USDA-FOREST SERVICE FS-2500-8 (7/08)

Date of Report: October 7, 2008

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: Gnarl Ridge

B. Fire Number: OR-MHF-000014

C. State: OR

D. County: Hood River County

E. Region: 6

F. Forest: Mt. Hood National Forest.

G. District: Hood River

H. Fire Incident Job Code: P6EFW4

I. Date Fire Started: 8-7-2008

J. Date Fire Contained: 90 % contained (10-6-08)

K. Suppression Cost: $ 15,000,000 (as of 10/6/2008)

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): Dozerline 6.0 miles, Handline 5.5 miles
2. Fireline seeded (miles):
3. Other (identify):

M. Watershed Number: 1707010506 (East Fork, Hood River)

N. Total Acres Burned: 3280
NFS Acres (**X**) Other Federal ( ) State ( ) Private ( )

O. Vegetation Types: 10, Timber (litter and understory) Timbered area with beetle-killed subalpine fir with heavy dead and downed component.

P. Dominant Soils: Soil Map Unit 380 is the dominant soil map unit in the Mount Hood Soil Resource Inventory for this area. Surface soils are dark gray, soft, very friable, non-sticky, non-plastic, sandy loams and very fine sandy loams, with weak, fine granular structure and less than 5 percent coarse fragments. These soils formed in ash mixed with andesitic residuum and colluvium.

The soils in the area are in the Cryic soil temperature regime and Hydrologic Soil Group B. The forest floor is covered with a 1 to 3 inch layer of decomposing needles and twigs from subalpine tree species including mountain hemlock, noble fir, western larch, subalpine fir, and Douglas-fir over many fine roots and fungal mycelia.

Table 1. Major Soil Map Units - Distribution by Acres and Selected Attributes

SRI_CODE	% Slope Class	Sum of Acres	Surface Erosion Potential	Rate of Surface Runoff	Water Detention Storage Capacity
380	5 – 30	1493	Slight	Moderate	Moderate
382	5 – 30	307	Moderate	**High**	**Low**
6-382	5 – 30+	221	Moderate	**High**	**Low**
6-7		125			

Q. Geologic Types: This entire area is underlain by volcanic rock from either Mt. Hood or from a small volcano centered at Cloud Cap.

Geology and Hazards

Eliot Branch valley is eroded deeply into the volcanic bedrock. The very steep west valley slope is composed of andesite lava from Mt. Hood.

Basaltic andesite from the Cloud Cap volcano is exposed in the steep east slope of the Eliot Branch valley. The basaltic andesite lava flows emanated from a vent near Cloud Cap and flowed northeasterly, forming the relatively smooth slope between Eliot Branch valley and a major unnamed tributary to Tilly Jane Creek, referred to here as North Fork Tilly Jane Creek. This tributary flows into Tilly Jane Creek near 3700 feet elevation. Creeks flowing on this smooth slope are only slightly incised and have few tributaries. This is a result of the resistant bedrock and the relatively young age of the landform.

Southeast of North Fork Tilly Jane Creek the area is underlain by a thick wedge of pyroclastic deposits that originated from Mt. Hood during a major eruption that occurred about 15,000 years ago. This wedge of easily erodible material thickens to the southeast. Polallie Creek and its tributaries are eroded deeply into these pyroclastic deposits and have steep unstable valley slopes. Tilly Jane Creek and Doe Creek are also incised. Creek channels on the pyroclastic deposits are more developed, more incised, and have more tributaries than the creek channels on the basaltic andesite lava flows due to the easily erodible nature of the pyroclastic material. All the slopes in this area have been covered with volcanic ash from recent Mt. Hood eruptions.

Both Eliot Branch and Polallie Creek have experienced major debris flows in the recent past. There were massive debris flows in Eliot Branch in November 1999 and November 2006.

Each of these debris flows destroyed bridges and damaged roads and diversion structures. Massive debris flows in Polallie Creek have closed Highway 35 twice since 1997. A Polallie Creek debris flow in December 1980 killed a camper at the former Polallie Creek Campground. There is no documented record of debris flows in any other creek within the fire perimeter.

R. Miles of Stream Channels by Order or Class: perennial: 10.4, intermittent: 1.8

S. Transportation System:

Trails: 4.0 miles Roads: 6.6 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 601 **(low)** 1,167 **(moderate)** 673 **(high)** *

***note:** Burn severity was assessed on the Cloud Cap polygon only. Once the BARC map is available, burn severity will be mapped for the remaining Gnarl Ridge fire area in wilderness.

High Severity Burn
The duff and the fine root mass within four inches from the soil surface was completely consumed. Soil structure was destroyed in this layer, leaving behind a powdery, mixed ash and soil surface. Overstory and shrub mortality was very high so that there is no potential for needle-cast.

Approximately five percent of this burn area contained red, baked soil where larger diameter fuels were present on the ground. These larger diameter fuels extended the duration of soil heating and increased soil temperatures as water evaporated from the soil profile. This resulted in the localized consumption of organic matter and fine roots. However, soil moisture was high enough during the fire that detrimental, deep soil heating did not occur below a depth of four to six inches.

Moderate Severity Burn
In general, the moderate severity rating in the Gnarl Ridge fire occurred in two classes. In higher elevations, the duff layer was partially consumed and charred. Soil moisture levels above 4,900 feet in elevation were high enough to protect soil structure and fine roots in the moderately burned areas - the fine root mass and weak soil structure was mostly preserved.

At lower elevations, below approximately 4,900 feet, moderate severity burns were on the high end of the moderate severity class. The litter layer was often consumed. Overstory tree and shrub mortality was often greater than 80%, but needle-cast began covering the ground within days after the fire.

Unburned and Low Severity Burn
Overstory and shrub mortality is very low. Shrub canopy and grass understory may be scorched or less than 30% consumed. Unburned and charred, but recognizable, grasses and shrub litter are present at the surface. Fine roots near the surface were not affected by soil heating. Unburned and low severity areas were combined in this rating category.

B. Water-Repellent Soil (acres): Not significant or measurable related to the fire. However, below three inches from the surface there are volcanic ash soils which exhibit repellency when totally dry. In either case, soils will be slightly repellent and susceptible to erosion for the first storms of the year.

C. Soil Erosion Hazard Rating by total and FS (acres):

1735 (low) 617 (moderate) 77 (high)

D. Erosion Potential: 20.65 **tons/acre**

E. Sediment Potential: 4,433 **cubic yards / square mile**

PART IV - HYDROLOGIC DESIGN FACTORS

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

B. Design Chance of Success, (percent): 65

C. Equivalent Design Recurrence Interval, (years): 25

D. Design Storm Duration, (hours): 24

E. Design Storm Magnitude, (inches): 6

F. Design Flow, (cubic feet / second/ square mile): 108 -228 csm

G. Estimated Reduction in Infiltration, (percent): 75*

H. Adjusted Design Flow, (cfs per square mile): 162-250 csm

*__note__: Some reduction in infiltration is expected in up to 75 % of the burned area.

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

Soils: The Gnarl Ridge Fire burned approximately 3,280 acres on the Hood River Ranger District, Mount Hood National Forest. The fire can be separated into three major burn area polygons. For the purpose of this report, the fire burn severity analysis and specifications focus on the Cloud Cap area polygon, which is approximately 2,430 acres in size. The other two polygons, at Lamberson Spur and North Fork Cold Spring Creek, are in the Mount Hood Wilderness and will not likely be treated with BAER treatments. Given the restricted amount of time available, the team had a limited amount of time to gathered data on the ground within the burned areas. Due to cloudy conditions over the fire area, a BARC map was not available to the team during this initial assessment.

Areas of high and moderate burn intensities removed effective groundcover in the headwaters of Eliot, Evans, Tilly Jane, Doe, and Polallie drainages. In general, the soils did not exhibit a fire-induced hydrophobicity within the high and moderate severity areas. However, below three inches from the surface there are volcanic ash soils which exhibit repellency when totally dry. In either case, soils will be slightly repellent and susceptible to erosion for the first storms of the year. Numerous zero and first order drainages have moderate and high severity burns through them.

The soils information in this report is based on the Mount Hood National Forest Soil Resource Inventory (Howes, 1979). Field investigations performed by soil and watershed specialists identified burn severity, soil types, slope morphology, and soil hydrophobicity (water repellency). Information from the SRI combined with field observations, formed the basis for the input used to model erosion and sediment. The models used to quantify soil loss were ERMiT (Robichaud, et. al., 2006) and Disturbed WEPP (Elliot, et. al., 2007).

There is a concern about a potential loss of soil productivity due to accelerated soil erosion resulting from the absence of groundcover and presence of a thin hydrophobic layer near the soil surface. Where duff has been consumed, there is a higher likelihood of soil particle detachment by raindrop impact. In addition, soils in this area have weak surface structure, further increasing the risk of detachment by water or wind.

Absent treatment, soil loss is anticipated where burn severity is high, with moderate burn areas at risk as well. Soil loss can have a significant impact on long-term soil productivity. Consumption of the duff and litter layer in areas with high burn severity has already affected site productivity. The further loss of topsoil would reduce site productivity. It is important to keep the topsoil in place from a physical and biological standpoint.

In forested soils of the west, an average rate of soil formation is about one ton of soil per acre per year. Without any stabilization treatments in the high and moderate burn intensity areas of this fire, we can expect to lose approximately 20 tons of soil per acre the first year.

These first year erosional losses can be reduced significantly by hillslope treatment and stabilization measures. Rate of soil loss in subsequent years will depend on recovery rate of vegetation and litter cover accumulation.

Invasive Plants

Spotted, diffuse, and meadow knapweed (Centaurea stoebe, C. diffusa, and C. pratensis), all Class B noxious weeds, are present in the fire area. Bulldozers, crew carriers, other vehicles, and equipment used to fight the fire may have spread knapweed seed within the fire area or transported and introduced knapweed seed from infestations outside the fire area. Drop points, parking areas, sling spots, medic sites, dozer lines, handlines, and burned areas may be invaded by knapweed species and other invasive non-native plants not currently growing in the vicinity of the Gnarl Ridge fire. Prevention measures have included a weed-washing station at the nearby ODOT station along Hwy 35. Postfire control measures of invasive plants next spring may include manual (handpulling), mechanical (mowing), and/or chemical (herbicide) treatment. Repeated treatment in successive years following the fire are expected to be needed to effectively control invasive plant species.

Populations of spotted, diffuse, and meadow knapweed occur along Highway 35 and on adjacent national forest land and private land. Noxious weed seeds from nearby populations may be spread along road corridors by vehicles, wildlife, hikers, and mountain bikers.

Water Quality

1. Crystal Springs Municipal Water System

Crystal Springs is located on the northeast flank of Mount Hood, approximately 8.25 miles northeast of the summit. Crystal Springs is the sole potable water source for the Crystal Springs Water District. Water for the Crystal Springs Water District is drawn from Crystal Springs, which is considered a groundwater source with no surface water connection. Crystal Springs Water District supplies water to approximately 5000 residents of the upper Hood River Valley and the eastern half of the lower Hood River Valley.

The zone of contribution (ZOC) for Crystal Springs is the area in which groundwater will eventually flow to Crystal Springs and related springs. The ZOC boundary is based on the conceptual hydrogeologic model and supporting data presented in the document Crystal Springs Zone of Contribution, January 2003, prepared by Mark Yinger, Geologist. The only portion of the Gnarl Ridge fire area with a direct surface water connection to where groundwater is withdrawn from Crystal Springs is the headwaters of Weygandt Canyon. The headwaters of Weygandt canyon were burned at a moderate and high burn severity, but the Crystal Springs water supply is not expected to be affected since it is a groundwater source with no documented surface water connection. To reduce the risk of post-fire related stream sedimentation, aerial helimulching is proposed high burn severity areas along both sides of a portion (0.18) miles of the upper Weygandt canyon.

2. Other domestic water supplies and irrigation districts

There are several other smaller domestic water supplies and a number of major water diversions (irrigation) downstream of the burned area. These domestic water supplies and irrigation diversions may be affected to some extent by accelerated surface erosion from the burned area.

Heritage Resources

1. Cloud Cap Road: The resources at risk are situated within the Cloud Cap – Tilly Jane Historic District. The District is listed on the National Register of Historic Places, and the Cloud Cap Road (FDR 3512) is a contributing element to the national significance of the Historic District. The Historic District is situated on the northeast flank of Mount Hood, bordered on the west by Eliot Creek and on the east by an unnamed tributary to Tilly Jane Creek.

The Cloud Cap Road begins at an elevation of about 4360 feet within the burned area, and ascends through a series of switchbacks upslope to terminate at an elevation of about 5720 feet just below Cloud Cap Inn. The Cloud Cap Road was constructed in 1926 as the northeast side of the mountain was under consideration for recreational development.

Approximately 74 drainage structures, most of which include masonry headwalls, were probably constructed along the Cloud Cap Road ca.1939. These historic drainage structures are currently at risk due to anticipated accelerated post fire sedimentation and runoff.

2. Coopers Tent Cabin and newly discovered camp:

Cooper's Tent Camp is also a contributing element to the national significance of the Historic District. Cooper's Tent Camp is situated at an altitude of about 5600 feet on one of the few level areas near the top of the Historic District. In 1885, David Cooper set up a tent camp to serve visitors to the north slope of Mt. Hood. The facilities included a cook's tent, dining tent, and up to five sleeping tents. The Camp was closed when Cloud Cap Inn opened in 1889. A new historic camp was newly discovered during reconnaissance of the burned area on October 7, 2008.

The intense heat from the fire killed the overstory, and entirely consumed the understory and ground cover over the entire area of the Camp. The area of the Camp burned with some of the greatest intensity of the fire. The soils within and adjacent to the Camp have mixed with ash from the fire to form a light, powdery and unconsolidated layer anywhere from 6" to 12" deep. Sill logs for a tent have completely been consumed by the fire.

Without effective ground cover, the unconsolidated soils within and adjacent to Cooper's Tent Camp and a newly discovered historic camp will immediately wash away with the slightest rainfall. Artifacts exposed to the elements are easily visible to the casual forest observer and at risk from active collectors. The importance of the Camp as a significant National Register of Historic Places property will be at risk unless measures are employed to reduce erosional effects from precipitation and artifact visibility.

3. Wagon Road

The historic Wagon Road is also located within the Cloud Cap – Tilly Jane Historic District. The Wagon Road begins at an elevation of about 4360 feet within the burned area, and ascends steeply directly upslope to terminate at an elevation of about 5720 feet at the Cloud Cap Inn. Switchbacks within Forest Development Road 3512 cross the wagon road 10 times as it climbs through the Historic District to Cloud Cap Inn.

The Wagon Road was abandoned immediately after construction of Forest Development Road 3512 in 1926, and is in relatively pristine condition. The Wagon Road (system trail #642) does continue to function as a ski trail, and portions are used by snow groomers and snowmobiles when the snow pack is over two feet deep. The Wagon Road consists as an entrenched trail from 2' to 3' deep.

The intense heat from the fire killed the overstory, and entirely consumed the understory and ground cover over most of the length of the Wagon Road. The soils within and adjacent to the Wagon Road have mixed with ash from the fire to form a light, powdery and unconsolidated layer anywhere from 6" to 12" deep. Fallen snags criss-cross the Wagon Road in places. The historic Wagon Road is currently at risk from surface runoff and sedimentation from the burned area. Since Wagon Road was constructed more or less on a ridge going directly uphill, the risk of gullying from post-burn surface runoff is high.

Roads

Potential values at risk in the Gnarl Ridge fire area are the National Forest System Roads (NFSR) that access the area or cross drainages down slope of the burned area. Accelerated runoff, sedimentation, and debris moving off the burned area threaten the existing road drainage system and historic (CCC constructed) masonry culvert inlet structures. The following is the list of roads and corresponding mileages identified for the initial assessment:

3512000 – Cloud Cap Road: Mile post (mp) 0.00 junctions with Hood River County road, Cooper Spur to mp 10.50 at the parking lot for Cloud Cap Inn.

3512630 – Tilly Jane: This road access' the Tilly Jane Camp Ground. Mile Post 0.00 to mp 0.52 end of road at the camp ground.

3511000 - Mile post (mp) 0.00 junctions with Hood River County road, Cooper Spur. From mp 0.00 to mp 3.70 at the end of the road.

3511620 – Mile post 0.00 junctions with 3511000 at mp 1.18 and ends at mp 1.42.

2840000 – Laurance Lake. From mile post 0.00 to mp 3.16 at the junction with 2840630.

2840630 – From mp 0.00 to mp 1.88 at the end of the road.

All of these roads were evaluated for potential damage from the burned area from storm runoff and soil and debris movements that could exceed the capacity of road drainage systems, plug culverts and ditches, and cause cut bank and fill slope failures and erosion. Field reviews show a low risk to all roads except the 3512000 – Cloud Cap, and 3512630 – Tilly Jane roads. These two roads are considered high risk for post fire related damage from accelerated surface runoff, debris, and sedimentation.

Fisheries

Several Federally listed Proposed, Endangered, Threatened, or Sensitive (PETS) salmon and trout species and their critical and essential fish habitat are known to be present in the East Fork Hood River 5th field watershed of the Hood River basin. The Gnarl Ridge Fire burned in multiple drainages of the Upper Middle Fork Hood River, Middle East Fork Hood River, and Lower East Fork Hood River 6th field subwatersheds of the East Fork Hood River 5th field watershed. Potential values at risk for aquatic species are a reduction in both quality of spawning and rearing habitat for both the short (0 to 5 years) and long-term (5 to 50 years) for both Federally listed as threatened Columbia River (CR) bull trout (*Salvelinus confluentus*) and Lower Columbia River (LCR) steelhead trout (*Oncorhynchus mykiss*) and their critical habitat. Other aquatic species, such as native coastal cutthroat trout (*O. clarki clarki*) rainbow trout (*O. mykiss*), and non-native brook trout (*S. fontinalis*) found in the watershed may experience loss of quality spawning and rearing habitat for both the short and long-term.

Trails

The values at risk include hiking, biking and ski/snowshoe use on trails within the burned area. The effect of the fire has increased the risk to the trail infrastructure through erosion and to human life due to the fire undermining the tread of the trail, and killing almost all the trees along the affected stretches of trails. Unless high risk hazard trees are felled along the entire stretch of these trails,, emergency erosion control work would be very dangerous. To reduce the risk to BAER implementation personnel and crews, hazard trees must be fellec prior to any erosion control treatment.

Rill erosion on the trails had already begun on September 30, 2008, after less than 0.5 inches of rainfall, and is expected to be severe on most areas of the trails, as they are steep trails, climbing about 1,000 feet per mile, or an average of 20% slope, with pitches exceeding 40% slope. Since the field visit conducted on 9/3008, over 3 inches of additional rain has fallen on the fire area in the 30 hours previous to completion of this assessment.

The Polallie Ridge Trail #643A runs along the top of the ridge to the north of Polallie Creek and to the south of Doe Creek where the burn was intense. It was originally developed and used by Native Americans prior to western settlement. Currently, it is a medium use skiing and hiking trail and is often used as an access trail for the historic structures at Tilly Jane and Cloud Cap, which receive high winter use.

The Tilly Jane Ski Trail #643 runs alongside the Doe Creek drainage to the north of the Polallie Ridge Trail in an area where the burn was also intense. The Tilly Jane Ski trail is a very popular trail used to access the historic structures, skiing above timberline and as a climbing access route for Mt Hood north side climbers. The Tilly Jane Ski trail is used as a descent route by skiers and snowshoers.

Both trails #643 and #643A are also moderately popular as hiking trails in the summer season. Both trails were open to mountain bikes but have been closed to that use due to excessive erosion caused by bikes damaging drainage structures during dry weather when soils turn powdery.

Based on field reviews of both trail 643 and 643A, the entire 4 miles of the length inside the burn will need to receive erosion control structures, hazard tree felling, and tread reconstruction. The trails are on highly erosive soils that down cut rapidly if drainage structures are not properly constructed and maintained.

B. Emergency Treatment Objectives:

Fisheries: Reduce fine sediment inputs from roads and streamside areas with high burn severity to fish bearing streams located downstream of the fire perimeter.

Provide for the early detection of invasive non-native plants invading the burned area from adjacent populations or transported to the burned area by various fire-fighting equipment (dozers, trucks, etc.).

Reduce the potential for surface erosion in the burned area by aerially applying straw mulch to provide immediate ground cover on high risk areas prior to significant damaging storms.

Prevent probable damage to roads and historical road drainage inlet structures from fire-related increased sediment and runoff, by installing rolling water bars on roads, keeping road ditches and culverts free of fire-related sediment/debris, and hydromulching up to 100 feet of the burned area along the Cloud Cap Road.

Ensure the safety of BAER implementation teams and the public by posting warning signs, removing hazard trees threatening BAER implementation personnel performing erosion control work to prevent further fire-related damage to the trail tread.

Reduce the risk of further damage to the Coopers Tent historical site and the newly discovered camp by mulching the immediate area and the also the area above it.

Prevent further damage to the historical Wagon Road by spreading wood straw and woody material over the

road surface to minimize erosion from accelerated surface runoff.

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

Land 75 % Channel N/A % Roads/Trails 75 % Protection/Safety 75 %

***Note**: Assuming first damaging storm is a 2 year, 24 hour storm event.

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	65 – 70	80	95
Channel	75	80	95
Roads/Trails	75	85	95
Protection/Safety	80	90	95

E. Cost of No-Action (Including Loss): $ 653,000

Justification for no-action cost estimate

Road reconstruction associated with FS Road 3512 and 3511, $420,000 repair costs.

Trail reconstruction associated with Tilly Jane and Polallie Ridge trails, $100,000.

Reduction in timber productivity site class associated with loss of soil productivity, reduction in one site class on 266 acres of high soil burn severity not treated at $500/acre = $133,000

F. Cost of Selected Alternative (Including Loss): (note: will send this value by e-mail on 10-8,

G. Skills Represented on Burned-Area Survey Team:

[**X**] Hydrology	[**X**] Soils	[**X**] Geology	[ ] Range	[ ]
[ ] Forestry	[ ] Wildlife	[ ] Fire Mgmt.	[**X**] Engineering	[ ]
[ ] Contracting	[ ] Ecology	[**X**] Botany	[**X**] Archaeology	[ ]
[**X**] Fisheries	[ ] Research	[ ] Landscape Arch	[**X**] 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 # L1, Invasive Species Assessment (Detection)

Purpose: Postfire assessments will ensure early detection and rapid response, prescribing subsequent treatment to control and prevent the spread of invasive non-native plants, including noxious weeds, in the Gnarl Ridge fire area. Invasive plants can be difficult and costly to control. Detection assessments are intended to reduce the postfire potential for significant increase in invasive plant populations that could spread into the burned area and quickly out-compete native vegetation, causing erosion problems in the future, displacing native plants, and degrading wildlife habitat. In order for native vegetation to establish successfully, invasive plant populations need to be located during the first three years after the fire in order to control their establishment and spread.

Conduct an invasive plant species detection assessment in along approximately 6 miles of fire line that are in close proximity to known knapweed populations, drop points, parking areas, sling spots, and medic sites. Detection assessments would be conducted to determine if treatment of invasive plants is warranted. If invasive plants are detected the first year, an invasive species emergency stabilization treatment and assessment plan would be submitted to request funding for treatment and effectiveness assessment the second year, and third year if necessary.

The 435 acres identified for detection assessment were calculated based on a 300' buffer from the center (both sides) of 6 miles of fire line in the Gnarl Ridge Fire area. Drop points, parking areas, sling spots, medic sites, and the burned area may be invaded by invasive non-native plant species not currently growing in the vicinity of the Gnarl Ridge fire. An assumption has been made that these areas in the Gnarl Ridge fire are at the greatest risk of invasion due to vehicle traffic and other human activities, which spread weeds. Roads, dozer lines, fire lines, and fire camps act as seed dispersal corridors.

Personnel costs were calculated based on a high-intensity survey method that would require transects approximately 5'-8' apart through the survey area as defined above. Using the high-intensity survey method, it is expected that approximately 20 acres per day could be surveyed by a Forest Service botanist.

:

Treatment # L2, Aerial Straw Mulching

Purpose: Aerial (helicopter) mulch high burn severity areas along streams and other high risk areas at a rate of approximately one ton of straw per acre to provide protective surface cover because of total duff layer consumption. One of the objectives of aerial helimulching is to reduce the amount of sediment in streams (Tilly Jane, and Weygandt Canyon) that normally provide a source of clean water to the East Fork, Hood River, which provides habitat for several Federally listed Proposed, Endangered, Threatened, or Sensitive (PETS) salmon and trout species. Another objective is to reduce the amount of surface runoff and sedimentation affecting the historic Cloud Cap Road (3512) with it's CCC constructed culvert inlet masonry structures, and protect the Coopers tent camp area from surface erosion and artifact looting. Aerial helimulching would also help maintain soil productivity in the areas treated.

Roads and Trail Treatments:

Purpose: Implement measure to prevent damage to roads and trails from increased runoff, sediment, and debris from the burned area.

Treatment # R1 : Reinforced driveable drain dips

Construct 80 rock reinforced drivable drain dips on the Cloudcap Road (3512). Driveable drain dips will be reinforced with 3 inch dense graded crushed rock.

Treatment # R2 : Storm Patrol

Storm watch FS roads 3511 and 3512 during the winter of 2009 through 2011 for non-properly functioning water bars, ditch relief pipes, and culverts at stream crossings in Tilly Jane, Evans, and Doe Creeks.

Have personnel drive roads 3511 and 3512 during (if safe) and immediately after any storm event which has caused an annual bankfull event in the East Fork Hood River watershed. Identify any non properly functioning pipe or water bar and repair it immediately when it is deemed safe to do so.

If road is unsafe to drive, then take access the area with a snow cat or an aerial flight over the area to identify areas of concern.

Treatment # R3: Maintain proper functioning of the road drainage system

Accelerated runoff, debris, and sedimentation from the burned area during is likely to fill road drainage ditches, plug culverts, as well as begin eroding the road surface.

Blade and shape road. Remove travel way ruts. Shape inslope and outslope sections.
Construct and clean out ditches and remove slides. A 6 way blade dozer recommended.

Treatment # R4: Signing and Traffic Control

Information signs and traffic control will be needed during implementation of road drainage improvement work on the Cloud Cap and other roads.

Treatment # R5: Road-side hydomulching

Hydromulching of road cutslopes and burn areas adjacent to the road will be accomplished from the existing roadway using a truck-mounted or trailer-mounted hydromulcher. The application should be done in such a way as to avoid a "shadow" effect behind rocks, trees, and brush. This may require applying the hydromulch from different angles.

Fertilizer: The fertilizer shall be a 7-2-3 formulation, containing 15% humic acids and bacteria, yeast, and mold at a minimum of 60,000 per 100 grams. Sulfur content shall be a minimum of 4 percent. An example of a product meeting these specifications is Biosol-mix (Rocky Mountain Bio-Products, 970-926-1025). The fertilizer shall be applied at the manufacture's recommended rate for these conditions

Inoculant: The inoculant will contain viable populations of micronized endomycorrhizal fungi. The inoculem shall consist of at least 3 species blend of popagules of arbuscular mycorrhizal fungi including Glomus intraradices, Glomus mosseae, and Glomus aggregatum. There shall be a minimum of 100,000 spores per propagulas per pound of inocumlum. If in powder form, the inoculem should have a particle size of no more than 300 microns. The inoculant will be added to the hydromulch at the manufactures recommended rate for the conditions

Mulch: The mulch shall consist of 100% virgin wood fiber manufactured from green, pre-kiln dried wood. The mulch shall be applied at a rate of 2,000 pounds/acre. An example of a product meeting these specifications is Ecofiber (Canfor 1-800-363-8873).

Tackifier: Apply a Guar-based tackifier at a minimum rate of 3% the mulch rate (e.g.. 60 pounds of tackifier required for 2,000 pounds of mulch). Some mulch products can be purchased from the manufacture pre-treated with tackifier. Pre-treated mulch is acceptable and meets this tackifier specification. An example is Ecofiber Plus.

Protection/Safety Treatments:

Purpose: Implement actions to minimize fire-related surface erosion on the Tilly Jane and Polallie Ridge trails, and provide for the safe implementation of the BAER erosion control treatments by removing hazard trees.

Treatment #S1—Reconstruct/Construct Trail Drainage Structures: Implement erosion control Work (water bars, etc.) on approximately 4 miles of trail to reduce the potential for the concentration of water flow and accelerated surface erosion resulting from the increased runoff caused by intense fire effects. The amount of erosion control work will be the minimum needed to prevent further fire-related runoff damage to the existing trails.

Treatment #S2– Trail Hazard Tree Abatement: Remove the minimum number of high hazard trees along both trails prior to commencing Treatment #**S1,** to provide for the safety of BAER implementation personnel and crews.

Treatment #S3–Hazard warning signs, public information: Install hazard signs, produce information packages and send press releases to inform the public of hazards and any trail closures related to the Gnarl Ridge fire.

Treatment # S4-Cooper's Tent Camp and newly discovered Camp Heritage site erosion control/protection:

The energy and speed of water traveling across the sites should be reduced in order to reduce its carrying capacity and diminish its erosional ability. At least a temporary ground cover should be restored before winter snows, to protect the site from further erosion and individuals looking for artifacts, etc.

An area encompassing approximately 5 acres (each) in the location of Cooper's Tent Camp, and another newly discovered camp should be seeded with approximately 50 lbs/acre of annual rye grass to establish a temporary ground cover. The area should also be mulched with straw at a rate of approximately 1 ton per acre to provide immediate soil cover and to help cover exposed historical artifacts.

Treatment # S5- Wagon Road (heritage site) erosion control:

Various erosion control measures need to be implemented to protect the historic wagon road from erosion related to accelerated runoff from the burned area. Silt fences, small log permeable sediment filters, and wood straw will be used to reduce surface erosion potential on approximately two miles of the historic Wagon Road. Hazard trees will also be felled as needed to insure the safety of BAER personnel.

I. **Monitoring Narrative:**

Effectiveness Monitoring will be completed in Q1 of 2009, if weather conditions permit, to document the objectives of aerial hydromulching and other ground-based erosion control treatments. If it isn't possible to do effectiveness monitoring this fall, the monitoring will be done after the snows have melted (Q3 2009). A monitoring plan will be submitted at a later date.

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

Click red icons for notes.	NFS Lands					Other Lands				All
Line Items	Units	Unit Cost	# of Units	BAER $	Other $	# of Units	Fed $	# of Units	Non Fed $	Total $
A. Land Treatments										
L1, Invasive species	each	$10,000	1	$10,000			$0		$0	$10,000
assessment				$0			$0		$0	$0
L2, Aerial helimulching	acres	$1,200	137	$164,400			$0		$0	$164,400
				$0			$0		$0	$0
Subtotal Land Treatments				$174,400	$0		$0		$0	$174,400
B. Channel Treatments										
				$0			$0		$0	$0
Subtotal Channel Treatments				$0	$0		$0		$0	$0
C. Road and Trails										
R1,Driveable drain dips	each	$1,115	80	$89,200			$0		$0	$89,200
R2, Storm patrol	each	$8,100	1	$8,100			$0		$0	$8,100
R3,Road drainage maint.	each	$8,100	1	$8,100			$0		$0	$8,100
R4,Signing, traffic control	each	$2,500	1	$2,500			$0		$0	$2,500
R5,Road hydromulching	acres	$750	42	$31,500			$0		$0	$31,500
Subtotal Road & Trails				$139,400	$0		$0		$0	$139,400
D. Protection/Safety										
S1,Trail erosion control	miles	$4,500	4	$18,000			$0		$0	$18,000
S2,Hazard tree removal	miles	$2,000	4	$8,000			$0		$0	$8,000
S3,Hazard warning signs	each	$2,000	1	$2,000			$0		$0	$2,000
S4,Coopers Tent Camp	acres	$1,110	10	$11,100			$0		$0	$11,100
S5, Wagon Wheel Road	miles	$20,000	2	$40,000			$0		$0	$40,000
				$0			$0		$0	$0
Subtotal Protection				$79,100	$0		$0		$0	$79,100
E. BAER Evaluation										
BAER Survey	each	$35,000		---	$0	---		---		$0
	---	---	---	---	$0	---		---		$0
Subtotal Evaluation				---	$0	---	$0	---	$0	$0
F. Monitoring										
M1, Monitoring	each	$5,000	1	$5,000			$0		$0	$5,000
				$0			$0		$0	$0
Subtotal Monitoring				$5,000	$0		$0		$0	$5,000
G. Totals				**$397,900**	**$0**		**$0**		**$0**	**$397,900**
Previously approved						Comments:				
Total for this request				**$397,900**						

PART VII - APPROVALS

1. /s/ Gary L. Larsen — 10/7/08
   Forest Supervisor (signature) — Date

2. /s/ Carvin N. Joyner (for) — 10/28/08
   Regional Forester (signature) — Date