

Most of the fire areas with low soil burn severity (see Soils Report) should revegetate or recover with native plants fairly rapidly, likely to acceptable levels within 1-3 years. In moderate soil burn severity areas, scattered duff layers are still present, as are isolated patches of surviving native plants, resulting in the ability to re-establish forbs and graminoids via natural seeding/succession over much of the burn area fairly readily, likely within 3-5 years, except in high elevation zones, harsh sites (southwest aspects or thin soils) or where soil mass failures in the area. In high soil burn severity areas, especially those that are extensive or in high elevation areas, native recovery will likely take some time to successfully re-establish (potentially 3-8 years for forbs or graminoids, but up to 8-15 years for shrubs or on harsh sites, such as high elevations, thin-soils, or low elevation southwest aspects.)

Additionally, some of the higher soil burn severity areas also tend to occur where existing non-native invasive plants already are present. As a result, many of these sites will not only be slower to recover, but will also have a high likelihood of non-native invasive plant encroachment within the burned area.

A. Describe Critical Values/Resources and Threats:

A comprehensive list of potential values at risk within or directly downstream of the Kettle Complex – Renner and Graves Mountain burned areas was compiled through consultation with local management and resource specialists and through BAER Team on the ground assessment. Following guidance in Interim Directive 2520-2013-1, the BAER assessment team evaluated this list of values through field assessment and subsequent analysis to identify the critical values (FSM 2523.1 – Exhibit 01) that may be treated under the BAER program (See project file for VAR Risk Assessment for BAER Critical Values). The critical values were then assigned a level of risk defined by the probability of damage or loss coupled with the magnitude of consequences using the risk assessment matrix (FSM 2523.1 – Exhibit 02). The critical values with unacceptable risks signify a burned-area emergency exists. The characterization of the probability of damage or loss is based on the watershed response analysis completed by the BAER Assessment. Critical values having a "Very High" or "High" risk rating include recommended emergency stabilization actions known to mitigate potential threats or minimize expected damage, which are described below. "Intermediate" risk areas were identified and discussed with the recommended treatment consisting of coordination with local, state, and other federal cooperators. Additionally critical warning signs are recommended in some areas with an intermediate risk. No treatments were identified for values when the analysis resulted in a "low" or "very low" risk rating.

Renner Fire:

1. Human Life and Safety (HLS)

a. **High** risk exists to public, cooperators, and FS workers due to increased flooding, sedimentation, and rock fall along the Thompson Ridge ATV Trail (#107). Treatment recommendations include a trail closure within the Fire perimeter and installation of closure and warning signs at each end of the trail until hazards can be mitigated.
b. **Intermediate** risk exists to the dispersed recreation use i.e. hunters located in moderate and high soil burn severity areas due to an increased threat of falling trees/snags, falling rocks, excessive erosion, flooding, and other debris. Warning signs at major entry points into the burn area is the recommended treatment until natural recovery occurs.
c. **Intermediate** risk exists to the public, cooperators, and FS workers on all FS and other ownership roads located in moderate and high soil burn severity due to an increased threat of falling trees/snags, rocks, excessive erosion, flooding, and other debris. Warning signs at major entry points into the burn area is the recommended treatment until the hazards can be mitigated on Forest Service Roads. Treatment recommendations will be coordinating with NRCS for point source protection along private roads. Additionally all of these routes will need to be monitored for long term hazard tree abatement.
d. **Intermediate** risks exists to public, cooperators, and FS workers on groomed snowmobile trails located in moderate to high soil burn severity due to increased geologic failures and avalanche potential, debris torrents, and/or fire weakened trees. Warning signs at major entry points along the routes into the burn area is the recommended treatment until the hazards can be mitigated. Additionally these routes will need to be monitored for long term hazard tree abatement.
e. **Intermediate** risk exists to hydrologic function from loss of ground cover and coarse woody debris, mass erosion, flooding and debris flows that scour channels below the root structure of the surviving plant communities. The highest threat is within the private community located on the southern end of the fire perimeter. Impacts to hydrologic functions will benefit from the natural recovery. Treatment recommendations will be coordinated with NRCS for point source protection.
f. **Low** risk exists to the public, cooperators, and FS workers on all FS and other ownership roads located in low and unburned soil burn severity to an increased threat of falling trees/snags, falling rocks, excessive erosion, flooding, and other debris. These routes will need to be monitored for long term hazard tree abatement. No treatments are recommended.
g. **Low** risk exists to recreators at Renner Lake due to an increased threat of falling trees/snags, rocks, excessive erosion, flooding, and other debris. This area is located in low to unburned soil burn severity. No treatments are recommended.
h. **Low** risk exists to recreators at Davis Lake due to an increased threat of falling trees/snags, rocks, excessive erosion, flooding, and other debris. This area is located in an unburned soil burn severity. No treatments are recommended.
i. **Very low** risks exists to public, cooperators, and FS workers on Groomed Snowmobile Trails located in low to unburned soil burn severity due to increased geologic failures and avalanche potential, debris torrents, and/or fire weakened trees. No treatments are recommended.

2. Property (P)

a. **High** risk exists to 1.49 miles of FS trail infrastructure located on steep slopes and in high to moderate soil burn severity on Thompson Ridge ATV Trail (#107) due to increased flooding and sedimentation caused by the fire. Treatment recommendations include trail storm proofing treatments and administrating the trail closure.
b. **Intermediate** risk exists to all FS and other ownership roads and associated infrastructure located in moderate and high soil burn severity due to increased flows, hazard trees and unstable ground upslope of the roads. Warning signs at major entry points into the burn area is the recommended treatment until the hazards can be mitigated on Forest Service Roads. Treatment recommendations will be coordinating with NRCS for point source protection along private roads. Additionally all of these routes will need to be monitored for long term hazard tree abatement.
c. **Intermediate** risk exists to hydrologic function from loss of ground cover and coarse woody debris, mass erosion, flooding and debris flows that scour channels below the root structure of the surviving plant communities. The highest threat is within the private community located on the southern end of

the fire perimeter. Impacts to hydrologic functions will benefit from the natural recovery. Treatment recommendations will be coordinated with NRCS for point source protection.

d. **Low** risk exists to all FS and other ownership roads and associated infrastructure located in low and unburned soil burn severity due to increased flows, hazard trees and unstable ground upslope of the roads. The treatment recommendation is natural recovery.
e. **Low to very low** risks exists to all Groomed Snowmobile Trails in the burn area due to increased geologic failures and avalanche potential, debris torrents, and/or fire weakened trees. The treatment recommendation is natural recovery.
f. **Very low** risk exists to Renner Lake due to an increased threat of falling trees/snags, falling rocks, excessive erosion, flooding, and other debris. This area is located in a protective drainage of low to unburned soil burn severity. No treatments are recommended.
g. **Very low** risk exists to Davis Lake due to an increased threat of falling trees/snags, rocks, excessive erosion, flooding, and other debris. This area is located in a protective drainage of unburned soil burn severity. No treatments are recommended.
h. **Very low** risk exists to the dispersed recreation use i.e. hunters located in moderate and high soil burn severity areas due to no permanent property existing at those locations and an increased threat of falling trees/snags, rocks, excessive erosion, flooding, and other debris. The treatment recommendation is natural recovery.

3. Natural Resources (NR)

a. **Intermediate** risk to soil productivity from increased soil erosion within areas that burned at moderate to high severity. The probability of considerable loss of soil from sheet/rill erosion, hillslope erosion, and mud flows is unlikely. This comes from the limited acres of high and moderate burn severity and results from the erosion and sedimentation models indicating low levels of soil erosion and sedimentation. Despite the unlikely probability of loss of soil productivity, the magnitude of consequences is major. A majority of the soils in the high and moderate burn severity areas have volcanic ash as their parent material or as a major source of parent material. Nutrient rich volcanic ash deposits are rare in nature, making any loss of this material irreversible and catastrophic in nature. The mosaic nature of the fire and naturally occurring slope break will reduce the amount of soil transported out of the burn area. The fire is expected to impact soil quality by eroding exposed soil off-site, as well as by increasing the potential for spread of noxious weeds and invasive plant species. The recommended treatment is natural recovery.
b. **Intermediate** risk exists to soil productivity from increased soil erosion within areas that burned at moderate to high severity. The probability of considerable loss of soil from sheet/rill erosion, hillslope erosion, and mud flows is unlikely. This comes from the limited acres of high and moderate burn severity and results from the erosion and sedimentation models indicating low levels of soil erosion and sedimentation. Despite the unlikely probability of loss of soil productivity, the magnitude of consequences is major. A majority of the soils in the high and moderate burn severity areas have volcanic ash as their parent material or as a major source of parent material. Nutrient rich volcanic ash deposits are rare in nature, making any loss of this material irreversible and catastrophic in nature. OHV intrusion into these areas will increase soil loss. Disturbance of the new deposited litter, the soil surface, subsurface compaction and the creation track in the landscape will result in additional soil erosion. All intrusions (i.e. OHV and land management) need to be eliminated until natural recovery occurs. This will prevent additional soil erosion and the potential introduction of noxious weeds and invasive plant species. Treatment recommendations include natural recovery.
c. **Intermediate** risk exists of increased debris flow potential, rock fall and landslide potential in to areas that burned at moderate to high severity. It is likely that debris flows, rock falls, and landslide will occur in high and moderate burn severity areas and the magnitude of consequence associated with debris flows, rock falls, and landslide is moderate resulting in an Intermediate risk. Debris flows, rock falls, and landslide occurring in the high and moderate burn severity areas can result in further loss of infrastructure, loss of soil productivity, and deposition of sediment, rocks, and material into drainages. Treatment recommendations include natural recovery. Low risk exists to native vegetation in the Renner Fire due to lack of recovery of native vegetation, establishment/spread of invasive plants, and potential loss of native seed sources is possible in the Renner high soil burn severity areas. In the limited high soil burn severity areas, seed banks in the soil profile have likely been destroyed due to fire

consumption or heat. High percentages of native plant rhizomes and crowns also were likely destroyed due to heat. Therefore, in some high soil burn severity areas, native plant recovery could take many years to attain acceptable levels. These areas are fairly small and isolated across the burn area. The treatment recommendation is natural recovery.

d. **Low** risk exist in Renner Fire due to the establishment or spread of invasive weeds along access roads is very unlikely in the Renner Fire, as is weed movement away from conduits (such as roads, dozer lines, etc.) into the moderate and high soil burn severity areas. On the Renner Fire only 0.1 miles of conduits were located within the high soil burn severity and 0.5 miles were located within the moderate soil burn severity. These areas are fairly small and isolated across the burn area. The treatment recommendation is natural recovery.

4. Cultural and Heritage Resources (CHR) – No critical BAER values were identified.

Graves Mountain Fire:

1. Human Life and Safety (HLS)

a. **Intermediate** risk of loss of ingress/egress exists to the public, cooperators, and FS workers on all FS and other ownership roads located in low and unburned soil burn severity to an increased threat of falling trees/snags, rocks, excessive erosion, flooding, and other debris. These routes will need to be monitored for long term hazard tree abatement. Warning signs at major entry points into the burn area is the recommended treatment until natural recovery occurs. Treatment recommendations will be coordinating with NRCS for point source protection along private roads and with Washington Department of Transportation for point source protection along State Highway 20. Additionally all of these routes will need to be monitored for long term hazard tree abatement.
b. **Intermediate** risk to human life and safety for those participating in dispersed recreation fire-wide due to flooding, sedimentation, rock fall, and/or hazard trees. Warning signs at major entry points into the burn area is the recommended treatment until natural recovery occurs.
c. **Intermediate** risk to human life and safety at Hoodoo Trail Foot Bridge exists due loss of ingress/egress, flooding, and/or debris flow. Install warning sign along the trail above and below the bridge until natural recovery occurs.
d. **Intermediate** risk to human life and safety a [redacted] s due to increased, flooding, and debris flow. No treatments are recommended.
e. **Intermediate** risk to human Life and Safety at [redacted] Stream improvements due to increased flooding and sedimentation impacting the features at the location. No treatments are recommended.
f. **Low** risk of loss of ingress/egress exists to the public, cooperators, and FS workers on all FS and other ownership roads located in low and unburned soil burn severity to an increased threat of falling trees/snags, rocks, excessive erosion, flooding, and other debris. These routes will need to be monitored for long term hazard tree abatement. No treatments are recommended.
g. **Low** risk to human life and safety at Hoodoo Trailhead Recreation Area exists due to flooding, sedimentation, rock fall, and/or hazard trees. No treatments are recommended.
h. **Low** risk to human life and safety at Canyon Creek Campground due to increased flooding and sedimentation impacting the features at the location. No treatments are recommended
i. **Low** risk to human life and safety at Canyon Creek Campground walking trail due to increased flooding and sedimentation impacting the features at the location. No treatments are recommended.
j. **Low** risk to human life along snowmobile routes with portions located in low/unburned soil burn severity. The increase risk is due to flooding, sedimentation, rockfalls, and/or hazard trees along route. No treatments are recommended.
k. **Low** risk to human life and safety due to the loss of powerlines south of the fire Perimeter. Risk comes from rolling rocks, flooding and debris flow and fire weakened trees. No treatment recommended.

2. Property (P)

a. **High** risk exists to road 200386 where two culverts draining Elbow and Milk Creek. These tributary areas have significant acres of high and moderate soil burn severity. Treatment recommendations

include the utilization of storm patrols to detect any issues in these structures and maintain as needed.

b. **High** risk exists to Milk Creek near road 200386 that has been realigned due to burrow pit. Flooding and sedimentation could cause channel and highway culvert loss. The treatment recommendation is to coordinate with Washington DOT.
c. **Intermediate** risk of loss of erosion causing loss of road tread, impacts on crossing and road drainage features moderate and high soil burn severity to an increased threat of falling trees/snags, rocks, excessive erosion, flooding, and other debris. These routes will need to be monitored for long term hazard tree abatement. No treatments are recommended.
d. **Intermediate** risk to property involved with dispersed recreation fire-wide due to flooding, sedimentation, rock fall, and/or hazard trees. No treatments are recommended.
e. **Intermediate** risk to property at [redacted] due to increased, flooding, and sedimentation. No treatments are recommended.
f. **Intermediate** risk to property at ([redacted] due to increased flooding, and sedimentation impacting the features at the location. No treatments are recommended.
g. **Intermediate** risk of loss of private houses, bridges and other structures south of the fire by the Canyons Creek Camp ground. Risk comes from loss of ingress/egress, rolling rocks, flooding, and debris flows, and fire weakened trees. Treatment recommendations will be coordinated with NRCS for point source protection.
h. **Low** risk of loss of erosion causing loss of road tread, impacts on crossing and road drainage features in low and unburned soil burn severity to an increased threat of falling trees/snags, rocks, excessive erosion, flooding, and other debris. These routes will need to be monitored for long term hazard tree abatement. No treatments are recommended.
i. **Low** risk of loss of erosion causing loss of road tread on all private roads located below low and unburned soil burn severity due to impacts on crossing and road drainage, falling trees/snags, rocks, excessive erosion, flooding, and other debris. No treatments are recommended.
j. **Low** risk to property at Hoodoo Trailhead Recreation Area exists due to flooding, sedimentation, rock fall, and/or hazard trees. No treatments are recommended.
k. **Low** risk to property at Canyon Creek Campground due to increased flooding, and sedimentation impacting the features at the location. No treatments are recommended.
l. **Low** risk to property at Canyon Creek Campground walking trail due to increased flooding, and sedimentation impacting the features at the location. No treatments are recommended.
m. **Low** risk to snowmobile routes with portions located in low/unburned soil burn severity. The increase risk is due to flooding, sedimentation, rockfalls, and/or hazard trees along route. No treatments are recommended.
n. **Low** risk of loss of powerlines south of the fire Perimeter. Risk comes from rolling rocks flooding and debris flow and fire weakened tress. No treatment indicated.

3. Natural Resources (NR)

a. **Intermediate** risk exists to hydrologic function from loss of ground cover and coarse woody debris, mass erosion, flooding and debris flows that scour channels below the root structure of the surviving plant communities. The highest threat is within the private community located along Sherman Creek. Impacts to hydrologic functions will benefit from the natural recovery. Treatment recommendations will be coordinated with NRCS for point source protection.
b. **Intermediate** risk to soil productivity from increased soil erosion within areas that burned at moderate to high severity. The probability of considerable loss of soil from sheet/rill erosion, hillslope erosion, and mud flows is unlikely. This comes from the limited acres of high and moderate burn severity and results from the erosion and sedimentation models indicating low levels of soil erosion and sedimentation. Despite the unlikely probability of loss of soil productivity, the magnitude of consequences is major. A majority of the soils in the high and moderate burn severity areas have volcanic ash as their parent material or as a major source of parent material. Nutrient rich volcanic ash deposits are rare in nature, making any loss of this material irreversible and catastrophic in nature. The mosaic nature of the fire and naturally occurring slope break will reduce the amount of soil transported out of the burn area. The fire is expected to impact soil quality by eroding exposed soil off-site, as well as by increasing the potential for spread of noxious weeds and invasive plant species. The recommended treatment is natural recovery.

c. **Intermediate** risk exists to soil productivity from increased soil erosion within areas that burned at moderate to high severity. The probability of considerable loss of soil from sheet/rill erosion, hillslope erosion, and mud flows is unlikely. This comes from the limited acres of high and moderate burn severity and results from the erosion and sedimentation models indicating low levels of soil erosion and sedimentation. Despite the unlikely probability of loss of soil productivity, the magnitude of consequences is major. A majority of the soils in the high and moderate burn severity areas have volcanic ash as their parent material or as a major source of parent material. Nutrient rich volcanic ash deposits are rare in nature, making any loss of this material irreversible and catastrophic in nature. OHV intrusion into these areas will increase soil loss. Disturbance of the new deposited litter, the soil surface, subsurface compaction and the creation track in the landscape will result in additional soil erosion. All intrusions (i.e. OHV and land management) need to be eliminated until natural recovery occurs. This will prevent additional soil erosion and the potential introduction of noxious weeds and invasive plant species. Treatment recommendations include natural recovery.
d. **Intermediate** risk exists of increased debris flow potential, rock fall and landslide potential in to areas that burned at moderate to high severity. It is likely that debris flows, rock falls, and landslide will occur in high and moderate burn severity areas and the magnitude of consequence associated with debris flows, rock falls, and landslide is moderate resulting in an Intermediate risk. Debris flows, rock falls, and landslide occurring in the high and moderate burn severity areas can result in further loss of infrastructure, loss of soil productivity, and deposition of sediment, rocks, and material into drainages. Treatment recommendations include natural recovery.
e. **Low** risk exists to the Hoodoo Inventoried Roadless Area (IRA). Values at risk include 1.Soil, water, and air, 2. Diversity of Plant and Animal Communities, 3. Scenic Views, 4. Heritage, 5. Solitude and primitive recreation, 6. Manageability, and 7. Special features. No treatment recommended
f. **Low** risk exists to native vegetation in the Graves Mountain Fire due to lack of recovery of native vegetation, establishment/spread of invasive plants, and potential loss of native seed sources is possible in the Graves Mountain high soil burn severity areas. In the limited high soil burn severity areas, seed banks in the soil profile have likely been destroyed due to fire consumption or heat. High percentages of native plant rhizomes and crowns also were likely destroyed due to heat. Therefore, in some high soil burn severity areas, native plant recovery could take many years to attain acceptable levels. These areas are fairly small and isolated across the burn area. Treatment recommendation is natural recovery.
g. **Low** risk exist in Graves Mountain Fire due to the establishment or spread of invasive weeds along access roads is very unlikely in the Graves Mountain Fire, as is weed movement away from conduits (such as roads, dozer lines, etc.) into the moderate and high soil burn severity areas. These areas are fairly small and isolated across the burn area. Treatment recommendation is natural recovery.

4. Cultural and Heritage Resources (CHR)

a. REDACT

B. Emergency Treatment Objectives:

<u>Land Treatments:</u>
<u>Cultural Resources (Graves Mountain Fire)</u>

The objective of cultural resource treatments is to prevent irretrievable loss of archeological information, to prevent looting by informing recreational users of the importance of archaeology and federal laws that prohibit theft of artifacts and damage to historic or prehistoric sites, and to prevent erosion on disturbance of archaeological materials.

<u>Road and Trail Treatments (Renner Fires)</u>

The objective of the trail stabilization treatments is to lower the risk of damage to property (1.49 miles of

motorized OHV trail in high and moderate soil burn severity) by lowering erosion of the trail surface in severely burned and steep areas within the burned area and to provide for public safety. The objective of temporary closure of the trail is to reduce risk to human life and safety.

Protection/Safety Treatments
Warning Systems for Public Safety (Renner and Graves Mountain Fires)

The objective of installing warning signs is to reduce threats to life/safety of Forest users by warning that they are entering a burned area and warning against access into hazardous areas. These signs also serve to accelerate natural recovery by deterring travel off roads and trails.

Storm Inspection and response (Graves Mountain)

The objective of post storm inspection and response is to survey impacts to the transportation infrastructure after a wildfire. This treatment will be used in lieu of more costly upgrades that are not feasible due to time constraints of installing these treatments before the first damaging event or before winter occurs.

Interagency Coordinator (Renner and Graves Mountain Fires)

Facilitating and coordinating with the National Weather Service or warning and or watch advisories for flooding will reduce the threat to life and safety. Interagency coordination with the NRCS and Washington Department of Transportation to inform these entities of anticipated post wildfire watershed response and associated threats to public safety on private and state highways. This information could be utilized in the development of early warning systems or emergency response plans.

Treatments discussed by not warranted

Early Detection Rapid Response (EDRR) Surveys are utilized to determine if native or naturalized communities are at risk to the introduction of invasive species or noxious weeds particularly in areas where they previously *were absent or present in only minor amounts.* Invasive plants pose a serious threat to the stability and function of ecosystems. Often these plants rapidly colonize a burned area especially in moderate and high soil burn severity areas, reducing other plant abundance and diversity. Utilizing GIS the dozer lines, hand lines, and other fire suppression roads work was overlaid on the Final Soil Burn Severity map for each Fire. On the Renner Fire only 0.1 miles were located within the high soil burn severity and 0.5 miles were located within the moderate soil burn severity. On the Graves Fire only 0.1 miles were located within the high soil burn severity and 1.3 miles were located within the moderate soil burn severity. These areas were often remote and isolated within the Fire perimeter. The need for EDRR surveys was discussed but determined to not be warranted.

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

Land **90** % Channel **0** % Roads/Trails **90** % Protection/Safety **90** %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	75	85	95
Channel	--	--	--
Roads/Trails	75	85	95
Protection/Safety	80	70*	60*
*Initially, visitors will heed the warning signs.			

Complacency is expected after the initial year unless there are continued damaging events.

E. Cost of No-Action (Including Loss):

Renner Fire	$1,110,500 (Market Resource Value from the VAR Worksheet)
Graves Mountain Fire	$727,000 (Market Resource Value from the VAR Worksheet)

F. Cost of Selected Alternative (Including Loss):

Renner Fire	REDACT Vorksheet)
Graves Mountain Fire	Vorksheet)

Implementation of recommended response actions is based on market resources only and is economically justified with the following benefit:cost ratio below:

Renner Fire	6.8
Graves Mountain Fire	4.8

The likely probability of loss if treatments were not applied is based on field observations and estimate of damage or loss with the longer duration precipitation event. For the recommended treatments there is a reduced probability of damage or loss with implementation. The expected loss would not be as costly when implementing the recommended treatments. The VAR analysis focused primarily on market values so potential benefits such as lowering level of risk to human life and safety, natural resources, and cultural resources were recognized in this BAER assessment, but not included in the cost basis for Values at Risk analysis.

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Mary Moore

Email: REDACT Phone: REDACT

Name	Home Unit	BAER Specialty
Mary Moore	SO, Stanislaus NF, R5	*Team Leader/Hydrologist*
Andy Casillas	Regional Office, R3	*Soils Trainee/Botany Trainee*
Jacob Noland	SO, Lewis and Clark NF, R1	*Engineering Trainee/Recreation Trainee*
Alicia Beat	SO, Colville NF, R6	*Cultural Resources Trainee*
Terri Contreras	Newport/Sullivan Lake RDs, Colville NF, R6	*GIS Trainee*
Dorothy Thomas	Regional Office, R6	*GIS*

H. **Treatment Narrative:**

Land Treatments:

Cultural Treatment (Graves Mountain Fire Only)

The objective for the treatment of the sites is to stabilize the soils to preserve the existing stratigraphy, integrity of the artifacts and features, context of artifacts and features, and the prevention of looting and disturbance of the site. Seeding, mulching or a combination thereof combined with annual monitoring of

the treated sites can be applied to reduce the possibility of the loss of the resource. The effectiveness of revegetation and mulching is dependent on the types of soils, slope of the site and other limiting factors, since the revegetation of the sites is in partnership with botany and soils please refer to their reports for the effectiveness of these treatments. Revegetation of the indicated sites should be in consultation of the Forest Archaeologists on the Colville National Forests.

Graves Mountain Fire:

Cost Estimation for Cultural Protection				
Item	Unit Cost	Unit	Total Units	Total Item Cost
REDACT				

Noxious Weeds Early Detection Rapid Response (EDRR) (Renner and Graves Mountain Fires)

None recommended.

Channel Treatments:

None recommended.

Roads and Trail Treatments:

Trails Stabilization – (Graves Mountain Fire Only) **RENNER FIRE ONLY** **Renner Fire Only**

1.49 miles of Thompson Ridge ATV trail is located at steep grades through high and moderate burn severity the soils in this area are highly erosive, and with the increased flows from the soil burn severity high damaging flows are expected. This treatment is designed to stabilize trails for anticipated increases in runoff. The stabilization methods may vary by site but are designed to reduce trail erosion or damage. The expected treatments include reducing existing burns on the trail to promote positive drainage, and also installing rolling drain dips and waterbars. The BAER Team considers this treatment to be the minimum necessary to achieve a reduction in risk to the accumulated critical values: trail infrastructure, soil productivity, hydrologic function, and public and administrative use. A Forest Service representative will be present to design and implement this work.

Graves Mountain Fire **RENNER**

Cost Estimation for Trail Drainage Stabilization				
Item	Unit Cost	Unit	Total Units	Total Item Cost
Equipment Rental Contract-Trail Excavator	REDACT			
WG 10 to Oversee Trail Stabilization				
Vehicle Mileage				
Total Cost of				

Protection/Safety Treatments:

Warning Systems for Public Safety (Renner and Graves Mountain Fires)

Roads:

See Roads and Trails Treatment map showing the proposed locations of the signs. A recreational specialist shall be present during implementation to finalize the location of the signs. This treatment will design and install burned area warning signs to caution forest visitors recreating within the burned area. It is consistent with the language provided in the BAER Treatments Catalog. The treatment is a component of the overall travel control devices for the burned area (USDA Forest Service-EM7100-15, 2005). The warning signs will identify the types of hazards to watch for on roads. A Forest Service employee will inspect the signs for visibility, damage, or loss and replace as needed.This treatment will inform users of the dangers associated with entering/driving within a burned area.

Renner Fire:

Cost Estimation for Road Warning Signs				
Item	Unit Cost	Unit	Total Units	Total Item Cost
Purchase of Signs	REDACT			
WG 10 to Install Signs and Administer the Warning Sign				
Vehicle Mileage				
Total C				

Graves Mountain Fire:

Cost Estimation for Road Warning Signs				
Item	Unit Cost	Unit	Total Units	Total Item Cost
Purchase of Signs	REDACT			
WG 10 to Install Signs and Administer the Warning Sign				
Vehicle Mileage				
Total Cost of				

Trails:

This treatment is to design and install burned area warning signs to caution public and administrative users about the potential hazards that exist within the burned area on walking trails. Consistent with the language provided in the BAER Treatments. Under this treatment, two warning signs would be installed at the Hoodoo Trail, East of the Graves Mountain Fire. The signs shall be installed on each side of the walking bridge warning about the potential for increased flows and sedimentation due to the Graves Mountain Fire.

Graves Mountain Fire:

Cost Estimation for Trail Warning Signs				
Item	Unit Cost	Unit	Total Units	Total Item Cost
Purchase of Signs	REDACT			
WG 10 to Install Warning Signs				
Vehicle Mileage				
Total Cost of T				

Snowmobile Routes:

This treatment is to design and install burned area warning signs to caution public and administrative users about the potential hazards that exist within the burned area on snowmobile routes. Consistent with the language provided in the BAER Treatments. Under this treatment, warning signs would be installed at major snowmobile route points that enter the burn area. For the Renner Fire, signs shall be installed on each side of the burned area on snowmobile route 9565. For the Graves Mountain Fire, the signs shall be installed on the side of the burned area where snowmobile route 759 meets the county road 48. This sign should warn about increased hazard tree and avalanche potentials.

Renner Fire:

Cost Estimation for Snowmobile Route Warning Signs				
Item	Unit Cost	Unit	Total Units	Total Item Cost
Purchase of Signs	REDACT			
WG 10 to Install Signs and Administer the Warning Sign				
Vehicle Mileage				
Total Cost of T				

Graves Mountain Fire:

Cost Estimation for Snowmobile Route Warning Signs				
Item				
Purchase of Signs	REDACT			
WG 10 to Install Signs and Administer the Warning Sign				
Vehicle Mileage				
Total Cost of Tı				

Administrative Closure (Renner Fire Only)

Trails:

The treatment objective is to close the Thompson Ridge ATV Trail due to hazard tree and erosion potentials. This treatment will install 4 signs on the Thompson Ridge ATV Trail. Two, one on each end, will be a trail closure sign. The objective of this sign is to mitigate the risk to human life and safety due to hazard tree and erosion potential. Two, one at each end, will be warning signs to caution public and administrative users about the potential hazards that exist within the burned area. Consistent with the language provided in the BAER Treatments Catalog (USDA Forest Service-EM7100-15, 2005), the treatment is a component of the overall traffic control devices for the burned area. The warning signs will identify the types of hazards to watch for at the recreation site or trail.

The signs will be integral to the enforcement of a legal order identified in the Temporary Trail Closure Treatment and citing the appropriate CFR. Purchase and install signs at each of the identified locations consistent with Forest Recreation Standards and the Trail Management Handbook at these locations. Inform users of the dangers associated with entering/recreating within a burned area as well as inform them of closures to help ensure that users are able to access available routes in a safe manner.

Renner Fire:

Cost Estimation for Trail Closure Signs				
Item	Unit Cost	Unit	Total Units	Total Item Cost

Purchase of Signs (2 Warnings Signs, 2 Closure Signs)	REDACT
WG 10 to Install Signs and Administer the Closure	
Vehicle Mileage	
Total Cost of	

Storm Inspection and Response for Roads (Graves Mountain Fire)

Immediately upon receiving heavy rain and spring snowmelt the FS will send out patrols to identify road hazardous conditions. Observations of rocks and sediment causing washouts and plugged culverts are identified and corrected before they worsen or jeopardize motor vehicle users. The road patrol personnel bring the heavy equipment necessary to mechanically remove any obstructions from the roads and culvert inlets and catch basins where necessary. All excess material and debris removed from the drainage system shall adhere to the sidecasting as reviewed by the archeologist and hydrologist.

Roads within the Graves Mountain Fire contain drainage structures that cross streams located in watersheds having areas of high to moderate soil burn severity. These flood source areas have a greater potential for increased runoff and debris flows. These increases in flows pose a threat to the existing crossings which may result in plugging culverts or exceeding their maximum flow capacity. If these flows plug drainage structures the result could be unacceptable erosion and debris torrents further down the drainage from the failure of the fill slope of the road. There is an immediate and future threat to travelers along these roads within the burned area due to the increased potential for rolling and falling rock from burned slopes and increased potential for falling trees, flash floods and mudflows. With the loss of stabilizing vegetation, normal storm frequencies and magnitudes can more easily initiate rill and gully erosion on the slopes and it is likely this runoff will cover the roads or cause washouts. These events make for hazardous access along steep slopes and put the safety of users at risk.

Engineering, Recreation, and District personnel will survey the roads within the fire perimeter after high-intensity winter storms in 2015 before they are snowed out of the area and spring 2016 runoff. Survey will inspect road surface condition, ditch erosion, and culverts/inlet basins for capacity to accommodate runoff flows. Concentrated monitoring should occur on road 2000386 as there are several drainages along that road that have tributary areas that have significant portions that fall into moderate and high burn severity.

The purpose equipment rental backhoe and dumptruck is to have funds ready to get equipment on site in a timely manner and implement additional work needed to maintain flow conveyance structures (culverts, bridges) across roads in order to provide safe access across FS lands.

Graves Mountain Fire:

Cost Estimation for Storm Inspection and Response				
Item	**Unit Cost**	**Unit**	**Total Units**	**Total Item Cost**
Equipment Rental-Backhoe and Dumptruck for Storm Response	REDACT			
WG 10 to Survey for Impacted Roads Due to Debris/High Flows (in lieu of road treatments)				
Vehicle Mileage				
Total Cost o				

BAER Coordinator – (Renner and Graves Mountain Fires)

This involves communication and coordination with other federal (NRCS), state (Washington Department of Transportation (WA DOT)), local tribes and agencies with jurisdiction over lands where life and property are at risk from post-fire conditions. Actions include but are not limited to cooperating with other agencies on hazard notification systems, permitting the siting of rain gauges and soil moisture instruments to monitor conditions within the burn in support of National Weather Service forecasts, and exchanging information and coordinating the BAER implementation plan as needed when subsequent recovery plans are developed by other agencies. This initial request is to fund a primary coordinator (Forest BAER Coordinator) to facilitate coordination of the Forest Service BAER activities with the cooperating partners. Additional coordination needs may ensue costs which will be requested on an interim 2500-8. During the next 3-5 years it is critical that appropriate agencies maintain due diligence and continue to inform the public of the potential hazards resulting from post-fire watershed response.

Renner Fire:

Cost Estimation for BAER Coordinator				
Item	Unit Cost	Unit	Total Units	Total Item Cost
GS 12 Forest BAER Coordinator	REDACT			
Vehicle Mileage				
Total Cost of Tr				

Graves Mountain Fire:

Cost Estimation for BAER Coordinator	
Item	REDACT
GS 12 Forest BAER Coordinator	
Vehicle Mileage	
Total Cost of Tr	

I. **Monitoring Narrative:**

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

This report is an initial funding request based on a rapid assessment. If additional treatment needs are identified through more site specific on the ground investigation in cooperation with interested agencies, or through further field analysis locations an interim requests for additional funding will be filed. These funding requests will identify the purpose for each treatment, and specific treatment specifications, locations, and number of each treatment. A detailed implementation and treatment effectiveness monitoring plan will be submitted as a separate document to the Regional BAER coordinator.