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

Date of Report: 09/08/14

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: Duncan (Chiwaukum Complex)

B. Fire Number: WA-OWF-000377

C. State: WA

D. County: Chelan

E. Region: PNW (06)

F. Forest: Okanogan-Wenatchee (17)

G. District: Entiat Ranger District

H. Fire Incident Job Code: P6H8QM (0617)

I. Date Fire Started: July 16, 2014

J. Date Fire Contained: August 26, 2014

K. Suppression Cost: as of 8/27/2014; $7,010,000

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

M. Watershed Number: Portions of the following 6th Level HUCs:

170200100202	Three Creek-Entiat River
170200100204	Lake Creek-Entiat River
170200100203	North Fork Entiat River

N. Total Acres Burned: 12,691
NFS Acres(12,691) Other Federal (0) State (0) Private (0)

O. Vegetation Types: Ponderosa Pine, grand fir, silver fir, mountain hemlock, sub-alpine fir

P. Dominant Soils: ashy sandy loams,and rock outcrop/rubblelands

Q. Geologic Types: The majority of the area is the Duncan Hill Pluton (Eiq) which consists of heterogenous plutons and dikes of gneissose quartz diorite, tonalite, granodiorite, monzodiorite, and rare granite with alpine glacial drift in the drainage bottoms of the North Fork Entiat

R. Miles of Stream Channels by Order or Class: (By Soil Burn Severity (SBS))

Stream Type	Total	In High SBS	In Moderate SBS	In Low SBS
Intermittent	11	1	4	2
Perennial	11	1	2	4
Total	22	2	6	6

S. Transportation System

Trails: 12 miles Roads: 73 miles

Maintenance Level	Description	Miles	High SBS	Moderate SBS	Low SBS
1	Basic custodial care	37	4	14	9
2	High Clearance vehicles	23	2	8	5
3	Suittable for passenger cars	8	-	1	2
4	Moderate degree of user comfort	0	-	-	-
5	High degree of user comfort	3	-	-	0
Road	Non-FS System	2	1	0	0
Trail	Hiking	1	-	1	0
	Motorcycle	5	1	3	0
	Pack and Saddle	2	0	1	1
	Not FS	4	0	2	1

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 2,938 - 23% (very low); 2,891 - 23% (low); 4,974 - 39% (moderate); 1,888 - 15% (high)

Watershed	Subwatershed	Total Acres	Burned Acres and (%)	Low Severity Acres and (%)	Moderate Severity Acres and (%)	High Severity Acres and (%)
Entiat River	Lake Creek – Entiat River	37,648	4761 (13 %)	985 (3 %)	1574 (4 %)	709 (2 %)
	North Fork Entiat River	17,374	4487 (26 %)	1153 (7 %)	1996 (11 %)	696 (4 %)
	Three Creek – Entiat River	22,154	3443 (16 %)	753 (3 %)	1404 (6 %)	483 (2 %)

B. Water-Repellent Soil (acres): 5147 acres (75% of high and moderate soil burn severity

C. Soil Erosion Hazard Rating (acres):
189 (1%) (slight); 1887 (15%) (moderate); 8654 (68%) (severe); 1448 (11%) (very severe)

D. Erosion Potential: average of 27 tons/acre **per storm event**

E. Sediment Potential: 1,572 cubic yards / square mile **per storm event**

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 3 to 5

B. Design Chance of Success, (percent): 70

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

D. Design Storm Duration, (hours): 1 hour

E. Design Storm Magnitude, (inches): 0.94

F. Design Flow, (cubic feet / second/ square mile): 4

G. Estimated Reduction in Infiltration, (percent): ~ 54

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

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

Values at risk	**Risk and emergency**
Human life and safety on National Forest System (NFS) roads. Several culverts in NFSR 51 have been blocked and overtopped. At least one culvert in a maintenance level 2 road is known to have failed. Additional culvert blockage and failure is anticipated. Portions of road prism could be lost with the culvert failures. There is no alternate egress from the area should NFSR 51 be blocked anywhere above NFSR 5900.	Probability of damage or loss = likely Magnitude of consequence = moderate Risk = high Emergency treatment needed = yes Emergency actions needed = yes
Human life and safety on NFS trails Burned trees adjacent to trails present a hazard to the user. BAER hazard tree funding is only available to mitigate hazards to BAER teams.	Probability of damage or loss = likely Magnitude of consequence = high Risk = very high Emergency treatment needed = no Emergency actions needed = yes
Human life and safety in Silver Falls Campground. The results of the WILDCAT5 modeling indicate that there will be little change in runoff characteristics since a relatively small portion of the watershed burned. However, a portion of the campground could be affected by culvert blockage of Silver Creek at NFSR 51.	Probability of damage or loss = possible Magnitude of consequence = major Risk = high Emergency treatment needed = yes Emergency actions needed = yes

Values at risk	Risk and emergency
Human life and safety at the Riverside recreation residences tract. Slopes tributary to the tract are largely unburned or burned at low severity. There is a possibility that events affecting Jungle Creek could also affect egress from this tract.	Probability of damage or loss = unlikely Magnitude of consequence = major Risk = intermediate Emergency treatment needed = no Emergency actions needed = no
Human life and safety at the Pope Creek recreation residences tract. Debris flows have affected the tract; more are expected. Modeling shows a substantial increase in post-fire flows which could further erode the stream channels and mobilize sediment and debris in the channels and across the alluvial fan. Structures could be damaged. Egress from the area could be lost.	Probability of damage or loss = very likely Magnitude of consequence = major Risk = very high Emergency treatment needed = no Emergency actions needed = yes
Human life and safety in North Fork Campground. This campground is on a debris fan. Two flood and debris flows have come from Pope Creek in response to relatively small rain events. Similar debris flows are expected from the North Entiat River. Although the modeling does not show substantial changes in runoff for the whole watershed, portions of the lower third of the watershed are burned and could produce debris flows.	Probability of damage or loss = likely Magnitude of consequence = major Risk = very high Emergency treatment needed = yes Emergency actions needed = yes
Human life and safety in Cottonwood and Spruce Grove Campgrounds. Based on the acreage and severity of the burned area possibly affecting Cottonwood and Spruce Grove Campgrounds plus the modeling, the BAER team concluded that there will be little change in runoff characteristics due to the fire.	Probability of damage or loss = unlikely Magnitude of consequence = major Risk = intermediate Emergency treatment needed = no Emergency actions needed = no
Human life and safety at Three Creek Campground. Based on the campground's location on an alluvial fan, the acreage and severity of the burned area possibly affecting this campground, and the modeling, the BAER team concluded that there is a possibility of fire-related effects on the site.	Probability of damage or loss = possible Magnitude of consequence = major Risk = high Emergency treatment needed = yes Emergency actions needed = yes
Human life and safety at Cottonwood Guard Station. The slopes upgradient of the Station are largely unburned or burned at low severity.	Probability of damage or loss = unlikely Magnitude of consequence = major Risk = intermediate Emergency treatment needed = no Emergency actions needed = likely
Human life and safety on trails in the burned area. Life and safety are threatened by burned trees along all trails. Additionally, trail treads may be lost or unstable in many areas.	Probability of damage or loss = very likely Magnitude of consequence = major Risk = very high Emergency treatment needed = no Emergency actions needed = yes

Values at risk	Risk and emergency
Property at the Pope Creek recreation residences tract. The residences are under permit. The permit has a clause specifying that the permit holder assumes all risk of loss to the authorized improvements including loss from fire, fire fighting, and natural events.	Probability of damage or loss = very likely Magnitude of consequence = major Risk = very high Emergency treatment needed = no Emergency actions needed = yes
Damage to National Forest System roads. All roads in the burned area may be affected in some way – ravel; rock fall or trees blocking the roadway; culverts blocked and overtopped with and without embankment failure; debris flows depositing on the roadway or removing portions of the road prism.	Probability of damage or loss = very likely Magnitude of consequence = moderate to major Risk = very high Emergency treatment needed = yes
Damage to the Silver Falls National Recreation Trailhead. The trailhead includes a paved parking lot, toilet, information kiosk, and the Silver Falls Guard Station. The results of the modeling indicate that there will be little change in runoff characteristics since a relatively small portion (5% moderate and high) of the watershed burned. However, a portion of the parking lot could be affected by culvert blockage of Silver Creek at NFSR 51.	Probability of damage or loss = unlikely Magnitude of consequence = moderate Risk = intermediate Emergency treatment needed = no Emergency action needed = no
Damage to trail infrastructure, including tread, drainage features, and retaining walls. Slope ravel or failures, debris, and increased runoff or debris flows may affect all or portions of the trail itself.	Probability of damage or loss = very likely Magnitude of consequence = minor Risk = low Emergency treatment needed = no Emergency action needed = yes
Damage to the Silver Falls National Recreation Trail bridges. The trail has several trail bridges crossing Silver Creek. The results of the modeling indicates that there will be little change in runoff characteristics since a relatively small portion of the watershed burned (5% moderate and high). However, the bridges are possibly threatened by burned debris being carried down the channel.	Probability of damage or loss = possible Magnitude of consequence = major Risk = high Emergency treatment needed = yes
Damage to infrastructure in the Silver Falls Campground. Infrastructure includes a spring diversion and distribution box in the burned area, several historic structures in the community kitchen section of the campground, and several vault toilets. The diversion and distribution box have been damaged by the fire. The modeling results indicate that there will be little change in runoff characteristics since a relatively small portion of the watershed burned.	Probability of damage or loss = possible Magnitude of consequence = moderate Risk = intermediate Emergency treatment needed = no
Damage to infrastructure at the North Entiat Trailhead. There is a toilet at the trailhead located at the edge of the alluvial fan/debris flow deposition zone. While the trailhead itself is not burned, the surrounding area is burned at high and moderate severity.	Probability of damage or loss = possible Magnitude of consequence = moderate Risk = intermediate Emergency treatment needed = yes

Values at risk	Risk and emergency
Damage to infrastructure at the Cottonwood Trailhead. This trail head is on the edge of the burned area.	Probability of damage or loss = unlikely Magnitude of consequence = moderate Risk = low Emergency treatment needed = no

NFS Transportation Infrastructure: Entiat Valley Road (FSR 51), Shady Pass Road (FSR 5900) plus numerous NFS Roads damaged or threatened by heavy runoff and debris flows (FSR 5901, 5902, 5606 and 5608). Some of these roads would be at risk from enhanced post-fire overland flow running down and/or across the road which would damage the road tread. Some road intersections would potentially be damaged at stream or drainage crossings where the culvert (or other crossing type) could plug and fail resulting in high amounts of downstream sedimentation. This senario occurred on August 14th on FSR 5902 where it crossed Pope Creek. The resulting sediment and routed runoff and sediment scoured Pope Creek, moved the main channel to historic channels on the debris fan near the mouth and damaged the Entiat River Road (FSR 51) and highlighted the potential for damage of historic recreation residences on the fan.

NFS Infrastructure: trailhead and campground developments including vault toilets, picnic tables and associated campground infrastructure for level 2 development. Trail bridges are at risk from elevated bulked post-fire flows and debris flows and trail treads are at risk from elevated post-fire overland flow which will run down trail treads and overwealm trail drainage structures designed for pre-fire runoff.

ESA Listed aquatic resources: bull trout, west slope cutthroat trout, Columbia River spring chinook and Columbia River summer steelhead are at risk from elevated post-fire sedimentation and in-stream turbidity in the Entiat river just downstream of Entiat Falls (natural barrier to anadromy).

Human life and safety: the Entiat River Road (FSR 51) has no alternate egress above the Shady Pass Road (FSR 5900). There are also campgrounds downstream of high and moderate soil burn severity which are at risk from elevated post-fire bulked flows and debris flows (e.g. North Fork Campground, Three Creek Campground and Fox Creek Campground) in tributaries and in one case the mainstem of the Entiat. Life and safety is also of high concern at the mouth of Pope Creek (permitted recreation residences) and all along Entiat River Road. Similarly three camp sites at Silver Falls CG would put humans at risk. Trails that are within the burn area and immediately downstream would put users at risk of post-fire flows, debris flows, hazard trees and stump holes.

Resource Summaries:

Hydrology

The Duncan Fire is entirely in the Entiat River watershed. The primary watershed responses of the Duncan Fire area are 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 responses are 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.

The primary hydrologic mechanisms of damage are flooding, debris flows, and debris jams. After a field reconnaissance, the BAER team identified the Silver Creek, Pope Creek, Duncan Creek, and North Fork subwatersheds of particular concern. The Soil Burn Severity map and modeling coupled with field observations were used to assess the level of threat and risk to the values at risk in and adjacent to the burned area, and to develop treatment recommendations.

The combination of moderate and high severities was used to indicate the hydrologic response because it is these severity ranges that produce the majority of the post-fire runoff. Sixty five percent of the Pope Creek subwatershed burned at moderate and high severity; 73% of the Duncan Creek subwatershed , 16% of the North Fork subwatershed, and 5% of the Silver Creek subwatershed burned at moderate and high severity. At the downstream edge of the burned area, nine percent of the Entiat River is burned at moderate and high severity. Modeled post-fire runoff indicates an increase of at least two orders of magnitude for the Duncan and

Pope Creek subwatersheds and an increase of at least one order of magnitude for the North Fork. Modeling for Silver Creek indicated little change in runoff. The model does not assess the probability of debris flows. At least two debris flows have emanated from Pope Creek. Similar flows are expected from the North Fork and additional ones from Pope Creek.

Soils

Soil loss through post wildfire erosion on both soil burn severity classes will result in a long-term loss of soil productivity. Additionally, other detrimental fire/soil heating effects on soils occurred on both high and moderate burn severity areas.

Natural recovery of ground cover through needle cast and native vegetation is expected to occur over the next 3-5 years. Under severely burned forest stands, the full function of the thick litter and duff layer that existed before the fire would be fully realized until a new forest stand is established.

The Soils Team considered but did not propose any hill-slope erosion control treatments for protection of soil productivity. Hill-slope treatments could potentially reduce but not eliminate threats to downstream values at risk.

Fisheries

The Entiat River currently supports runs of Upper Columbia River summer steelhead (threatened), Upper Columbia River spring Chinook salmon (endangered), Columbia River bull trout (threatened) and their designated "Critical Habitat", as well as coho salmon, red band/rainbow, westslope cutthroat and Pacific lamprey.

Within the burned area there is increased probability of erosion, mass wasting, and sediment delivery to the Entiat River based on peak flow calculations and hill slope erosion models of the Duncan fire. The probability of delivering measurable amounts of sediment and debris to the Entiat River in a 25-year storm event is relatively high. If a 25-year storm event does trigger mass wasting in the North Fork (NF) Entiat, Pope and Silver creek drainages, large volumes of sediment and debris would be expected to reach the Entiat River. Combining abundance, productivity and spatial structure and diversity parameters, The Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan (2007, Upper Columbia Recovery Board), have listed Entiat Spring Chinook salmon, bull trout and steelhead populations at high risk of extinction due to little genetic divergence within a population. Given depressed productivity levels, and spawning habitat that is primarily limited to the mid-reaches of the Entiat, and projections of peak flow events and sediment delivery, post-fire effects from the Duncan Fire could be particularly problematic for bull trout and Chinook salmon. Post-fire effects can be exacerbated after intense summer convective storms, and with low baseflows and warming stream temperature these effects can be intensified. With this, the Duncan Fire has a high probability of adverse effects/risks to fall spawners such as spring/summer Chinook salmon and bull trout populations. Adverse effects to steelhead could be less problematic because they are spring spawners when there is more available habitat for spawning and rearing, and episodic debris torrents are diluted with seasonal flows and spring run-off.

The probability of fine sediment or a debris flow reaching the Entiat River is likely (50% to <90%) occurrence within 1-3 years but, the magnitude of consequences could be moderate (damage to critical fisheries resources resulting in considerable or long term effects). Therefore, the risk determination is high.

During the BAER assessment, road-related sediment delivery to the Entiat River was considered a risk to critical fisheries values. Geologic and hydrologic analysis determined that potential road-related sediment delivery resulting from intense precipitation events would contribute only a minor percentage above expected levels of erosion and mass wasting generated within the burned area. Therefore, road treatments would not be effective at reducing the post-fire risk to critical fisheries values. However, road treatments were developed to protect other critical values and will have secondary, long-term benefits to the Entiat Watershed and to ESA-listed fish.

Engineering

Specific VARs And threats described above

Cultural

Twenty (20) recorded cultural resource sites are located adjacent to the Duncan fire perimeter. Sites in the Pope Creek Recreation Residence Tract (9 historic cabins), sites in the Riverside Recreation Residence Tract (8 historic cabins), two Forest Service guard stations at Cottonwood and Silver Falls campgrounds, and campground features associated with the Civilian Conservation Corps (1933-1942) were field-reviewed to identify risk(s) from erosion, watershed failure, flooding, debris flow, and hazard tree fall that could potentially affect site integrity and permanently alter or destroy cultural resources. None of the cultural resource sites visited during this assessment requires immediate BAER treatment.

B. Emergency Treatment Objectives:

At Campgrounds/Trailheads (Table below) provide for protection of infrastructure that could be damaged in elevated post-fire flows and debris flows. Primary protection will likely be achieved simply by moving the infrastructure (picnic tables, trash cans and other moveable infrastructure out of floodplains and debris fans.

NAME	TYPE
Cottonwood	Campground
Three Creek	Campground
Spruce Grove	Campground
North Fork	Campground
Silver Falls	Campground
Lake Creek	Campground
Fox Creek	Campground
North Fork Trailhead	Trailhead
Silver Falls Trailhead	Trailhead
Three Creek Trailhead	Trailhead
Cottonwood	Trailhead

Provide for protection of NFS infrastructure at recreation sites. While sites are closed user safety is provided for but the infrastructure itself could be damaged in post-fire enhanced flood flows. Also where sanitary facilities are concerned there is a potential for flooding to entrain human waste into flows resulting in sanitary issues downstream.

Provide for protection of trail bridges that are downstream of areas burned at high and moderate soil burn severity and with elevated bulked post-fire stream flows and debris flow potential to avoid lossing the bridges. Also provide for drainage off trail tread where current trail drainage was sufficient before the fire put due to enhanced post-fire runoff onto the trail which could result in gully erosion and loss of the trail.

At permitted recreation residences along the Entiat River at Pope Creek provide for user safety by not allowing permittees to put themselves at risk. Provide for personal property protection by allow permittees to obtain there property within and around those permitted recreation residences.

Provide for Forest user safety within the burn area and immediately downstream where road crossings and other areas have been deemed at enhanced risk to flooding and debris flow potential. Forest users could be at risk of flooding, debris flows, snags, stump holes and more.

Provide for protection of Forest Service Roads - Implement actions within the Duncan Fire to:

- Ensure safe primary access (ingress and egress) for administrative access within the drainage
- Reduce road-related hazards related to the burned area

- Reduce the potential for accelerated surface runoff damaging Forest Service roads within and directly downstream of the fire areas in headwaters directly affected by the fire
- Reduce the potential for debris "bulking" as potential debris flow encounters a road-related drainage structure.
- Reduce the potential for roads to act as a conduit for overland flow and increasing sediment loading.

Provide for safety of downstream landowners, homes and businesses through interagency cooperation. Support instalation of ALERT (Automated Local Evaluation in Real Time) station to provide precipitation data for flood forecasting and early warning

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

Land __ % Channel __ % Roads/Trails **80** % Protection/Safety **70** %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land			
Channel			
Roads/Trails	80	80	80
Protection/Safety	90	90	90

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

F. Cost of Selected Alternative (Including Loss):

G. Skills Represented on Burned-Area Survey Team:

[X] Hydrology [X] Soils [ ] Geology [ ] Range [X] PIO2
[ ] Forestry [ ] Wildlife [ ] Fire Mgmt. [X] Engineering [X] Webmaster
[ ] Contracting [ ] Ecology [ ] Botany [X] Archaeology [ ]
[X] Fisheries [ ] Research [ ] Landscape Arch [X] GIS

Team Leader: Gregory A. Kuyumjian

Email:gakuyumjian@fs.fed.us Phone:_ 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.)

Land Treatments:

Felling of "killer trees" may be required for implementation team safety.

Channel Treatments:

No treatments proposed at this time -

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.

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.

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.

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.

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.

Treatment #R4 – Construct Armored Vented Ford1: Construct outsloped drainage feature over existing culverts with armoring to improve the culverts ability to better handle 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 Appendix for detail)

Treatment #R5 – Road Storm Proofing:

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 #R6 – Cattle Guard/Trash Rack/Debris deflector at Mile Marker 30, Entiat River Road (5100)

Treatment #R7 –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 #R8 – 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 on FSR 5100 at MP 38.9 after the JCT with FSR 5600. Additional gates are needed at FS Road 5606 and FS Road 5608 at the junctions with FSR 5100.

Treatment #R9 – Storm Patrol: Patrol area during and immediately after storm events to repair, unplug, or aid in drainage of road drainage features along FS Road 5100 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.

Treatment #R10 – Remove trail bridges: 3 Trail Bridges with the probability of catching debris resulting in breeches or out of channel flood flows

Treatment #T2 – trail tread stabilization: Unknown at this time

Protection/Safety Treatments:

Treatment #PS1 – Closure and Warning Signs: Fire closure bulletin boards will be installed on Entiat River Road upon enter National Forest along with two other locations at the ridgeline to be determined by the district. Warning signs will include Fallen Rock and Debris, Flash Flood Area, Next XX Miles, located at on the South Side of Pope Creek and North side of the North Fork Campground and Entering Burned Area, Stay on Roads and Trails on FSR 5100 before the junction of FSR 5900 and will be installed to meet Manual of Uniform Traffic Control Devices (MUTCD) standards. Note: These signs would not be installed if the Entiat River Road is closed from below Pope Creek.

Treatment #PS2 - Support installation of ALERT precipitation stations - Field verification and expedited processing for the issuance of temporary emergency Special Use Permits for stations on National Forest System lands. This includes resource to process the permit, help someone through the permitting process and provide the resource specialists to allow for rapid site clearance (e.g. Archaeologist for SHPO clearance).

Treatment #PS3 - 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.

Treatment #PS4 - 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. This includes one CXT at Entiat River Trailhead, four CXTs and 1 pit toilet at Cottonwoode CG, one pit toilet at Three Creek CG, one CXT at North Fork Trailhead, two pit toilets at North Fork CG for a total of 10 sites.

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 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										
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$0	$0		$0		$0	$0
B. Channel Treatments										
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Channel Treat.				$0	$0		$0		$0	$0
C. Road and Trails										
Armored drainage sag	each	2135	3	$6,405	$0		$0		$0	$6,405
Unarmored drainage sag	each	812	3	$2,436	$0		$0		$0	$2,436
Armored drainage dip	each	1790	11	$19,690	$0		$0		$0	$19,690
Unarmored drainage dip	each	789	74	$58,386	$0		$0		$0	$58,386
armored ford	each	6202	11	$68,222	$0		$0		$0	$68,222
vented ford	each	5144	2	$10,288	$0		$0		$0	$10,288
trash rack	each	5000	1	$5,000			$0		$0	$5,000
hydrologically close road	mile	4828	7.5	$36,210	$0		$0		$0	$36,210
surface water management	mile	1000	15.7	$15,700	$0		$0		$0	$15,700
Storm inspection/response	Days	1175	10	$11,750	$0		$0		$0	$11,750
Trail Bridge Removal	each	2275	3	$6,825	$0		$0		$0	$6,825
Insert new items above this line!				$240,912	$0		$0		$0	$240,912
Subtotal Road & Trails										
D. Protection/Safety					$0		$0		$0	$0
ALERT Support	Each	3000	1	$3,000	$0		$0		$0	$3,000
Gates	Each	8453	3	$25,359	$0		$0		$0	$25,359
Closure/warning signs	Each	548	11	$6,028	$0		$0		$0	$6,028
Vault Toilet protection	Each	1000	10	$10,000	$0		$0		$0	$10,000
Insert new items above this line!				$44,387	$0		$0		$0	$44,387
Subtotal Structures										
E. BAER Evaluation				---			$0		$0	$0
				---	$75,000		$0		$0	$75,000
Insert new items above this line!				---	$75,000		$0		$0	$75,000
Subtotal Evaluation										
F. Monitoring				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring										
G. Totals				$285,299	$0		**$0**		**$0**	**$285,299**
Previously approved										
Total for this request				$285,299						

PART VII - APPROVALS

1. Michael L. Ballweg — Forest Supervisor (signature) — 9-10-14 — Date

2. [signature] — Regional Forester (signature) — 9.16.14 — Date