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: Cascade Creek Fire B. Fire Number: WA-GPF-000563

C. State: Washington D. County: Skamania (started), Yakima

E. Region: 06 F. Forest: Gifford Pinchot National Forest

G. District: Mt. Adams RD H. Fire Incident Job Code: P6G7ZP

I. Date Fire Started: 9/9/12 J. Date Fire Contained: 85% 10/15/2012 – rain/snow on 10/16 onward.

K. Suppression Cost: estimated $15,000,000 as of 10/24/12.

L. Fire Suppression Damages Repaired with Suppression Funds

1. Fireline waterbarred (miles): **handline:** 18.6 miles; **trails**: (unknown); **dozer line**: 7.4 miles
2. Fireline seeded (miles): **0**
3. Other (identify): Fireline covered with slash: 0, **handline** 18.6 miles; **trails**: (unknown) **dozer line**: 7.4 miles

M. Watershed Number:

1707010508 (White Salmon River)
1708000201 (Lewis River)

N. Total Acres Burned: 20,300 acres

NFS (20,300) Other Federal ( ) State ( ) Private ( )

O. Vegetation Types:

Mountain hemlock series
Pacific silver fir series
Subalpine series
Grand fir series

P. Dominant Soils:

Soils information derived from the Gifford Pinchot National Forest Soil Resource Inventory[1], GIS analysis, Resource Advisor accounts, and aerial observations formed the basis for analysis. Derived from basalt, glacial till and volcanic ash, soils are often shallow with exposed rock on steep slopes. Slopes of less than 30 percent dominate the fire. Most soils there are one to six feet deep and derived from material ejected during volcanic eruptions. The majority of soils in the burn area have a moderate potential for surface erosion when exposed to bare mineral soil.

Soil Map Units (SMU) 45 and 46 are the greatest in area, with SMU 1892 common on steeper slopes (Table 1). Some soil mapping units contain combinations of soils and are deeper and more loamy, e.g., ash and pumice-derived soils occur in combination with soils derived from glacial till northwest of the fire. Soil temperature and moisture are classified in a cold and relatively moist soil taxonomic class (cryic temperature and udic moisture).

Areas on the south flank of Mount Adams are underlain with fractured and glaciated basalt flows, sometimes prone to debris avalanches and lahars. Along the treeline facing the south slopes of Mount Adams are a combination of rock outcrop, talus, and dry meadows with rocky shallow soils. The Aiken Lava Bed bounds the fire's east edge and the Mount Adams' landforms of glacial U-shaped valleys, lahar plains, earth flows and uneven, hummocky slopes.

Table 1. Major Soil Map Units and Selected Attributes

SMU	Landform	Slope	Surface Erosion Potential	Fertility
17	Valley Bottoms and Toeslopes	0-30	Slight	Low
1795	Complex of Valley Bottoms, Toeslopes and Gentle Ridge tops and Benches	0-30	Moderate	Low
1892	Complex of Steep and Steep Smooth Sideslopes	>30	Moderate	Low
2	Lava Flow	0-30	Slight	Low
3	Wet Meadows	0-5	Slight	Moderate
40	Rock Outcrop	ANY	N/A	Low
45	Bench Landforms	0-30	Moderate	Low
46	Rough and Irregular Bench Topography	0-30	Moderate	Low
46F	Rough and Irregular Bench Topography	0-30	Moderate	Low
6	Rock Outcrop-Talus-Dry Meadows	0-90+	Moderate	Low
7	Rock Outcrop-Talus-Dry Meadows	>30	Moderate	Low
7E	Rock Outcrop-Talus-Dry Meadows	>60	Moderate	Low
9	Canyon Walls	>60	Very Severe	Low
92	Steep Sideslopes	>30	Moderate	Low
9240	Complex of Steep Sideslopes and Rock Outcrop	>30	Moderate	Low
93	Gentle Sideslopes and Terraces	0-30	Moderate	Moderate
95	Gentle Ridge tops and Benches	0-30	Moderate	Low

[1] Wade, J.; Herman, L.; High, C. T.; Couche, D. 1992. Soil Resource Inventory. Gifford Pinchot National Forest. Vancouver, Washington.

A lack of surface water and aquatic features appears inconsistent with the favorable soil textures (particle sizes) that control soil moisture holding capacity and high annual precipitation amounts. Likely, porous, fractured basalt bedrock contributes to droughty summer soil just south of the fire.

Q. Geologic Types:

Geology of the Cascade Creek Fire

The Cascade Creek Fire burned a large area on the south, southwest, and west flanks of Mount Adams , a major Cascade Range stratovolcano. This volcano has been sporadically erupting for the last 500,000 years; gradually building an edifice that is over 12,000 feet high and encircled by a thick apron of mostly andesite lava flows that extend about 10 miles from the summit in all directions. The eruptions have been dominated by fluid lava flows, with only rare pyroclastic flows and little ash fall. Repeated glacial advances have scoured much of the looser volcanic deposits from the volcano's upper flanks. During the most recent ice age, about 15,000 years ago, large valley glaciers occupied all the major valleys, including Cascade Creek valley and Morrison Creek valley. The actions of the glacial ice left typical glacial landforms in this area: relatively wide valley bottoms, glacial cirques, and steep valley slopes.

R. Miles of Stream Channels by Order or Class:

Table 2. Miles of streams within perimeter burn

Channel Type	Length (miles)
Intermittent streams	65.0 miles
Perennial streams	35.4 miles

S. Transportation System

Trails: 32.7 miles
Roads: 16.3 miles (Maintenance Level) - ML1 roads 2.0 mi.; ML2 roads 11.3 mi.; ML3 3.1 mi.

PART III - WATERSHED CONDITION

A. Burn Severity by total and FS (acres):

6,146 (low) 9807 (moderate) 3737 (high)

Table 3. Soil Burn Severity

Soil Burn Severity	Acres	Percent of Total
Unburned/Very Low	367	2%
Low	6,146	30%
Moderate	9807	49%
High	3737	19%
TOTAL	**20,083**	**100%**

Table 4. Burn Severity by Subwatershed

	Unburned or Very Low		Low		Moderate		High	
Subwatershed	Wilderness	Non-wilderness	Wilderness	Non-wilderness	Wilderness	Non-wilderness	Wilderness	Non-wilderness
Buck Creek	-	-	115	1325	522	173	488	11
Cascade Creek	367	0	1318	239	2732	3	430	-
Hole in the Ground Creek	-	-	66	1076	83	2154	1	464
Morrison Creek	-	-	378	372	1320	824	907	290
Upper White Salmon River	-	-	440	516	1489	41	768	-
*Headwaters Lewis River	-	-	302	-	465	-	379	-

*Combine subwatesheds of Swampy Creek, Twin Falls Creek-Lewis River, and Boulder Creek-Lewis River.

Table 5. Soil Burn Severity inside Wilderness and outside of Wilderness

	Soil Burn Severity				
Area	Unburned/Very Low	Low	Moderate	High	Total
Fire Outside of Wilderness	-	3528	3196	765	
Fire Within Wilderness	367	2618	6611	2972	
Total Fire Area	367	6136	9807	3737	20,047*

*Total acreage within the fire perimeter is 20,083 acres but contains 26 acres of "no burn severity data" in the BARC map.

Table 6. Percentage of burned acreage by subwatershed (note: burned acreage figures include unburned/very low, low burn, moderate and high severity burn, see Table 4 for breakdown)

Subwatershed Name	Subwatershed Size (ac)	Wilderness burned by subwatershed (ac)	Non-wilderness burned by subwatershed (ac)	Total Burn in subwatershed (ac)	Percent Burned in Wilderness subwatershed	Percent Burned non-wilderness subwatershed	Percent Burned by subwatershed
Upper White Salmon	9207	2697	557	3254	29.3	6	35.3
Cascade Creek	9838	4480	242	4722	45.5	2.5	48
Buck Creek	4704	1125	1509	2634	23.9	32	56
Morrison Creek	6501	2605	1486	4091	40	22.9	62.9
Hole in the Ground Creek	11800	150	3694	3844	1.3	31.3	32.6
*Headwaters Lewis River	149,322	1146	-	1146	.8	-	.8

*Combine subwatesheds of Swampy Creek, Twin Falls Creek-Lewis River, and Boulder Creek-Lewis River.

Table 7. Burned acreage by watershed

Watershed 5th HUC	Size (ac)	Wilderness Burned (ac)	Non-wilderness Burned (ac)	Percentage of watershed burned
White River Salmon	250,843	11,057	7488	7.4
Headwaters Lewis River	149,322	1,146	0	0.77

B. Water-Repellent Soil by total and FS (acres):

Water repellancy was observed at about 3 inches depth in the few areas visited but BAER team had limited access to the burned area due to safety concerns. As a result, the total area of water repellent soil within the burned area could not be adequately estimated.

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

1463 (low) 18,592 (moderate) 38 (high)

D. Erosion Potential:

34.2 tons/acre

E. Sediment Potential:

12339 cubic yards / square mile.

Erosion and sediment potential was estimated by mean basin slope, percent of slope over 30%, percent of the area with high and moderate burn severity, and percent of the area within 300 feet of the stream with high and moderate burn severity for each 7th field watershed. These values were compared to recent fires in the region nearby (Cold Springs, Gnarl Ridge, or Dollar Lake fires) to come up with a proxy for the 7th field watershed. A soil burn severity map was constructed with a moderate degree of accuracy.

F. Geohazard assessment:

Geohazard assessment of post fire debris flow risk was conducted by Tom DeRoo, Forest Geologist of the Mt. Hood National Forest. His assessment was based on a satellite derived burn severity (BARC) map. This BARC map had alternate linear areas of data gaps but was the best available at the time. Aerial and field observations from field personnel were done to help validate the extent of high intensity burn areas. A burn map constructed with a high degree of confidence about the areal extent of the high intensity burn areas.

The stability of hillslopes is partially dependent on the tensile strength of the roots of trees and smaller vegetation on that slope. The roots serve to protect and anchor the soil mantle. On slopes where timber has been harvested and subsequently replanted, root strength decays with time, reaching a minimum about 5 to 15 years after harvest. After this minimum is reached the older decaying roots continue to lose strength but the newer roots begin to restore the level of root reinforcement of the hillslope to pre-harvest levels. Roots are usually not damaged directly during timber harvest.

Most forest fires burn at varying levels of intensity in a patchwork pattern across the landscape. Fire can lethally damage or quickly destroy trees and undergrowth. The roots of vegetation whose crowns have been lethally damaged by heat or scorching will die and decay over a timeline similar to that after timber harvest. In areas of high burn intensity vegetation can be consumed by the fire. Burning tree boles concentrate heat and fire can creep down into the root system, directly burning some of the roots. Shallow roots of trees and smaller vegetation can be directly consumed by intense fire. In severely burned areas minimum root strength may occur in the first 3 years.

Any decrease in root strength on a hillslope will increase the susceptibility of that hillslope to shallow landslides. Map 1 shows the areas within the Cascade Creek Fire perimeter where high burn intensity occurred on steep slopes, conservatively defined here as about 50%. These are the hillslope areas where small shallow landslides (debris slides) are most likely to occur at a higher frequency than pre-fire levels. This elevated hazard could continue for 15 years, or until vegetation is reestablished on these hillslopes.

An acceleration of dry ravel is common after fires. Dry ravel is the gravity-induced surface movement of soil particles and rocks. Dry ravel and debris slides are two processes that can deliver sediment to creek channels where it can then be mobilized by debris flows.

Debris flows are a type of landslide that typically occurs in a confined creek channel. Debris flows are mixtures of soil, rock, and water and can have the consistency of very wet concrete. They are capable of traveling many miles if the channel geometry allows. Debris flows can initiate from hillslope landslides that reach the channel and then transform into debris flows, or from the mobilization of channel material in very steep confined channels. Usually debris flows initiate during intense rainfall events. Debris flows can incorporate downed logs and knock over trees, sometimes creating log jams that may temporarily dam the channel. A dam-burst can restart the debris flow. It was estimated that a 50 year rainfall event or more would be necessary to cause a debris flow that would reach the Morrison Creek campground.

Mount Adams has a recent history of large weather-induced debris flows. Their initiation is independent of any fire. Within the fire area, Cascade creek, Salt Creek, Crofton Creek, and Morrison Creek have experienced large debris flows within the last 10 years. These landslides typically initiate above timberline near the toes of the glaciers and travel down channels for miles. For example, the 2006 Salt Creek Debris Flow initiated near 7200 feet elevation and traveled down the Salt Creek channel into the Cascade Creek channel settling out at the 3300 ft elevation, a distance of 6.3 miles. An unknown amount of materials were deposited into the Cascade Creek drainage terminating at the Cascade Creek marsh, raising water level by 3 feet and killing hardwood trees. Some of the debris materials near the initiation zone also spilled into the Crofton Creek drainage as well. In 1921 approximately 4,000,000 cubic meters of debris slide materials spilled into Salt Creek but records did not indicate at what elevation the initiation took place or how long the debris flow traveled.

Map 1. Debris flow risk map.

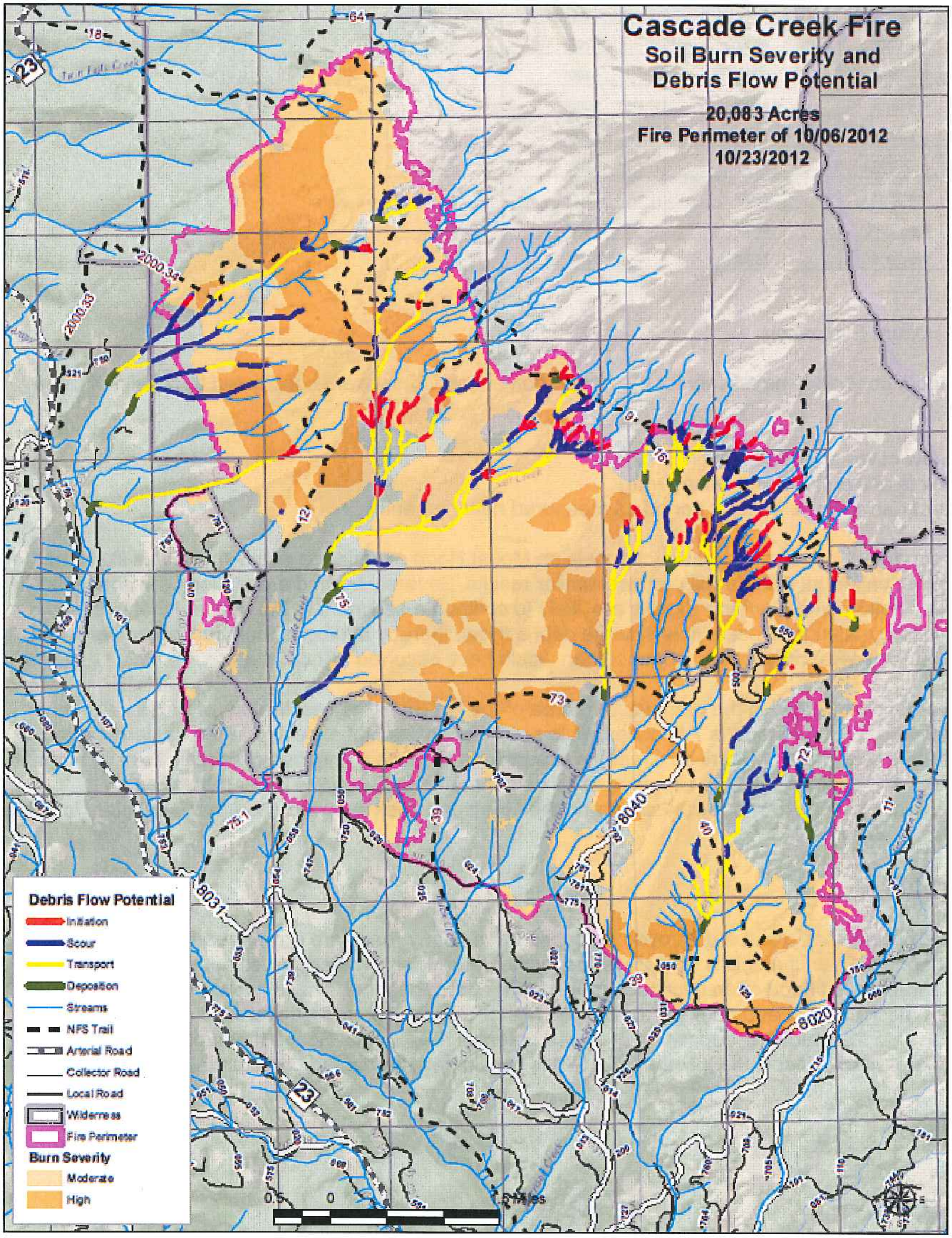

Table 8. Recent large debris flows within Cascade Creek Fire area.[1]

RECENT LARGE DEBRIS FLOWS WITHIN CASCADE CREEK FIRE AREA				
Creek Name	Date	Initiation Elev (ft)	Deposition Elev.	Length (mi)
Cascade	Pre-2006	6900'	5700'	1.7
Cascade	Pre-2006	8000'	4400'	3.4
Salt	Pre-2006	6800'	5000'	1.7
Salt	Pre-2006	6900'	5200'	1.7
Salt	Nov. 2006	7200'	3300'	6.3
Crofton	Pre-2006	7200'	6100'	0.6
Crofton	Nov. 2006	6600'	5800'	0.6
Morrison	Pre-2006	7300'	5200'	2

Debris Flow Hazard Evaluation

On the Mt. Hood, conditions necessary for the generation of debris flow were considered to consist of three conditions:

1) minimal snow cover on the mountain,
2) freezing levels above 8000' elevation, and
3) 2" or more of rain within a 24-hour period as measured near timberline.

When these conditions occur one or more channels on Mount Hood experience debris flows. It is likely that similar conditions on Mount Adams will produce similar results. Severely burned areas along the channels of Cascade, Salt, Crofton, and Morrison Creeks are likely to contribute sediment to the channel that is then available for incorporation into these already large debris flows, thereby adding to their bulk and momentum and extending their paths further down channel than would have occurred without the fire.

Precipitation amount expected in the northwestern area of the fire (near the headwaters of White Salmon River) for a 10 year, 24 hour storm is 7.5 inches while precipitation amount expected in the eastern portion of the fire (near the headwaters of Morrison Creek) is expected to produce 6.0 inches of rainfall. Excess amount of sediment and some minor debris is expected to be be generated in the mid to lower tributaries of Headwaters White Salmon River subwatershed and the Morrison Creek subwatershed that is tributary to White Salmon River.

Resources at Risk

Road/stream crossings can also be destroyed by debris flows. Many roads are downstream from potential debris flow channels. Even if a debris flow stops (deposits its larger size material) well upstream from a road crossing, a sand-charged flood often continues much further down channel. These hyper-concentrated flows and floods can block culverts and damage roads. The higher elevation crossings are most at risk as the crossing is closer to the predicted deposition area of a potential debris flow. Roads that cross potential debris flow channels are listed in Table 9. Only the 8031070 is considered threatened by potential fire-enhanced debris flow.

Table 9. Road crossings of potential debris flow channels [1].

Road Number	Creek Name
8031070	"West Grassy Hill"
8031	Wicky
8040020	Hole in the Ground
8031101	"West Grassy Hill"
8031	Cascade
8031101	White Salmon

On the Debris Flow Potential Map (Map 1) all possible debris flow channels have been color coded to indicate those channel segments with the potential to experience in-channel debris flow initiation (red), scour (blue), transport (yellow), and deposition (green). A channel segment in the transport zone will experience extensive movement of channel material but no net loss in the volume of that material.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 10

B. Design Chance of Success, (percent): 60

C. Equivalent Design Recurrence Interval, (years): 10

D. Design Storm Duration, (hours)[2]: 2.89

E. Design Storm Magnitude, (inches)[3]: 1.19

F. Design Flow, (cubic feet / second/ square mile)[3]: 73 to 116

G. Estimated Reduction in Infiltration, (percent): 28 to 50

H. Adjusted Design Flow, (cfs per square mile)[4]: 96 to 153

Stream flow analysis was achieved using the Forest Service Peak Flow Calculator.

Table 2. Modeled Post Fire Peak Flow Changes[4]

Sub-Watershed	2-yr Post-burn Q (cfs)	% Increase from Pre-Fire Q	10-yr Post-burn Q (cfs)	% Increase from Pre-Fire Q
Buck	618	51%	1160	35%
Cascade	645	42%	1646	46%
Hole	648	30%	1647	32%

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[1] DeRoo, Tom. Debris Flow Hazards at Cascade Creek Fire. Mt. Adams Ranger District. Gifford Pinchot National Forest. 2012.

[2] Robichaud, Peter R.; Elliot, William J.; Pierson, Fredrick B.; Hall, David E.; Moffet, Corey A. 2006. **Erosion Risk Management Tool (ERMiT) Ver. 2009.09.17**. [Online at <http://forest.moscowfsl.wsu.edu/fswepp/>.] Moscow, ID: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

[3] Elliot, William J.; Hall, David E.; Robichaud, Peter R. 2010. **Forest Service Peak Flow Calculator. Ver. 2012.08.02**. Moscow, ID: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Online at http://forest.moscowfsl.wsu.edu/fswepp/ermit/peakflow.

[4] See Process Paper, "Hydrologic Modeling Methodology used to Determine Post-Burn Hazards, Cascade Creek Fire," by Mark Kreiter, BAER team hydrologist.

Morrison	617	106%	1556	108%
Up. White Salmon	550	29%	1397	32%

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

The Cascade Creek Fire began on September 9, 2012 as the result of a lightning strike in the Cascade Creek drainage. The burned area is located on the south flank of Mt. Adams where approximately 65% of the wildfire is entirely in the Mt. Adams Wilderness, while 35% of the fire is located in the non-wilderness area. The fire is entirely on the Gifford Pinchot National Forest.

Two major watersheds were affected by the fire, the Headwaters Lewis River (149,322 acres), and the White Salmon River (250,843 acres). There are five major stream systems that drain to the south from the fire. The headwaters of the Upper White Salmon River drainage (9,207 acres) which is part of the White Salmon River watershed that drains into the Columbia River. Cascade Creek, Buck Creek, Morrison Creek and Gotchen Creek are all tributary streams to the White Salmon River.

Approximately 95% of the fire burned in the Upper White Salmon River, Cascade Creek, Buck Creek, Morrison Creek, and Gotchen Creek drainages, while the remaining 5% of the burn areas are located in the Northwest corner of the perimeter burn in the upper headwaters of Swampy Creek, Twin Falls-Lewis River, and Boulder Creek-Lewis River subwatersheds.

Past wildfires on the GPNF that occurred within the perimeter of the Cascade Creek Fire include the Crofton Fire (2009) at 93 acres, Cold Spring Fire (2008) at 7959 acres (4776 acres are on GNFL), and Salt Creek Fire (2001) at 241 acres. The Cold Springs and Crofton Fires continue to recover hydrologically and vegetatively, although some of the western portion of the Cold Springs Fire experienced some reburn from the Cascade Creek Fire.

A Burned Area Reflectance Classification (BARC) satellite-derived map of postfire vegetation condition was requested beginning on September 27, 2012 from the Remote Sensing Application Center (RSAC) using a satellite imagery, as part of the BAER team's effort to obtain an accurate burn severity map. Smoke over the fire obscured the satellites (SPOT) view of the burned area. Attempts for a BARC satellite-derived map continued for over a week, but smoke from the fire continued to hamper the effort.

Ground surveys to validate burn severity were very limited due to safety concerns, primarily hazard trees. On September 28 and October 1, 2012, helicopter flights by BAER team members were made to classify burn severity by video-taping and photography, but heavy smoke hampered much of the visual detail below. Also, the helicopter's flight path was restricted due to safety concerns (e.g. winds, smoke, other helicopter flights fighting the wildfire), which limited the BAER team's flight coverage of the fire. Additional helicopter BAER team flights were not made because aerial resources were needed for fire suppression related objectives. The Job Hazard Analysis (JHA), used nationally for BAER teams, directs limiting the number of helicopter flights due to safety concerns.

The BAER team received numerous photos from helicopter flights made by Incident overhead staff and others, as well as pictures taken on the ground in the effort to validate and create a burn severity map and identify resources affected, such as roads and trails. BAER team members worked with specialists of Incident team, such as the Fire Behavior Analyst and Operations staff to obtain information on burn severity. Resource advisors and field observers were also consulted.

On October 7, 2012 the BAER team received a BARC map based on Landsat 7 imagery (October 5), but data gaps of 1150 ft (350 m) wide in alternate bands existed. This was the best available BARC map for the BAER team.

The burn severity classes on the BARC map were adjusted by using all the available information in order to produce the best available burn severity map to use for determining values at risk from additional runoff, debris flows and sediment from the fire that could affect critical resource values.

Due to the unusually warm and dry season that extended well into October 15, 2012 when fire was at 85% contained. October 16 onward began wet season with rain and eventually turned to snow over the fire. The area is now covered with snow. Road access is now covered with snow.

Critical Values at Risk

Soils

Areas of high and moderate burn intensities removed effective groundcover and live vegetation, often with no potential for needle cast mulch, as judged from photographs and field accounts. Interior burn access to validate BARC map burn severity was limited due to safety concerns involving high number of snags falling. A few hydrophobicity tests were done which noted a hydrophobic depth of 3 inches and considered as fire induced. Hydrophobicity was field validated at other area such as along one section of the 8040-500 road on a steep slope where ½ inch of soil was wet with recent rain and the moisture did not penetrate the hydrophobic layer of soil. Volcanic ash soils in the area naturally exhibit repellency when dry but to a lesser degree than what was seen in high burn severity area. Exposed soils within the high burn intensity area will be susceptible to increased erosion for the first storms of the year. Increased erosion can be expected in zero and first order drainages that have moderate and high severity burns through them.

Soils information derived from the Gifford Pinchot National Forest Soil Resource Inventory (GPNF, 1992), GIS analysis, Resource Advisor accounts, and aerial observations formed the basis for analysis. There is a concern about a potential loss of soil productivity due to accelerated soil erosion resulting from the absence of groundcover and presence of hydrophobic soils. Where duff has been consumed, there is a higher likelihood of soil particle detachment by raindrop impact.

Absent treatment, soil loss is anticipated where burn severity is high. Soil loss can have a significant impact on long-term soil productivity. Consumption of the duff and litter layer in areas with high burn severity has already affected site productivity and further loss of topsoil would reduce site productivity.

Without any stabilization treatments in the high and moderate burn intensity areas of this fire, we can expect to lose approximately 20 tons of soil per acre the first year. Rate of soil loss in subsequent years will depend on recovery rate of vegetation and litter cover accumulation.

Campgrounds

1. Morrison Creek Campground - The slopes surrounding the Morrison Creek campground experienced predominantly high burn severity, resulting in the potential for increased surface runoff and surface erosion in the campground area. Debris flows are possible in the steep headwaters slopes in the Morrison Creek watershed. It is not likely that deposition of materials from a debris flow will reach the campground although that's highly dependent on the rainfall return interval. The Morrison Campground Shelter is at risk from flooding from nearby Morrison Creek. Signs and some other structures were destroyed by the fire, but larger structures such as the concrete toilet remain intact. This will need to be addressed in the Spring of 2013 with the need to place sandbags around the Morrison Creek Shelter.

2. Cold Springs Campground - The slopes around the Cold Springs Campground burned at a moderate to high burn severity. The campground is located on a wide ridgetop arm. Near the campground on the 8040500 road Hole in the Ground Creek drainage is located well below the road and should not be at risk from any debris flows at that location.

Trees killed in both campgrounds and along many trails in the area pose a significant hazard to crews doing erosion control/drainage, especially along 8040-500 road.

Trails

Some of the National Forest System trails, including the nationally known Pacific Crest Trail, were detrimentally impacted by the fire and are at risk of damage from surface erosion due to surface runoff from steep upslope burned areas onto the trails themselves.

Trail sections at highest risk are those located below steep slopes (>30%) in high intensity burn areas. Rill erosion, sheeting and some slough of materials are expected in many areas of the trails. Many trails are classified in the 12 to 20% gradient class and so include drainage structures. Trails were identified in high impact areas that would require immediate treatment to minimize erosion (Table 10; and Map 2).

Table 10. At risk trails on the Gifford Pinchot National Forest in areas of high burn and greater than 30% slope. See Map 1 for trail impacted locations in high intensity burn areas with slope greater than 30%.

Trail Name	Trail #	Trail Section (ft)
Pacific Crest Trail	2000.34	650
Pacific Crest Trail	2000.34	135
Pacific Crest Trail	2000.34	135
Pacific Crest Trail	2000.34	245
Pacific Crest Trail	2000.34	180
Pacific Crest Trail	2000.34	170
Crofton Ridge Trail	73	245
Crofton Ridge Trail	73	150
Round the Mtn Trail	9	1160
Shorthorn Trail #16	CLOSED TIL FURTHER NOTICED	0
Stagman Trail	12	1100
Stagman Trail	12	660
South Climb Trail	183	550
South Climb Trail	183	185
Coldsprings Trail	72	290
Coldsprings Trail	72	600
Total Length		**6455**

Trail/creek crossings can be destroyed by debris flows. Trails are more prone to damage in high and moderate burn areas at crossings that are at risk of debris flow.

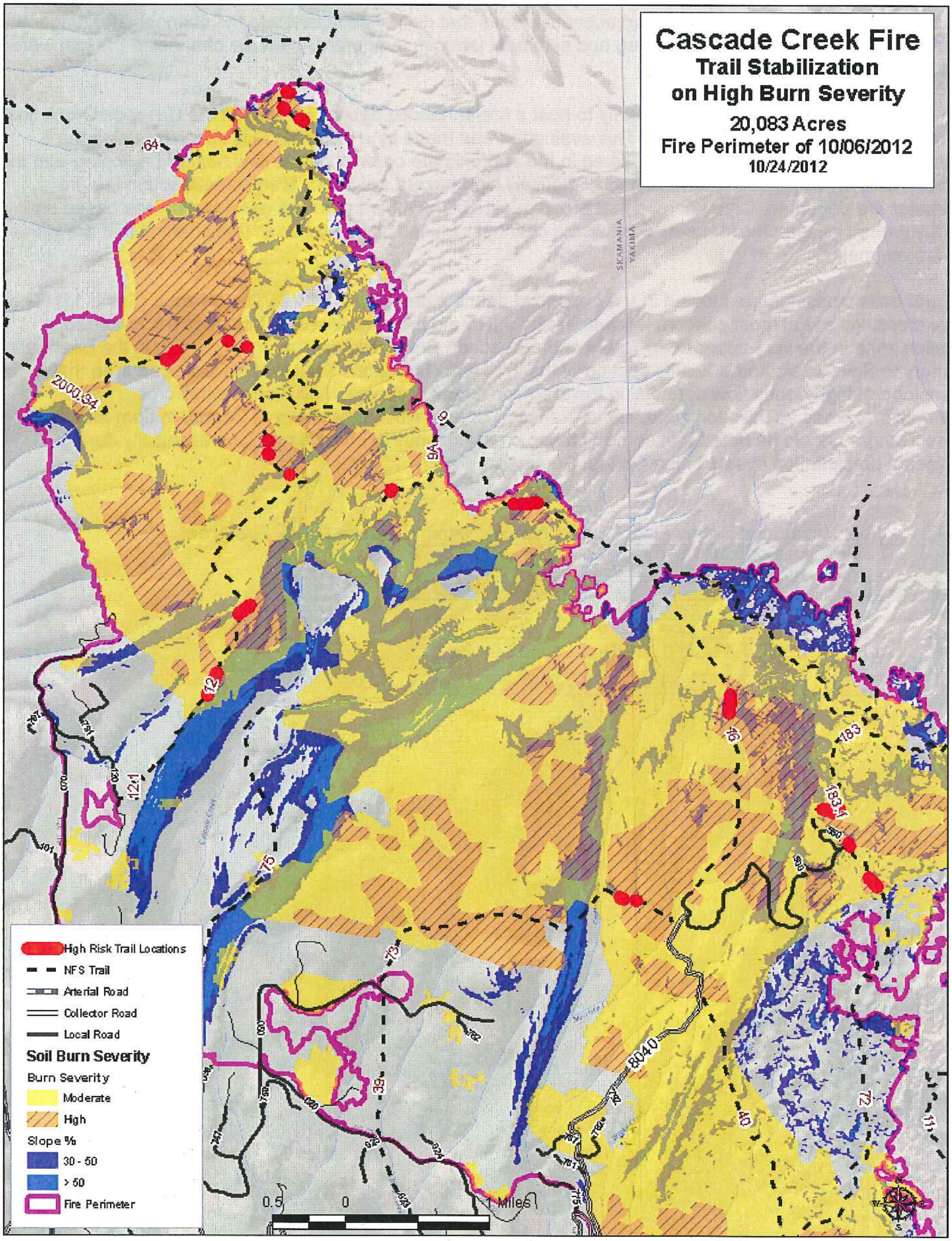
Many channels within the fire area are not steep enough or confined enough to host a debris flow. The channels that are most likely to host a debris flow are located in the steep valley heads of Cascade Creek, Salt Creek, and Morrison Creek. If adjacent hillslopes have had their vegetation and root structure destroyed by the fire, then the potential for a debris flow increases.

Several factors can be evaluated to assess the relative debris flow hazard of creek channels within the Cascade Creek fire perimeter.

1. Channel length (feet) within initiation zone (steeper than 36%) (**IZ**)
2. Channel length (feet) within scour zone (steeper than 18%) (**SZ**)
3. Number of channel heads (**CH**)
4. Channel length (feet) within high burn severity (**HB**)
5. Channel length (feet) within moderate burn severity (**MB**)

Date of Report: 10/25/2012

Map 2. Trails in high intensity burn areas with slope greater than 30% candidate for trail erosion stabilization.



More channel heads and longer potential debris flow channel lengths suggest a greater hazard for debris flows at the channel mouth or at any other evaluated point along the channel. Debris flows often initiate at channel heads from small debris slides in the adjacent hillslopes that deliver sediment into the channel. The longer the channel length, the more likely some log and sediment jam can temporarily dam the channel. If the jam were to burst, then a debris flow could result.

The most hazardous channels (most likely to host a fire-enhanced debris flow) within the Cascade Creek fire perimeter are listed below (Table 11). This evaluation was made by a slope stability specialist using the 5 factors listed above. The channels are listed in the approximate order of debris flow hazard beginning with the highest hazard. Only those channels with a relatively high hazard are listed. Many creeks within the fire perimeter are unnamed. Creek names that are in quotes in the table below are assumed names based on nearby named geographic features. Each listed channel includes all tributaries to that channel that are within the fire perimeter.

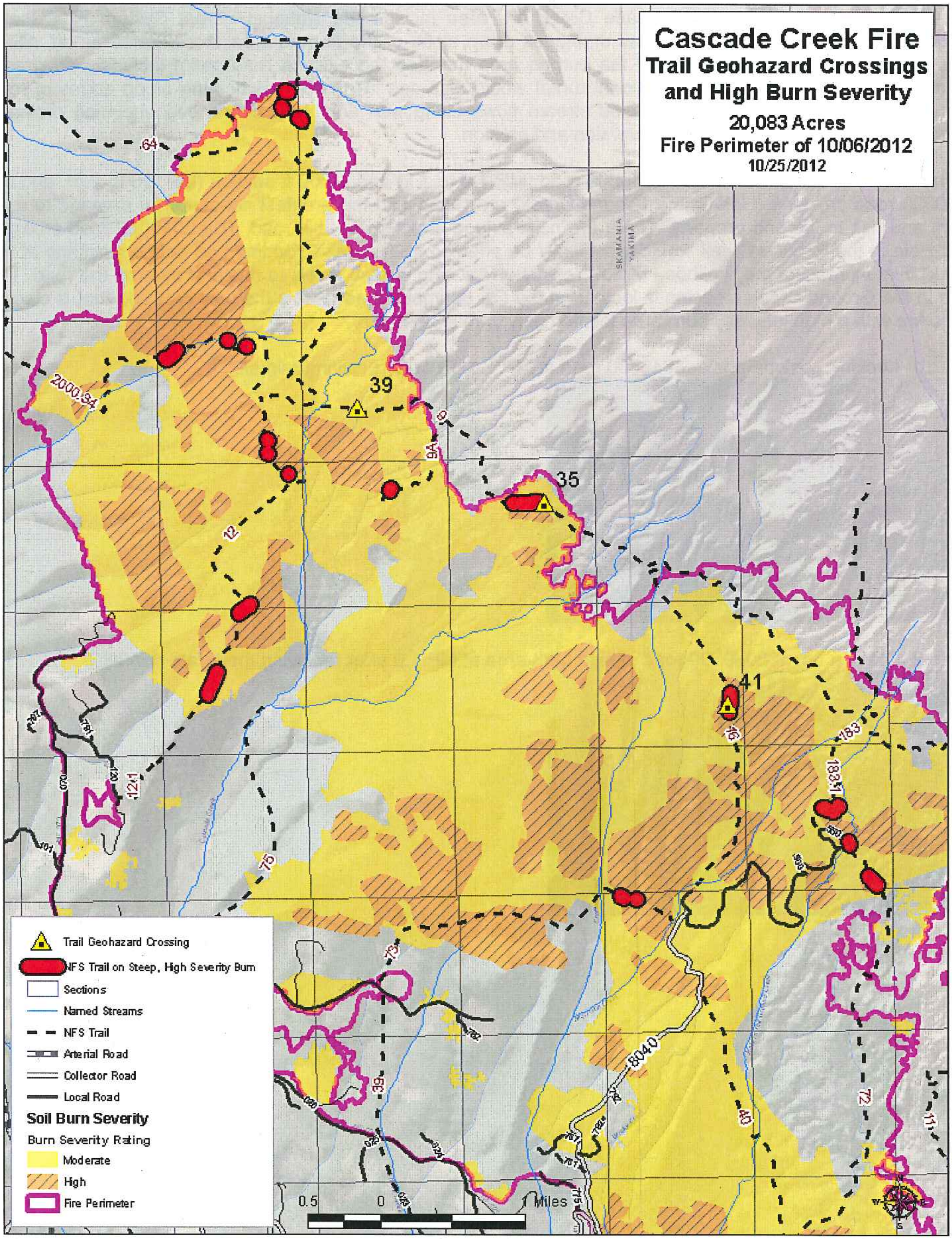
Several trails crossings are located in fire enhanced debris paths and/or in the initiation zone (Table 11). The three crossings are at most concern follows: Trail # 9 (Round the Mountain Trail) crosses a known debris initiation zone in the very upper headwaters of the Cascade Creek and another trail crossing in the headwaters tributary to Salt Creek; and a ¼ mile section of the Trail #16 (Shorthorn Trail) that traverses an area that is downslope of high debris flow potential in the Morrison Creek drainage. Map 3 shows trail crossings of channels that cross an initiation zone, scour, transport or deposition area (Map 1) located in burn affected areas. Danger should be noted that some of these crossings may become hazardous especially during significant precipitation events in the Spring, Summer or Fall.

Table 11. Most Hazardous Debris Flow Prone Channels within Cascade Creek Fire Area

MOST HAZARDOUS DEBRIS FLOW PRONE CHANNELS WITHIN CASCADE CREEK FIRE AREA						
Channel name	**IZ**	**SZ**	**CH**	**HB**	**MB**	**Trail Crossings at Risk**
Morrison	12800'	20200'	19	22800'	17400'	6 on Trail 9, 1 on Trail 16
Salt	9600'	16000'	23	1800'	42200'	2 on Trail 9
Cascade	13200'	6400'	13	4000'	17000'	1 on Trail 9, 1 on Trail 75
"West Morrison"	4200'	5400'	9	0'	9600'	7 on Trail 9, 1 on Trail 16
Crofton	800'	3500'	2	2000'	11800'	1 on Trail 16, 1 on Trail 73

Date of Report: 10/25/2012

Map 3. Identified hazardous trail crossings in debris flow prone channels within the Cascade Creek Fire.



Roads

Potential values at risk in the Cascade Creek fire area include the National Forest System Roads and associated drainage structures or cross drainages down slope of the burned area. Accelerated runoff, rilling, sedimentation, and debris moving off the burned area threaten the existing road prism including subgrade, surfacing and drainage system. Additional runoff would also see increased downcuttng along edges of road producing deep rills or gullies. Increased stream flows along with additional debris overwhelming drainage structures could cause overtopping, diversion and erosion.

A nine hundred foot section of the 8040500 road (MP 1.0 to 1.2) and a 600 ft section (MP 2.6 to 2.8), and the 8040020 road crossing (Hole in the Ground Creek) are roads with the greatest concerns for damage to road prism and risk to life and property. There are no drainage structure on this road. The 8040020 road crossing over Hole in the Ground Creek would most likely be affected from excess flooding and debris blockage at the culvert inlet increasing the likelihood of flow restriction causing stream levels to rise and overtop the road. The Hole in the Ground Creek crossing is located at the fire perimeter's edge. It is the only crossing that is closest to the fire with a high intensity burn area located only ¾ mile upstream.

Photo 1. Looking upslope above 8040500 road at MP 1.1. Prior to receiving rainfall.

Photo 2. Looking up up 8040500 road in high burn area at MP 1.0 after receiving moderate rainfall.

Photo 3. Looking down 8040500 road at MP 1.1 after receiving moderate rainfall.

Photo 4. Erosion at waterbar on 8040500 road at MP ~1.1 after receiving moderate rainfall.

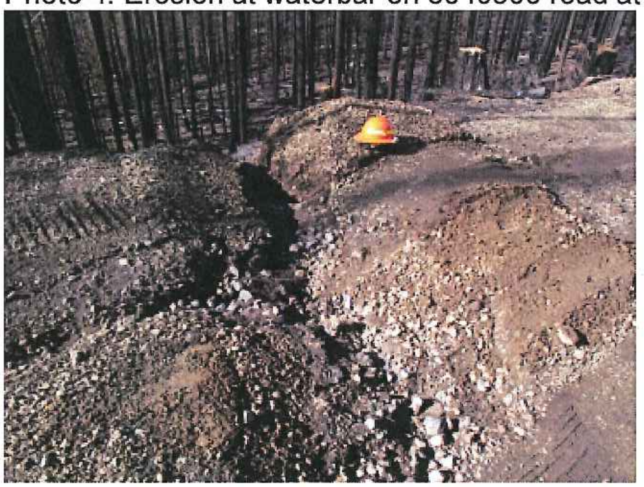
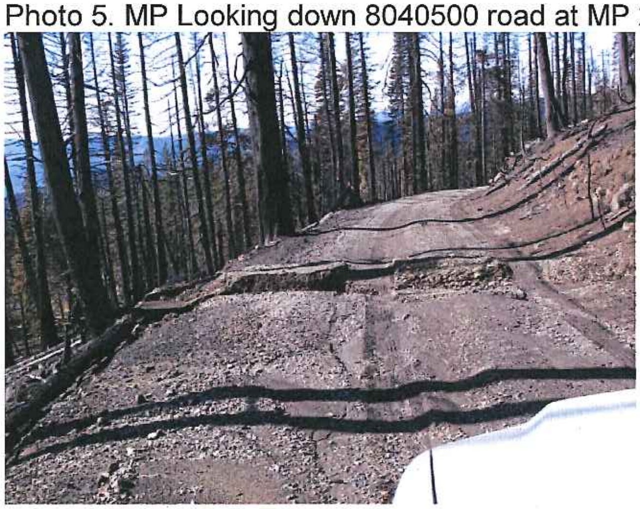


Photo 5. MP Looking down 8040500 road at MP 2.7 after receiving moderate rainfall.



There are numerous culvert crossings on roads outside of the fire perimeter that will likely experience increased sediment delivery from soil, ash and small woody debris that may impact a culvert's functionality. The amount of disturbance or potential for damage would be dependent on rainstorm return interval. Roads included are the 8040000, 8020000, and 80310000 collector roads which would require occasional culvert inspection/cleaning after any significant rainfall.

Mid-Alpine Lakes

Several small bodies of mid-alpine lakes exist inside the fire perimeter. The majority of the lakes have largely escaped the fire receiving low or no burns while a few received moderate to high intensity burns around the perimeter of the lakes such as Looking Glass Lake. In the past Looking Glass Lake was stocked with Brook trout during the 1980s or early 1990s and have reproduced naturally since then. It is unknown whether trout continued to thrive there before the fire. Looking Glass Lake is the only recorded lake historically stocked with trout while two other lakes identified in the Mt Adams High Lakes Survey Report (1999) are outside of the fire perimeter. Most mid-alpine lakes impacted by the fire are located in the northwest section of the fire perimeter. All of the lakes inside the fire perimeter are in the Mt. Adams Wilderness.

Wild and Scenic Rivers

The White Salmon River, from the headwaters to the boundary of the Gifford Pinchot National Forest, became a Congresssionally designated Wild and Scenic River corridor on August 2, 2005. This corridor reach includes the Cascade Creek corridor from its headwaters to its confluence with the White Salmon River. Approximately two miles of the White River Salmon headwaters are within the Cascade Creek fire perimeter containing a mix of low, moderate and high severity burn areas. The rest of the White Salmon River is outside of the burned area.

Approximately 6.5 out of 8.6 miles of the Cascade Creek are within the fire perimeter. Half of the lower drainage contain low and moderate intensity burns while the upper half contains more high intensity burns along with moderate and low intensity burns. Water quality (turbidity) in these Wild and Scenic Rivers is likely to be affected to some extent this winter during peak runoff events.

Irrigation Diversions of Trout Lake

Water for irrigation purposes originates from two gravity fed sources, the White Salmon River and Trout Lake Creek. Water is diverted from the White Salmon River at River Mile 16.5. The amount of intake in cubic feet per second (cfs) is unknown, but an estimate is that the White Salmon River diversion provides approximately 55 cfs to the irrigation system of Trout Lake valley. Turbidity and sediment may become an issue at the intake from White Salmon River.

Glacier Springs Water Diversion

The source of water is groundwater that is collected and diverted to the town ofTrout Lake as part of their public drinking water supply (Glacier Springs Water Association (GSWA). BAER team hydrologists met with a representative of the GSWA to talk with them about the potential effects of the fire on water resources.The Cascade Creek Fire will not have any impact to this spring water diverson system nor affect its water quality.

Fisheries and Condit Dam Removal

Bull trout populations are unknown in the White Salmon region although the USFWS identified the upper White Salmon River as conducive to supporting rearing and spawing habitat for the lower Columbia River bull trout. Two sightings of bull trout in the White Salmon River above Condit Dam have been recorded in the past two decades by Washington Department of Fish and Wildlife biologists, one during a gillnet operation in 1986 and one during a creel census in 1989. Recent investigations have yet to identify any bull trout.

The Condit Dam was removed in 2011 by Pacificorp, allowing the White Salmon River to reconnect with the Columbia River. BAER team members contacted Todd Olson of Pacificorp, who is interested in knowing about any potential increases in peak flows in regard to effects on the Condit Dam removal site.

In the upper drainage of the White Salmon River and tributaries that flow through the burned areas of the Cascade Creek Fire entering White Salmon River. The upper subwatershed of White Salmon River will likely see increase in turbidity from ash and sediment inputs after a significant rainfall. Sedimentation in some stream reaches, and potential blockage of stream channels from loosened rocks and woody debris will likely occur.

Invasive Plants

The critical resource value to be protected are native plant communities on National Forest Service lands where invasive species/noxious weeds are absent (largely true in Mt. Adams Wilderness), or are present only in minor amounts (lands outside the Mt. Adams Wilderness within the burned area).

Invasive plants known to be present in the burned area in patchily distributed occurrences include *Cirsium arvense* (Canada thistle), *C. vulgare* (bull thistle), *Hypericum perforatum* (St. John's wort), and *Senecio jacobaea* (tansy ragwort). *Centaurea diffusa* (diffuse knapweed), *C. stoebe* (spotted knapweed), and *Cynoglossum officinale* (houndstongue) are found in large concentrations in the Trout Lake Valley and along roadsides in the Trout Lake area, including along the Mt. Adams Highway and Forest Road 23, which were major access routes to the fire utilized heavily by engines and other fire-fighting vehicles.

Prevention measures used during the fire included a weed-washing station located at the fire camp in Hollenbeck Park, Trout Lake. This station was consistently utilized by incoming vehicles, and also for daily washing for many vehicles (this was voluntary). Hollenbeck Park itself is a large grassy field with no evidence of invasives. Adjacent to the park, within the riparian area along Trout Lake Creek, both houndstongue and *Phalaris arundinacea* (reed canary grass) are present in scattered occurrences.

Invasive plant seeds from nearby occurrences may be spread into the fire along road corridors by vehicles, equipment, wildlife, hikers, and mountain bikers. In addition, the Mt. Adams Allotment (livestock grazing) overlaps the burned area in the area west of Aiken Lava Bed; cattle in this allotment freely range from non-federal lands to the east (private, Washington Department of Natural Resources, and Yakama Reservation) onto federal lands. If livestock are allowed to range into the burned area, there is a moderate to high likelihood that cattle may transport invasive plant seeds into the burned area (this is a particular concern for houndstongue which is transported on animal fur).

In addition bulldozers, crew carriers, and other equipment used to fight the fire may have brought invasive plants seeds from many off-site locations. The drop points, parking areas, sling spots, medic sites, dozer lines, handlines, and the burned area may be invaded by invasive plants not currently growing in the vicinity of the Cascade Creek fire.

Areas within the fire perimeter that experienced substantial soil disturbance (dozer and hand lines, staging areas, and the burned area itself) are at high risk for invasive plant invasion and establishment; these areas will need to monitored for the purpose of early detection and rapid response (EDRR), in order to allow natural succession of native plant communities to occur within these areas.

Heritage Resources

1. Shorthorn Site: This resource at risk is situated along the Shorthorn Trail #16 within the Mt. Adams Wilderness. The site exists along both sides of the trail and is at risk from erosion along the trail as well as potential sheet washing. Burn severity in the area is moderate. Potential treatments/mitigations include dispersal of wood straw, installation of wattles along the trail, or placement of brush and woody material is areas threatened by erosion. The Shorthorn Site is eligible for the National Register of Historic Places (NRHP).

2. Cairn: The cairn is located near the Pacific Crest Trail #2000 and the White Salmon River in a **high severity burn area**. It is at risk from erosion, debris flows, and destabilization. This is a potentially critical heritage resource, pending additional field examination. Mitigations would include seeding, mulching, and wood straw dispersal.

3. Gotchen Creek Guard Station: The Gotchen Creek Guard Station is the oldest standing historic structure on the Gifford Pinchot National Forest. Constructed in 1909, the cabin served as the summer headquarters of the Mt. Adams Ranger Station until 1917. It continued in use by Forest Service personnel regularly into the 1990s. Built by rangers and staff, lumber for construction of the cabin was hauled by wagon from a mill in Glenwood, Wash. The cabin is an excellent, well-preserved example of simple, elegant, and functional early Forest Service architecture. The cabin was officially listed on the National Register of Historic Places in 2007. The cabin is in a unburned area, near the southeast corner of the fire perimeter. The cabin is at risk from increased flow in Gotchen Creek, which would result in increased flow in the diversion ditch which runs approximately 20 ft. west of the cabin. If the ditch were to flood its banks, the cabin would be at risk from being flooded and the associated water damage. The preferred mitigation would be closing off the ditch gate or placement of sandbags.

4. Morrison Creek Trail Shelter: Morrison Creek Trail Shelter was constructed by the Civilian Conservation Corps in the 1930s. It is an Adirondack style, three-sided rectangular shelter with a peeled log and pole frame with a sawn cedar shake walls and roof and dirt floor. The shelter is located in a moderate severity burn area. The site was visited by Gifford Pinchot Archaeologist Chris Donnermeyer on 10/18/2012 and a new creek channel was flowing approximately 10-12 m west of the structure; this new channel is likely a result of recent precipitation and the increased chance of erosion due to the effects of the fire. Therefore, the trail shelter is at risk from erosion and debris flows. Mitigations for this potential affect include strategic placement of sandbags between the channel and the shelter.

5. Cascade Creek Cabin: The Cascade Creek Cabin is a pre-1870 trapper's cabin located immediately west of Cascade Creek on a small portion of high ground; it is located in an unburned area. The cabin site was visited by Gifford Pinchot South Zone Archaeologist on 9/13/2012. Very little of the cabin remains are currently visible on the surface; there is a rock pile from the chimney and two possible sill logs on the surface that appear as parallel rounded ridges. The cabin is at risk from flooding potential increased flow of Cascade Creek or debris flows in the creek. Potential mitigations include placement of sandbags around the feature.

6. Sheep Camp Historic Artifact Scatter: This site was discovered by Gifford Pinchot South Zone Archaeologist Chris Donnermeyer and Resource Advisor Matt Mawhirter on 10/18/2012 while hiking along the Shorthorn Trail to access potential risks to several other sites. The site is located within a **high severity burn area**. An initial examination of the surficial artifacts revealed a large scatter of historic artifacts likely related to late 19th century/early 20th century sheephearding activities in the area. Potential mitigations include dispersal of wood straw, mulching, and seeding.

7. Wetlands Peeled Cedars: This resource at risk is situated 0.75 miles west of Stagman Ridge and about half of the site has been burned over by the fire; the site is an a low severity burn area. The site is eligible for the NRHP. The fire could potentially destabilize soil around the trees, resulting in destabilization of the root system. Potential treatments include mulching and seeding.

8. Shorthorn Cabin: The resources at risk are situated near the Shorthorn Trail #16. The cabin is located in a moderate severity burn area. The potential exists for increased erosion in the vicinity of the cabin due to destabilization of soils. Potential treatments include dispersal of wood straw and/or placement of brush and woody material around the area of the cabin.

9. Shorthorn Trail #16: The Shorthorn Trail heads north from the Morrison Creek Campground and intersects the Round the Mountain Trail near treeline. The trail travels through both moderate and **high severity burn areas**. The trail is at risk from erosion including the potential for additional runoff depending on the heat severity along approximately 2.3 miles of trail within the fire perimeter; this has not yet been determined. Potential treatments/mitigations include wattle installation, potential wood straw dispersal, construction of waterbars, and placement of brush and woody materials..

10. Section Line Trail and Bridge: This resource at risk is a historic trail with a small, wooden bridge that runs east-west between Morrison Creek Trail #39 and Salt Creek Trail #75. It is no longer in use. The site is potentially eligible for the NRHP. The site is within a low severity burn area. The trail is at risk from erosion including the potential for additional runoff along approximately 1.3 miles of trail within the fire perimeter; this has not yet been determined. Potential treatments/mitigations include wattle installation and potential wood straw dispersal.

11. Crofton Butte Boulder: The resource at risk is situated just north of Crofton Ridge Trail #73, directly south of Crofton Butte. The boulder is in a low severity burn area. The potential exists for destabilization of soils at the base of the boulder, which could result in boulder movement. Given the low burn severity in the area, this is unlikely. A risk assessment of the burn severity around the boulder cannot currently be conducted.

12. Bearing Trees and Brass Cap: These resources at risk are located just west of Stagman Ridge between sections 30 and 31 as well as south of Crofton Ridge at the section corner of Sections 4, 5, 8, and 9. Both sites are potentially eligible for the NRHP. The site is in a low severity burn area. The resource is at risk from potentially destabilized soil around the trees, resulting in destabilization of the root systems. Also, soil movement could bury the brass cap. Potential treatments include mulching and seeding.

Cattle Grazing (Mt Adams Grazing Allotment)

The Cascade Creek Fire burned approximately 13,193 acres of the Mt Adams Cattle Allotment (33,013 acres) plus an additional 2,700 acres from the 2008 Cold Springs Fire, leaving a remaining 17,120 acres or half of the remaining grazing allotment for cattle grazing opportunities. The permitted number has been 516 cow/calf pairs for two months (1035 Animal Unit Months) since 1988. The grazing system is season-long, and the season of use on the grazing permit is from August 1 to September 30 each year.

Water quality

There are no identified 303(d) listed impaired streams (Category 5) in the White Salmon River watershed, according to a 2008 Washington state Water Quality Assessment report in accordance with the Clean Water Act. Although approximately 5% of the Cascade Creek Fire resides in the very upper portion of the Headwaters Lewis River watershed. There are a few river segments in the lower portion of the Headwaters Lewis River watershed that have listed 303(d) impaired stream segments due to increased water temperature. The fire in the very upper reaches of the Lewis River headwaters is not expected to have an impact on identified impaired stream reaches downstream due to the distance from the fire, the size of the burn area and the amount of burn severity.

With enough significant rainfall to cause surface runoff in moderate and high severity burn areas, especially in exposed steep slopes, downstream water quality in both watershed river systems will be affected with the release of ash, loosened burned soils, and other sediment. It is expected that with the release of sediment downstream, there will be an increase in turbidity and sedimentation/deposition in stream channels. This may alter some of the channel's morphology in the lower gradient reaches where deposition of ash and sediment will be likely. Over time, with significant rainfall, it will be the source of continuining flushing of ash, sediment, and channel debris downstream. Water quality will temporarily be negatively affected during significant rainfall events until there is sufficient vegetative recovery to reduce surface runoff and erosion.

Critical Values Identified[5]

The BAER team evaluated the risk level to each identified critical value using the matrix below (Table 12). The estimated risk to downstream critical values is based on the assumption of the design storm, a 10 year, 2.89 hour rainfall event (estimated output given by the ERMiT Model[6]) of at least 1.19 inches of rainfall, occurs sometime within a 12 month period following containment of the fire.

Table 12. Magnitude of Consequences on Probability of Damage or Loss

Probability of Damage or Loss	**Magnitude of Consequences**		
	Major	Moderate	Minor
	Loss of life or injury to humans; substantial property damage; irreversible damage to critical natural or cultural resources.	– Injury or illness to humans; moderate property damage; damage to critical natural or cultural resources resulting in considerable or long term effects	Property damage is limited in economic value and/or to few investments; damage to natural or cultural resources resulting in minimal, recoverable or localized effects
	RISK		
Very Likely (>90%)	**Very High**	**Very High**	**Low**
Likely (>50% to <90%)	**Very High**	**High**	**Low**
Possible (>10% to <50%)	**High**	**Intermediate**	**Low**
Unlikely (<10%)	**Intermediate**	**Low**	**Very Low**

The Very High and High Risk are unacceptable risk levels due to threats to human life, property, infrastructure and resources, therefore treatments should be applied. An Intermediate Risk could be unacceptable if human life or safety is the critical value at risk.

Treatment #T1 addresses the high risk to life listed in Table 13. Treatment T1 also addresses the high risk to property listed in Table 13 for the next 6 months and will be followed by proposed treatment in quarter 3. These will include protection of campground shelter with sand bags, trail erosion protection measures, and rolling armored dips on FR 8040500. No treatment is recommended for the FR 8031070 bridge crossing a tributary to White Salmon River because the bridge connects to a short stretch of dead end road.

No high value at risks were estimated for Natural Resources (Table 15).

Treatment #T1 addresses the high risk to heritage resources in Table 16 in the next 6 months and will be followed by recommending trail erosion protection measures around the NRHP site and the cairn located on the Pacific Crest Trail.

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[5] Per FSM 2523.1 Exhibit 01 (Interim Directive 2520-2012-1)

[6] Robichaud, Peter R.; Elliot, William J.; Pierson, Fredrick B.; Hall, David E.; Moffet, Corey A. 2006. **Erosion Risk Management Tool (ERMiT) Ver. 2009.09.17.** [Online at <http://forest.moscowfsl.wsu.edu/fswepp/>.] Moscow, ID: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Table 13. Values at Risk to Life

Value at Risk: Life			
Risk	Probability of Damage or Loss	Magnitude of Consequences	Value at Risk
High	Likely	Major	Morrison Creek Campground flooding or debris flow.
High	Possible	Major	Camping in debris flow prone areas
High	Possible	Major	Travel corridor on parts of the 8040-500 road from loose rocks, trees, debris slides upslope above road, and risk on driving on damaged road prisms on steep side slopes. Slope above one 800ft section of road is between 50 to 70% containing high intensity burns where road crosses a steep side slope.

Table 14. Values at Risk to Property

Value at Risk: Property			
Risk	Probability of Damage or Loss	Magnitude of Consequences	Value at Risk
High	Likely	Moderate	Morrison Creek Campground structures including shelter, toilets, and tables close to Morrison Creek.
Low	Not likely	Minor	Cold Springs Campground tables, toilets, signs
High	Likely	Moderate	Hiking Trails (Areas of high intensity burns and slope greater than 30%)
High	Likely	Moderate	Forest Road (FR) 8040 prism
High	Possible	Moderate	FR 8031-070 Bridge at end of road
Low	Not likely	Minor	FR 8031 at Morrison Creek crossing. Nine foot Culvert with sediment and some debris likely.
Low	Possible	Minor	FR 8031 at Wicky Creek crossing. Culvert with sediment deposition around inlet.
Intermediate	Possible	Moderate	FR 8040 at Wicky Creek crossing. Culvert may experience large deposition of sediment and some minor debris. Historical culvert double piped lined with wood onside. Masonry work on outside of inlet and outlet ends.
Intermediate	Likely	Moderate	FR 8040020 at Hole in the Ground Creek culvert.
High	Likely	Major	FR 8040500, road prisms at MP 1.1 to 1.3, and MP 2.6 to 2.8
Intermediate	Possible	Minor to Moderate	FR 8051 at junction of FR 8040 (near or at the Morrison Creek Campground.

Table 15.

Value at Risk: Natural Resources			
Risk	Probability of Damage or Loss	Magnitude of Consequences	Value at Risk
Intermediate	Possible	Moderate	Non-Native and Invasive Weeds (Introduction/ Spread)
Low	Possible	Minor	Water quality (increase turbidity and sedimentation/deposition in stream channels)

Table 16.

Value at Risk: Heritage Resources			
Risk	Probability of Damage or Loss	Magnitude of Consequences	Value at Risk
High	Possible	Moderate to Major	Three sites on trails identified as potentially eligible for the National Register of Historic Places (NRHP) while one site is identified as eligible for NRHP. Only one NRHP site is located within high burn severity area.

Value at Risk: Heritage Resources			
Risk	Probability of Damage or Loss	Magnitude of Consequences	Value at Risk
Intermediate	Possible	Moderate	Shorthorn Cabin and Crofton Butte Boulder

B. Emergency Treatment Objectives:

Safety: Post warning signs to warn the public of trail/road closures and associated hazards within the burned area.

Trails: Prevent/minimize additional post fire damage to trails from illegal entry by posting and enforcing trail closures for public safety.

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

Land **N/A** % Channel **N/A** % Roads/Trails **N/A** % Protection/Safety **95** %

D. Probability of Treatment Success: Signage and monitoring only. Rain and now snow has covered the fire area. No on the ground treatment can be done at this time due to the nature of a late fire season, extended of an unusually warm and dry season and the quick snowfall turnaround. An interim BAER 2500-8 may be expected for 2013 to address fire damaged areas after roads and trails clear up.

E. Cost of No-Action: Risk to public users of roads and trails.

F. Cost of Selected Alternative: $1,500

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Mike McConnell

Email: msmcconnell@fs.fed.us Phone: (360) 449-7841 FAX: 449-7801

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.)

Date of Report: 10/25/2012

Part VI – Emergency Stabilization Treatments and Source of Funds

	NFS Lands					Other Lands				All Total $
Line Items	Units	Unit Cost	# of Units	BAER $	Other $	# of Units	Fed $	# of Units	Non Fed $	
A. Land Treatments										
							$0		$0	$0
Subtotal Land Treatments					$0		$0		$0	$0
B. Channel Treatments										
				$0			$0		$0	$0
Subtotal Channel Treatments				$0	$0		$0		$0	$0
C. Road, Trails, Campgrounds										
#T1 Implement Signage	Each	$1,500	1.0	$1,500						
							$0		$0	$0
							$0		$0	$0
Subtotal Road & Trails				$1,500	$0		$0		$0	$1,500
D. Protection/Safety										
				$0			$0		$0	$0
				$0			$0		$0	$0
Subtotal Protection				$0	$0		$0		$0	$0
E. BAER Evaluation										
BAER Assessment	Each	$52,186	---		$0	---		---		$0
	---	---	---	---	$0	---		---		$0
Subtotal Evaluation				---	$0	---	$0	---	$0	$0
F. Monitoring										
#M1 Road Storm Patrol	Each	$4,000	1.0	$4,000			$0		$0	$4,000
#M2 Monitoring signage effectiveness	Each	$15,000	1.0	$15,000			$0		$0	$15,000
Subtotal Monitoring				$19,000	$0		$0		$0	$19,000
G. Totals				**$20,500**	**$0**		**$0**		**$0**	**$20,500**
Previously approved						Comments:				
Total for this request				**$20,500**						

PART VII - APPROVALS

1. Ruth E. Evans for

JANINE CLAYTON
Forest Supervisor (signature)

10/25/2012
Date

2.

Regional Forester (signature)

Date