

Date of Report:

BURNED-AREA REPORT
(Reference FSH 2509.13)**PART I - TYPE OF REQUEST**

A. Type of Report

- ☒ 1. Funding request for estimated emergency stabilization funds
☐ 2. Accomplishment Report
☐ 3. No Treatment Recommendation

B. Type of Action

- ☒ 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)
☐ 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: Tumblebug Complex Fire B. Fire Number: OR-WIF-000145
C. State: Oregon D. County: Lane
E. Region: Pacific Northwest F. Forest: Willamette
G. District: Middle Fork H. Fire Incident Job Code: P6E65K
I. Date Fire Started: September 17, 2009 J. Date Fire Contained: Not Contained
K. Suppression Cost: \$14,500,000
L. Fire Suppression Damages Repaired with Suppression Funds
 1. Fireline waterbarred (miles): 3 miles
 2. Fireline seeded (miles): 3 miles
 3. Other (identify):
M. Watershed Number: 1709000123
N. Total Acres Burned: 14,560
 NFS Acres(14,560) Other Federal () State () Private ()
O. Vegetation Types:

Vegetation on the Tumblebug fire varies considerably due to the range of elevations, slopes and aspects within the fire perimeter. In the lower elevations Douglas fir and related plant associations with a significant ponderosa pine, sugar pine and incense cedar component are common on southerly slopes and gentle north slopes. In middle elevations and steep north slopes western hemlock vegetation types are common and are the dominant vegetation types in the fire area. Above 4000' the

dominant stand type is Pacific silver fir/noble fir grading into mountain hemlock types near the ridge tops. The area also contains a number of meadow vegetation types ranging from dry rocky outcrops to wet meadows and small ponds. Previously harvested stands (regeneration harvest has been occurring in this area for the last 40 years) were planted with Douglas-fir and ponderosa pine in the lower elevations, Douglas-fir in the middle elevations, and Douglas-fir and noble fir in the higher elevation areas.

P. Dominant Soils:

As would be expected, the soil types primarily reflect the underlying geology and glacial history. The primary landtypes (Legard and Meyer, Soil Resource Inventory, 1973) within the burn area cover three general geomorphic terrains:

- A. Low land benches, flats and stream terraces along the Middle Fork of the Willamette River and the confluences of Echo and Tumblebug Creeks. Typical landtypes include 14, 16, and 162. Soil depths range from 10 to more than 20 feet.
- B. The steep to very steep and rocky side slopes (50 to 100% plus) that rise up sharply from the valley bottoms. Relief in most areas ranges from 1000 to 3000 feet. Typical landtypes include 602, 603, and 607. Soil depths in this area are often only a few feet. Included in this terrain category are numerous areas of rock outcrops and cliffs. These areas are considered unsuited for timber management and include the landtypes of 3, 210, and 610.
- C. The high elevation uplands and benches that form the broad ridges that contain Happy Prairie, McLean and McGowan Mountains, and Cougar Ridge (moving from east to west across the fire). Landtypes here include 92, 93, and 95. Soil depths are commonly about 5 to 10 feet.

Most of this project area was burnt by either natural or aboriginal fires that were likely prevalent and carried through much of the project area in the last several hundred years. Many areas may have been under burnt instead of stand replacement. At least three cohorts of trees appear evident, as a result of the fires in the last several hundred years. Consequently, these soils have developed with perennial fires as a natural part of their genetic process. They are used to the effects of heating and the periodic loss of organic material. As do the fires, these conditions would vary across the landscape, depending on aspect, elevation, and slope position.

Q. Geologic Types:

The fire lies within the Western Cascades physiographic region, and most of the volcanic strata in this area are assigned to the "Twb" of Sharrod (1991). These rocks are predominately lava flows and breccia of basalt or andesite. Potassium-argon ages in the map area range from about 17 to 12 million years old and are considered middle to late Miocene in age. The broad ridge line west of Tumblebug Creek, which contains Happy Prairie, is mapped at the "Trb" by Sharrod (1991). This basaltic unit commonly forms a ridge capping strata in the Western Cascades physiographic sub province. Potassium – argon ages range from about 7.2 to 3.2 million years or late Miocene or Pliocene age.

In the last several million years, these rock formations have been extensively modified primarily by stream erosion and mountain glaciations. It is likely that large valley glaciers periodically surged north and west down the Middle fork canyon throughout the Pleistocene, as their remnant moraines and outwash can be found in numerous areas on the District (Long and Leverton, 1984). Ice cap glaciers probably covered the High Cascade platform many times during the Pleistocene, sometimes with sheets of ice hundreds of feet thick. During the early and most extensive glacial periods, valley glaciers surged away from the large ice mounds along the Cascade crest and traveled down the major drainages as they acted as outlets for excess ice accumulation for the large ice platforms along the Cascade summit. More recent late Pleistocene glaciations were likely much smaller and localized valley glaciers carved smaller cirques into the head waters of both Echo and Tumblebug Creeks.

R. Miles of Stream Channels by Order or Class: Greater than 20 miles of perennial stream.

S. Transportation System

Trails: 3 miles (includes Middle Fork, Chuckle Springs, McLean, Cougar, and McGowan)
Roads: 62 miles

PART III - WATERSHED CONDITION

- A. Burn Severity (acres): 4,413 (low) 4,010 (moderate) 2,156 (high)
- B. Water-Repellent Soil (acres): 62
- C. Soil Erosion Hazard Rating (acres):
4,400 (low) 4,700 (moderate) 1,500 (high)
- D. Erosion Potential: 240 tons/acre
- E. Sediment Potential: 36.73 cubic yards / square mile (16,000 yd³/100 acres)

PART IV - HYDROLOGIC DESIGN FACTORS

- A. Estimated Vegetative Recovery Period, (years): 2-5
- B. Design Chance of Success, (percent): 70
- C. Equivalent Design Recurrence Interval, (years): 5 -10
- D. Design Storm Duration, (hours): 24
- E. Design Storm Magnitude, (inches): 2.7
- F. Design Flow, (cubic feet / second/ square mile): 64
- G. Estimated Reduction in Infiltration, (percent): 39
- H. Adjusted Design Flow, (cfs per square mile): 89

PART V - SUMMARY OF ANALYSIS

- A. Describe Critical Values/Resources and Threats:

Fisheries

Bull trout and spring Chinook salmon, both listed as threatened under the Endangered Species Act are found in the fire area, as well as coastal cutthroat and rainbow trout, both Management Indicator Species. Post-fire effects may directly and indirectly impact these species and their habitat. Sediment transport, increased flows and increased stream temperatures, may impact the survival of bull trout and spring Chinook salmon eggs and fry, whose redds are located both within the fire perimeter and immediately downstream in Chuckle Springs and the Middle Fork Willamette River. With a population size of approximately 20-30 spawning adults (based on redd count and adult trap data), the Middle Fork Willamette River bull trout population would be severely impaired by any mortality caused by the fire.

The Willamette National Forest and their partners have invested \$2.7 million into the reintroduction of

bull trout and habitat restoration in the Upper Middle Fork Willamette River watershed. The watershed has recently been designated as the Forest's top priority watershed for restoration and has recently published a 5-year Restoration Plan that includes over \$4 million in aquatic enhancement projects.

Soils

The values at risk from this fire were the fundamental soil qualities of long term productivity and slope stability.

Hydrology

As a result of the fire, increased runoff, erosion and sediment delivery will occur within the drainages of the Tumblebug Complex. This assessment determined that the values at risk from the increased runoff, erosion and sediment delivery include fisheries habitat and forest infrastructure.

Fisheries Habitat:

Critical fish habitat within drainages burned by the fire have the potential to be adversely affected by increased flows, sediment deposition and water temperatures. Fish species of concern are bull trout (threatened), spring Chinook (threatened), rainbow trout (management indicator species) and native cutthroat trout. Increased sediment delivery from Royal Creek, Echo Creek, Mac Creek and Tumblebug Creek to listed fish habitat in the Middle Fork of the Willamette River has the potential to decrease the survival of bull trout and spring Chinook salmon eggs and fry. The decrease in forest canopy cover may result in the increase of water temperature which will adversely impact temperature sensitive bull trout. See Fisheries Report for details.

Forest Infrastructure:

The geology and slope of the fire area is naturally unstable and prone to mass wasting, deep-seated flows and shallow rapid landslide events (LMF Watershed Analysis 1995, UMF Watershed Analysis 1996). Combined with loss of vegetation due to the fire, there is an increase risk to road culvert plugging and failure. Failures of the road infrastructure combined with expected increases in burned area erosion may result in detrimental levels of sediment delivery to downstream fish habitat.

Roads/Infrastructure

The watersheds burned in the Tumblebug Complex Fire will show the effects of the fire via increased runoff rates, erosion, sediment, and debris transport. This creates a future concern for roads, culverts, and channels along the drainage paths of the burned watersheds in that they may be plugged, overtopped or washed away more frequently than experienced when the watershed was in its pre-fire condition. The fire also burned several transportation structures such as warning signs along major routes. These structures are required per Federal Highway Standards and are also necessary to provide a safer passage to motorists traveling on this road.

Vegetation

The major vegetation issues include threats to the ecological integrity of the area from the expansion of invasive species in, and adjacent, to the burned area. A review of the Special Habitat forest database showed 249 acres of Special Habitats within the fire perimeter. Special Habitat types common in the fire include; moist and dry rock gardens and mesic meadows. A GIS analysis using the fire severity map showed that 16 special habitat areas were in areas were rated as high severity. The moist rock gardens and mesic meadows were the most affected by the Tumblebug fire. There is no known occurrence of Sensitive Plants in the burned area

Heritage

The main risk is the loss or degradation of cultural resource sites due to exposure from post-fire run-off and erosion, resulting in potential archaeological data loss and vandalism from illegal surface collection by recreationist and other forest users. Following field assessments and severity mapping of the Tumblebug Fire, we determined that there are no known cultural resource values at risk under BAER at that could be impacted by fire related soil erosion or debris flows. However, some of the proposed

treatments have the potential to impact cultural resource sites not previously identified if they are located on lands considered to have a high probability for cultural resources being present.

Protection of these resources are required by Federal law under the National Historic Preservation Act of 1966, Section 106 requires Federal agencies to take into account the effects of their actions on properties included in or eligible for the National Register. This significance of these resources as defined in the Forest Plan states "Eligible cultural resources should be protected from natural deterioration caused by fire, flood, earthquake, precipitation, wind or other degradation." (Forest Plan Willamette National Forest, IV-87, 1990).

B. Emergency Treatment Objectives:

The primary objectives of the Tumblebug Complex Burned Area Emergency Stabilization Plan were:

- To insure the BAER team's personal safety and provide for public safety during our assignment
- To assess the risk to human life and property and/or natural or cultural resources from impaired watershed conditions and to recommend appropriate stabilization actions to protect the following values:
 - Prevent unacceptable erosion, and minimize degradation to water quality, T&E anadromous and non-anadromous fish habitat, and spawning habitat. Especially, those watersheds containing critical fish habitat for Federally Threatened Spring Chinook and Bull trout.
 - Protect road infrastructure and minimize sediment delivery in to critical fish habitat.
 - Warn the public about future flooding, especially during storm events in or near the mouths of severely burned watersheds and along trails and roads.
 - Prevent the spread of noxious weeds to the burned area wherever possible.
 - Evaluate emergency actions that aid in the protection of the Northern Spotted Owl habitat.
 - Protect recreation infrastructure from flooding and minimize sediment delivery into critical fish habitat from trails.
 - Provide recommendations that continue protection of special habitats.

The BAER assessment evaluated the above objectives for possible mitigation using an array of treatment options and/or actions allowable by Department of Agriculture (USDA) policy. Treatments have been designed specifically to mitigate the threats and issues listed above.

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

Land 90 % Channel 70 % Roads/Trails 80 % Protection/Safety 90 %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	70	60	60
Channel	60	50	40
Roads/Trails	90	70	50
Protection/Safety	90	80	80

E. Cost of No-Action (Including Loss): \$2,905,800

F. Cost of Selected Alternative (Including Loss): \$655,000

G. Skills Represented on Burned-Area Survey Team:

<input checked="" type="checkbox"/> Hydrology	<input checked="" type="checkbox"/> Soils	<input checked="" type="checkbox"/> Geology	<input type="checkbox"/> Range
<input type="checkbox"/> Forestry	<input type="checkbox"/> Wildlife	<input type="checkbox"/> Fire Mgmt.	<input checked="" type="checkbox"/> Engineering
<input type="checkbox"/> Contracting	<input type="checkbox"/> Ecology	<input checked="" type="checkbox"/> Botany	<input checked="" type="checkbox"/> Archaeology
<input checked="" type="checkbox"/> Fisheries	<input type="checkbox"/> Research	<input type="checkbox"/> Landscape Arch	<input checked="" type="checkbox"/> GIS

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H. Treatment Narrative:

(Describe the emergency treatments, where and how they will be applied, and what they are intended to do. This information helps to determine qualifying treatments for the appropriate funding authorities. For seeding treatments, include species, application rates and species selection rationale.)

Land Treatments:

Treatment #1. Aerial Wood Mulch

Apply wood mulch to the ground surface by helicopter to replace ground cover consumed by the fire.

The treatment unit totals 150 acres. The location of this treatment is in Royal Creek drainage above Road 2144 and the Middle Fork Willamette River. If funds and mulch are still available, treat high severity portions of the next unnamed drainage to the south downslope of Road 2144 in areas with less than 70% slope and little remaining standing or downed wood. Wood fiber will be staged in piles along Road 2154. This road will also be used for loading and delivery of mulch. Refer to BAER Treatment Map for exact locations. Other priority treatments have been identified as funds within the initial request are available.

This treatment is intended to achieve three sequential objectives:

- Improve conditions to protect soil productivity by replacing ground cover burned in the fire. Replacing ground cover will: a) decrease erosion by interrupting raindrop impact and surface soil detachment; and b) increase hillslope obstructions to decrease slope lengths which mitigate accelerated overland flow, thereby decreasing sediment delivery. Mulching also helps to protect the native seedbed and retain moisture on the burned slopes to facilitate vegetative recovery of the treatment areas.
- Decrease overland flow and erosion from high soil burn severity areas upslope of trails, which can intercept surface runoff and result in damage and/or loss of the trail infrastructure.
- Decrease sedimentation from burned areas and upslope of the Middle Fork Willamette River that provide important spawning and rearing habitat for bull trout, a federally listed aquatic species.

The mulching treatments are predicted to lower the estimated soil erosion and subsequent sediment delivery to the streams by about 1/2. Mulching will also reduce downstream peak flows by absorbing and slowly releasing overland runoff which is likely to be increased due to reduced soil cover and hydrophobic soil conditions. Mulching treatments in the headwaters of the streams can protect a much larger

downstream area from cumulative runoff and sedimentation. The purpose of the mulching treatment is to reduce the delivery of sediment from severely burned hillslopes to avoid sediment bulking of flows entering Road 2144 culvert on Royal Creek causing failures that would then directly deliver to the Middle Fork Willamette River. Any excess debris or surface erosion is likely to clog culverts resulting in fillslope failure and related channel scour below the roads. Just downstream of Royal Creek is one of the most important sections of the Middle Fork Willamette River for supporting bull trout, and spring Chinook salmon.

The felling and mulching treatments in the Royal Creek drainage were determined to be the minimum necessary to prevent unacceptable damage to the Middle Fork Willamette River primary bull trout spawning areas. Based on pre-fire redd count monitoring data, the section of river between Tumblebug Creek and Swift Creek (approximately 3 river miles) is annually used by a high percentage of the adult bull trout spawning population.

Treatment #3. Mulching/Seeding Road Cut and Fill Slopes

Apply wood mulch with native grass seed to the ground surface by truck mounted applicator to speed vegetative recovery on cut and fill slopes in high and moderate severity burn areas. Vegetative cover is needed to maintain and hold soils on cut and fill slopes and accelerate recovery of native vegetation, and to protect any seeds remaining onsite.

The treatment unit totals 4.5 miles of road in high and moderate severity burned areas along Road 2144 and Road 370. These two roads run parallel to the Tumblebug Creek with Road 2144 on the west side of the drainage and Road 370 on the east side of the drainage. If funds are still available, treatment of high severity burned portions of Road 2144-303 will occur. Wood fiber will be staged in piles along Road 2154. This road will also be used for loading and delivery of the mulch to Road 2144. Refer to BAER Treatment Map for exact locations.

The mulching and reseeding treatments are predicted to lower the estimated soil erosion and subsequent sediment delivery and will control erosion by about 50-80% (Grenier et. al 2000). The purpose of the mulching treatment is to hold the seeds on the cut and fill slopes so a majority of the seed will stay in place and serve the intended purpose of stabilizing the cut and fill slopes. Road failures of the above mentioned roads would add excessive amounts of sediment to Tumblebug Creek and would detrimentally affect bull trout and spring Chinook salmon spawning areas downstream in the Middle Fork Willamette River. Based on pre-fire redd count monitoring data, the section of river between Tumblebug Creek and Swift Creek (approximately 3 river miles) is annually used by a high percentage of the bull trout spawning population.

Channel Treatments:

Treatment #2. In Channel Directional Tree Felling

In-channel tree felling is prescribed to maintain channel stability in side draws (swales) and the main channel. In-channel tree felling replaces woody material consumed by the fire. It also is used to treat steep drainages to reduce the risk of in-channel debris flow bulking for several years after a fire (Fitzgerald, unpublished paper).

In-channel tree felling involves directionally felling trees downslope so the tops of the trees are in the channel. The trees are felled at a diagonal along designated channel reaches. The trees are staggered from side to side along the channel or swale in a herringbone design.

This treatment totals about 10,200 feet of 0- to 1st-order channels located above road drainage features on Road 2144. The location of this treatment is in the Royal Creek drainage. Refer to BAER Treatment Map for exact locations.

In-channel tree felling traps floatable debris and suspended sediment. It also dissipates runoff energy that can move fine sediments. Over time, woody material can cause sediment deposition and channel aggradation. For seasonal channels the in-channel trees serve as dams to stabilize existing prefire bed material and to trap and store post fire sediment in the short term, while providing long-term channel stability (Fitzgerald, unpublished paper). In-channel tree felling reduces effects to critical natural resources or downstream values (water quality, road crossings, bull trout spawning habitat) by restoring large woody debris to the channel and dissipating stream energy.

The ultimate purpose of the in-channel felling treatment is to reduce the delivery of debris from severely burned hillslopes to road culvert entrances to reduce risk of fillslope failure and direct delivery to the Middle Fork Willamette River. Any excess debris or surface erosion is likely to clog culverts resulting in fillslope failure and related channel scour below the roads. Just downstream of Royal Creek is one of the most important sections of the Middle Fork Willamette River for supporting bull trout, and spring chinook salmon.

The felling and mulching treatments in the Royal Creek drainage were determined to be the minimum necessary to prevent unacceptable damage to the Middle Fork Willamette River primary bull trout spawning areas. Based on pre-fire redd count monitoring data, the section of river between Tumblebug Creek and Swift Creek (approximately 3 river miles) is annually used by a high percentage of the adult bull trout spawning population.

Roads and Trail Treatments:

Treatment #4. Drainage Clean & Construct Features

The roads listed below were found to have issues with their drainage system due to the expected increase in flows from fire removal of vegetation. The protection of road infrastructure is to help minimize sediment delivery into the Middle Fork Willamette River which contains listed fish species (spring Chinook salmon and bulltrout) and Critical Habitat. The purpose of this treatment will protect the road infrastructure and provide for safe public access.

The minimal treatments required to remedy these issues are:

1. Ditch Cleaning – The cleanout of drainage ditch is required to remove any debris that may deflect the flow out of the ditch and also to ensure the flow reaches the outflow structure.
2. Culvert Cleaning – The cleanout of catch-basins below the inlet of the culvert is done to capture the sediment transported from the channel or ditch. Capturing the sediment will help in preventing the culvert inlet from being partially plugged or completely buried.
3. Rolling dips (with or without armor) - Roadway dips modify the road drainage by altering the template and allowing surface flows to run off the road to prevent any excessive erosion of the surface. The armor consisting of rip rap is placed where runoff could possibly cause erosion to the road surface and fill slopes.
4. Waterbars – Purpose and function is similar to rolling drain dips except the length of the structure is more abrupt and is recommended for roads that do not receive any or very little traffic.
5. Lower Fill Heights – Purpose is to lower the fill height at stream crossings by

- excavating a deep, flat-bottomed notch in the roadway intended to prevent channel diversion in the event that the culvert plugs.
6. Inslope/outslope – Sloping of the road surface to direct water flow either toward the ditch or to the outside of the road.
 7. Berm Barricades – An earthen embankment structure used to prohibit vehicular access.
 8. Hazard Tree Reduction – Fall hazard trees around stationary work activities.

The roads listed below were found to have or will have road drainage issues and at a minimum will require all or part of the treatments listed above.

FR 2144

Ditch Cleaning: 12.5 Miles
Culvert Cleaning: 120 Each
Rolling dips: 4 Each
Waterbars: 143 Each
Lower Fill heights: 12 Each
Berm Barricades: 4 Each
Inslope/Outslope: 2 Mi
Hazard Tree Reduction: 48 Each

FR 2153370

Ditch Cleaning: 7.0 Miles
Culvert Cleaning: 74 Each

FR 2143

Ditch Cleaning: 6.0 Miles
Culvert Cleaning: 116 Each
Rolling dips: 2 Each
Hazard Tree Reduction: 21 Each

FR 2144305

Ditch Cleaning: 4.5 Miles
Culvert Cleaning: 48 Each

FR - (Locals 18.4 mi)
Waterbars: 479 Each

Treatment #5. Fill Slope Stabilization

The road listed below was found to have issues with the roadbed. Logs and stumps along the roadway have burnt out and have undermined the structure of the roadway. The protection of road infrastructure is to help minimize sediment delivery into the Middle Fork Willamette River which contains listed fish species (spring Chinook salmon and bulltrout) and Critical Habitat. This treatment will also protect the road infrastructure and provide for safe public access. The minimal treatments required to remedy these issues are to subexcavate the burn out area removing all charred and woody debris. Layer, place and compact borrow material to subgrade elevation. Place 8" of aggregate over the construction sites.

FR #2144

Fill Slope Stabilization: 6 Each

The treatments listed for each road are those treatments found during the initial survey and are not all inclusive to these sites. These treatments should be used to stabilize other locations discovered during implementation.

Treatment #8. Mac Creek Culvert Removal

One culvert on Mac Creek was identified as being undersized due to the expected increase in flows from the burned area above the crossing. The culvert and fill at the upper crossing (FR# 2143320 MP 1.0 Mac Creek) will be removed.

The purpose of this treatment is to reduce the risk of pipe failure and the associated sediment delivery (from road and fillslope failure) to the Middle Fork Willamette River which contains listed fish species (spring Chinook salmon and bulltrout) and Critical Habitat. This treatment will also provide a better protection against loss of infrastructure investment. The crossings identified for replacement have been determined to be necessary to support immediate and long-term administrative uses. Immediate administrative use includes protection of critical habitat, patrols for drainage cleaning to prevent road failure and infrastructure loss, and to support the districts short-term program of work.

Treatment #11. Trail Drainage Rehabilitation

Trail realignment, tread stabilization and water bar installation will occur on approximately 3 miles of trail – all trails within the burned area that travel within or just downslope from areas burned at moderate or high severity. This includes Chuckle springs, McCleen, Middle Fork, Cougar, McGowan.

Many of the trails in the burned area have been de-stabilized due to the removal of brush, roots and logs. Trail drainage is inadequate in areas burned from moderate to high severity. In these areas, water bars and tread realignment would be used to process increased runoff in areas of moderate or high severity. These treatments would prevent unacceptable erosion, minimize degradation to water quality and protect bull trout habitat and salmon spawning redds. The reroute and water structures will be inspected throughout the year after implementation to monitor the effectiveness of water run-off and the trail tread condition.

Protection/Safety Treatments:

Treatment #6. Patrols for Storm Induced Road Hazards

Roads within the fire perimeter contain drainage structures that cross streams located in watersheds that have a high to moderate burn severity. These streams now have the 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 massive erosion and debris torrents further down the drainage due to the failure of the fill slope. Also, 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 flash floods and mudflows. With the loss of vegetation normal storm frequencies and magnitudes can more easily initiate rill and gully erosion on the slopes and it is likely that 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. The patrols are used to identify those road problems such as plugged culverts and washed out roads and to clear, clean, and/or block those roads that are or have received damage. The storm patrollers shall have access to at least a backhoe and dump truck that can be used when a drainage culvert is plugged or soon to be plugged and to repair any road receiving severe surface erosion.

The patrols should first focus on those roads that receive the most traffic and are of more value to the transportation system. In order of preference, these roads include #2144, #2143, 2153370, #2144305 and all other roads within the fire perimeter.

The purpose of the monitoring is to evaluate the condition of roads for motorized access and to identify and implement additional work needed to maintain and/or repair damage to road surfaces and flow conveyance structures across roads in order to provide safe access across FS lands. Engineering and District personnel will survey the roads within the fire perimeter after high-intensity winter rainstorms in 2010, 2011 and 2012 and Spring 2010, 2011 and 2012 snow-melt. Survey will inspect road surface condition, ditch erosion, and culverts/inlet basins for capacity to accommodate runoff flows.

Treatment #7. Road and Trail Warning Signs

This treatment is for the installation of highway warning signs, directional signs, burned area warning signs, and road closure signs. The traffic warning signs are those signs that warn the public of dangers on the road such as curves and falling rocks. Directional signs consist of names of locations along with their corresponding distances labeled on the sign itself. These signs are mainly installed at intersections of roads and trails which help inform the traveler on which direction they can take to their destination. Burned area signs consist of a warning to the public identifying of the possible dangers associated with a burned area. It shall contain language specifying of items to be aware of when entering a burn area such as falling trees and limbs, rolling rocks, and flash floods. Road closure signs are self explanatory.

- Traffic Warning Signs - An inventory of the burned traffic warning signs will need to be done on FSR #2144, 2143, 2144305 to ensure the correct ordering of those signs that were damaged by the fire and need to be replaced.
- Directional Signs - An inventory will need to be done to determine the exact number of signs that need to be replaced and what each specific sign had written on them. Based on observations from the field it was determined that approximately 5 signs at road intersections were destroyed by the fire.
- Burned Area Signs - These signs shall be installed at all entries into the fire perimeter. The location of these signs shall be along roads and trails. The field perimeter map shall be used to identify those roads and trails that enter into the fire burn area.
- Road Closure Signs - These signs shall be installed on FSR 2144, and 2143305.

The purpose of the Highway Warning, Road Closure, and Burned Area signs is to provide safety to the motorists of upcoming road dangers. The purpose of replacing the Directional Signs is also to provide safety to the motorist by directing them to their destination without taking a wrong turn, especially during severe weather conditions.

Treatment #9. Road Special Order Closure

Refer to *Treatment #7 and Treatment #4* for physical closure actions. Gates will be installed so that the special order closure can be properly monitored and enforced to ensure maintenance of the drainage structures (*Treatment #4*) and the safety of the public. This treatment will also follow up with the necessary special orders.

Treatment #12. Trail Special Order Closure

Refer to *Treatment #7 and Treatment #4* for physical closure actions. This treatment will also follow up with the necessary special orders.

I. Monitoring Narrative:

Treatment #10. Noxious Weed Monitoring and Treatment

The perimeter of the fire, and helicopter drop points will be monitored for weeds that may have been introduced during fire suppression and/ or rehabilitation. Dozer lines, road sides and large push out areas are high priority sites for monitoring. Treat and map any new weed populations. Weed monitoring will focus on all points and routes used during the fire suppression activities. Weed monitoring will also be focused on special habitats in high severity burned areas per Forest Plan. Target weed species would be the high priority species from the Willamette NF weed list. Species includes sulfur cinquefoil, spotted knapweed, and false brome.

Approximately 4 miles of dozer line was created, push outs (10) drop points (17 sites), and helicopter landing zones (6 sites) and roadsides that were used during suppression efforts are high priority. Three push out areas are located on the Umpqua NF and should be included in this survey. Special Habitat areas that burned intensely during the fire should be surveyed to insure that weeds are not colonizing these areas. The ICP at Hills Creek was on Army Corps Land, and has high priority weed species (Sulfur cinquefoil, false brome and diffuse knapweed) and many other common invasive species (blackberry and scotch broom). Weeds were treated here in the summer of 2009 but they were not fully eradicated and both of the above species were in seed at the time the camp was used. The camp will be surveyed for new sites of invasive species also, especially the location of the weed washing station.

The fire has created suitable habitat for the spread of noxious weeds, and the fire area is currently weed free. While weed washing was required of vehicles used for fire suppression and rehabilitation, information on weed washing during the initial attack phase of the fire is unknown. Vehicles or aircraft could have come from weed infested areas and weeds introduced through mud, debris, or gear.

Water tenders used during the fire may have used drafting sites that contained weeds. Seeds may have been carried to the road system via water tenders.

Monitoring will reduce the potential for establishment of new noxious weed sites.

Treatment #13. Monitoring Unstable Hillslopes

Slope stability inventory is proposed for the Northeast portion of the Tumblebug drainage. The intent would be to determine if the magnitude and/or frequency of slope instability will increase within the next year. If slope instability is determined to pose an immediate threat to the water quality and stream integrity of Tumblebug Creek, then a treatment would be developed. This inventory would be completed in the spring immediately after snowmelt. A treatment may be designed as appropriate and would likely be additional large woody debris placed in this stream system to ameliorate the effects of the increased sediment load from the slope failures. See soils report for more details.

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

			NFS Lands				Other Lands			All
		Unit	# of		Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER \$	\$	units	\$	Units	\$	\$
A. Land Treatments										
#01 – Aerial Mulch	acre	655.77	150	\$98,366	\$0		\$0		\$0	\$98,366
#03 – Mulch & Seed Road Slopes	mile	5383	4.5	\$24,224	\$0		\$0		\$0	\$24,224
#10 - Weed Detection and Treatment	acre	23	202	\$4,646	\$0		\$0		\$0	\$4,646
<i>Insert new items above this line!</i>										
<i>Subtotal Land Treatments</i>				\$127,235	\$0		\$0		\$0	\$127,235
B. Channel Treatments				\$0	\$0		\$0		\$0	\$0
#02 – In-channel Directional Tree Felling	feet	1.62	10200	\$16,524	\$0		\$0		\$0	\$16,524
<i>Insert new items above this line!</i>										
<i>Subtotal Channel Treat.</i>				\$16,524	\$0		\$0		\$0	\$16,524
C. Road and Trails				\$0	\$0		\$0		\$0	\$0
#04 - Drainage Clean & Construct Features	mile	4508	48	\$216,384	\$0		\$0		\$0	\$216,384
#05 - Fillslope Stabilization	mile	1700	6	\$10,200			\$0		\$0	\$10,200
#08 – Mac Creek Culvert Removal	site	10270	1	\$10,270			\$0		\$0	\$10,270
#11 – Trail Drainage Clean & Construct	mile	1800	3	\$5,400			\$0		\$0	\$5,400
<i>Insert new items above this line!</i>										
<i>Subtotal Road & Trails</i>				\$242,254	\$0		\$0		\$0	\$242,254
D. Protection/Safety				\$0	\$0		\$0		\$0	\$0
#06 – Storm Patrols	day	3375	5	\$16,875	\$0		\$0		\$0	\$16,875
#07 – Road & Trail Warning Signs	each	293	26	\$7,618	\$0		\$0		\$0	\$7,618
#09 – Road Special Order Closure	each	4500	5	\$22,500	\$0		\$0		\$0	\$22,500
#12 - Trail Special Order Closure	each	1000	1	\$1,000	\$0		\$0		\$0	\$1,000
<i>Insert new items above this line!</i>										
<i>Subtotal Structures</i>				\$47,993	\$0		\$0		\$0	\$47,993
E. BAER Evaluation							\$0		\$0	\$0
Assessment				\$0	\$35,000		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$35,000		\$0		\$0	\$0
<i>Subtotal Evaluation</i>										
F. Monitoring				\$0			\$0		\$0	\$0
#13 – Monitoring Unstable Hillslopes	acre	300	14	\$4,200	\$0		\$0		\$0	\$4,200
<i>Insert new items above this line!</i>										
<i>Subtotal Monitoring</i>				\$4,200	\$0		\$0		\$0	\$4,200
				\$438,206	\$35,000		\$0		\$0	\$438,206
G. Totals										
Previously approved										
Total for this request				\$438,206						

PART VII - APPROVALS

1. /s/ MELANY I. GLOSSA
Forest Supervisor (signature)

10/12/09
Date

2. _____
Regional Forester (signature)

Date