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File Code: 2520

Date: October 10, 2014

Route To:

Subject: Carlton Complex Fire: Interim #1 - Burned Area Emergency Response (BAER)  
Report and Funding Request

To: Regional Forester, R-6

Enclosed for your review and approval is Interim #1 - Burned Area Emergency Response Report (FS-2500-8) for the Carlton Complex Fire on the Okanogan-Wenatchee National Forest. This Interim #1 will replace the letter dated September 22, 2014, because that 2500-8 failed to highlight the previously approved treatments and only those proposed treatments that were ready for approval.

Approval of this funding request will authorize implementation of recommended response actions intended to reduce threats to accumulated NFS values that include human life and safety, road infrastructure, soil productivity, hydrologic function, native/naturalized communities, and designated Critical Habitat for three Federally-listed fish species.

A summary of the request by category is provided below:

Response Action	Request
Land Treatments	\$222,463
Channel	None
Roads & Trails	\$114,972
Protection and Safety	\$31,588
Monitoring	None
<b>Total Treatment Request</b>	<b>\$369,023</b>

A BAER assessment project record that includes site-specific objectives and technical specifications for the response actions listed above, as well as individual resource assessments and project maps is available for review at:

[O:\NFS\OkanoganWenatchee\Project\ForestWide\2520BAER\OkaWenFireComplexes2014\NECarltonComplex\01\\_BAER\\_Report\\_2500\\_8\Report\\_CarltonCmplx](O:\NFS\OkanoganWenatchee\Project\ForestWide\2520BAER\OkaWenFireComplexes2014\NECarltonComplex\01_BAER_Report_2500_8\Report_CarltonCmplx).

Please contact BAER Assessment Team Leader, TJ Clifford at 208-866-3204 or Stuart Woolley, Resources/Planning Staff at 509-664-9332 if you have any questions.

MICHAEL L. BALBONI  
Forest Supervisor



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cc: Jason J Kuiken, Michael C Liu, Stuart M Woolley, Amy Verellen, Jason N Peterson, Karen A Bennett, Michael D Carroll



**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 #1**  
     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: Carlton Complex

B. Fire Number: WA-OWF-000781

C. State: WA

D. County: Okanogan

E. Region: PNW (06)

F. Forest: Okanogan-Wenatchee (17)

G. District: Methow Valley

H. Fire Incident Job Code: PNH8HC1502

I. Date Fire Started: July 14, 2014

J. Date Fire Contained: August 25, 2014

K. Suppression Cost: \$68,360,000 as of 08/22/2014

## L. Fire Suppression Damages Repaired with Suppression Funds

1. Fireline waterbarred (miles): unknown
2. Fireline seeded (miles): seed scheduled to arrive September 12, 2014
3. Other (identify):

## M. Watershed Number:

Subwatershed	Watershed #
Alder Creek-Methow River	170200080610
Bear Creek	170200080604
Benson Creek	170200080609
Chiliwist Creek	170200062204
French Creek	170200080705
Pearrygin Creek-Chewuch River	170200080408
South Fork Beaver Creek	170200080606
Swamp Creek	170200050502
Texas Creek-Methow River	170200080702
Upper Beaver Creek	170200080607

N. Total Acres Burned: 255,181

NFS Acres - 79,795    BLM - 6,157    BIA - 590    State - 69,885    Private (98,753)

O. Vegetation Types: Elevations throughout the burned area ranges from 2,800 to about 6,500 feet. Vegetation in this geographic area ranges from dry pine forests, riparian habitats, mid-elevation mesic forest, and high elevation mix-conifer montane forests. Primary conifer species include ponderosa pine, Douglas-fir, larch, lodgepole pine, Engelmann spruce, with subalpine fir found on highest peaks. Aspen also occurs throughout most forest types.

P. Dominant Soils: Soils formed primarily in parent material from residuum and colluvium from intrusive igneous granodiorte and granodiorite gneiss. Smaller areas of unconsolidated deposites of mixed glaciofluvial deposits are also present in valley bottoms. Soil textural family control sections are primarily loamy, loamy-skeletal and sandy-skeletal with inceptisols being the dominant soil order. Rock outcrops and lithic soils are common, epecially on upper backslope and shoulder slope positions.

Q. Geologic Types: Almost exclusively intrusive, coarse crystalline, volcanic rock consisting of granodiorte, granodiorite gneiss, and granodiorite quartz.

R. Miles of Stream Channels by Order or Class: Intermittent: 96.3 miles. Perennial: 31.4 miles.

S. Transportation System: Roads: 215.4 miles Trails: 3.7 miles

### **PART III - WATERSHED CONDITION**

A. Burn Severity (acres):<sup>1</sup>

Watershed	Low	Moderate	High	Total
Alder Creek-Methow River	1,970	475	90	2,535
Bear Creek	2,002	801	226	3,029
Benson Creek	7,167	5,166	4,128	16,461
Chiliwist Creek	298	175	379	852
French Creek	1,091	280	134	1,505
Lower Beaver Creek	5,449	2,546	1,664	9,659
Pearrygin Creek-Chewuch River	940	163	18	1,121
South Fork Beaver Creek	1,420	319	70	1,809
Swamp Creek	495	760	267	1,522
Texas Creek-Methow River	569	224	100	893
Upper Beaver Creek	2,270	792	251	3,313
<b>Total</b>	<b>23,671</b>	<b>11,701</b>	<b>7,327</b>	<b>42,699</b>

B. Water-Repellent Soil (acres): All burn severity classes and the unburned natural soil indicated some degree of water-repellency. Due to post fire precipitation events and subsequent surface wetting and erosion, field transects containing 10 sample ponts tended toward low to moderate hydrophobosity in the burned area. Of the 43,053 acres in the three soil burn severity class 32,289 or 75% exhibited some degree of water-repellency.

C. Soil Erosion Hazard Rating (acres):

346 low      3,809 moderate      44,465 high

D. Erosion Potential: 3.5 tons/acre

E. Sediment Potential: 800-960 cubic yards/square mile

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<sup>1</sup> Watersheds within this table represent those evaluated within Interim #1 do not include areas evaluated within the Initial Report for SW Carlton.

## **PART IV - HYDROLOGIC DESIGN FACTORS**

The primary watershed response expected within the Carlton Complex burned area is expected to include 1) an initial flush of ash; 2) rill and gully erosion in drainages and on steep slopes within the burned area; 3) flash floods with increased peak flows and sediment deposition; 4) debris flows. The watershed response will be dependent on the occurrence of storm and melt events and should be greatest with initial storm events. The disturbances will become less evident as vegetation is reestablished, providing ground cover and increasing surface roughness.

- A. Estimated Vegetative Recovery Period (years): 3-5
- B. Design Chance of Success (percent): 70
- C. Equivalent Design Recurrence Interval (years): 25
- D. Design Storm Duration (hours): 1
- E. Design Storm Magnitude (inches): 0.77
- F. Design Flow (cubic feet / second/ square mile): 1
- G. Estimated Reduction in Infiltration (percent): 20
- H. Adjusted Design Flow (cfs per square mile): 92

## **PART V - SUMMARY OF ANALYSIS**

Although the Carlton Complex Fire burned area within the jurisdiction of many private, municipal, state, tribal, and federal agencies, this BAER assessment addresses only emergency threats to values within the Carlton Complex Fire that burned on lands under the jurisdiction of the Methow Valley Ranger District on the Okanogan-Wenatchee National Forest. The project area evaluated by the team assigned to this portion of the Carlton Complex was about 48,697 acres. This report includes response actions recommended in accordance with Forest Service Manual (FSM) Interim Directive 2500-2013-1 (Burned Area Emergency Response).

The objective of the BAER assessment is to identify imminent post-wildfire threats to human life and safety, property and critical natural or cultural resources; and take immediate actions to manage unacceptable risks. This assessment used methodology outlined in Exhibit 01 and Exhibit 02 of the FSM to guide the identification of critical BAER values important to the local management unit and the apparent risk to those values that now exist from threats associated with the burned area. The assessment team assigned risk to the critical values by assessing the probability for post-fire damage and the magnitude of consequences, if damage occurred. A wide array of response actions were considered to achieve the emergency response objectives. However, only 3 actions were considered feasible.

The Carlton Complex fires started on July 14, by lightning from a weather system that moved through the Methow Valley. The Carlton Complex started as four fires: the Stokes Fire, the Gold Hikes Fire, the French Creek Fire and the Cougar Flat fire. These fires grew into one larger fire on July 20. The fire grew dramatically on July 17. Hot weather and windy conditions pushed the fire over the ridge tops and into the town of Pateros resulting in a large number of evacuations. The fire made significant runs towards the cities of Brewster and Pateros between July 17th and 18th, consuming approximately 300 homes in its path and destroying critical infrastructure. The Okanogan Public Utility Department (PUD) was able to restore power to most of the communities by July 26, 2014. The Okanogan County Emergency Operations Center was opened to help coordinate and reestablish the affected communities. Community meetings were held in Pateros, Brewster, Twisp, Malott, Winthrop, Canyon and Methow. Great Basin Incident Management Team 1

assumed command of the Carlton Complex, along with the Little Bridge Creek Fire and the Upper Falls Fire, at 8 p.m. on August 11th.

Recent significant rain has caused some slides within the burn scar area. Cooperating agencies during these efforts included the U.S. Forest Service (USFS), Washington State Department of Natural Resources, (WA DNR), Bureau of Land Management, WA Department of Fish & Wildlife, Okanogan Fire District 6, Okanogan Fire District 15 and the Okanogan County Sheriff's Office.

A Burned Area Emergency Response (BAER) Team was assembled and consisted of individuals representing Safety, Engineering, Hydrology, Soils, Cultural Resources, Fisheries, Vegetation, and Geographic Information Systems. On September 2, 2014, an in-briefing was held with the District Ranger after coordinating with BAER team's led by Greg Kuyumjian. Field assessments were conducted between September 2<sup>nd</sup> and September 7<sup>th</sup>, 2014 by BAER Team members to evaluate risk to identified values. Our team continued to closely coordinate with a similar team that was concurrently assessing State and Private Lands and led by John Chatel.

Values that may be threatened due to post fire events were identified during the initial scoping meetings. During the course of field assessments, the BAER Team refined the values list to those that are at moderate to very high risk due to post fire events. Values of low to no risk are discussed in the resource assessments, but are not part of this plan.

#### A. Describe Critical Values/Resources and Threats:

(edited to incorporate "Critical Values" from ID 2520-2013-1, effective June 6, 2013)

NFS Critical Value	Value-at-Risk	Description of Threat	Risk
Human Life & Safety	Motorized Access Major Highways (Safety of Employees/Visitors)	Threats from flooding, hazard trees, and rockfall along/at roads, developed and designated dispersed sites, and FS administrative sites that are downstream or downslope of burned slopes, especially those with a moderate-high burn severity. These threats were evaluated along WA State Highway 20 from the eastern edge of the fire west approximately 4 miles.	Possible Major High
Human Life & Safety	Motorized Access Along NFS Roads (Safety of Employees/Visitors)	Risk to travelers (visitors and employees) from flooding, hazard trees, and rockfall along/at roads that are downstream or downslope of burned slopes, especially those with moderate-high burn severity.	Very Likely, Major, Very High
Property	Highways - Road Infrastructure	Risk to road infrastructure at intermittent and perennial drainages as a result of expected increases to flooding and debris flows. Undersized culverts are expected to plug or overtop and thereby severely damaging road infrastructure and investment.	Very Likely, Major, Very High
Property	Major NFS Road Infrastructure	Risk to road infrastructure at intermittent and perennial drainages as a result of expected increases to flooding and debris flows. Undersized culverts are expected to plug or overtop which may severely damage road infrastructure and investment.	Very Likely, Major, Very High
Property	Minor NFS Road Infrastructure	Risk to road infrastructure at intermittent and perennial drainages as a result of expected increases to flooding and debris flows. Undersized culverts are expected to plug or overtop which may severely damage road infrastructure and investment.	Very Likely, Major, Very High

NFS Critical Value	Value-at-Risk	Description of Threat	Risk
Natural Resource	Steelhead (Critical Habitat)	Risk to steelhead and associated designated Critical Habitat due to the threat of post-fire runoff, erosion, and sediment delivery. These threats have the potential to negatively affect steelhead populations and lead to the degradation of designated critical habitat, deterring recovery objectives. There are 0.1 miles of designated Critical Habitat within the fire. However, there are 27 miles of critical habitat within 3 miles of the fire perimeter.	Likely, Moderate, High
Natural Resource	Spring Chinook (Critical Habitat)	Risk to spring chinook and associated designated Critical Habitat due to the threat of post-fire runoff, erosion, and sediment delivery. These threats have the potential to negatively affect spring chinook populations and lead to the degradation of designated critical habitat, deterring recovery objectives. There are 0 miles of designated Critical Habitat within the fire. However, there are 19 miles of critical habitat within 3 miles of the fire perimeter.	Likely, Moderate, High
Natural Resource	Bull trout (Critical Habitat)	Risk to bull trout and associated designated Critical Habitat due to the threat of post-fire runoff, erosion, and sediment delivery. These threats have the potential to negatively affect bull trout populations and lead to the degradation of designated critical habitat, deterring recovery objectives. . There are 2.1 miles of designated Critical Habitat within the fire. However, there are 35 miles of critical habitat within 3 miles of the fire perimeter.	Likely, Moderate, High
Natural Resource	Riparian Habitat	Risk to hydrologic function of hillslopes and channels due to the loss of soil cover and structure, decreased infiltration, hillslope erosion and sediment delivery to stream channels, and increased stream channel runoff. Flooding and debris flows are expected. Channel widening and excessive gully formation will occur. About ?% of the fire burned at moderate to high severity posing a widespread threat to hydrologic function across the fire. Risk to riparian areas from increased stream flows, channel erosion and loss of grass, forb, and shrub components in those areas that experienced moderate and high soil burn severity	Likely, Moderate, High
Natural Resource	Hydrologic Function	Hydrologic function of hillslopes and channels is at risk due to the loss of soil cover and structure, decreased infiltration, hillslope erosion and sediment delivery to stream channels, and increased stream channel runoff. Under such conditions, greater probability of erosion, sedimentation, flooding, and debris flows will exist.	Likely, Moderate, High
Natural Resource	Native or naturalized communities - non-forested	The slow natural regeneration following moderate to high burn severity consuming seed bank threatens the native or naturalized communities of grass/shrub steppe habitat important. Known noxious and invasive weed populations that include Dalmatian toadflax, diffused knapweed, and other species cover approximately 1,263 acres within the fire perimeter, and are expected to aggressively compete with native species for space and nutrients in burned areas.	Very Likely, Moderate, Very High

NFS Critical Value	Value-at-Risk	Description of Threat	Risk
<b>Natural Resource</b>	Soil Productivity	Risk to soil productivity with a high probability of immediate detrimental soil displacement in burned areas affected by moderate and high burn severity. The loss of effective ground cover and above ground organic matter will leave the soil resource susceptible to erosive forces for 3 to 5 years in high severity areas and 2 years in moderate.	Likely, Moderate, High
<b>Natural Resource</b>	Native or naturalized communities - Forested	Significant tree mortality, where the natural regeneration is delayed due to the loss of the canopy, seed bank, and organic soil layer threatens native or naturalized vegetative communities of forest land. Known noxious and invasive weed populations cover approximately 1,263 acres within the fire perimeter, and are expected to aggressively compete with native species for space and nutrients in burned areas.	Very Likely, Moderate, Very High
<b>Cultural &amp; Heritage Resource</b>	Cultural Sites	Risk to historic structure walls/rubble from fire killed trees. Threats to features and artifact assemblages from erosion or engulfed by debris/mud flows.	Likely, Moderate, High

B. Emergency Treatment Objectives:

- Reduce threats to personal injury and/or human life of visitors using select system roads or trails.
- Protect or minimize damage to National Forest System investments within the burned area. Minimize damage to key system travel routes within the fire boundary.
- Protect or mitigate potential post-fire impacts to critical natural resources and significant cultural resources within or downstream from the burned area.
- Control expected invasion of noxious weeds within and adjacent to the area where soils/vegetation was disturbed as a result of suppression activities.
- Warn users of Forest roads and trails of hazards present in the burned area. Consider temporary closure to protect public users of NF lands.

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

Land - 60%      Channel – NA      Roads/Trails - 60%      Protection/Safety - 90%

#### D. Probability of Treatment Success

Treatment	Years after Treatment		
	1	3	5
Land	90	70	--
Channel			--
Roads/Trails	70	80	90
Road treatments are designed for increased runoff which will decrease as vegetation recovers.			
Protection/Safety	80	60	60
Assume Visitors will pay attention to the new signs.			

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

#### F. Cost of Selected Alternative (Including Loss):

#### G. Skills Represented on Burned-Area Survey Team:

- |   |   |  |   |
|---|---|--|---|
| [ <input checked="" type="checkbox"/> ] Hydrology | [ <input checked="" type="checkbox"/> ] Soils | [ <input 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 checked="" type="checkbox"/> ] GIS    | [ <input type="checkbox"/> ] Landscape Arch         |

Team Leader: TJ Clifford, Boise District BLM

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Phone: 208-384-3459

FAX:

#### 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.)

*These treatments were developed by each of the respective resource groups as part of a specification sheet that helped guide narrative and cost considerations. Each treatment proposal was then captured within this document. Since the development of those specification sheets, the team leader has communicated with BAER Coordinators at forest, regional, or national levels to ensure consistency with BAER authority. Therefore, this document, with the included treatment description and design, supersedes all prior versions.*

#### Land Treatments

##### L03 - Seeding

**General Description of Treatment:** High soil burn severity areas within the Carlton Fire are subject to being captured by adjacent noxious weed communities. Many of the noxious weed species have the potential to out compete the native plant community during the post-fire recovery period. This treatment is designed to protect the R6 sensitive plants and supplement the remaining native seed bank in order to promote a more robust recovery of the native plant community and avoid the potential for the conversion of the selected high soil burn severity areas to noxious weeds.

**Suitable Sites:** The proposed treatments are designed for the areas occurring adjacent to forest roads and in polygons where noxious weed pressure on the native plant community is expected to be high.

**Design/Construction Specifications:** Apply inoculated native seed mix to roadside buffers and polygons in areas of high soil burn severity adjacent to known noxious weed infestations. Use seed mix recommended by the Methow Valley Ranger District Botanist and approved by the Okanogan-Wenatchee National Forest Regional Botanist. Apply seed mix at a rate of 20.15 pounds per acre, based on Critical Area Planting standards.

1. Seed will be pretreated with plant specific mycorrhizal inoculant at 1 pound per 20 pounds of seed mix.
2. Seed will be applied by hand mechanical seeders on locations identified on the treatment map.
3. Seeding should occur in late fall or early winter which will allow seed to naturally stratify.
4. Seed can be broadcast directly onto snow.
5. The seed mix was provided by Kelly Barabiar, Methow Valley Ranger District Botanist (509-996-4019). A seeding rate of 20 pounds per acre will be used, based on the existing site conditions which coincide with the concepts established by the USDA Natural Resource Conservation Service, Critical Area Planting Standard 342. A higher than normal seeding rate is being proposed for areas that will be aerial seeded to account for seed drift. Prices for seed mixes listed below are estimated at the 25 lbs/acre price. The cost of seed will decrease where it is applied by hand at the 20 lbs/acre price. There will also be areas where a lower seeding rate will be applied to evaluate and monitor appropriate seeding rates for future knowledge. Costs will also decrease if the Forest Service can partner with the DNR to share implementation costs such as helicopter time.
6. Treatment includes 108 acres of 20 foot wide buffers along roads and outside of documented noxious weed populations (or above and below disturbed road prism width) within the high soil burn severity areas and 719 acres of seeding within upland polygons that have a high probability of noxious weed infestations (see treatment map for locations).
7. A monitoring plan for post BAER seeding effectiveness will be submitted prior to spring green-up.

Common Name	Scientific Name	Quantity	Total amount for mix
Mountain Brome	<i>Bromus carinatus</i>	46%	<b>7609 lbs.</b>
Yarrow	<i>Achillea millefolium</i>	2 %	<b>331 lbs.</b>
Canbyi's bluegrass	<i>Poa canbyi</i>	12%	<b>1985 lbs.</b>
Blue Wildrye	<i>Elymus glaucus</i>	40%	<b>6616 lbs.</b>
*Biotype not specified. BFI uses what's on hand.	@ 827 acres x 20 Pure Live Seed lbs/acre = 16,540 lbs. Pure Live Seed		

\*Assume 0.30-0.35/lb. for shipping costs (not factored in to prices below).

**Purpose of Treatment:** Fire is a disturbance that provides a receptive avenue for the spread of noxious weeds and/or invasive species. Noxious weeds and non-native invasive species are a concern for native plant communities. Weed invasion is a potentially threatening process leading to competition and habitat modification. This treatment is necessary to prevent the establishment and to control the spread of noxious weeds and non-native invasive species into certain high soil burn severity areas of the Carlton Fire. Since one seed mix will be applied over different seed zones, four different species are recommended in the seed mix to help guarantee success. Native communities are at high risk of type conversion to Knapweed and/or Toadflax and other non-native weeds by the spread of weed seed into high soil burn severity areas. This treatment targets areas of pre-fire native plant communities that included, among other native and naturalized plants, the following R6 sensitive plants; *Botrychium ascendens*, *Botrychium crenulatum*, *Botrychium lineare*, *Botrychium paradoxum*, *Botrychium pedunculosum*, and *Mimulus pulsifera*.

The BAER team considered this treatment the minimum necessary to achieve a reduction in risk to the accumulated critical values of:

**1. Native and Naturalized plant communities**

This treatment is intended to achieve four sequential objectives:

- a) Maintain the natural bio-diversity of the native plant community by providing a buffer from known areas of noxious weeds.
- b) Supplement the native seed bank, which was damaged by the high soil burn severity.
- c) Protect the habitat of the R6 Sensitive plants from encroachment by and conversion to noxious weeds.
- d) Increase the transfer of available soil moisture and nutrients by pretreating the seed with mycorrhizal inoculant.

**Describe Treatment Effectiveness Monitoring:**

1. Visually inspect seeded areas to determine the percentage of seed mix germination.
2. Visually inspect, over several growing periods, the areas along roads that were buffered by the seeding and larger polygons that were seeded in order to determine the presence of noxious weeds.
3. Check short feeder roots and soil matrix for the cottony white appearance of fungal mycelia.  
Inspection. Note: Symbiotic mycorrhizae associated with plant roots will not promote or show root decay.

### **Roads and Trail Treatments**

Treatment #R1a – Construct/Improve Armored Drainage Sag: Construct outsloped drain sags with armoring for diverting and removing water off the road surface, as well as draining any roadway ditch. Typical drainage sags are 30-50 ft in length and create a low water trough to redirect drainage flow. Drainage sags are installed in natural grade break in the road prism. Actual spacing of drainage sags will be based on Forest Service Handbook direction and location of topographical features, particularly in areas where active streams are crossing the road. (See Engineering report for detail)

Treatment #R1b – Construct/Improve Unarmored Drainage Sag: Construct outsloped drain sags for diverting and removing water off the road surface, as well as draining any roadway ditch. Typical drainage sags are 30-50 ft in length and create a low water trough to redirect drainage flow. Drainage sags are installed in natural grade break in the road prism. Actual spacing of drainage sags will be based on Forest Service Handbook direction and location of topographical features, particularly in areas where active streams are crossing the road. (See Engineering report for detail)

Treatment #R2a – Construct/Improve Armored Drainage Dip1: Construct outsloped drain dips with armoring for diverting and removing water off the road surface, as well as draining any roadway ditch. Typical drainage dips or rolling dips on steeper grades (5-12% grades) have a one (1) foot trough depth and range between 120 to 140 feet in length including taper with the cross slope of the roadbed maintained through the dip. Drain dips rely on a mound of soil at the downhill side to stop water. Actual spacing of drainage dips will be based on Forest Service Handbook direction and location of topographical features. (See Engineering report for detail)

Treatment #R2b – Construct/Improve Unarmored Drainage Dip1: Construct/improve outsloped drain dips for diverting and removing water off the road surface, as well as draining any roadway ditch. Typical drainage dips or rolling dips on steeper grades (5-12% grades) have a one (1) foot trough depth and range between 120 to 140 feet in length including taper with the cross slope of the roadbed maintained through the dip. Drain dips rely on a mound of soil at the downhill side to stop water. Actual spacing of drainage dips will be based on Forest Service Handbook direction and location of topographical features. (See Engineering report for detail)

Treatment #R3 – Construct Armored Ford2: Construct outsloped drainage feature with armoring to improve anticipated increases in stream flow including debris, keeps the flow in the same drainage, thus reducing diversion potential and usually prevents a total fill failure. Fords will be located based on locations of existing culverts and length of armor will depend on field conditions at each site. (See Engineering report for detail)

Treatment #R4 – Hydrologically close road:

1. Construct/Improve drain dips: Construct drain dips to enable maintenance level 1 roads to better handle expected increases in surface runoff. Drain dips are recommended due to the steepness of the road prism which renders water bars ineffective. Actual spacing of drain dips will be based on Forest Service Handbook direction.

2. Remove Existing Culverts: Remove existing culvert and associated road fill in selected channel or draw locations to reestablish more natural flow pattern and reduce the risk of culvert plugging due to increased sedimentation loading from the upslope fires. Removed road fill to be used to construct a drain dip down gradient of crossing to prevent the risk of further sedimentation from the road.
3. Construct road closure berms:

Treatment #R5 – Fabricate and install gate: Fabricate/purchase and install closure gates and burned area hazard notification signs to inform the public of post-fire conditions and management actions taken to protect the public safety (roads, trails and trailheads). Gates will allow the Forest Service to provide essential access to private lands and protect the public from existing and potential road washouts as a least cost alternative. A gate is to be located at the beginning FSR 4013200.

Treatment #R6 –Surface Water Management: Clean inlets and outlets of existing relief culverts and those culverts in active stream channels to reduce the buildup of sedimentation which may lead to fill failure along road grades >2% within or directly downslope or downgrade of moderately to high intensity burn areas in areas contiguous with critical fisheries habitat. Treatment includes installation of temporary erosion control during construction.

Treatment #R7 – Storm Patrol: Patrol area during and immediately after storm events to repair, unplug, or aid in drainage of road drainage features along FS Road 4010, 4012100, 4013200 and 40330400 to the closure, to reduce the risk of catastrophic road drainage failure and high sedimentation yield. As the remaining open access for administration and public, it is important to monitor this road. Recommend two person teams to complete the assessment. Days include 5 days for road crew backhoe to complete emergency mitigation action.

#### RT04 – Storm Patrols

**General Description:** The patrols are used to identify those road problems such as compromised drainage issues such as plugged culverts and washed out roads and to clear, clean, and/or block those roads that 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 roads which are exhibiting severe surface erosion.

**Suitable Sites:** Refer to BAER Treatment Map. The patrols should first focus on those roads and bridges that receive the most traffic, are of more value to the transportation system, and/or have high-risk structures that are prone to storm damage. Not listed in any order of preference, these roads include the following:

- NFSR 4150000 (Benson Creek Road)
- NFSR 4100000 (South Summit Road)
- NFSR 4250200 (Volstead Creek Road)
- NFSR 4100300 (Finley Mtn Road)

Other roads within the fire perimeter will need to be patrolled in the spring after runoff and after all severe storm events. Order of preference will depend on the storm location.

#### Design/Construction Specifications:

1. FS personnel will direct the work.
2. Immediately upon receiving heavy rain and during significant spring snowmelt the FS will send out patrols to identify road hazard conditions – obstructions such as rocks, sediment, washouts, and plugged culverts, so the problems can be corrected before they worsen or jeopardize forest road users.
3. The road patrols shall bring in 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 be placed outside of the bank-full stream channel where it cannot re-enter the stream.

**Purpose of Treatment:** Roads within the Carlton Complex Fire contain drainage structures that cross both perennial and intermittent streams and dry gullies located in watersheds that have a moderate and high burn severity. These streams and gullies 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 will likely be additional erosion and debris further down the drainage due to the failures of the fill slopes of the roads and roads washing out caused by the flow travelling down the roadway.

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. The post-fire flooding will threaten to interrupt access to visitors, local residents, and Forest Service personnel who are implementing treatments. 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 especially along and below steep slopes.

The purpose of the monitoring is to evaluate the condition of roads and bridges for motorized access and to identify and implement additional work needed to maintain and/or repair damage to road surfaces and flow conveyance structures (culverts, rolling dips, ditches) along 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 summer thunderstorms and spring snow-melt. Survey will inspect road surface condition, ditch erosion, and culverts/inlet basins for capacity to accommodate runoff flows. The BAER Team considered this treatment to be the minimum necessary to achieve a reduction in risk to the accumulated critical values of:

1. Human life and safety of visitors, private residents, and agency personnel
2. Property (Forest roads)
3. Hydrologic function (including riparian and stream channel stability)

**Describe Treatment Effectiveness Monitoring:** Monitor the storm-patrol response time to ensure objectives are being met. Identify the type of storm event that mobilizes material.

### Protection/Safety Treatments

#### PS01 –Safety Signs

**General Description:** This treatment is for the installation of burned area warning signs and road delineators. Burned area signs warn the public about possible dangers associated with a burned area on major entry points into the burned area and developed recreation sites. It shall contain language specifying items to be aware of when entering a burn area such as falling trees and limbs, rolling rocks, and flash floods.

Road delineators are reflective devices mounted in a series along the edge of roadway where there is danger adjacent to the roadway to help indicate the roadway alignment and ensure driver safety.

**Suitable Sites:** Refer to BAER Treatment Map.

**Detailed Design/Construction Specifications:**

1. Traffic Warning and Road Closure Signs shall conform to the Manual on Uniform Traffic Control Devices (MUTCD) and shall be installed per Federal Highway Safety Standards.
2. Burned Area warning signs along Highway 20 shall measure, at a minimum, 4 feet by 4 feet and consist of 0.08" aluminum, sheeted in high intensity yellow with black letters and/or meet WSDOT Standards. The BURNED AREA lettering shall be a minimum of 5 inches in height and all remaining lettering shall be a minimum of 3.5 inches in height.
3. Bridge delineators shall conform to Type 3 object marker standards established by the MUTCD. Road delineators shall conform to MUTCD and the "Sign and Poster Guidelines for the Forest Service" (EM-7100-15).
4. Burned Area warning signs at entrances to National Forest lands shall measure, at a minimum, 30 inches by 36 inches and consist of 0.08" aluminum, sheeted in high intensity yellow with black letters and/or meet WSDOT Standards. The BURNED AREA lettering shall be a minimum of 5 inches in height and all remaining lettering shall be a minimum of 3.5 inches in height.

**Purpose of Treatment:** The purpose of this treatment is to provide safety to the motorists of upcoming road dangers and/or objects. The BAER Team considered this treatment to be the minimum necessary to achieve a reduction in risk to the accumulated critical values of:

1. Human life and safety of visitors, private residents, and agency personnel

**Protection/Safety Treatments (SW Carlton Portion)**

Treatment #PS1 – Closure and Warning Signs: Fire closure bulletin boards will be installed on FSR 4010 upon enter National Forest along with two other locations at the ridgeline to be determined by the district. Warning signs will include Entering Burned Area, Stay on Roads and Trails on FSR 4010,4012100, 4013200 and 4330 and will be installed to meet Manual of Uniform Traffic Control Devices (MUTCD) standards.

Closure Gates - install closure gates at locations to reduce the risk to public being caught in a debris/runoff event or being hit by fire-killed trees. Area closure signs will be included in the sign totals to inform users that a closure order is in place and highlight the post-fire hazards to people ignoring that order.

Closure and Warning signs –the warning and closure signs on gates will help to provide both technical closure information and warning information to potential Forest users.

Pump, sanitize, close and lock vault toilet restroom facilities at recreation use sites that could be impacted by post-fire floods. This will help to minimize the risk to the facilities along with reducing the potential for downstream sanitary problems. For the south part of the Carlton Fire this includes two CXTs (Foggy Dew Campground), one single vault toilet (Black Canyon SnowPlay Area) and one double vault toilet (South Fork Gold Creek SnowPlay Area).

**Describe Treatment Effectiveness Monitoring:** District personnel will monitor or check signs after events to ensure that they will be effective for the future.

**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.)

Monitoring will focus on implementation monitoring to ensure that the treatments are implemented as planned/prescribed. Some effectiveness monitoring for the area closure is

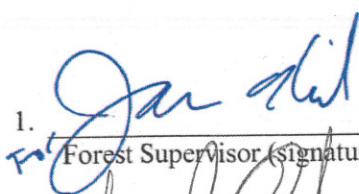
included to determine if further law enforcement presence or additional public information is needed to get compliance and provide for public safety.

**PART VI – EMERGENCY RESPONSE ACTIONS AND SOURCE OF FUNDS****Interim #1**

		NFS Lands			Other	Other Lands			All
		Unit	# of	BAER \$		# of	Fed	# of	
Line Items	Units	Cost	Units	\$	units	\$	Units	\$	Total
<b>A. Land Treatments</b>									
L03 Seeding	acres	269	827	\$222,463	\$0	\$0	\$0	\$0	\$222,463
<i>Insert new items above this line!</i>									
<i>Subtotal Land Treatments</i>				\$222,463	\$0	\$0	\$0	\$0	\$222,463
<b>B. Channel Treatments</b>									
<i>Subtotal Channel Treat.</i>				\$0	\$0	\$0	\$0	\$0	\$0
<b>C. Road and Trails</b>									
Storm inspection/respond	days	1175	5	\$5,875	\$0	\$0	\$0	\$0	\$5,875
Construct/improve armor	each	2135	6	\$12,810	\$0	\$0	\$0	\$0	\$12,810
Construct/improve unarm	each	870	5	\$4,350	\$0	\$0	\$0	\$0	
Construct/improve armor	each	1790	8	\$14,320	\$0	\$0	\$0	\$0	
Construct/improve unarm	each	870	10	\$8,700	\$0	\$0	\$0	\$0	
Construct armored ford(t)	each	8710	2	\$17,420	\$0	\$0	\$0	\$0	\$17,420
Hydrologically Close roa	mile	6765	4.8	\$32,472	\$0	\$0	\$0	\$0	\$32,472
Surface water manageme	mile	1500	8.8	\$13,200	\$0	\$0	\$0	\$0	\$13,200
RT04 Storm Patrols	days	1165	5	\$5,825					
<i>Insert new items above this line!</i>									
<i>Subtotal Road &amp; Trails</i>				\$114,972	\$0	\$0	\$0	\$0	\$81,777
<b>D. Protection/Safety</b>									
PS01 Safety Signs	signs	56	343	\$19,208	\$0	\$0	\$0	\$0	\$19,208
Gates	Each	7140	1	\$7,140	\$0	\$0	\$0	\$0	
Signs (PS1)	Each	310	4	\$1,240	\$0	\$0	\$0	\$0	
Vault Toilet protection	Each	1000	4	\$4,000	\$0	\$0	\$0	\$0	
<i>Insert new items above this line!</i>									
<i>Subtotal Structures</i>				\$31,588	\$0	\$0	\$0	\$0	\$19,208
<b>E. BAER Evaluation</b>									
SW Carlton Team					\$40,000				
NE Carlton Team					\$108,511	\$0	\$0	\$0	\$108,511
<i>Insert new items above this line!</i>									
<i>Subtotal Evaluation</i>				---	\$0	\$0	\$0	\$0	\$0
<b>F. Monitoring</b>									
<i>Insert new items above this line!</i>									
<i>Subtotal Monitoring</i>				\$0	\$0	\$0	\$0	\$0	\$0
<b>G. Totals</b>									
Previously approved				\$145,527					
Total for this request				\$223,496					

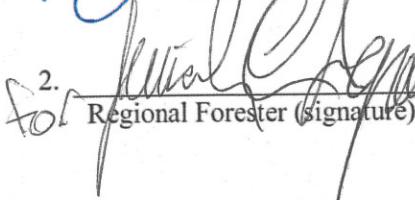
PART VII - APPROVALS

1.



Forest Supervisor (signature)

2.



Regional Forester (signature)

10/10/14

Date

10/20/14

Date