

Date of Report:
10/17/2018**BURNED-AREA REPORT**
(Reference FSH 2509.13)**PART I - TYPE OF REQUEST****A. Type of Report**

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

B. Type of Action

- ☒ 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)
☐ 2. Interim Report # _____
 ☐ Updating the initial funding request based on more accurate site data or design analysis
 ☐ Status of accomplishments to date
☐ 3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTION

- A. Fire Name: McLeod Fire B. Fire Number: WA-OWF-000522
C. State: Washington D. County: Okanogan
E. Region: PNW (R6) F. Forest: Okanogan-Wenatchee
G. District: Methow Valley RD H. Fire Incident Job Code: P6L25K
I. Date Fire Started: 8/11/2018 J. Date Fire Contained: 91% as of 09/27/2018
K. Suppression Cost: \$14.2 million as of 09/17/2018
L. Fire Suppression Damages Repaired with Suppression Funds
 1. Fireline waterbarred (miles):
 2. Fireline seeded (miles):
 3. Other (identify): Approx. 28 miles restored to N. Zone suppression repair standards

M. Watershed Number:

Subwatershed Name/HUC	Subwatershed acres (% burned)	Unburned or very low acres	Soil Burn Severity					
			Low		Moderate		High	
			Acres	%	Acres	%	Acres	%
Eightmile Creek (170200080404)	29,642 (28%)	23,732	3,682	12%	2,099	7%	129	<1%
Goat Creek (170200080601)	22,929 (40%)	16,313	3,706	16%	2,684	12%	226	1%
Lower Lost River (170200080104)	42,290 (16%)	37,524	2,141	5%	2,252	5%	373	1%
Rattlesnake Creek-Methow River (170200080205)	25,060 (1%)	24,759	94	<1%	25	<1%	182	1%
Grand Total		102,328	9,623		7,060		910	

N. Total Acres Burned: 24,412 total acres (as of 9/23/2018) NFS Acres (24,412)

O. Vegetation Types:

Pre-fire vegetation consisted largely of a higher elevation Subalpine-fir zone dominated by Lodgepole Pine, Subalpine fir, and Engelman Spruce. The lower elevations were dominated by Douglas-fir with some Ponderosa Pine. The highest elevations were larger rock scree and high elevation herbs and shrubs. Understories were dominated by alder, ceanothus, and huckleberry.

P. Dominant Soils:

The dominant soil orders within the Mcleod fire perimeter include Inceptisols, Andisols, with Alfisols dominating the southeast portion of the perimeter. Predominant modifiers for all soils include Lithic, Andic, and Vitrandic. Volcanic ash exists in large concentrations within the upper profile of 90% of all mapped soils. Dominant soil textures are moderately coarse to fine sandy loams, most of which are located on steep backslope down to toeslope positions. At least 50% of the soils within the burned area have extremely high rock content throughout the upper profile, ranging from 35% to 90%. Unconsolidated materials dominate the upper 1/3 backslopes of higher elevation landforms within the perimeter, with these being highly fragmental (>90% rock fragments). Shallow soils with very stony to extremely stony surface phases comprise over 80% of the upper elevation fire perimeter.

Q. Geologic Types:

The central part of the fire is dominated by the Panther Creek Formation (Km(p)), the Hart's Pass Formation (Km(h)), and Winthrop Sandstone (Kc(w)). Panther Creek Formation is composed of black shale containing granitoid, roundstone conglomerate, and minor arkose. The formation is visible on Sweetgrass Butte and Sunrise Mountain. Hart's Pass Formation is a massive tubular Arkose Sandstone. The Winthrop sandstone formation is 10,000 feet of sediment containing numerous fossils of flowering plants, ferns and conifers that grew in a semitropical environment. This formation appears mostly on the west side of the valley north of Winthrop. The east side of the fire is dominated by the Button Creek stock (Jit(b)), Buck Mountain Formation (Kvs(b)), and the Vashon stade (Qgd). The Button Creek Formation is a biotite hornblende quartz-diorite stock. It intrudes the andesitic and volcanoclastic rocks of the Buck Mountain Formation. Buck Mountain Formation consists of andesitic flows, breccia, and sediments. It is common to find marine fossils and terrestrial plant fossils in this formation. The Vashon stade was the last glacial advance and retreat to cover the region. It was the last of at least seven glaciations during the Pleistocene Epoch.

R. Miles of Stream Channels by Order or Class:

Stream Type	Miles
Perennial	26.9
Intermittent	54.7
Ephemeral	0
Artificial Path	0.1
Grand Total	81.7

S. Transportation System

Trails: 9.90 miles (0 miles in designated wilderness)

Roads:

Maintenance Level	Miles
1 - BASIC CUSTODIAL CARE (CLOSED)	15.4
2 - HIGH CLEARANCE VEHICLES	26.4
3 - SUITABLE FOR PASSENGER CARS	3.0
NON-FS ROADS	8.3
Grand Total	53.1

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Soil Burn Severity by Ownership Acres					
Ownership	Unburned	Low	Moderate	High	Total
Forest Service	7,001 (29%)	9,624 (39%)	7,059 (29%)	728 (3%)	24,412

B. Water-Repellent Soil (acres):

Natural hydrophobicity is present in the volcanic ash soils found within the fire and was variable during field verification in unburned, low, and moderate burn severities. Fire-induced or altered hydrophobicity occurred on approximately 23% of soils (100% of severely burned soil and 50% of moderately burned soil), or around 5,540 acres.

C. Soil Erosion Hazard Rating (acres):

354 (low) 5,482 (moderate) 16,093 (high) 2,388 acres not rated, or are rock/water

D. Erosion Potential: up to 6.8 tons/acre

E. Sediment Potential: up to 4,321 cubic yards per square mile

Subwatershed	Erosion Potential (tons/acre)	Sediment Potential (yd³/mi²)
Glance Creek	4.5	2,854
Eightmile Tributary	5.1	3,235
Button Creek	5.3	3,321
Ortell Creek	4.0	2,547
Upper Goat	4.4	2,802
Panther Creek	4.9	3,114
Cougar Creek	4.6	2,923
Roundup Creek	4.9	3,129
Long Creek	4.1	2,598
Whiteface Creek	3.9	2,476
Hurricane Creek	6.2	3,932
Sunset Creek	6.8	4,321

F. Debris Flow Potential:

The USGS Geologic Hazards Division provided estimates of debris-flow likelihood, volume, and combined hazard for several design storms with a range of peak 15-minute intensities. Estimates are calculated at two scales: the stream segment and for drainage basins. The USGS model results, summarized below, can also be accessed on the USGS web page at http://landslides.usgs.gov/hazards/postfire_debrisflow/. The Critical Values table in the Values Assessment section below contains descriptions of specific road crossing locations for treatments.

Debris flows are very likely to occur in the in steep tributaries to streams within the McLeod Fire Area. Debris flows and flooding have occurred in the past under non-fire conditions. Within the burned area, some watersheds show past debris slide/debris flow activity and it appears likely these areas could experience future debris flows.

The following summary of debris flow risk is based on review of the USGS model and field observations with the probability of debris flow occurrence in burned area stream channels in response to a 15 minute rainstorm at a peak intensity of 24 mm/hour.

Summary of USGS Model Results and Field Observations

- USGS model results show that the probability of debris flows is likely (above 60%) to very likely (above 80%) for numerous steep side channels within burned area sub watersheds.
- The USGS Combined Risk Rating is based on both probability and volume. Much of the burned area has a combined risk rating of moderate and Hurricane Creek sub watershed is rated high.
- As refelected by the "Watch stream" layer provided by the USGS and the hydrologic response model results summarized in this report, elevated debris laden and sediment bulked flows are likely to occur in main stem stream channels within the burned area. In these lower gradient reaches, it is likely suspended, dissolved and or floatable materials will be carried significantly further downstream.
- Potential for debris flow activity will decrease as vegetation recovers (3-5 years)

PART IV - HYDROLOGIC DESIGN FACTORS

Estimated Vegetative Recovery Period	3 to 5 years
Design Chance of Success	80%
Equivalent Design Resource Interval	5 years
Design Storm Duration	1 hour and 24 hour
Design Storm Magnitude	5-yr, 1-hr: 0.6 inches 5-yr, 24-hr: 2.6 inches
Design Flow	5-yr, 1-hr: 0 cfs/mi ² 5-yr, 24-hr: 412 cfs/mi ²
Estimated Reduction in Infiltration	32%
Adjusted Design Flow	5-yr, 1-hr: 191 cfs/mi ² 5-yr, 24-hr: 1415 cfs/mi ²

Modeled Drainage	Unburned acres (%)	Low acres (%)	Moderate acres (%)	High acres (%)
Button 350 Rd	224 (33%)	108 (16%)	293 (44%)	42 (6%)
Button Eightmile Rd	273 (21%)	251 (19%)	710 (53%)	97 (7%)
Copper Glance	1,004 (65%)	350 (23%)	200 (13%)	
Eightmile Trib	343 (69%)	108 (22%)	42 (8%)	
Goat	2,612 (36%)	2,387 (33%)	1,965 (27%)	220 (3%)
Long	330 (58%)	124 (22%)	108 (19%)	5 (1%)
Ortell	564 (29%)	857 (44%)	511 (26%)	27 (1%)
Roundup	626 (37%)	581 (34%)	392 (23%)	1 (<1%)
Whiteface	941 (68%)	280 (20%)	169 (12%)	

PART V - SUMMARY OF ANALYSIS

As of September 23, 2018 the McLeod Fire burned approximately 24,412 acres of NFS land approximately 5 miles north of Mazama, WA. Most of the western part of the fire is within the Pasayten Wilderness.

The BAER team assessment identified the overall soil burn severity for the McLeod Fire as 29% unburned, 39% low, 29% moderate, and 3% high. The team conducted soil hydrophobicity tests and found that neither moderate nor high burn severity areas had greatly increased hydrophobicity from baseline conditions. In high and moderate-SBS areas, groundcover burned intensely, consuming organic duff on the soil surface along with leaves and needles on standing live vegetation.

Hydrologic conditions in the burned watersheds have changed significantly as compared to pre-fire conditions. Under pre-fire conditions, vegetation and underlying organic matter slows runoff and protects soils from direct raindrop impact, assists with water infiltration to soil, and releases runoff at slower rates. After fire the lack of vegetation leads to increased erosion and faster and higher peak runoff. The magnitude of the peak flows are dependent on the amount of high and moderate soil burn severity within the watershed. Drainages that often do not flow are likely to flow under these changed conditions. Several watersheds have up to 60% of the Moderate and high severity burn, with Button Creek has the most moderate and high burn severity.

The on-line USGS StreamStats program (Cooper 2005) was used to delineate the fire into drainages with pour points at the bottom of burned watersheds, or where critical values were located. Watershed response is referenced to these pour points. The table below shows the soil burn severity in the modeled drainages. Approximately 28% of the larger Eightmile subwatershed is within the fire perimeter, and 6% of the Lower Lost River subwatershed is in the fire perimeter.

Large portions of the fire area will remain unsafe to the public due to hazard trees, unsafe trail and road conditions and potential for flooding events, debris flow and falling rocks. Goat Creek trail, Copper Glance trail, and Roundup Creek trail all need additional assessment in the spring to assess threats to life and safety. All of the drainages modeled are expected to have increased flows, however, Goat Creek and Button Creek are expected to have the largest increases in predicted flow.

**Pre and post-fire peak flow predictions from
Wildcat Rainfall-Runoff Hydrograph Model for events with a 5 year return interval**

Sub-Watershed	5-year, 1-hour event		5-year, 24-hour event		
	Pre-fire estimated discharge (cfs)	Post-fire estimated discharge (cfs)	Pre-fire estimated discharge (cfs)	Post-fire estimated discharge (cfs)	Change in flow from pre to post fire conditions (cfs)
Button 350 Rd	0	8	20	68	48
Button Eightmile Rd	0	45	55	256	201
Copper Glance	0	14	122	186	64
Eightmile Trib	0	4	40	55	15
Goat	0	59	103	477	374
Long	0	10	4	41	37
Ortell	0	24	49	177	129
Roundup	0	16	12	103	91
Whiteface	0	11	9	53	44

Due to this magnitude of increase, all of the culverts along FS Road 5220-350 are being proposed for removal to prevent debris flow check dam bulking that could wash out FS Road 5130 and is a life and safety risk to Forest users and staff. FS Road 5200-430 adjacent to Goat Creek is at risk of failure from increased flow and large woody debris in draws that could plug the culverts. All of the culverts along this road are proposed for removal to reduce the loss of the road prism, reduce risks to life and safety, and reduce potential increase in sedimentation to Goat Creek. Please see the Critical Values Table and Treatment Map below for each proposed treatment and location.

A. Describe Critical Values/Resources and Threats:

Values Assessment:

The table below is Exhibit 02 from FSM 2523.1. This matrix was used to evaluate the risk level for each value identified during this BAER assessment. See FSM 2523.1 for additional information.

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

The embedded table is a summary of the values within and adjacent to the McLeod fire area, the threats to those values, the probability of damage or loss, magnitude of consequences and the resulting level of risk. In summary, the burned area includes a road and trail network, trailhead parking areas, campgrounds, critical habitat for ESA-listed bull trout and chinook salmon and steelhead habitat, as well sensitive plant communities and heritage/cultural resources.

Summary Table of Critical Values

Life/ Property/ Resources	Critical Value	Threat to Value	Probability of Damage or Loss	Magnitude of Consequence	Risk	Treatment
HLS	Roads intersecting fire boundary	Potential of snags, felling of trees, or other unforeseen timing of hazards	Likely, Roads within moderate/high burn severity	Major, concern for safety including potential travel delays	Very High	Post Fire Hazard Warning Sig
Property/HLS	Eightmile Creek 2 Bridge	Potential scour in high flows and potential impact damage from mobilized debris.	Likely, increased flow and associated debris	Major, Loss of bridge investment	Very High	Storm Inspection and Response/Monitor
HLS - Trail Users	Copper Glance, Goat Creek, Roundup Creek	Flooding, Debris Flows, Loss of Trail Tread,	Possible	Major; Watershed response modeling points to higher flows and erosion potential	High	Warning Signs at Trailhead
Property/HLS	FSR 5220100 road prism	elevated runoff and dry ravel from moderate- high SBS burned hillslopes	Likely, increased flow and large woody debris in draws and culverts could erode roadway at point of flow	Moderate, Loss of road prism and Loss of access to critical USFS infrastructure	High	Storm Inspection and Respor 1.5 miles

	Threat to Value	Probability of Damage or Loss	Magnitude of Consequence	Risk	Treatment	Notes
e	Potential scour in high flows and potential impact damage from mobilized debris.	Possible, increased flow and associated debris	Major, Loss of bridge investment	High	Storm Inspection and Response/Monitor	Bridge is on 2019 inspection schedule as a part of regular program of work. Further treatment may be required if monitoring warrants additional countermeasures
idge	Potential scour in high flows and potential impact damage from mobilized debris.	Possible, increased flow and associated debris	Major, Loss of bridge investment	High	Storm Inspection and Response/Monitor	Bridge not on 2019 inspection schedule, therefore inspection is required to monitor for scour and debris buildup. Further treatment may be required if monitoring warrants additional countermeasures
	Potential scour in high flows and potential impact damage from mobilized debris.	Possible, increased flow and associated debris	Major, Loss of bridge investment	High	Storm Inspection and Response/Monitor	Bridge not on 2019 inspection schedule, therefore inspection is required to monitor for scour and debris buildup. Further treatment may be required if monitoring warrants additional countermeasures
ied ids	Flooding	Possible, campsites along floodplain are at risk	Major; Watershed response modeling points to higher stream flows	High	Close campground during high flows	Close and post warning signs at campgrounds along creek at both developed rec sites.

Threat to Value	Probability of Damage or Loss	Magnitude of Consequence	Risk	Treatment	Notes
<p>Potential scour in high flows and potential impact damage from mobilized debris.</p>	<p>Possible, increased flow and associated debris</p>	<p>Major, Loss of bridge investment</p>	<p>High</p>	<p>Storm Inspection and Response/Monitor</p>	<p>Bridge not on 2019 inspection schedule, therefore inspection is required to monitor for scour and debris buildup. Further treatment may be required if monitoring warrants additional countermeasures</p>
<p>potential for trail failure from bare/burned soil</p>	<p>Very Likely, increased flow and large woody debris in draws and culverts could erode roadway at point of flow</p>	<p>Major, Loss of trail investment</p>	<p>High</p>	<p>Waterbar and drainage improvements, hazard tree removal for workers</p>	<p>4 miles of trail in high and moderate soil burn severity. 10 miles of trail total in fire perimeter.</p>
<p>Potential scour in high flows and potential impact damage from mobilized debris.</p>	<p>Possible, increased flow and associated debris</p>	<p>Major, Loss of bridge investment</p>	<p>High</p>	<p>Storm Inspection and Response/Monitor</p>	<p>Bridge is on 2019 inspection schedule as a part of regular program of work. Further treatment may be required if monitoring warrants additional countermeasures</p>
<p>elevated runoff and dry ravel from moderate-high SBS burned hillslopes</p>	<p>Very Likely, increased flow and large woody debris in draws and culverts could erode roadway at point of flow</p>	<p>Major, Loss of road prism and increased sedimentation into Eightmile Creek that affects fish critical habitat</p>	<p>Very High</p>	<p>Construct 4 Armored Dips, Storm Inspection and Response, and Storm Proof 2.5 miles of road</p>	<p>Sole access to multiple trailheads and campgrounds</p>

	Threat to Value	Probability of Damage or Loss	Magnitude of Consequence	Risk	Treatment	Notes
ism	elevated runoff and dry ravel from moderate-high SBS burned hillslopes	Very Likely, increased flow and large woody debris in draws and culverts could erode roadway at point of flow	Major, Loss of road prism and increased sedimentation into Roundup Creek that affects fish critical habitat	Very High	Storm Inspection and Response; Storm Proof at Vanderpool Crossing, 0.5 miles	Sole access to multiple trailheads and campgrounds
ism	elevated runoff and dry ravel from moderate-high SBS burned hillslopes	Very Likely, increased flow and large woody debris in draws and culverts could erode roadway at point of flow	Moderate, Loss of road prism and increased sedimentation into Ortell Creek that affects fish critical habitat	Very High	Storm Inspection and Response 2.5 miles	Key USFS infrastructure and critical access road for lookout and radio tower
ism	elevated runoff and dry ravel from moderate SBS burned hillslopes	Very Likely, increased flow and large woody debris in draws and culverts could erode roadway at point of flow	Moderate, Loss of road prism and increased sedimentation into Roundup Creek that affects fish critical habitat	Very High	Construct 2 Dips, and 2 armored dips on 0.5 miles of road	Road is adjacent to Roundup Creek and failure would cause increased sedimentation into creek that serves as critical T&E habitat
ism	elevated runoff and dry ravel from moderate SBS burned hillslopes	Very Likely, increased flow and large woody debris in draws and culverts could erode roadway at point of flow	Moderate, Loss of road prism, cascading failure of road prism threatening 300 spur, and increased sedimentation into Goat Creek that affects fish critical habitat	Very High	Remove culvert at crossing to protect T&E habitat and property below which serves as sole access to trailhead	40 CY of fill washed out due to plugged inlet. Cascading failure of road prism threatening 5200300 spur

	Threat to Value	Probability of Damage or Loss	Magnitude of Consequence	Risk	Treatment	Notes
-ism	elevated runoff and dry ravel from moderate SBS burned hillslopes	Very Likely, increased flow and large woody debris in draws and culverts could erode roadway at point of flow	Moderate, Loss of road prism and increased sedimentation into Goat Creek that affects fish critical habitat	Very High	Storm proof 0.6 miles of road and construct 3 armored dips	Sole access to Trailhead
-ism	elevated runoff and dry ravel from moderate SBS burned hillslopes	Very Likely, increased flow and large woody debris in draws and culverts could erode roadway at point of flow	Moderate, Loss of road prism and increased sedimentation into Button Creek that affects fish critical habitat	Very High	Remove all culverts on 3 miles of road (18 culverts)	At headwaters of Button Creek cascading waters could affect 5130000
-ism	elevated runoff and dry ravel from moderate-high SBS burned hillslopes	Very Likely, increased flow and large woody debris in draws and culverts could erode roadway at point of flow	Moderate, Loss of road prism and increased sedimentation into Whiteface Creek that affects fish critical habitat	Very High	Storm Inspection and Response at Whiteface Creek crossing	Road is adjacent to Whiteface Creek T&E critical habitat
-ism	elevated runoff and dry ravel from moderate-high SBS burned hillslopes	Very Likely, increased flow and large woody debris in draws and culverts could erode roadway at point of flow	Moderate, Loss of road prism and increased sedimentation into Goat Creek that affects fish critical habitat	Very High	Remove all culverts (9) along 3 miles of road and install 2 drivable dips	Road is adjacent to Goat Creek T&E critical habitat

	Threat to Value	Probability of Damage or Loss	Magnitude of Consequence	Risk	Treatment	Notes
rism	elevated runoff and dry ravel from moderate-high SBS burned hillslopes	Likely, increased flow and large woody debris in draws and culverts could erode roadway at point of flow	Moderate, Loss of road prism and increased sedimentation into Ortell Creek that affects fish critical habitat	High	Storm Inspection and Response 2 miles Construct 2 armored Dips, Clean Low Water Crossing	Road prism parallels creek
rism	elevated runoff and dry ravel from moderate-high SBS burned hillslopes	Likely, increased flow and large woody debris in draws and culverts could erode roadway at point of flow	Moderate, Loss of road prism and increased sedimentation into Ortell Creek that affects fish critical habitat	High	No treatments proposed	Section of road in high/moderate burn is high in the watershed, therefore no treatment proposed
rism	elevated runoff and dry ravel from moderate-high SBS burned hillslopes	Possible, increased flow and large woody debris in draws and culverts could erode roadway at point of flow	Moderate, Loss of road prism and increased sedimentation into Mad River drainage that affects fish critical habitat	Intermediate	No treatments proposed	Intermediate risk rating does not warrant treatments
rism	elevated runoff and dry ravel from moderate SBS burned hillslopes	Likely, increased flow and large woody debris in draws and culverts could erode roadway at point of flow	Moderate, Loss of road prism and increased sedimentation into Short Creek that affects fish critical habitat	High	Construct one armored Dip at Short Creek crossing	Road is adjacent to Short Creek and failure would cause increased sedimentation into creek that serves as critical T&E habitat

Threat to Value	Probability of Damage or Loss	Magnitude of Consequence	Risk	Treatment	Notes
potential scour in high flows	Possible, Roads with minimal burn severity.	Minor, Loss of road prism and increased sedimentation into Chewuch River drainage that affects fish critical habitat	Low	No treatments proposed	Low risk does not warrant treatment
6 Invasive plant spread and establishment into Botrychium crenulatum site (06080400001) Site is directly adjacent to Rd.5220, LEVU population along old road used as dozer line.	Likely, loss of native plant communities	Moderate; Active livestock allotment with high risk of spreading controlled populations.	High	EDRR of ox eye daisy site next to BOCR population off the Eightmile rd #5220. Approximately 1 mile. 2 people 1 day.	EDRR Suppression, treatments used on bare soil created by suppression activities
6 Invasive plant spread and establishment. Dozer line runs through areas adjacent to invasive and sensitive plant populations. Cattle use in area could be vectors for spread. LEVU and CEDI are threats.	Likely, loss of native plant communities	Moderate; Active livestock allotment with high risk of spreading controlled populations.	High	EDRR of 2 miles of dozer line that runs uphill and intersects roads with invasive plant populations. Part of this is estimate is the dozer at the junction of the 5130-100 that runs parallel to the 5130 road. Would need to do EDRR at Botrychium populations that runs adjacent to dozer line. Estimated 2 people for 3 days.	EDRR Suppression, treatments used on bare soil created by suppression activities
loss of ash cap and surface soil through erosion and debris flows, decreased infiltration, damming and sedimentation of waterways	Very likely, steep slopes, highly erodible soils, loss of canopy and ground cover	Moderate, loss of ash cap is not recoverable, short-term recoverable effects to hydrologic function	Very High	no treatment recommended--no cost-effective treatment available	

Threat to Value	Probability of Damage or Loss	Magnitude of Consequence	Risk	Treatment	Notes
loss of critical habitat due to excess sedimentation and debris flow, increased turbidity, and duration and magnitude of sediment load	Likely, increased flow and highly erodible soils and steep slopes	Moderate, genetics, population size and poor habitat quality, spawning habitat	High	treat roads and trails to minimize post-fire erosion and sedimentation of aquatic habitat where multiple values benefit from such treatment	
water quality/soil degradation	Likely	Moderate	Intermediate		Intermediate risk rating does not warrant treatment
Erosion, hazard trees	Likely, soil and plant damage from permitted livestock grazing	Minor	Low/Very Low Risk	Trough is next to spring. No BAER treatment recommended	Low risk does not warrant treatment

B. Emergency Treatment Objectives:

The objectives of the emergency treatments proposed in this document are to manage identified unacceptable risks from "imminent post-wildfire threats to human life and safety, property, and critical natural resources on National Forest System lands" (FSM 2523.02). The timely application of the proposed treatments is expected to substantially reduce the probability of damage to the BAER critical values identified in the section A, above. Recommended emergency treatment objectives include the following:

Land Treatments

1. Foster the recovery of native plant communities, including sensitive species, in the burned area by minimizing the proliferation of noxious weed populations

Channel Treatments

1. No channel treatments proposed

Road and Trail Treatments

1. Reduce risk of road and trail infrastructure damage from elevated post-fire hillslope runoff and flood flows
2. Reduce erosion and transport of fine sediment into area streams, and thus reduce impacts of road and trail network to water quality and aquatic habitat for ESA-listed species.

Protection and Safety Treatments

1. Protect human life and safety of forest visitors through raising awareness of the risks present in a post-fire forested mountain setting by installing informational and warning signs at trail and road portals in and adjacent to the burned area.
2. Protect human life and safety from post-fire hazards at selected trails and campgrounds through closure treatments

Monitoring and Coordination

1. Facilitate partner agency efforts to install temporary systems on NFS land to provide early warning for precipitation and runoff events that could threaten off-NFS values.
2. Monitor the effectiveness of road and trail treatments and facilitate any needed maintenance of treatments during the first year following the fire.

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

Land 95 % Channel -- % Roads/Trails 75 % Protection/Safety 90 %

D. Probability of Treatment Success

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

E. Cost of No-Action (Including Loss): **\$1,288,000** (roads only—other losses not quantified)

F. Cost of Selected Alternative (Including Loss): **\$181,580**

G. Skills Represented on Burned-Area Survey Team:

- Soils: Justin Urresti, Mary Young, Ryan Schmitt (T)
- Hydrology: Jamie Krezelok, Tom Matthews
- Engineering: Lori McAllister, Ken Bigelow, Brett Yaw (T), Fredrick (Shaun) Oliver (T)
- Archeology: Jennifer Ryan
- Recreation: Methow Trail Staff
- Fisheries: Gene Shull
- Botany, Weeds: Kelly Baraibar, Lowell (Dean) McFetridge
- GIS: Tim Downing
- PIO/Liason: Carly Reed

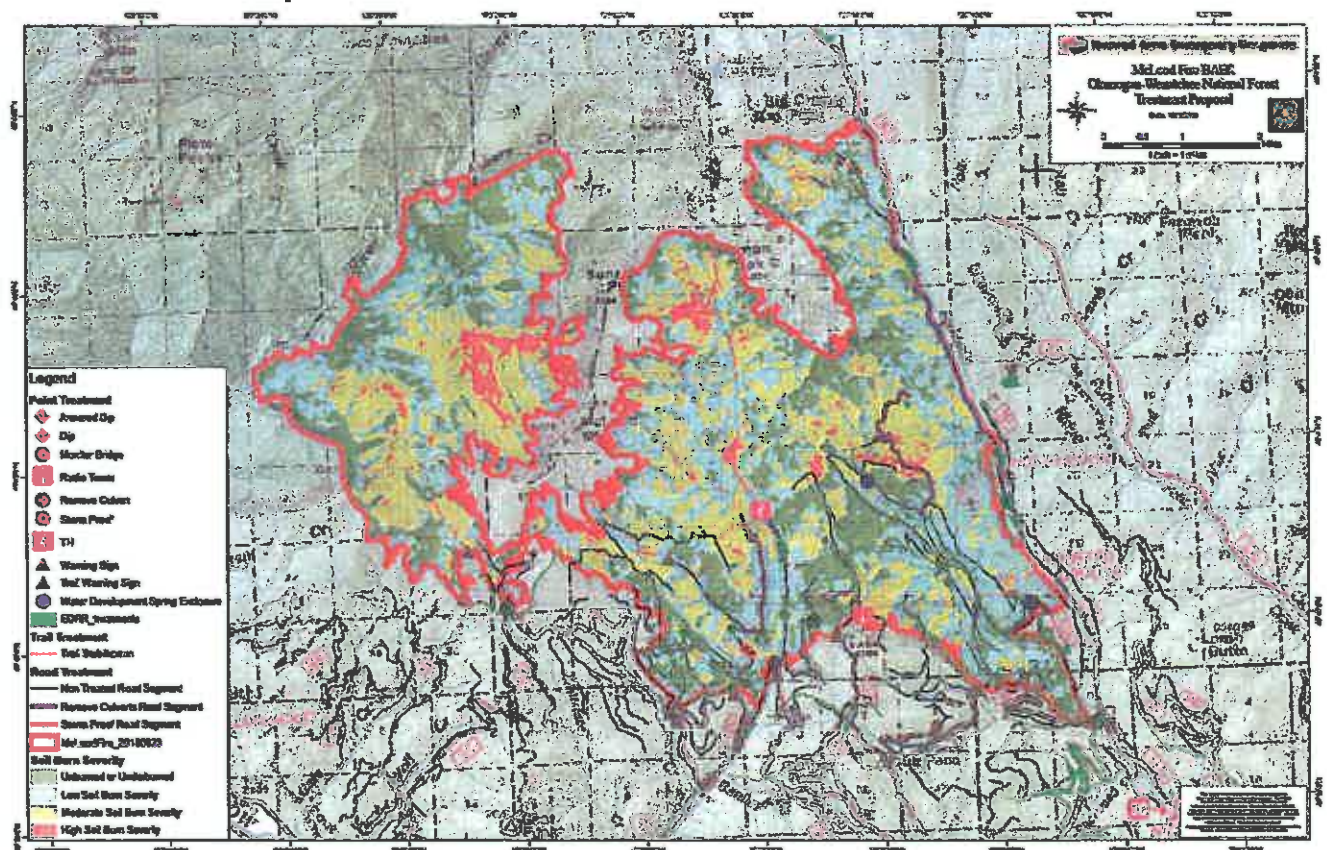
Team Leaders: Eric Schroder, Luke Cerise

Email: eschroder@fs.fed.us (303 541 2538), lukemcerise@fs.fed.us (509) 486-5108

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.)

BAER Treatment Map



Land Treatments:

Noxious Invasive Weed Early Detection Rapid Response (EDRR) – Early detection and treatment of invasive plants is critical to prevent them from becoming established in fire-affected areas. Treatment is most effective when infestations are small and isolated. Timing of treatments is important in order to address the weeds before they can produce seed and proliferate. EDRR is covered under the Okanogan-Wenatchee Forest-wide Site-specific Invasive Plant Management FEIS and ROD (2016) with a range of

treatment options including use of nine herbicides. Proposed treatments fall under two categories: suppression repair related mitigation of dozer lines that passed through noxious weed-infested areas on private land and into uninfested national forest system and land protection of sensitive native plant communities Please refer to the treatment map for locations.

Following the 2018 update of national weed treatment guidance, BAER is a potential mechanism to treat suppression-related potential spread of invasive weeds along equipment-installed fire line where equipment is known to have passed through weed-infested areas and into uninfested areas, in the first year following the fire. Dozer lines below 4000' elevation through the burned areas were judged to be at greatest risk for spreading whitetop, oxeye daisy, diffuse knapweed, sulphur cinquefoil and other aggressive invasive weeds. These areas have bare soil exposed and are a high risk for invasive weed spread. EDRR in these settings in the first year following the fire should enable OWNF personnel to minimize the spread of these weeds onto previously undisturbed Forest lands.

Item	Unit	Unit Cost	# Units	Total
2 Person Crew w/materials & supplies (EDRR Suppression)	Acres	\$170/acre	39	\$6,630
Total Land Treatment Cost				\$6,630

Channel Treatments:

No channel treatments are prescribed.

Roads Treatments:

Within the fire perimeter there are 44.79 miles of Forest Service (FS) system roads. Additionally, there are 6.7 miles of road directly below the fire perimeter impacted by burned areas that were determined to be at elevated levels of risk of damage in the post-fire environment. Road treatments are designed to improve drainage in order to remove higher levels of runoff from roads before extensive damage or loss of infrastructure can occur.

Roads proposed for treatment are vital for public and administrative access in addition to resource protection. Efforts were made to prescribe the least-cost alternative to accomplish the desired mitigation. See the Critical Values table above for road treatment details.

Treatments to protect property and natural resources include:

- Improving existing drainage features that are not adequate for the projected flow increases
- Armored rolling dip/rolling dip to minimize damage to the road surface and divert water off the road
- Storm inspection and response
- Culvert Removals
- Hazard warning signs
- Bridge and culvert inspection

Road and Trails				
rolling dip (un-armored)	each	\$1650	2	\$3,300
armored relief dip	each	\$3600	12	\$43,200
storm inspect/response - bridges	each	\$1000	9	\$9,000
culvert removal	each	\$1500	28	\$42,000
road storm proofing	miles	\$3200	4	\$12,800

<i>Subtotal Road & Trails</i>				\$110,300
Protection and Safety				
road warning signs	each	\$750	7	\$5,250
trail warning signs/installation	each	\$1340	5	\$6,700
<i>Subtotal Protection and Safety</i>				\$11,950

Trail Treatments:

There are approximately 10 miles of trail within the McLeod Fire on the Methow Valley Ranger District. Of those miles 1 received high soil burn severity, 3 miles of moderate soil burn severity, and 6 miles of low soil burn severity or unburned conditions.

BAER team members assessed the first 0.5 miles of Goat Creek trail, Copper Glance trail, and Roundup Creek trail. Multiple burned snags and stump holes exist along these trails. Bridges that were damaged by the fire need further analysis and may need to be removed to avoid falling into streams and affecting channel characteristics (see road and bridge report). Trail surveys found that soil burn severity levels and relative steepness were reasonable predictors of erosion potential. Fire burn severity is used to determine trail stabilization treatments.

In addition, the fire left some trails in a dangerous condition, with holes in the tread left by burned out roots, rough tread, slough and other obstacles could cause accidents. Treatment for these conditions as well as trails with low burn severities were not included in this BAER proposal but need to be addressed before the trails can be reopened to the public.

Drainage work needs to be completed within one year. The following table details the cost for treatment of trail drainage installation.

Four miles of trail burned with high and moderate severity, and all of trails were given priority based on burn severity areas, potential for capturing or intercepting increased post-fire flood runoff, main access trails to wilderness, near fish populations and locations adjacent to stream channels and crossings. Priority trails are listed on page 3 of the trails specialist report.

Trails Treatment costs (cost includes labor cost/plus stock support/consideration of remoteness of trails)

Soil Severity	Trail Miles	Number of drainage structures	Cost (\$50 per structure)
High	1	30	\$1,500
Mod	3	60	\$3,000
Totals	4	90	\$4,500

Recreational Facilities (developed campgrounds)

- Two camp sites at Honeymoon sit close to Eightmile Creek. A high risk exists for flooding at these camp sites and should have seasonal closure to ensure public safety (details in Critical Values table above). See hydrology and soils report for watershed response.
- Ruffed Grouse along Eightmile Creek is at risk from increased watershed response modeling and the campsite along the creek needs a closure (details in Critical Values table above).
- There is an increased risk from flooding and debris flows for backcountry camps that are located near streams or in flood plain areas and located below burned areas. Hazard trees pose an increased risk to those who may camp or travel through the burned areas and need further assessment.

Public Safety-Signage

Access to most trails and backcountry campsites affected by the fires is not suggested at this time due to hazard tree and other dangers. Until these immediate post fire hazards can be mitigated a closure order should be held in place. Warning signs are needed at all three trailheads in the fire perimeter. Notifications should be sent to outfitter guide special use permit holders of the conditions of burned area.

In the future when trail stabilization work takes place, it may still be necessary to keep some trails closed. Each trail will need to be further evaluated and signs posted on those trails that will remain closed until funds can be secured to reconstruct the trails. Hazard tree felling for each trailhead and campground locations will be needed to ensure public and employee safety. Administration of closure orders will be needed to help ensure public safety.

There may be a need to install ALERT weather warning systems in the fire area to alert local residents of severe weather. Coordination with the National Weather Service (Spokane, WA office) for site locations is needed.

ITEM	COST
Vehicle @ 400/month	\$400
Closure and warning writing/signs/hardware/installation 4 employees 2 days @225/day	\$1800
Trailhead and campground hazard tree falling – 12 sites @ 650/site	\$7,800
ALERT system coordination – 4 days @ 350/day	\$1,400
total	\$11,400

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.)


The effectiveness of the protection and safety treatments is highly dependent on monitoring and adaptive management. Funding not requested at this time. The Forest may pursue the development of Forest-wide BAER monitoring plan.

Part VI – Emergency Stabilization Treatments and Source of Funds

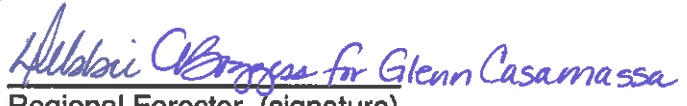
Interim #

Line Items	Units	Unit Cost	NFS Lands			Other Lands			
			# of Units	WFSU SULT \$	Other \$	# of units	Fed \$	# of Units	Non Fed \$
A. Land Treatments									
EDRR Suppression - Crew, Supplies,	acres	170	39	\$6,630					
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0
Subtotal Land Treatments				\$6,630	\$0		\$0		\$0
B. Channel									
None proposed									
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0
Subtotal Channel Treat.				\$0	\$0		\$0		\$0
C. Road and Trails									
rolling dip (un-	each	1650	2	\$3,300					
armored relief dip	each	3600	12	\$43,200					
storm									
inspect/response -	each	1000	9	\$9,000					
culvert removal	each	1500	28	\$42,000					
road storm proofing	miles	3200	4	\$12,800					
trail drainage	miles	1125	4	\$4,500					
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0
Subtotal Road & Trails				\$114,800	\$0		\$0		\$0
D. Protection and									
road warning signs		750	7	\$5,250					
trail warning signs and									
closure implementation	each	1340	5	\$6,700					
TH and CG hazard	site	650	12	\$7,800	\$0		\$0		\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0
Safety				\$19,750	\$0		\$0		\$0
E. BAER Evaluation									
Total Team Cost	each	1	20200	\$20,200					
<i>Insert new items above this line!</i>									
Subtotal Evaluation				\$20,200					
F. Monitoring									
				\$0					
Subtotal Monitoring					\$0				
G. Totals				\$181,580	\$0		\$0		\$0

PART VII - APPROVALS

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Forest Supervisor (signature)

10/17/2018
Date
- 

Regional Forester (signature)

10/25/2018
Date