

Date of Report: 01/27/2016

**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:** Wolverine**B. Fire Number:** WA-OWF-000287**C. State:** WA**D. County:** Chelan**E. Region:** 06**F. Forest:** Okanogan-Wenatchee**G. District:** Entiat/Chelan**H. Fire Incident Job Code:** P6JU89**I. Date Fire Started:** June 29, 2015**J. Date Fire Contained:** November 3, 2015**K. Suppression Cost:** \$30.1 Million at date of report**L. Fire Suppression Damages Repaired with Suppression Funds**

1. Fireline waterbarred (miles): on-going
2. Fireline seeded (miles): unknown
3. Other (identify): unknown

**M. Watershed Numbers:****Subwatersheds**

Bear Creek-Lake Chelan, 170200090206  
Company Creek, 170200090111  
Devore Creek-Lake Chelan, 170200090201  
Headwaters Entiat River, 170200100201  
Lake Creek-Entiat River, 170200100204  
Lone Fir Creek-Lake Chelan, 170200090207  
Lower Railroad Creek, 170200090204  
North Fork Entiat River, 170200100203  
Three Creek-Entiat River, 170200100202  
Upper Railroad Creek, 170200090203

N. Total Acres Burned: 65,323

NFS Acres( 62,469) Other Federal (2,583) State ( ) Private (197)

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

P. Dominant Soils: Volcanic ash cap 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: Total 71.47

Class I; 19.04 Class II; 2.05 Class III; 26.01 Class IV; 24.38

S. Transportation System

Trails: 79 miles Roads: 24 miles

### PART III - WATERSHED CONDITION

A. Burn Severity (acres): 13,210 (very low/unburned) 12,690 (low) 31,627 (moderate) 7,796 (high)

B. Water-Repellent Soil (acres): 19,700

C. Soil Erosion Hazard Rating (acres):  
1,836 (low) 4,553 (moderate) 36,640 (high) 12294 (not rated – rock/water)

D. Erosion Potential: 24 tons/acre (weighted average of moderate and high burn severity acres in Railroad, Entiat and Lightning watersheds)

E. Sediment Potential: 1500 cubic yards / square mile (weighted average of moderate and high burn severity acres in Railroad, Entiat and Lightning watersheds)

### PART IV - HYDROLOGIC DESIGN FACTORS

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

B. Design Chance of Success, (percent): 90

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

D. Design Storm Duration, (hours): 1

E. Design Storm Magnitude, (inches): 0.91

F. Design Flow, (cubic feet / second/ square mile): 1

G. Estimated Reduction in Infiltration, (percent): 50

H. Adjusted Design Flow, (cfs per square mile): 320

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

### **Introduction/Background:**

The Wolverine Fire started from a lightning strike in the Lake Chelan sub-basin on June 29<sup>th</sup>, 2015. The fire began in the Wolverine Creek drainage on the south shore of Lake Chelan near Railroad Creek. The Fire subsequently burned into Railroad Creek, Domke Lake, up valley towards Holden Village and Rio Tinto's Holden Mine Site Cleanup and then expanded into the upper reaches of the Entiat River.

The soil burn severity (SBS) map shows approximately 13% burned at high and 51% burned at moderate soil burn severity. The rest of the fire was either low soil burn severity or unburned. Areas of high and moderate soil burn severity are found throughout the Wolverine Fire. Areas of moderate and high soil burn will produce higher runoff and soil erosion rates.

### **Erosion Response:**

Erosional response is heavily influenced by soil burn severity and slope. The burn affected soil aggregate stability, canopy cover, ground cover, and infiltration rates. Before the fire, most of the forested areas had protective ground cover in the form of litter, duff, or ground vegetation. In high and moderate soil burn severity areas, it is highly likely that increased rates of soil erosion and sediment delivery to stream channels will occur, mostly in the first and second year following the fire, particularly on steep slopes.

Post-fire slope stability and recovery of watershed hydrologic response is dependent on many factors and typically occurs within 3-5 years following the fire. Recovery of high burn severity areas is slower as little or no vegetative ground cover remains, the potential for needle cast is low and soils are now altered by fire effects.

### **Watershed Response:**

#### **Hydrologic Response:**

The risk of flooding and erosional events will increase as a result of the fire, creating hazardous conditions within and downstream of the burned area. Hazardous in-channel conditions may be intensified by a rain-on-snow event, where long-duration rainstorms falling on a snowpack can produce very high peak flows.

The watersheds of the Okanogan Wenatchee National Forest represent a combination of folded metamorphic and sedimentary geologic landforms, modified by alpine glaciation processes in the upper basins. Hillslopes are dominated by steep continuous slopes (45-85%) with shallow soil mantled over bedrock. The landforms are highly dissected by first order drainages (>4 miles/sq. mi.), with steep channel gradients (25-45%). Headwater stream channels and swales are filled with colluvium (bedrock hollows). The combination of colluvium filled bedrock hollows and bedrock formations increase the risk of localized shallow rapid mass wasting.

Average annual precipitation ranges from 30 inches along the lower portions of the drainages to over 50 inches at higher elevation. Summer thunderstorms are typically localized and usually short duration and high intensity events. Fall and winter storms are typically Pacific maritime frontal storms dominated by rain from mid-October through mid-November. Fall rain storms are typically low intensity and long-duration. Snowfall accumulation begins in higher elevations from mid to late November with snowfall accumulations continuing through April. Rain-on-snow events are not uncommon, typically occurring from November through January, and range in their magnitude of hydrologic responses.

The streams have a flashy hydrologic response due to shallow depth to bedrock and steep headwater slopes. They have naturally high fine and coarse sediment load and channel responses alternate between floodplain aggradation and channel incision.

The fire was divided into sub-watersheds with "pourpoints" established at or near the outlets of burned watersheds, or tributaries above identified values at risk. Watershed runoff response was calculated to these points.

Hydrologic design factors used to analyze the effects of the Wolverine Fire assumed vegetative recovery to take 3 to 5 years; treatment chance of success as 90%. The selected storm for analysis is a 25 year return interval with a one hour duration. The storm total is 0.91 inches using a distribution recommended by NOAA. Estimated reduction in infiltration was based on the percentage of hydrophobic soils in the burn area, which was determined to be approximately 50% of areas identified as high and moderate burn severity. Pre-fire normalized estimated flow at 1 cubic feet per second per square mile and post-fire normalized estimated flow is 320 cubic feet per second per square mile. These values do vary by watershed and are described in greater detail along with analysis methods in the Wolverine Hydrology report.

#### Water Quality:

Wildfires affect water quality through increased sedimentation. As a result, the primary water quality constituents or characteristics affected by fire include color, sediment, suspended material, and turbidity. Floods and debris flows can entrain large material, which can physically damage infrastructure associated with the beneficial utilization of water (e.g., water conveyance structures; hydropower structures; transportation networks). The loss of riparian shading and the sedimentation of channels by floods and debris flows may increase stream temperature. Fire-induced increases in mass wasting along with extensive tree mortality can result in increases in floating material – primarily in the form of large woody debris. Post-fire delivery of organic debris to stream channels can potentially decrease dissolved oxygen concentrations in streams. Fire-derived ash inputs can increase pH, alkalinity, conductivity, and nutrient flux (e.g. ammonium, nitrate, phosphate, and potassium), although these changes are generally short lived. Post-fire increases in runoff and sedimentation within the urban interface, and burned structures and equipment within the fire perimeter may also lead to increases in chemical constituents, oil/grease, and pesticides.

The most noticeable effects on water quality will be possible increases in sediment and ash from the burned area into the Entiat River and Railroad Creek in and downstream of the fire area.

Table 1. Burned area by 6<sup>th</sup> field subwatersheds.

| <b>6th Field Watershed</b> | <b>Total Watershed Acres</b> | <b>Percent Watershed Burned</b> | <b>Percent Area High and Moderate Burn Severity</b> |
|----------------------------|------------------------------|---------------------------------|---|
| Bear Creek-Lake Chelan     | 35576                        | 43                              | 29  |
| Devore Creek-Lake Chelan   | 37031                        | 13                              | 5   |
| Headwaters Entiat River    | 25619                        | 51                              | 30  |
| Lake Creek-Entiat River    | 37648                        | 1                               | 0.3   |
| Lone Fir Creek-Lake Chelan | 32037                        | 12                              | 7   |
| North Fork Entiat River    | 17374                        | 0.2                             | 0.05  |
| Three Creek-Entiat River   | 22154                        | 46                              | 31  |
| Upper Railroad Creek       | 24144                        | 17                              | 7   |
| Lower Railroad Creek       | 17387                        | 80                              | 49  |

#### **Geologic Response:**

Assessment of fire effects to geologic features, soil, and water resources was reliant upon several key data sets and observations of conditions in the field.

Surface erosion and mass wasting are the inherent hillslope processes, accelerated typically by disturbance, principally wildfire or intense precipitation and high runoff events. Erosion generally becomes accelerated when effective ground cover and a protective forest cover have been removed, or when runoff has been concentrated. When such conditions occur, soils are exposed to erosive forces such as raindrop impact and overland flow that can result in rills and gullies that signify an accelerated rate of surface erosion. The steepest slopes are most prone, particularly where soils are shallow, are somewhat water repellent, or where there is a subsurface restrictive layer. Soils that

have developed in volcanic ash and glacial till are easily detachable, having low cohesiveness and structure, and relatively low amounts of organic carbon and moderately thin topsoil horizons. On the steepest of slopes, the risk of debris flows can be high. Shallow soils on steep slopes in first and second-order headwater drainages are most prone, such as tributary drainages to Railroad Creek and the Entiat River, but elevated risk are also possible in drainages with thicker deposits of unconsolidated ash and pumice derived soils.

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

A BAER team began assessing the area for post-fire emergencies on September 17, 2015. In that time the team has identified the following values at risk to post-fire threats. Future Interim reports may be submitted if additional emergency treatments are identified and warranted.

*The risk matrix below, Exhibit 2 of Forest Service Manual Interim Directive No.: 2520-2014-1 was used to evaluate the Risk Level for each value identified during Assessment. Only values at risk that had a risk of Intermediate or above are discussed.*

| Probability of Damage or Loss | Magnitude of Consequences |              |          |
|-------------------------------|---------------------------|--------------|----------|
|                               | Major                     | Moderate     | Minor    |
|                               | RISK                      |              |          |
| Very Likely                   | Very High                 | Very High    | Low      |
| Likely                        | Very High                 | High         | Low      |
| Possible                      | High                      | Intermediate | Low      |
| Unlikely                      | Intermediate              | Low          | Very Low |

#### Threat to Human Life, Safety and Property

Threat to human life and safety from flooding and debris laden flows in flood prone areas on Entiat and Railroad Creek and avalanches in Railroad Creek were determined to be very high.

Within the Entiat drainage the flood prone areas include Cottonwood, Spruce Grove, Three Creeks, North Fork, Fox Creek, Silver Falls and Lake Creek campgrounds.

In the Holden area, there is a risk to human life and safety for residents and mine remediation workers. The infrastructure within the Holden Village footprint is at "high" risk of damage from flooding and avalanches from vegetation loss and soils burned at high and moderate severity. The Holden Village footprint includes: Holden water diversion intake, Holden ballpark, foot bridge across Railroad Creek to active construction and Rio Tinto headquarters, bridge across Railroad Creek accessing Rio Tinto headquarters, Bypass Road bridge on Railroad Creek, Pool Engineering's Control Base at Lucerne and at Dan's camp, mining water treatment plant including intake and outflow works, upper borrow pit (STP3 borrow), and Ten Mile bridge (potentially now undersized).

In the Lucerne area the risk to human life and safety is from flooding and avalanches from vegetation loss and soils burned at high and moderate severity. There are about 30 drainageways above FR 8301 that may experience increased runoff, erosion and sedimentation resulting in potential road washouts, rock fall and debris, and avalanches that may impact travel between Lucerne and Holden. There is increased risk from flooding in Railroad Creek and increased potential of flooding across the alluvial fan where Railroad Creek drains into Lake Chelan. Large post fire runoff events across this fan increase risk to human health and safety and may impact operations of loading and unloading of the ferry dock and barge landing at current location, use of A-frame shelter, travel across the FS 8301 bridge during increased flows, may impact the use of staging and parking areas used in mine remediation in the immediate floodplain between the bridge and Ferry dock and upstream of the bridge, LCBC dock, LCBC facilities, sleeping quarters for Pool Engineering employees (Poolville"), use of the Forest Service Administration Site, boat dock, and FS campgrounds.

In the Domke Lake area, the risk to human life and safety includes increased hazards from danger trees at Domke Lake resort, and Stuart and Hatchery Campgrounds. Hatchery campground (currently closed) is located on an alluvial fan below the Emerald Park drainage which now has an increased risk of avalanches debris flows and flooding.

Additionally, a potential threat to human life and safety from damage to water craft on Lake Chelan from flooding and debris flows into Lake Chelan is "high" to "very high". It is expected that flooding can deliver large woody debris that water craft would need to avoid in Lake Chelan.

There are threats to human life and safety from falling hazard trees on roads, trails, campgrounds, and trailheads along with other user areas within or directly adjacent to burned areas. "Very high" risk of loss of life, property or injury from falling hazard trees. Burned trees adjacent to trails present a hazard to the user.

#### Threat to Property

Damage to NFS roads in the burn area is very high in the Entiat River corridor and in Railroad Creek. All roads in the burned area may be affected in some way from: 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. FR 8301 in Railroad Creek, FR 5100 in the Entiat River corridor both inside and outside of the burn area is at risk of flood damage. All campground roads in the Entiat: FR 122, 124, 120, 125 are also at risk from threats listed above.

There is a very high or high risk of damage to recreational and other infrastructure in the upper Entiat River corridor including: Cottonwood, Spruce Grove, Three Creeks, North Fork, Silver Falls, and Fox Creek campgrounds from flooding and debris. Infrastructure includes a bridge (FR 5605) at Cottonwood CG, historic structures at Cottonwood Guard Station, and community shelter at Silver Falls CG, Cottonwood and North Fork campground water systems. Continued risks of damage to property at recreation residences tracts are high.

There is an elevated risk of damage to property in Lucerne, which is located on the shore of Lake Chelan at the mouth of Railroad Creek. The following infrastructure is at risk of damage from flooding and potential debris flows from vegetation loss and soils burned at high and moderate severity upstream of Lucerne; A-Frame Shelter Structure, Pool Engineering's Control Base, staging area for construction equipment and water tender filling station located at Lucerne and at Dan's camp, Ferry Dock and loading/unloading area, FS 8301 Road Bridge spanning Railroad Creek, Lake Chelan Boat Club (LCBC) dock and facilities, and vehicles, along with Poolville-construction worker housing. The following Forest Service facilities located within the Lucerne fan FS Guard Station, well/pumphouse, generator, out buildings, and boat dock, FS Campground-information board, boat dock, vault toilet, potable water, and Refrigerator Harbor Campground (3 sites). Refrigerator Harbor Campground is located at a higher elevation on the alluvial fan and still could be inundated by flood flows.

There is a cabin on 18.36 acres of private land at the mouth of Lightning Creek that may be subjected to flood and debris laden flows.

In the Holden area, the risk to mine remediation and Holden Village infrastructure– (Holden Village footprint) and housing areas, Holden water diversion intake, Holden ballpark, foot bridge across Railroad Creek to active construction and Rio Tinto headquarters, bridge across Railroad Creek accessing Rio Tinto headquarters, Bypass Road bridge on Railroad Creek, mining wastewater treatment plant including intake and outflow works, upper borrow pit (STP3 borrow), and Ten Mile bridge (possibly now undersized) is at "very high" risk of damage from flooding and avalanches from vegetation loss and soils burned at high and moderate severity.

In the Lucerne area the risk to infrastructure is from flooding and avalanches from vegetation loss and soils burned at high and moderate severity. There are ~30 slopes above the FR 8301 (the road connecting Lucerne to Holden Village) that can experience increased runoff, erosion and sedimentation resulting in potential road washouts, rock fall and debris delivery, and avalanches impacting travel between Lucerne and Holden. Increased risk from flooding in Railroad Creek and increased potential of flooding across the alluvial fan where Railroad Creek drains into Lake Chelan. Increase in flooding potential across the fan increase risk to human health and safety and may impact operations of loading and unloading of the Ferry dock at current location, use of A-frame shelter, travel across the FS 8301 bridge during increased flows, impact the use of using staging and parking

areas used in mine remediation in the immediate floodplain between the bridge and Ferry dock and upstream of the bridge, old Marina dock, Lucerne Resort, sleeping quarters for Pool Engineering employees ("Poolville"), use of the Forest Service Administration Site and boat dock, and FS campgrounds

In the Domke Lake area, the risk to infrastructure at the Domke Lake resort and Stuart and Hatchery Campgrounds. Hatchery campground is located on an alluvial fan below the Emerald Park drainage and has an increased risk of avalanches and debris flow/flooding to the fan area.

Additionally, the threat to personal water craft and commercial boat traffic on Lake Chelan from flooding and debris flows into Lake Chelan is very high. It is expected that flooding can deliver large woody debris that water craft would need to avoid in Lake Chelan.

### Threat to Natural Resources

The fire has altered the hydrologic functions of stream channels resulting in projected increases in sedimentation, debris jams, channel scour, and stream bank erosion. The fire has caused bare hillsides that will result in accelerated erosion which would result in damage to aquatic habitat.

Threat to soil productivity in the ash-cap and till soils is low to intermediate. Pre fire soil productivity is generally moderate to high, and low to moderate in the colluvium. They are capable of supporting fully stocked stands of forest ecotypes. Ash-cap and till soil types are fairly resilient, and they have a natural ability to recover (reestablishment of effective ground cover and vegetation) from disturbance within a relatively short timeframe (usually less than 5 years). Many of the slopes dominated by rock outcrops however are sparsely vegetated by comparison, and less resilient.

### Threat to Cultural Resources

The threat to cultural and heritage resources is high from debris in debris flows and avalanche and hazard trees. In Holden and vicinity, the threat is to the Ballpark Campground, "Honeymoon Heights" (on private land), and railroad grades. In the Domke Lake vicinity including the Domke Resort cabin, lookout and the FS campgrounds, the threat is from debris flows and avalanche and hazard trees. In Lucerne and vicinity, the threat is to a water diversion, the guard station, and an A-frame.

### **B. Emergency Treatment Objectives:**

1. Coordinate with the emergency management agencies, NRCS, counties and permit holders in the burn area and downstream in flood prone areas.
2. Mitigate the risk to human life and safety in the Entiat Valley, Holden and Lucerne areas in flood prone areas.
3. Mitigate the risk to human life and safety in the burn area from falling trees and rocks on roads and trails (normally accomplished by closure).
4. Mitigate the risk to property in the burn area and flood prone areas downstream of the burn area in Entiat River Valley and at the Lucerne fan on Railroad Creek.

At FS Campgrounds/Trailheads (Table 2. below lists sites by Ranger District) provide for protection of recreation site infrastructure that could be damaged or redistributed during elevated post-fire flows and debris flows. Removal of "danger trees" around trailheads will provide a "safety zone" for parking, staging and BAER implementation team use.

While sites are closed user safety is provided for but the infrastructure itself could be damaged in post-fire enhanced flood flows. Primary protection will likely be achieved by removing pump jacks and capping drinking water wells to protect integrity of water supply and by simply by moving the infrastructure (picnic tables, fire rings, interpretive trail signs, trash cans and other moveable infrastructure out of floodplains



and debris fans. 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 and/or removal of road bridge that is 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 bridge and abutments.

5. Mitigate the risk to natural resources in the burn area and areas downstream of the burn area.
6. Mitigate the risk to cultural resources from postfire effects in the burn area and areas downstream of the burn area.

**Table 2. FS Recreation Sites by Ranger District**

| <b>Entiat Ranger District</b>      |                |
|------------------------------------|----------------|
| Cottonwood                         | Bridge         |
| Cottonwood                         | Guard Station  |
| Cottonwood                         | Campground     |
| Three Creeks                       | Campground     |
| Spruce Grove                       | Campground     |
| North Fork                         | Campground     |
| Silver Falls                       | Guard Station  |
| Silver Falls                       | Campground     |
| Lake Creek                         | Campground     |
| Fox Creek                          | Campground     |
| North Fork Trail #1437             | Trailhead      |
| Silver Falls Trail #1442           | Trailhead      |
| Three Creek Trail #1428            | Trailhead      |
| Cottonwood                         | Trailheads (2) |
| Entiat River Trail #1400           | Trailhead      |
| Shetipo Trail #1429                | Trailhead      |
| Myrtle Lake Trail #1404a           | Trailhead      |
| Anthem Creek Trail #1435           | Trailhead      |
| <b>Chelan Ranger District</b>      |                |
| Lucerne                            | Guard Station  |
| Lucerne                            | Campground     |
| Domke Falls                        | Campground     |
| Domke Lake                         | Campground     |
| Stuart                             | Campground     |
| Hatchery                           | Campground     |
| Holden Ballpark                    | Campground     |
| Domke Lake Trail #1280             | Trailhead      |
| Domke Mountain Lookout Trail #1280 | Trailhead      |
| Lower Railroad Creek Trail #1240   | Trailhead      |
| 10 Mile Falls #1270                | Trailhead      |
| 10 Mile Creek #1241                | Trailhead      |



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

Land \_\_\_ % Channel \_\_\_ % Roads/Trails 60 % Protection/Safety 60 %

D. Probability of Treatment Success

|                   | Years after Treatment |     |     |
|-------------------|-----------------------|-----|-----|
|                   | 1                     | 3   | 5   |
| Land              | n/a                   | n/a | n/a |
| Channel           | n/a                   | n/a | n/a |
| Roads/Trails      | 90                    |     |     |
| Protection/Safety | 90                    |     |     |

E. Cost of No-Action (Including Loss): >1,757,000

F. Cost of Selected Alternative (Including Loss): 509,800

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Gregory A. Kuyumjian/Molly Hanson

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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:

Monitoring and control of weed species through chemical means (Early Detection Rapid Response-EDRR) to control new weed infestations within the fire perimeter on ~80 acres.

All treatments will be completed in the spring and fall of 2016. Two herbicide treatments are planned for and the timing will be determined by herbicide effectiveness by species. Treatments for Dalmatian toadflax are best at flowering to seed capsule phase and in the fall. St. Johnswort is best treated during pre-bloom and active growth periods. Knapweeds are best treated at spring to mid-bloom growth periods.

Channel Treatments:

None requested in this 2500-8

#### Roads and Trail Treatments:

Remove brige at Cottonwood and store deck out of floodplain. This bridge may constrict flows and floating debris/log rafts which may become trapped by the bridge increasing the potential for a breaching event. Deck removal will reduce risk of damage to bridge infrastructure/abutments from flooding and the potential for a debris dam/breach .

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.

#### Protection/Safety Treatments:

Send letter to cooperators (Chelan County, NRCS, City of Chelan, City of Entiat, WA Fish & Wildlife, State Parks, Domke Lake Resort, Holden Village and Mining Company) to describe the changed watershed conditions and provide burn severity maps or describe the areas of concern.

Manage woody debris that is delivered to Lake Chelan from near Lucerne. Install booms at the mouth of Lightning Creek and Railroad Creek (this may impact commercial boat docking operations and may necessitate the need for an alternative docking location). ~~The inidial request authorized funding for installation of a boom and Lightning Creek and a boom at Lightning Creek. After field review of exisiting boom, there is only enough for installation at Railroad Creek. Additional funding is requested for boom maintenance and repair costs of the boom at Railroad Creek for 2016. There is no request for additional funding for Lightning Creek with this request, and will defer that for another future request after closer review.~~

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. Use the existing closure gate installed below Pope Creek after the Duncan Fire and add closure gates on FR 8301 at Lucence and below Holden village. This will add another layer of mitigation if that road stays in use.

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).

Develop and maintain for 2015 fires the "Central Washington Recovery.Info" website to provide information sharing with partners, local, state and federal agencies and public.

Provide support for public information sharing and technical transfer through the use of a PIO and BAER subject matter expert.

At FS Campgrounds/Trailheads (Tables 3 and 4 below lists sites by Ranger District) provide for protection of recreation site infrastructure that could be damaged in elevated post-fire flows and debris flows. Trailheads will have danger trees removed to provide safety zones for BAER Implementation.

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. Primary protection will likely be achieved by removing pump jacks and capping drinking water wells to protect integrity of water supply and by simply

by moving the infrastructure (picnic tables, fire rings, interpretive trail signs, trash cans and other moveable infrastructure out of floodplains and debris fans.

The Cottonwood Guard Station has a pumphouse, shower house, barn, corral, and propane tank in the floodplain. The Silver Falls Guard Station has a pumphouse, shower house and a garage. The pumphouse and shower house may be wrapped and sandbagged to reduce damage from floodwaters. The propane tank should be removed out of the floodplain. No treatment recommended for the outbuildings and corral.

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 water quality degradation. See Table 3 for locations of toilets that were burned in the fire and need to be treated to protect water quality.

Table 3. Campground and Guard Station Infrastructure Protection

| Recreation Site               | Type                | Pump<br>Jacks<br>/<br>Cap<br>Wells | Toilets<br>CXT/Plt/<br>Composting<br>*burned | Picnic<br>Tables | Fire<br>Rings   | Remove<br>Interp./Info<br>Signs      | Fee<br>Station | Dumpster |
|-------------------------------|---------------------|------------------------------------|--|------------------|-----------------|--------------------------------------|----------------|----------|
| <b>Entiat Ranger District</b> |                     |                                    |  |                  |                 |                                      |                |          |
| Cottonwood                    | Guard<br>Station    |                                    | 0/1/0  |                  |                 |                                      |                |          |
| Cottonwood                    | Campground          | 2                                  | 3/0/0  | 16               | 2<br>CCC/<br>21 | 3                                    | 1              |          |
| Three Creeks                  | Campground          |                                    | 0/1/0  | 3                | 3               | 1                                    | 1              |          |
| Spruce Grove                  | Campground          |                                    | 0/1/0  | 2                | 2               | 1                                    | 1              |          |
| North Fork                    | Campground          |                                    | 1/2*/0                                       | 2                | 8               | 2                                    | 1              | 1        |
| Silver Falls                  | Campground          | 2                                  | 0/6/0  |                  |                 | >1                                   |                |          |
| Lake Creek                    | Campground          | 2                                  | 3/0/0  | 18               | 18              | 2                                    | 1              | 1        |
| Fox Creek                     | Campground          | 1                                  | 1/0/1  | 16               | 16              | 2                                    | 1              | 1        |
| <b>Chelan Ranger District</b> |                     |                                    |  |                  |                 |                                      |                |          |
| Holden<br>Ballpark            | Campground          |                                    |  | 2                | 2               |                                      |                |          |
| Domke Falls                   | Campground<br>/dock |                                    | 0/1/0  | 4                | 3               |                                      |                |          |
| Domke Lake<br>Resort          | SUP                 |                                    | 0/1*/0                                       |                  |                 |                                      |                |          |
| Domke Lake                    | Campground          |                                    | 0/1/0  | 8                | 8               | Closed since 2007 Domke Lake<br>Fire |                |          |
| Stuart                        | Campground          |                                    |  |                  |                 |                                      |                |          |
| Hatchery                      | Campground          |                                    | 0/1*/0                                       |                  |                 |                                      |                |          |

Table 4. Trailhead Infrastructure Protection

|                               |                |
|-------------------------------|----------------|
| <b>Entiat Ranger District</b> |                |
| North Fork Trail #1437        | Trailhead      |
| Silver Falls Trail #1442      | Trailhead      |
| Three Creek Trail #1428       | Trailhead      |
| Cottonwood                    | Trailheads (2) |
| Entiat River Trail #1400      | Trailhead      |
| Shetipo Trail #1429           | Trailhead      |
| Myrtle Lake Trail #1404a      | Trailhead      |
| Anthem Creek Trail<br>#1435   | Trailhead      |
| <b>Chelan Ranger District</b> |                |
| Domke Lake Trail #1280        | Trailhead      |

|                                       |           |
|---------------------------------------|-----------|
| Domke Mountain Lookout<br>Trail #1280 | Trailhead |
| Lower Railroad Creek<br>Trail #1240   | Trailhead |
| 10 Mile Falls #1270                   | Trailhead |
| 10 Mile Creek #1241                   | Trailhead |

**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.)

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

|   |      |        |          |           |          |     |     |     |           |
|---|------|--------|----------|-----------|----------|-----|-----|-----|-----------|
| <b>A. Land Treatments</b>               |      |        |          |           |          |     |     |     |           |
| EDRP/Noxious Weeds                      |      |        |          | \$15,000  | \$0      | \$0 | \$0 | \$0 | \$15,000  |
|   |      |        |          | \$0       | \$0      | \$0 | \$0 | \$0 | \$0       |
|   |      |        |          | \$0       | \$0      | \$0 | \$0 | \$0 | \$0       |
| <i>Insert new items above this line</i> |      |        |          | \$0       | \$0      | \$0 | \$0 | \$0 | \$0       |
| Subtotal Land Treatments                |      |        |          | \$15,000  | \$0      | \$0 | \$0 | \$0 | \$15,000  |
| <b>B. Channel Treatments</b>            |      |        |          |           |          |     |     |     |           |
|   |      |        |          | \$0       | \$0      | \$0 | \$0 | \$0 | \$0       |
|   |      |        |          | \$0       | \$0      | \$0 | \$0 | \$0 | \$0       |
|   |      |        |          | \$0       | \$0      | \$0 | \$0 | \$0 | \$0       |
| <i>Insert new items above this line</i> |      |        |          | \$0       | \$0      | \$0 | \$0 | \$0 | \$0       |
| Subtotal Channel Treat.                 |      |        |          | \$0       | \$0      | \$0 | \$0 | \$0 | \$0       |
| <b>C. Road and Trails</b>               |      |        |          |           |          |     |     |     |           |
| Remove & store Cotton                   | each | 30000  | 1        | \$30,000  | \$0      | \$0 | \$0 | \$0 | \$30,000  |
| FR 8301 gates (Holder                   | each | 10000  | 2        | \$20,000  | \$0      | \$0 | \$0 | \$0 | \$20,000  |
| Entiat Trails water con                 | mile | 4000   | 2.25     | \$9,000   | \$0      | \$0 | \$0 | \$0 | \$9,000   |
| Chelan Trails water co                  | mile | 4800   | 1.25     | \$6,000   | \$0      | \$0 | \$0 | \$0 | \$6,000   |
| Entiat Trailhead Safety                 | each | 425    | 9        | \$3,825   | \$0      | \$0 | \$0 | \$0 | \$3,825   |
| Chelan Trailhead safet                  | each | 525    | 5        | \$2,625   | \$0      | \$0 | \$0 | \$0 | \$2,625   |
| <i>Insert new items above this line</i> |      |        |          | \$71,450  | \$0      | \$0 | \$0 | \$0 | \$71,450  |
| Subtotal Road & Trails                  |      |        |          |           |          |     |     |     |           |
| <b>D. Protection/Safety</b>             |      |        |          |           |          |     |     |     |           |
| ALERT Support                           | each | 4000   | 4        | \$16,000  | \$36,000 | \$0 | \$0 | \$0 | \$52,000  |
| Sanitize/bury pit toilet                | each | 2500   | 2        | \$5,000   | \$0      | \$0 | \$0 | \$0 | \$5,000   |
| Sanitize/bury pit toilet                | each | 2000   | 1        | \$2,000   | \$0      | \$0 | \$0 | \$0 | \$2,000   |
| Entiat pit toilet sanitiz               | each | 1000   | 16       | \$16,000  | \$0      | \$0 | \$0 | \$0 | \$16,000  |
| Entiat toilet flood prote               | each | 3000   | 5        | \$15,000  | \$0      | \$0 | \$0 | \$0 | \$15,000  |
| Protect guard stations                  | each | 5,000  | 2        | \$10,000  | \$0      | \$0 | \$0 | \$0 | \$10,000  |
| Floodplain infrastructure remov         | 4000 | 9      | \$36,000 | \$0       | \$0      | \$0 | \$0 | \$0 | \$36,000  |
| Public/agency Coordin                   | day  | 400    | 20       | \$8,000   | \$0      | \$0 | \$0 | \$0 | \$8,000   |
| Remove pumpjacks an                     | each | 3000   | 8        | \$24,000  | \$0      | \$0 | \$0 | \$0 | \$24,000  |
| Notification letters                    | each | 250    | 7        | \$1,750   | \$0      | \$0 | \$0 | \$0 | \$1,750   |
| Boom maintenance/ro                     | each | 1      | 80,000   | \$80,000  | \$0      | \$0 | \$0 | \$0 | \$80,000  |
| Install booms (lake che                 | each | 40,000 | 2        | \$80,000  | \$0      | \$0 | \$0 | \$0 | \$80,000  |
| Storm Patrol                            | day  | 1,200  | 14       | \$16,800  | \$0      | \$0 | \$0 | \$0 | \$16,800  |
| Public Outreach Supp                    | day  | 300    | 20       | \$6,000   | \$0      | \$0 | \$0 | \$0 | \$6,000   |
| Subject Matter Expert                   | day  | 305    | 20       | \$6,100   | \$0      | \$0 | \$0 | \$0 | \$6,100   |
| <i>Insert new items above this line</i> |      |        |          | \$322,650 | \$36,000 | \$0 | \$0 | \$0 | \$358,650 |
| Subtotal Structures                     |      |        |          |           |          |     |     |     |           |
| <b>E. BAER Evaluation</b>               |      |        |          |           |          |     |     |     |           |
| Assessment Cost                         | ea   | 80,000 | 1        | ---       | \$80,000 | \$0 | \$0 | \$0 | \$80,000  |
| <i>Insert new items above this line</i> |      |        |          | ---       | \$0      | \$0 | \$0 | \$0 | \$0       |
| <i>Insert new items above this line</i> |      |        |          | ---       | \$80,000 | \$0 | \$0 | \$0 | \$80,000  |
| Subtotal Evaluation                     |      |        |          |           |          |     |     |     |           |
| <b>F. Monitoring</b>                    |      |        |          |           |          |     |     |     |           |
|   |      |        |          | \$0       | \$0      | \$0 | \$0 | \$0 | \$0       |
|   |      |        |          | \$0       | \$0      | \$0 | \$0 | \$0 | \$0       |
| <i>Insert new items above this line</i> |      |        |          | \$0       | \$0      | \$0 | \$0 | \$0 | \$0       |
| Subtotal Monitoring                     |      |        |          |           |          |     |     |     |           |
|   |      |        |          | \$409,100 | #####    | \$0 | \$0 | \$0 | \$525,100 |
| <b>G. Totals</b>                        |      |        |          |           |          |     |     |     |           |
| Previously approved                     |      |        |          | \$314,000 |          |     |     |     |           |
| Total for this request                  |      |        |          | \$95,000  |          |     |     |     |           |

**PART VII - APPROVALS**

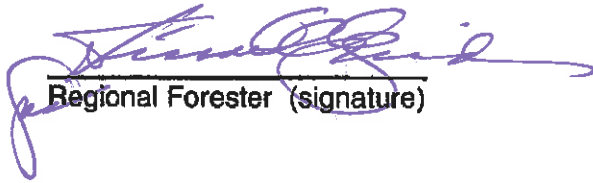
1.



Forest Supervisor (signature)

1/28/2016  
Date

2.



Regional Forester (signature)

12 Feb 16  
Date