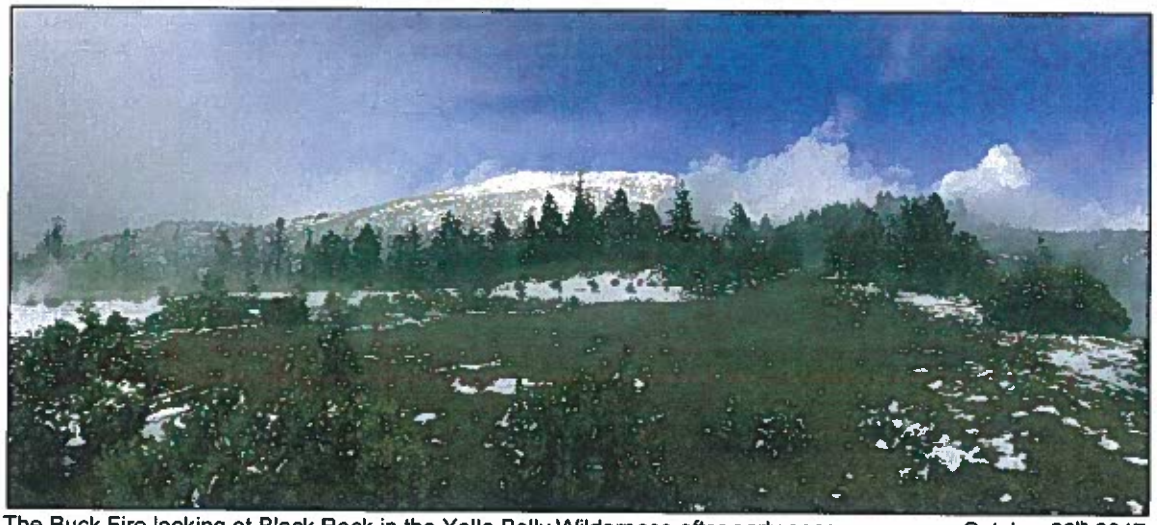
USDA-FOREST SERVICE

FS-2500-8 (7/08)
Date of Report: 10/24/17

BUCK FIRE BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST



The Buck Fire looking at Black Rock in the Yolla Bolly Wilderness after early season snow on October 20th 2017.

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: Buck

B. Fire Number: Buck = CA-SHF-001850

C. State: CA

D. County: Trinity

E. Region: 5

F. Forest: Shasta-Trinity

G. Districts: SFMU

H. Fire Incident Job Code: Buck - P5LC4X

I. Date Fire Started: Buck= September 12, 2017

J. Date Fire Contained: Buck= October ?, 2017 @68% containment

K. Suppression Cost: Buck = $20 ?? million

L. Fire Suppression Damages Repaired with Suppression Funds

Dozerlines:
Buck= Dozerlines needing repair / waterbarring: 20 miles

Handlines:
Buck= Handlines needing repair / waterbarring: 4 miles

M. Watershed Numbers and Names:

HUC6	**NAME** Sub-Watershed Name	**Acres**
180102120101	East Fork of South Fork	24,603
180102120102	Upper South Fork	27,237

N. Total Acres Burned: 13,350

Soil Burn Severity						
Unb./V.Low	Low	Moderate	High	Mapped	Unmapped	Total
4,632	4,170	1,944	173	10,920	2,428	13,348
42%	38%	18%	2%	[82%]	[18%]	[100%]

O. Vegetation Types:

Black oak, Oregon white oak, Pacific Douglas fir, white fir, mixed conifer, canyon live oak, lower montane mixed chapparal, gray pine, Ponderosa pine, annual grasses and forbs, upper montane mixed chapparal, huckleberry oak,

P. Dominant soils:

Tallac and Hugo very gravelly loams and Neuns very gravelly sandy loams; 35 soil map units in all with dominant slopes 40-60%.

Q. Geology and Geomorphology:

The Buck fire lies within the Klamath Mountains Physiographic Province, and is underlain predominantly by Paleozoic and Mesozoic metavolcanic and metasedimentary rock, along with minor amounts Quaternary sediments in the valleys. Tectonic processes accreted numerous terranes to the western margin of North America and four of these occur within the fire area, the Rattlesnake Creek, Western Klamath, Pickett Peak, and Yolla Bolly Terranes (see Table below).

Belt/Assemblage	Age	Terrane/Formation	Rock type
Western Paleozoic and Triassic	Paleozoic, Mesozoic	Rattlesnake Creek	Metavolcanics plus Metasediments, Diamictite, Hornblende Schist, Peridotite, Serpentinite
Western Paleozoic and Triassic	Jurassic to Late Cretaceous	Western Klamath Pickett Peak Yolla Bolly	Metavolcanics, Metasediments, Micaceous Schist, Metagraywacke, Chert, Peridotite, Serpentinite

The **Rattlesnake Creek Terrane** occupies a small pocket in the far northern portion of the fire complex. This terrane is an accretionary mélange consisting mostly of highly dismembered ophiolite including slabs of serpentinite and peridotite, basaltic volcanic rocks, some of which may contain naturally occurring asbestos, as well as radiolarian chert and limestone knockers. A significant proportion consists of diamictite, a weak metasedimentary rock which is prone to deep seated landslides. About 5% of the area within the fire perimeter is composed of this terrane.

The **Western Klamath Terrane** occupies a small area near the northern edge of the fire perimeter and, in this area, appears to consist only of a narrow tectonic sliver of slaty to semischistose detrital metasedimentary rocks of the Late Jurassic Galice Formation.

The **Pickett Peak Terrane** occupies the bulk of the fire complex and is the accreted eastern margin of the Coast Ranges province. It is an accretionary mélange consisting mostly of Mesozoic metagraywacke, metabasalt and metachert, including strongly deformed quartz-mica schist of the South Fork Mountain Schist. This schist forms the backbone of the west-trending ridge between North Yolla Bolly and Black Rock Mountains, continuing northwest toward its namesake, Pickett Peak. Although the South Fork Mountain Schist is more resistant to erosion, it is still prone to deep-seated and rotational slumps and landslides. Several areas have been mapped and observed as having dormant landslides, benchy terrain and more recent (<200 years) slumping on slopes in areas of moderate burn severity. This terrane also includes small, sporadic outcrops of serpentinite and peridotite, some of which may contain naturally occurring asbestos.

The **Yolla Bolly Terrane** in this area represents the Eastern Belt of the Franciscan subduction complex. It is mainly composed of arc-derived intercalated graywacke, shale, conglomerate, and radiolarian chert, all intruded by diabase-gabbro and quartz keratophyre (felsic dikes). These rocks are easily weathered and several active landslides are mapped and observed on the slopes above the South Fork of the Trinity River.

R. Miles of Stream Channels by Order or Class:

Buck = **18.5** Miles Perennial, **18.9** Miles Intermittent, **25.9** Miles Ephemeral

S. Transportation System:

Buck - Trails: **7.5** miles Roads: **20** miles

PART III - WATERSHED CONDITION

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

Soil Burn Severity						
Unb./V.Low	Low	Moderate	High	Mapped	Unmapped	Total
4,632	4,170	1,944	173	10,920	2,428	13,348
42%	38%	18%	2%	[82%]	[18%]	[100%]

Note: Oct 19 final perimeter acres = 13,348, portions are unmapped.

B. Water-Repellent Soil by total and FS (acres): Water repellency is a primary element of the soils effects in this fire: severe repellency is widespread and throughout the fire area, occurring in all soil burn severity classes from the bottom of the surface-charred layer (generally 0.5 - 1 inch deep), and varying in thickness from 0.5 - 1 inches in clay loam soils to 1 to 2 inches in sandy loams in high SBS. Repellency will be largely responsible for moderate soil burn severity expected to have a watershed runoff response similar to high. Repellency also occurred naturally in unburned areas, usually beginning at about 0.5 inches depth and 1 inch thick; but repellency was greatly exacerbated by the fire in coarse-sandy soils. It is estimated that about 40% of the fire area has water repellency elevated by the fire. About 880 acres (approx. 40% of Mod SBS + 60% of High SBS).

C. Soil Erosion Hazard Rating by total acres:

	Erosion Hazard Rating				
	Low	Moderate	High	Very High	
Total Acres	3,658	5,327	1,933	0	10,919
Percent	34%	49%	18%	0.0%	[82%]

D. Erosion Potential:

Total fire areas: 14 tons per acre for a 5-year runoff event, as determined using WEPP-ERMiT. Stated model accuracy is +/- 50%. With water repellency levels in this fire, +50% may be more representative for this area.

	ERMiT Runoff Event		
	2-Year	5-Year	10-Year
Erosion Rate (tons/acre):	0.67	6.02	13.99
Sediment Prod. (tons):	2,247	46,983	129,481

E. Sediment Potential:

ERMiT estimates (part 3D) try to account for hillslope re-deposition, and sediment production numbers are delivery to the bottom of the hillslope. Many modeled hillslopes in this fire do have streams at the base of the slope; water percolates into the soils (depending on the degree of water repellency) and sediment is delivered into creeks below. Therefore it is roughly estimated that 40% of sediment estimates above would be delivered to the fluvial system and bulk it by 10 to 30% especially in the Blossom Cabin Creek drainage.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years):	**30**
B. Design Chance of Success, (percent):	**80**
C. Equivalent Design Recurrence Interval, (years):	**2**
D. Design Storm Duration, (hours):	**6**
E. Design Storm Magnitude, (inches):	**1.95**
F. Design Flow, (cubic feet / second/ square mile):	**35.8**
G. Estimated Reduction in Infiltration, (percent):	**40**
H. Adjusted Design Flow, (cfs per square mile):	**62.4**

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

Background:

The Buck fire started by a series of lightning strikes in late August, 2017 starting new fires across the Shasta-Trinity National Forest. The Buck fire few quickly grew out of control with near-record heat and strong gusty southwesterly winds. Buck fire started later as a holdover from the August lightning swarm. Fires were fueled by an abundant grass crop produced by above average rain coupled with local brush suffering from long-term drought effects, and old growth stands of vegetation.

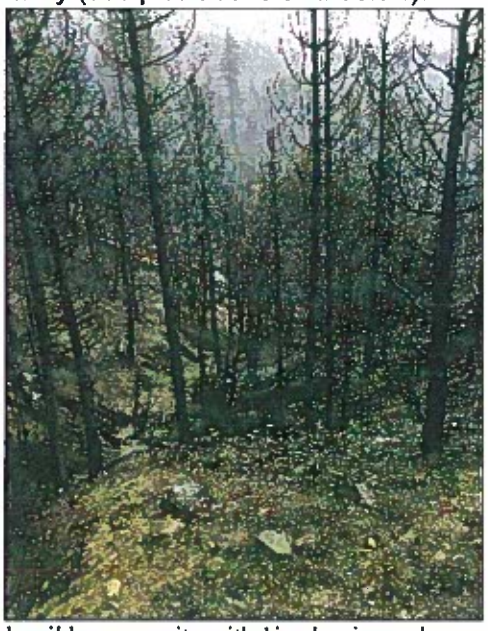
Approximately 20% for the Buck burned at moderate to high soil burn severity (see soil burn severity maps below). The rest of the fire (80%) was either low or very low soil burn severity. It is very important to understand the difference between *fire intensity* or *burn severity* as discussed by fire behavior, fuels, or vegetation specialists, and *soil burn severity* as defined for watershed condition evaluation in BAER analyses. Fire intensity or burn severity as defined by fire, fuels, or vegetation specialists may consider

such parameters as flame height, rate of spread, fuel loading, thermal potential, canopy consumption, tree mortality, etc. For BAER analysis, we are not mapping simply vegetation mortality or above-ground effects of the fire. Soil burn severity considers additional surface and below-ground factors that relate to soil hydrologic function, runoff and erosion potential, and vegetative recovery.

South-facing plantations high soil burn severity in Blossum

West-facing moderate soil burn severity above South Fork

General trends are north-facing mixed conifer old growth forested areas were low to moderate soil burn severity with 20 to 40 percent timber mortality. Open rocky south and west-facing mixed conifer with plantations and brush/grass areas had moderate to high soil burn severities with 50 to 90 percent mortality (see pics above and below).



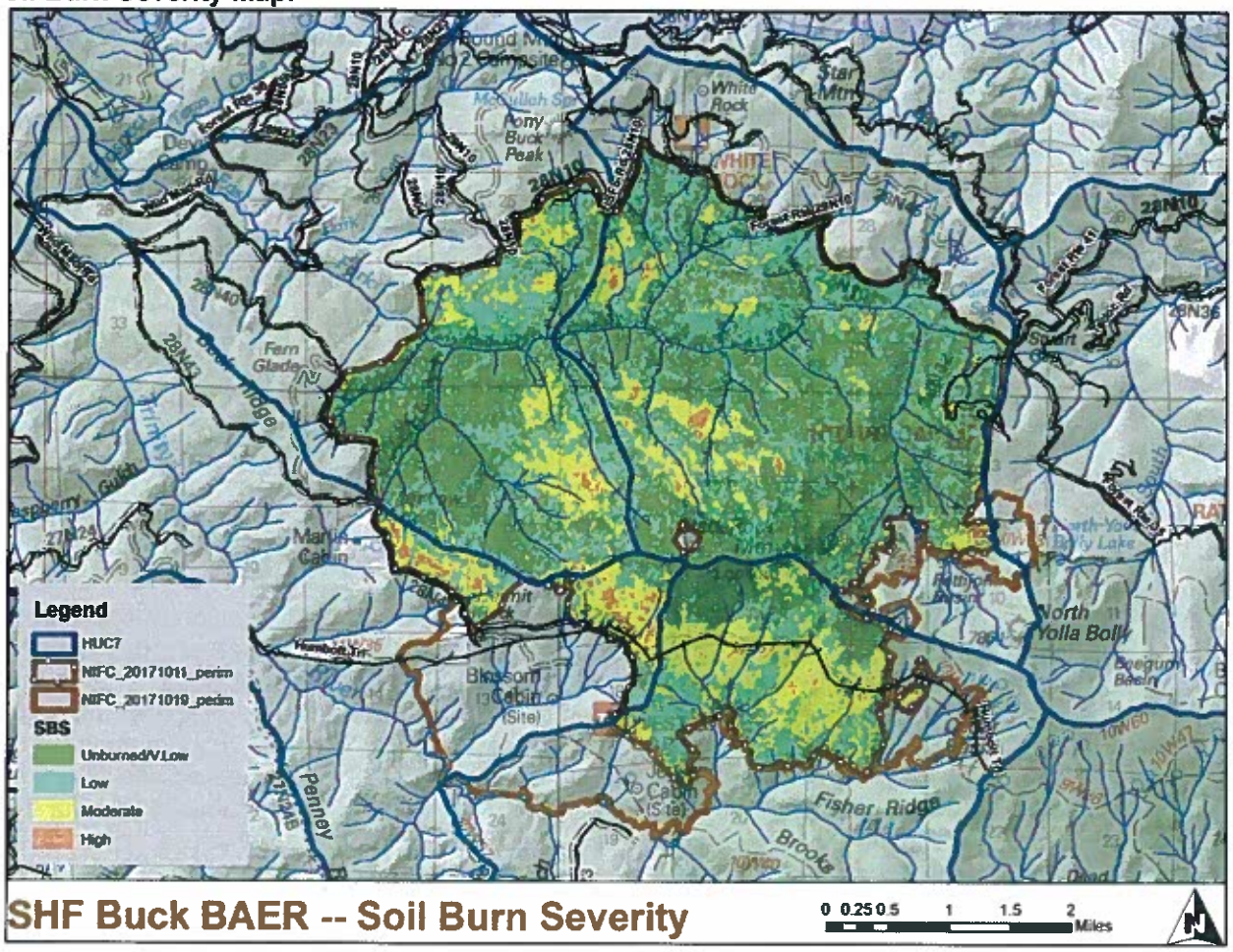
High soil burn severity with 1in char in vgr loam soil.

Moderate soil burn severity with repellency in gr loam.

Looking at the soil burn severity maps below shows multiple areas that have the majority of moderate and high soil burn severity. These areas are Weaver Bally, Monument Peak, Clear Canyon, Valdor

Canyon, Conner Creek, and Hocker Meadow area being at risk due to flooding and sedimentation affecting roads, water quality, and fish habitat.

Soil Burn Severity Map:



Resource Condition Assessment Sections:

Soils

Erosion risk was modeled using ERMiT. ERMiT (Erosion Risk Management Tool) is a FS-WEPP application developed by USFS Rocky Mountain Research Station (USFS, RMRS-GTR-188, 2007) specifically for use with post-fire erosion modeling. The ERMiT model is used with customized climate parameters to refine erosion estimates. This model estimates only sheet and rill erosion, which occurs when rainfall exceeds infiltration rates, and surface runoff has sufficient energy to entrain surface soil particles. The model does not account for debris flows, shallow landsliding or gullying, stream-bank erosion, road effects, or fire-line erosion and gullying, which can generically each be factors in the overall erosion picture post-fire but are treated quite differently to control.

ERMiT models erosion potential based on single hillslopes, single-storm "runoff events," and post-fire soil burn severity. Hillslopes include soil and topography inputs. Soil inputs include texture and matrix

rock content, which were based upon soil map unit information and field data. Hillslope gradients and profiles were derived in GIS from a 10m DEM, being more accurate than soil-map-unit level information to account for site-specific topography. 173 hillslopes were modeled to represent the Buck fire. Erosion models in general are quite sensitive to slope and terrain factors. ERMiT does account for some water repellency in sandy loam soils.

The interpolated PRISM climate for the fire area has approx. 50 inches of precipitation, modeled at 5,780 ft elevation. Elevation in the fire ranges from 980-7864 feet MSL, and a significant portion of precipitation comes as snow at the higher elevations. Modest spring rain-on-snow events are not uncommon in this locale.

Table 3. ERMiT design storm and runoff events, as modeled from a 37 year climate history record.

Hillslope Code	Rank	Storm Runoff	Storm Precipitation inches	Storm Duration hours	Peak Rainfall Intensity 10 minute	Peak Rainfall Intensity 30 minute	Storm Date
173	1	4.94	3.71	4.89	3.89	3.25	May 1 year 81
173	5 (20-year)	4.25	5.04	4.89	3.78	3.34	November 8 year 21
173	**10 (10-year)**	**3.64**	**2.54**	**5.55**	**3.72**	**2.89**	**April 5 year 29**
173	**20 (5-year)**	**2.97**	**4.39**	**4.68**	**3.95**	**3.39**	**March 14 year 20**
173	**50 (2-year)**	**1.89**	**3.37**	**7.14**	**3.85**	**3.16**	**February 10 year 22**
173	75 (11/3-year)	1.3	0	0	N/A	N/A	March 13 year 7

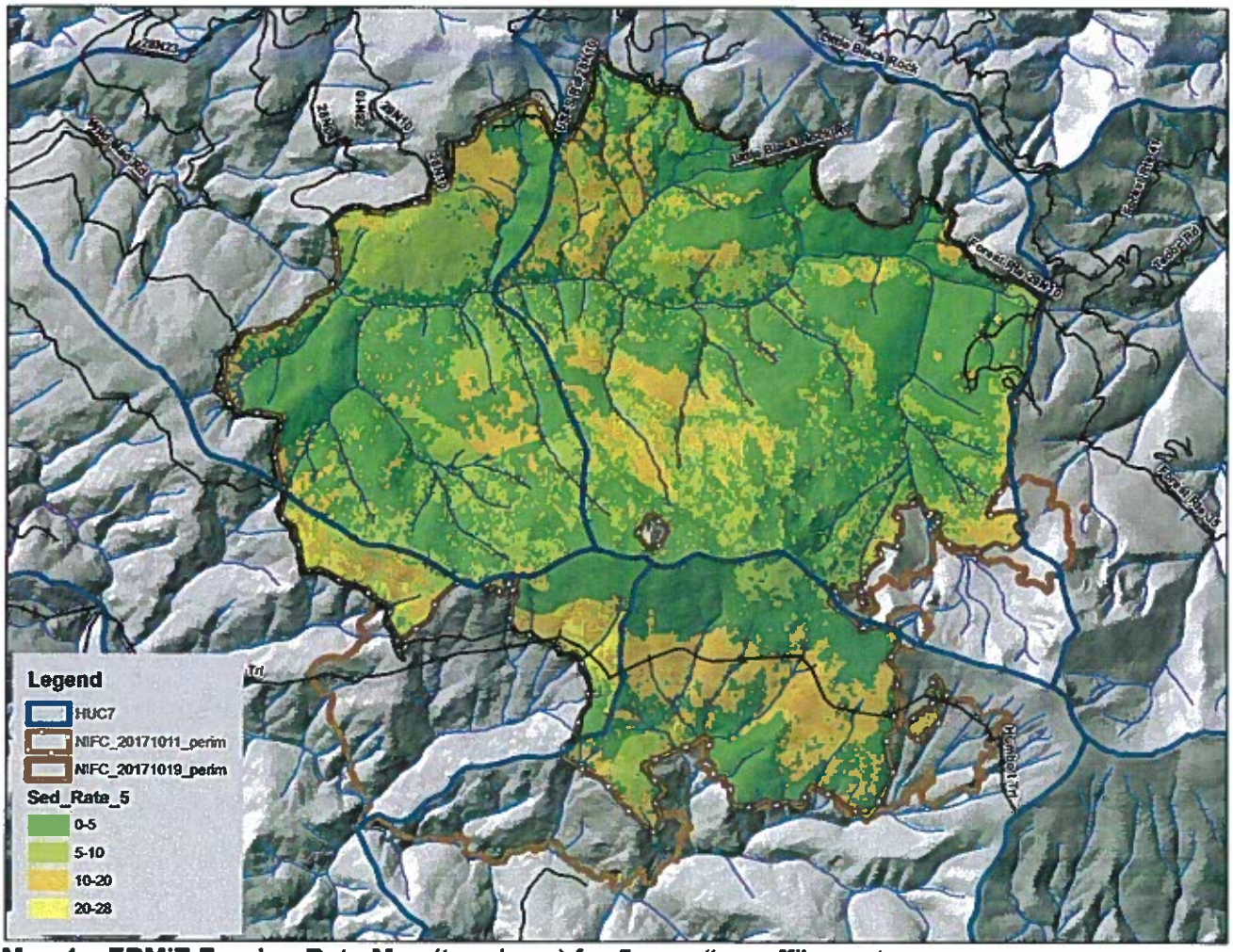
A range of storm runoff events were modeled to determine if the estimated soil erosion would represent a risk to soil productivity (source areas) or a hazard in terms of sediment delivery (water quality; contribution to stream bulking). For a 10-year event (10% probability) an estimated 130K tons of sediment may be produced, for an average 14 tons/acre (range 0-51 tons/acre). Notably this is a low probability event. Larger events are usually not modeled, both because of their increasingly-low probabilities (actual *risk* is lower) and because possible treatments are not considered effective for 20-year or greater events. With a 2-year event (the definition of average at 50% probability) about 2,250 tons of total sediment may be produced, averaging less than 1 ton/acre, which is conventionally considered within natural "background" erosion rates.

Table 4. ERMiT erosion estimates for the entire modeled fire area; stated model accuracy is +/- 50%.

	ERMiT Hillslope Erosion Estimates		
	2-Year Event	5-Year Event	10-Year Event
Ave. Erosion Rate (tons/acre):	0.67	6.02	13.99
Max. Erosion Rate (tons/acre):	8.69	27.12	50.67
Sediment Production (tons):	2,247	46,983	129,481

Map 4 (see below) display geographically the areas of greatest soil erosion risk. Areas identified with relatively high predicted erosion rates would represent priority areas for potential land treatments where erosion and sediment production pose a threat to values at risk. Treatments are often considered when predicted erosion rates exceed 20 tons/acre or more (personal threshold of concern). These areas would further be examined for treatment feasibility and suitability considering factors such as accessibility, slope gradient, stream density, and other down-slope values at risk. Most hillslopes within this fire are expected to produce under 20 tons/acre post-fire with a 5-year or 10-year event. Therefore increased post-fire flows will be relatively clean of soil, not substantially bulked flows, given events of reasonable magnitude (10-50% probability of occurring). Summer thunderstorms would present a much greater erosion

response, but these are notably very low probability events for any given specific location (again, actual *risk* is lower).



Map 4 – ERMiT Erosion Rate Map (tons/acre) for 5-year "runoff" event.

Hydrology

Stream Crossings & Watershed Areas of Concern

Stream crossings at risk were identified by overlaying roads and trails over streams within the burn area. The following table shows each area of concern based on a concentrated area having stream crossings. The stream crossings are also shown on the map following the table and Figure 3.

Table 3. Watershed of Concern Percentages by soil burn severity class and Peak Flow Modeling

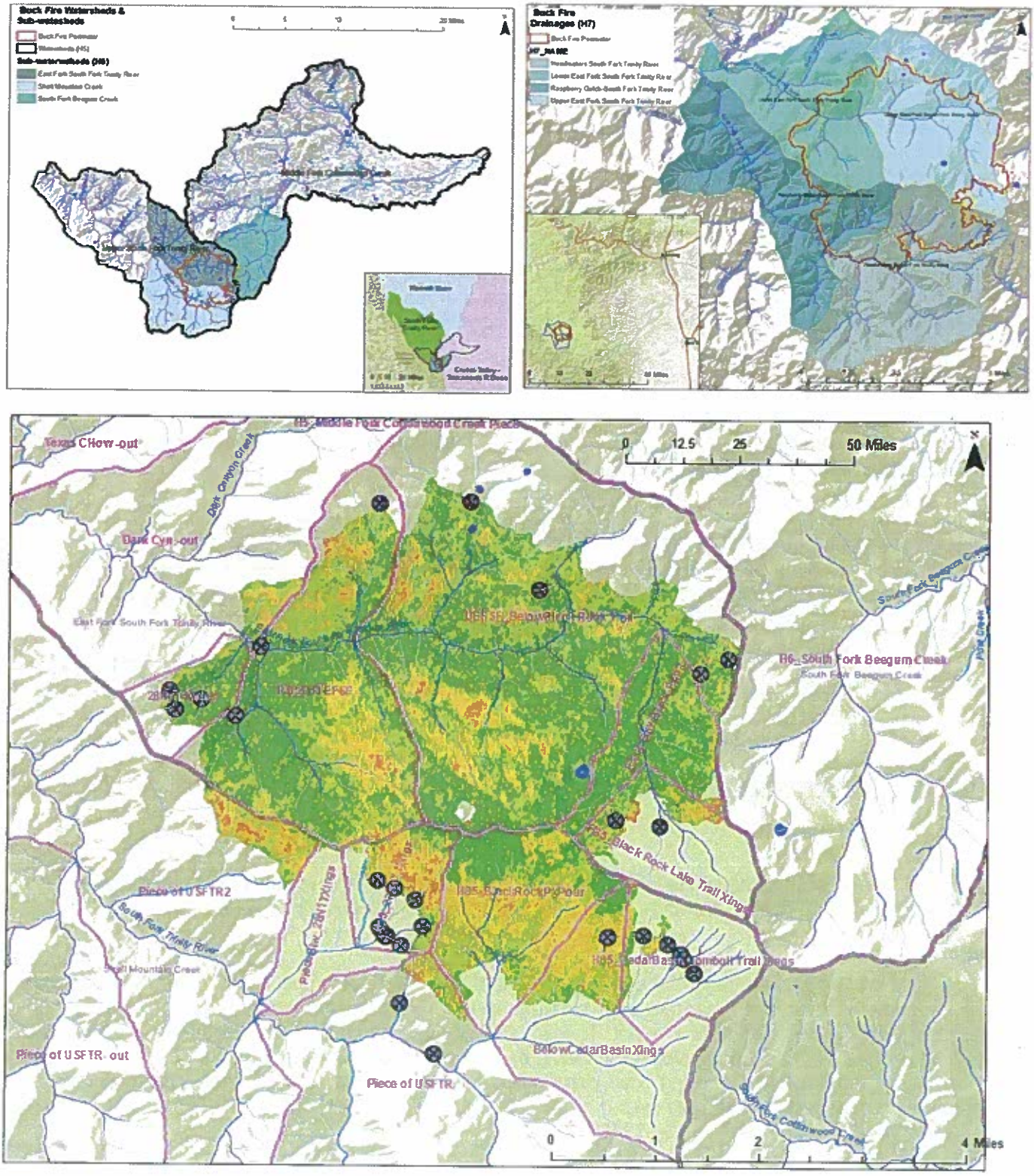
Buck Fire Watersheds of Concern H5 H6 H7 H8	Acres	%H	%M	%L	%U	Pre-Fire (cfs) Q2	Pre-Fire (cfs) Q5	Post Fire (cfs) Q2	Post Fire (cfs) Q5	Flow Increase
Upper SF Trinity R (H5)	100,558	0.2%	2%	4%	94%	11153	18633	11273	18834	1.0%
SFTR@EFSFTR confluence	51,840	0.3%	4%	8%	88%	6143	10332	6272	10549	2.0%
EFSF Trinity River	24,520	0.3%	4%	13%	82%	3132	5307	3214	5446	3.0%
EFSFTR- West Low Gap Trail Xing	10,994	0.7%	8%	30%	61%	1521	2599	1611	2751	6.0%
UEFSFTR	8,091	0.7%	6%	26%	67%	1155	1978	1210	2073	5.0%
LEFSFTR	7,934	0.2%	5%	15%	79%	1134	1944	1171	2007	3.0%
Hdwtr EFSFTR	1,833	1.2%	3%	20%	76%	303	528	314	546	4.0%
Black Rock Trail Xings	978	1.2%	4%	12%	83%	172	302	178	311	3.0%
28N41 Xings	497	0.0%	2%	17%	81%	94	165	96	169	2.0%
Shell Mountain Creek (Hdwtrs SF Trinity	27,287	0.3%	4%	3%	93%	3448	5836	3504	5930	2.0%
Hdwtrs SFTR	10,306	0.3%	7%	6%	86%	1435	2453	1477	2524	3.0%
Cedar Basin	2,539	0.4%	9%	7%	83%	407	705	422	731	4.0%
Humbolt Trail Xings	926	0.3%	3%	3%	93%	164	287	167	292	1.0%
Black Rock Pk Pour	1,395	0.9%	32%	31%	36%	237	414	269	468	13.0%
Blossom Cabin	1,311	3.1%	14%	9%	74%	224	392	239	418	7.0%
27N17 Xings	674	6.1%	27%	16%	51%	123	217	139	244	13.0%
Middle Fork Cottonwood Cr	159,274	0.0%	0.0%	0.00%	100%	16871	28057	16871	28057	0.0%
South Fork Beegum Cr	21,706	0.0%	0.0%	0.01%	100%	2806	4761	2806	4761	0.0%
N Yolla Bolla Lake	8,008	0.0%	0.0%	0.02%	100%	1144	1960	1144	1960	0.0%

Water Quality

Increases in peak flows result in rapid transport of loose materials such as floatable debris and increased fine sediment from accelerated hillslope erosion delivered to streams. This causes elevated nutrients, suspended sediment, turbidity, and accumulation of fines in pool and spawning habitat. In addition, accelerated surface and fill erosion on forest roads may result in delivery of fine sediment to stream channel. In some cases this can lead to failure at undersized pipes.

Figure 4: Watersheds of Concern

Pre and Post Fire Peak Flow Model Results:



Debris Flow Potential:

There is a moderate potential for the occurrence of earth flows/debris flows within the burned area (Figure 3, Soil Burn Severity). Most of the streams and stream segments at risk for earth flows/debris flows are located within the East Fork of the South Fork of the Trinity River and South Fork of the Trinity River watersheds that may have moderate to major impact on values at risk. Values that are at risk include channel crossing along multiple road segments within the fire perimeter, more specifically along road 27N17 and 28N40. Flow consistency will mostly be mud flows, but debris flows are possible. Due to the limited exposure to Values at Risk (VARs), i.e., roads and drainage structures, debris flow potential modeling was not performed for this fire.

Rock Fall Potential:

Minor rockfall hazards were observed along road 28N10 on the north side of the East Fork of the South Fork of the Trinity River. These are existing conditions that may be worsened by the fire which caused the burning of vegetation that was stabilizing material on the steep slopes.

Values at Risk: (see Appendix B)

The risk matrix below, Exhibit 2 of Interim Directive No.: **2520-2010-1** was used to evaluate the Risk Level for each value identified during Assessment:

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

Forest Service Roads and Trails:

Roads:

After field investigations, the roads listed below need two critical dips, one culvert inlet repair, two risers and three catchment basin clean-outs, along with hazard warning signs and a winter storm patrol.

Road 28N40
Issue: This crossing is at Hermit Creek, a tributary to the South Fork of the Trinity River. The drainage has experienced high and moderate burn severity on the ~35% slopes above the road and poses an elevated risk of a debris/mud flow event. The 24" CMP culvert appears to be functioning correctly, yet may present a risk of becoming clogged causing excess runoff to flow either diagonally across the road or down the inboard ditch causing road damage or failure. This would most likely create additional, uncontrolled sediment flow into the river.
Location: 40° 11' 56.6"N 123° 03' 34.7"W

Recommendations: We recommend that this section of county road be included in a rainy season storm patrol as issues caught early enough can avoid additional damage. We also recommend that the catchment basin be cleaned of debris and a riser be added to the culvert inlet as added overflow protection and from being clogged by woody debris or other objects.

Road 27N17
Issue: This crossing is on one of the branches of Blossom Creek, a tributary to the South Fork of the Trinity River. The drainage has experienced high and moderate burn severity on the slopes above the road and poses an elevated risk of a debris/mud flow event. The 24" CMP culvert appears to be functioning correctly, yet may present to risk of becoming clogged due to debris in the catchment basin causing excess runoff to flow either diagonally across the road or down the inboard ditch causing road damage or failure. This would most likely create additional, uncontrolled sediment flow into the river.
Location: 40° 11' 44.2"N 123° 02' 16.3"W

Recommendations: We recommend that this section of county road be included in a rainy season storm patrol as issues caught early enough can avoid additional damage. We also recommend that the catchment basin be cleaned of debris and a critical dip is added to the road downhill of the crossing.
Issue: This crossing is on one of the branches of Blossom Creek, a tributary to the South Fork of the Trinity River. The drainage has experienced high and moderate burn severity on the slopes above the road and poses an elevated risk of a debris/mud flow event. The 24" CMP culvert has been damaged and there are pieces of rebar in the catchment basin left over from an older hay bale check dam, presumably constructed after the Hermit fire.
Location: 40° 11' 38.0"N 123° 02' 03.7"W

Recommendations: Remove the remnant rebar and clean the catchment basin, repair the culvert inlet as required and add a riser. Also, improve the rolling dip downhill of the crossing to channel any possible overflow across the road.

Property: **High Risk** (Likely, Moderate) – It is likely that storms would provide increased runoff, sediment delivery, and mudflow to listed roads above due to the moderate to high burn severity in the area. Protection of the cross-drain culvert inlets and road prism is necessary to handle the increased runoff and sediment delivery. In addition, these roads lack the amount of drainage structure to handle the increased runoff and sediment delivery. If not mitigated, the cross-drain culverts would not function as intended and cause damage to the road prism. Potential washouts could occur on road segments where there is a lack of drainage structures for the increased runoff and sediment delivery.

Trails:

Property: **High Risk** (Likely, Moderate) – It is likely that storms would provide increased runoff, sediment delivery, and mudflow to the Humboldt Trail, Brooks Tie and Brooks Ridge Trails that were the most impacted by fire and will require treatments to ensure public safety. Public use of these routes are unsafe and accelerated erosion poses a threat to the trail and associated watersheds.

An unknown number of trees along the existing trails are dead or dying due to the ramifications of the fire. These standing trees pose a threat to users of the trails and Forest Service and contract trail crews. Protection of the crossings and trail prism is necessary to handle the increased runoff and sediment delivery. If not mitigated, the crossings would not function as intended and cause damage to the trail prism. Potential washouts could occur on trail segments where there is a lack of drainage structures for the increased runoff and sediment delivery.

Soil Productivity:

Values at Risk – Threats to Soil Productivity and Hydrologic Function (Fire-Wide)
Probability of Damage or Loss: Likely
Magnitude of Consequences: Moderate
Risk Level: High

An elevated level of erosion can be expected in the aftermath of the fire based on modeling of erosion and sedimentation and erosion risk analysis. Many of the slopes with the highest predicted erosion are too steep to effectively treat with mulch. The risk matrix used for determining the level of risk to soil productivity.

Based on the low ground cover and conditions in moderate and high severity burn, it is likely that erosion and sedimentation will occur in the Buck fire fire in the first year. The ERMiT modeled results show with the most likely scenario (a 5-year runoff event) that the amount of soil lost will be relatively moderate, this leads to a conclusion that the magnitude of consequences of soil loss is moderate. This leads to an overall risk rating of high.

Highest amount of soil erosion expected in Blossum Cabin area (southwest corner of fire area).
Effects of the fire on the soils have NOT created emergency conditions that would drive the need for erosion prevention via hillslope mulch treatments for emergency stabilization purposes. The BAER risk assessment process did not identify unacceptable risks as a likely result of soil erosion processes.

Natural recovery should be adequate for re-vegetation of hillslopes in the short-term (1-3 years). Increased hillslope erosion IS expected to occur throughout the fire area, but is NOT judged to represent an unacceptable on-site impact or off-site hazard. Land treatments are not considered necessary or cost effective to mitigate risks to VARs present in these watersheds.

Water Quality and Quantity:

Potential Critical Values at Risk (VARs)

Treatment Recommendation:

BAER treatment opportunities across the landscape are limited. Much of the area affected by the fire is unroaded and roughly 25 percent of the burn is within the Yolla-Bolla Wilderness area. Large areas within the burn perimeter (roughly 80 percent) was unburned or burned at a low burn severity.

Proposed BAER treatment specifications for NFS lands are limited to:

- Storm patrol and floatable debris removal at road and trail stream crossings
- Installation of risers, trash racks, and/or critical dips at undersized culverts
- Reconstruction of road and trail surfaces damaged from tree burnouts
- Hazard tree removal along roads and trails
- Invasive species (weed) monitoring
- Fence replacement within grazing allotment

Conclusions
As a result of the Buck Fire, minor increases in runoff are expected in most watersheds of concern.The largest increases in flows were 13% for two headwater tributary areas in the Headwaters of the South Fork Trinity River Watershed (also named Shell Mountain) the next highest increase was a 7 percent

increase in the same general areas. The unmapped portion of the fire had an unusual mosaic of mixed burn severities with portion that are likely high severity; this all drains into the "Shell Mountain Watershed". Even though the East Fork South Fork of the Trinity River Watershed had the greatest area burned it was almost all low burn severity and is expected to have a very slight increase in peak flows. The stream side areas in the East Fork South Fork are almost all intact and the channel has beautiful structure and variability wih stable and active floodplains.

Natural Resource Values at Risk - Threatened and Endangered Fisheries

The values at risk considered were federally threatened Coho salmon (*Oncorhynchus kisutch*) and associated impacts to designated critical habitat that exist inside the Buck Fire perimeter. Impacts to Designated Critical Habitat from excessive sedimentation and habitat degradation. Impaired habitat could lead to impacts to emergence, feeding and growth of young Coho salmon.

An assessment of fisheries Values at Risk (VAR) in relation to potential for soil erosion/sedimentation, decreased water quality and loss of cover indicates that federally ESA threatened coho salmon (*Oncorhynchus kisutch*), and their Critical Habitat as well as USFS Sensitive Upper Klamath-Trinity River Chinook salmon (*O. tshawytscha*); Klamath Mountain Province Steelhead (*O. mykiss*), and Pacific Lamprey, and MIS Spring-Run Chinook, winter-run steelhead and spring-run steelhead, and Essential Fish Habitat are likely to be adversely affected by post-fire impacts.

An assessment of fisheries Values at Risk (VAR) in relation to potentials for, soil erosion/sedimentation, decreased water quality and loss of cover indicated that federally threatened Coho salmon (*Oncorhynchus kisutch*) populations and habitats (designated critical habitat) are likely to be adversely affected by post-fire impacts. BAER treatment opportunities across the landscape are limited due to slope steepness (>60 percent) and inner gorge areas. Treatable acres for fisheries were limited to the Conner Creek drainage due to its importance as a domestic water source, designated critical habitat for Coho salmon, access roads, presence of dormant landslides and the inflow to the Trinity River which is designated as a Wild and Scenic River. In all other affected burn areas, too few treatable acres were identified to make a significant or cost effective difference in post-fire projected sediment yields. Emergency BAER treatments were identified for roads in the Buck and Buck Fires. No in channel treatments were prescribed for affected Buck Fire and Buck Fire streams due to the steepness of side slopes (>60 percent) and instability of inner gorge areas.

Threatened, Endangered, Sensitive and Invasive Plants:

Potential Values at Risk

The health of the ecosystem is at risk of post-fire noxious weed introduction which could result in the following issues: increased erosion, increased fire frequency intervals, decreased native plant communities, reduced terrestrial and aquatic sensitive plant and fisheries habitat, and altered nutrient cycles.
The Forest Service is obligated by law, and regulations such as Executive Order 13112, to respond to invasive species that threaten terrestrial and aquatic resources of the National Forest System and to collaborate with federal, state, and local partners to address invasive species that can spread from adjacent lands. Forest Service policy for invasive species management and research has recently been updated in 2013 by direction provided in Forest Service Manual (FSM) 2900 and by directions provided in FSMs 3400 and 4000.

Information on weed presence and abundance was documented with information from Natural Resources Information Systems (NRIS), California Invasive Plant Council (Cal-IPC), California Department of Food and Agriculture (CDFA), GIS analysis, and field surveys during the BAER assessment.

The Brooks trail, trail number 10W40, is at risk from burned stump holes and hazard trees on and adjacent to the trail. This trail is used by the grazing permittee towards the end of the season and is critical to the management of the allotment for the time being when a trespass into the wilderness does occur from the entrance point near Stuart's Gap trailhead. Rather than pushing the cattle back north towards Stuarts Gap, the permittee recently cleared the Brooks Trail to push cattle towards the Jensen Cabin site where feed and water are accessible and will encourage the cattle to stay in this area at the end of the season and out of the wilderness. The permittee and his wife spent over a week clearing the trail a few weeks prior to the start of the fire. Previous to their efforts on this trail, during one instance in an effort to move cattle out of the wilderness and into this area the brush was so thick that one of the cows stumbled and fell upside down in the brush. In its current state, the trail with the burned stump holes and hazard trees pose a threat to the safety of the permittee, and livestock that will be using that trail.

Rangeland and ecosystem health are at risk of post-fire noxious weed introduction which could result in the following issues: decreased forage, increased erosion, increased fire frequency intervals, decreased native plant communities, reduced wildlife habitat, and altered nutrient cycles.

Threatened, Endangered, or Proposed Species

The most recent list of endangered, threatened, or proposed species for Trinity County from the US Fish and Wildlife Service website (https://ecos.fws.gov/ipac), was accessed on October 8, 2017 by forest botanist, Lusetta Sims. White bark pine, *Pinus albicaulis*, is a candidate species and does not require consideration under this analysis. White bark pine is, however, analyzed as a sensitive species and although only threatened and endangered plants are considered for treatments under BAER.

Flowering plant species included on the report of Listed/Proposed Threatened and Endangered Species for Trinity County are:

Scientific name	Common name	Endangered Species Act status
Chamaesyce hooveri	Hoover's spurge	Threatened
Arabis macdonaldiana	McDonald's rock cress	Endangered
Orcuttia tenuis	Slender Orcutt grass	Threatened

None of these species occurs or has suitable habitat in the project area. Critical Habitat has been designated for Hoover's spurge and slender Orcutt grass; in neither case does Critical Habitat extend to Trinity County.

Noxious Weeds

The majority of the weed populations within the fire perimeter are concentrated in the wilderness areas, with the exception of a large population of diffuse knapweed near Hermit Rock at the intersection of 28N40 and 27N17. During the fire, this area was scraped, and a dozer line was created adjacent to this pullout that could easily spread the knapweed seeds further from their documented location. This diffuse knapweed population has been treated manually for the past 2 years and was treated prior to the start

of the fire, but diffuse knapweed seeds can remain viable in the soil for approximately 8 years (Goodwin and Burch, 2007). Woolly mullein and bull thistle were the dominant invasive species found in the wilderness areas, and were concentrated along the Humboldt trail. This area has had a history of repeated burns. Areas that have had repeated burns are particularly susceptible to establishment of annual grasses and invasive weeds due to the lack of ground cover, organic material, high slope, and increased erosion potential. See Appendix B for a map of the fire history.

The dominant noxious weeds found during the assessment were starthistle, diffuse knapweed, bull thistle, and woolly mullein. Cheatgrass (*Bromus tectorum*) and Canada thistle (*Cirsium arvense*) also occur within or adjacent to the fire. See Appendix C for a map of known infestations. The weed profiles can be found in Appendix D and at the CAL-IPC website: www.cal-ipc.org. Noxious weed ratings (CDFA, 2015).

Trails

The Brooks trail that accesses Jensen Cabin site incurred damage to the tread from stumps and roots burning beneath the trail causing sections of the trail to collapse. Along with hazard trees on or near to the trail, this trail in its current state poses safety hazards to humans and livestock using this trail.

Consequences of the fire on Values at Risk

Range Improvements
Grazing permit compliance is at risk from the burned sections of the West Low Gap drift fence that borders the Yolla Bolly Middle Eel wilderness. On the Shasta-Trinity National Forest, cattle are not permitted in the Yolla Bolly Middle Eel wilderness. The drift fence that restricts cattle access at the West Low Gap trailhead restricts entrance to the wilderness and has been successful for many years. This southern portion of the allotment is generally not used until later in the grazing season.

Noxious Weeds
Ecosystem stability of native plant communities are at risk following the fire due to the introduction of invasive plants and potential colonization. Post-fire, invasive plants generally have a superior competitive ability over the native species at using the resources such as influxes of nitrogen and phosphorus available from the ash, increases in sunlight and space (FEIS, 2015). The loss of soil from post-fire erosion is at risk from the conversion of native vegetation to invasive plants because often times the invasive plant root structures are not as adequately suited to hold onto the soil from erosion as native species.

Several weed seed corridors are located within the fire such as dozer lines, hand lines, roads, drop points, helispots, safety zones, recreational trails and waterways. See Figure 2. Various seed and plant vectors such as vehicles, off-road heavy equipment, human activity, high winds and wildlife were likely spreading weed seeds and propagules during suppression activities. A weed washing station was utilized during fire suppression activities. However, vehicles and equipment may have spread weed seeds within the fire vicinity from infested areas such as Photo 2 shows. Roadsides, dozer lines, hand lines and drop points will be most impacted by this threat as these areas have areas of newly exposed soil surfaces creating a habitat for the invasive plants and are areas where vehicle disturbance is most likely to occur. One of the main concerns of the newly created dozer and hand lines is that invasive weed populations and their seed bank that existed along roadsides previous to the fire will expand to the interior of the fire. Particular

areas of concern for weed invasions are areas near sensitive plant populations, wilderness areas and newly exposed soil surfaces.

Range Improvements

Threats from Damaged range improvements: Cattle have a history of accessing the Yolla Bolly Middle Eel Wilderness areas via the north eastern edge of the Upper South Fork allotment and have frequented the springs and meadows in the wilderness. Livestock presence is not currently permitted in the Yolla Bollys on the Shasta-Trinity National Forest. Trespass could result in reduced visitors using the recreation trails, increased trailing, and potential excess use of the springs and meadows within the wilderness.

Probability of Damage or Loss: **Likely**. Due to the burned portions of the fence, the fence not functional. Cattle trespass in the fence's current state is not a question of if trespass into the wilderness, but a question of when this would occur.

Magnitude of Consequence: **Moderate**. A moderate amount of property damage has resulted from the burn. Habitual trespass off of the and into the wilderness without an effort to prevent it could result in permit incompliance. Given the remoteness of this location, without the help of the fence to aid in prevention of trespass, keeping cattle out would be extremely difficult.

Risk: **High.**

Noxious Weeds

Threats to ecosystem stability from the introduction and spread of noxious weeds: An emergency exists in the form of soil erosion, increased exposed soil surfaces, decreased native vegetation to compete with the noxious weeds, noxious weeds competing with sensitive species for sensitive habitat, potential increased fire frequency return interval, decreased available forage.

Probability of Damage or Loss: **Likely**. This determination is due to the newly exposed soil surfaces created, the high amount of vehicle traffic and the ease at which invasives establish.

Magnitude of Consequence. **Moderate**. This determination is due to the noxious weed's ability to compete with sensitive species habitat and in areas that are at risk of having a vegetative type conversion which could cause long term negative impacts.

Risk Level: **High**.

Trails

Threats to safety from trail hazards: An emergency exists in the form of injury caused by poor trail stability from burned stump holes and roots that have collapsed or will collapse while stepping on the compromised areas. Hazard trees that have been weakened by the fire could fall and cause injury or potential death to humans or livestock.

Probability of Damage: **Likely.** Weakened trail tread from undermined burned roots and stumps and fire weakened trees on or adjacent to the trail could fall at any time.

Magnitude of Consequence: **Moderate**. Injury or potential loss of life could result from these trail hazards. This trail to the Jensen Cabin site keeps pressure off of the West Low Gap drift fence.

Risk Level: **High**

Threats to Cultural Resources: Post-fire effects on cultural resources result from two types of disturbances. The first is natural; the degradation of sites from burned hazard trees falling and increased erosion within the burn area which causes an increase in sediment deposition, debris flows, and scouring of the landscape. The second is cultural; increased access to the resource as a result of a denuded landscape that leads to a greater risk of looting, vandalism, and unauthorized OHV use. Each of these effects can also cause or exacerbate the other.

Critical Values for Heritage include all cultural resources which are listed on or potentially eligible for the National Register of Historic Places, Traditional Cultural Properties and Indian Sacred sites on National Forest lands. There are 12 known sites within the Buck burn perimeters that are in or in proximity of burned moderate to high intensity areas, some of which are prehistoric locations.

Field assessment of historic and prehistoric properties for the Buck Fire BAER was conducted over the span of two days. The fire areas are rich in cultural resources that represent Native American use of the area, as well as historic homesteading, ranching, and logging. It was necessary to prioritize sites as this is a large assessment in a relatively short amount of time. Six sites (out of 12 sites) that were identified as most "at risk" from post-fire effects were visited for assessment, although it should be noted that all sites that burned are at increased risk of vandalism and looting. Of the 6 visited, 4 was prehistoric, 2 were historic.

All of these sites are not risk from an increase in public access along due to the loss of vegetative barriers resulting from the fire. These make these sites not particularly vulnerable to increased disturbance and looting.

- For the site, the probability of damage or loss is "**Possible**;" and the magnitude of consequences is "**Minor**" for the site and the risk is "**Low**".

Threats to Public Safety:

Geologic Values-at-Risk (VARs) all involve public safety and property damage (rockfall, debris flow).

Rock falls - Minor rockfall hazards were observed along road 28N10 on the north side of the East Fork of the South Fork of the Trinity River. These are existing conditions that may be worsened by the fire which caused the burning of vegetation that was stabilizing material on the steep slopes.

Earth flow/debris flow – There is a moderate potential for the occurrence of earth flows/debris flows within the burned area. Most of the streams and stream segments at risk for earth flows/debris flows are located within the East Fork of the South Fork of the Trinity River and South Fork of the Trinity River watersheds that may have moderate to major impact on values at risk. Values that are at risk include channel crossing along multiple road segments within the fire perimeter, more specifically along road 27N17 and 28N40. Flow consistency will mostly be mud flows, but debris flows are possible. Due to the limited exposure to Values at Risk (VARs), i.e., roads and drainage structures, debris flow potential

modeling was not performed for this fire.

Threats to Wildlife: There are no wildlife concerns for the Buck fire due to limited impacts on T&E species.

Emergency Treatment Objectives: To allow safe passage of water to protect infrastructures and watersheds from accelerated sheet and rill erosion. To protect watersheds from the spread of noxious weeds and unfettered OHV access.

Risk determination is dependent on the design storm selected and downstream values at risk. By using an average storm (2-year event) emergency planning measures can be designed to mitigate and minumize anticipated risks. Using a 2-year design storm the values at risk can be evaluated to determine if an emergency exists.

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

Land **90** % Channel **-** % Roads/Trails **85** % Protection/Safety **90** %

D. Probability of Treatment Success:

	Years after Treatment		
	1	3	5
Land	80%	85%	90%
Channel	-	-	-
Roads/Trails	95%	90%	85%
Protection/Safety	95%	90%	85%

E. Cost of No-Action (Including Loss): $572,000

F. Cost of Selected Alternative (Including Loss): $86,850

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Brad Rust

Email: brust@fs.fed.us Phone: 530-226-2427 FAX: 530-226-2485

Risk Assessment Process:
The risk matrix below, Exhibit 2 of Interim Directive No.: **2520-2010-1** was used to evaluate the Risk Level for each value identified during Assessment:

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

Values at Risk Matrix:
The values at risk (VAR) matrix displayed in Appendix C below summarizes values at risk, post wildfire threats and risk ratings for forest service lands. Values with high or very high risk ratings are addressed, where possible, with BAER response actions (treatments). Generally, response actions are not recommended for values with low and intermediate risk ratings (except in the case for life).

H. Treatment Narrative for Forest Service:

(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.)

Land Treatments:
The proposed treatments on National Forest System lands can help to reduce the impacts of the fire, but treatments will not completely mitigate the effects of the fire. The treatments listed below are those that are considered to be the most effective on National Forest System lands given the local setting including topography and access.

Natural Recovery: Vegetation in the mixed conifer and fir forests will recover slowly. Even in areas of moderate soil burn severity, the canopy was mostly killed and the seed source removed. Stands with an element of Jeffrey, sugar, western, or ponderosa pine will likely recover more quickly, since at least a few mature trees are likely to have survived to produce seed into newly exposed mineral soil. Meadows dominated by grasses and forbs will recover within a year, because for the most part soil temperatures were not hot enough to kill root systems. The montane chaparral shrubs were mostly killed by the fire, but fire stimulates manzanita seeds stored in the soil to germinate. In riparian areas sedges and grasses were resprouting within 10 days of the fire, and most riparian shrubs are also likely to resprout.

Noxious Weed Detection and Eradication Treatments:

Weed Detection Surveys and Noxious Weed Removal
Forest Service policy mandates the Forest to minimize the establishment of non-native invasive species to prevent unacceptable degradation of the burned area. It is necessary to conduct noxious weed detection surveys to evaluate the potential for spread from both existing populations and from the

activities associated with fire suppression. The Forest Service's policy of Early Detection and Rapid Response (EDRR) is the most effective management plan available for invasive plant management. Therefore, noxious weed detection surveys are proposed for the first year following the fires to evaluate the potential infestations and determine the fires' potential impact on weed populations within the burned area. The objective of these treatments is to determine if the fire and associated ground disturbing activities have promoted the establishment and spread of noxious weeds to the extent that eradication efforts are necessary. Early detection dramatically increases the likelihood of successful treatment. If weeds are detected within the burn or at intersections where roads and dozers lines meet outside of the fire perimeter, they will be removed within year one post-fire.

Trail Repair

The objective to maintain the Brooks trail (10W40) is to prevent livestock access into the wilderness via the southern edge of the allotment where the West Low Gap drift fence restricts access. And in the event of a trespass occurrence, access to the Jensen Cabin site provides forage and water to encourage the cattle to use this area. The permittee has historically used this trail and has made an investment of his time and money to keep this trail open. Maintaining the trail provides safety to the permittee, livestock and other Forest visitors accessing the trail.

Treatment Description

Noxious Weed Detection Surveys and Weed Removal Treatment
Weed detection surveys will occur during the flowering season in 2018. Because of differences in flowering times for all potential species, two visits may be required during the growing season. Completion of inventory and treatments along roads, dozer lines, drop points, road and dozer line intersections, and known invasive plant populations will be the primary focus. See Appendix E for list of weed species will be mapped, using the west side Shasta-Trinity NF Invasive Weed List. Surveys will be completed using the NRIS protocol available at the national website: http://fsweb.nris.fs.fed.us/products/TESP_Invasive_Species/documentation.shtml. Results will be entered into the NRIS database.

Surveying will include documentation and hand pulling new weed occurrences at the time of inspection, where practical. New weed occurrences will be pulled to root depth, placed in sealed 3 mm plastic bags, and properly disposed.

Documentation of new infestations will include:

- Mapping perimeter of new infestations
- Filling out Weed Element Occurrence Form
- Treatment method
- Dates of treatment
- Incorporating data into local GIS spatial database
- Entering data into National Resource Information System (NRIS) database
- Entering data into FACTS database
- Evaluating success of treatment in subsequent inspections

A Weed Detection Survey Report will be submitted to the Regional and Forest BAER Coordinators, Invasive Weed Coordinator and Forest Botanists. If weed introduction and spread has occurred, an interim BAER report will be completed to request eradication funding. Reporting costs are included in figures below. See Appendix F for treatment locations.

Treatment Cost

Total Treatment Costs						
Treatment Type	Item	UOM (Unit of Measure)	Rate ($)/UOM	# of Units	Totals	Sum of Treatment Cost
Noxious Weed Survey and Removal	Road	Mile	850	25.6	21760	$25,330
	Dozer line	Mile	850	4.2	3570	
Fence Repair	GS 9-1 Range Management specialist	Day	250	5	1250	$4,920
	GS 5-1 Range Technician	Day	140	5	700	
	GS 4-1 Range Technician	Day	120	5	600	
	GS 3-1 Range Technician	Day	100	5	500	
	FS Vehicles (2 pickups, 100 mi each/day)	Mile	0.5	1000	500	
	Wooden Fence Posts (6"x8",	Each	20	25	500	
	T-posts (6 ft, heavy duty)	Each	6	40	240	
	Barbed Wire	Roll	70	4	280	
	Smooth Wire	Roll	75	2	150	
	Misc Supplies (gloves, nails, clips, wooden stays, 2x6s)	Each	200	1	200	
10W40 Trail Repair*	Leader, crew, supplies	Each				$14,200
Grand Total						$44,450

Road Treatments:

Safety – Within the Buck Fire, warning signs would need to be installed to warn road users of the fire area. In addition to warning signs, several roads within the Buck Fire would need a temporary closure for the winter due to potential runoff and sediment delivery that would likely be a safety issue to road users. Temporary road closures would include a forest order, barricades, and warning signs to warn the public.

Storm Proofing – Roads listed below are expected to see an increase in runoff and sediment delivery to the road prism due to the moderate to high burn severity and steep terrain of the Buck Fire.

A. Treatment Objectives

Treatment Type	Treatment Objective	Treatment Description	Treatment Cost
Storm proofing, repair and storm-patrol	To protect the road infrastructure, by reducing likelihood of culverts plugging up and road washouts due to increased runoff and sediment delivery.	Clean culverts, install risers where recommended, construct armored critical dips. The forest will send out a storm patrol after rain events to monitor and/or repair treatments as needed to prevent further damage to infrastructure.	$17,250
Public safety	To protect the lives of people by making them aware of the hazards they may encounter in the burned areas.	Install warning signs that describe hazards that can be encountered such as hazardous trees, falling rocks, debris flows and road debris.	$900
Total Cost			**$18,150**

B. Treatment Costs

Road Costs	Warning Signs			Armored Critical Dips			Risers				Culvert Cleaning			
Road	Qty (each)	Each	Total Cost	Qty (each)	Each	Total Cost	Size	Qty (Each)	Each	Total Cost	Qty (each)	Each	Total Cost	Overall Total
28N40	1	$300	$300				24	1	$2,250	$2,250	1	$ 750	$ 750	$3,300
27N17	1	$300	$300	2	$2,250	$4,500	24	1	$2,250	$2,250	2	$ 750	$1,500	$8,550
28N10	1	$300	$300											$ 300
Storm Patrol														$6,000
Totals			$900			$4,500				$4,500			$2,250	$18,150

The average value of the road and the cost of repairing these road segments without BAER treatment if damage occurs is approximately $50,000/mile.

Storm Patrols – NFSR 28N40 and 27N17are within a moderate to high burn severity. There is a future threat to travelers along the roads due to the increased runoff and sediment delivery and the potential for culverts to be plugged with sediments. Storm patrol would allow the forest to monitor the road drainage structure treatments to ensure the treatments are functioning, clean the area to ensure they continue to function in the future, and maintain and/or repair any damage to the road surface to the sediment delivery.

Trail Treatments Cost Estimate:

Treatment Objectives:
Moderate to severely burned trail segments on the Humboldt, Brooks Tie, and Brooks Ridge Trails will be water-barred to prevent channelization and accelerated erosion. Trail tread will be reinforced and stabilized from future collapse due to burned out stumps.

Since the forest has made the decision not to close the forest to the public, measures must be taken to protect the infrastructure and the public. These measures, if employed, will effectively protect the trail from anticipated erosion and trail use by the public. A combination of actions are necessary to protect users of the trail network and crews working to repair the trail.
Emergency work to be conducted on the Humboldt Trail, Brooks Tie and Brooks Ridge Trails will be implemented by the California Conservation Corp (CCC) as there are no Forest Service trail crews in the area. Remote location of the trail work to be implemented will require the CCC crew to camp for two weeks near the West Low Gap Trailhead.

Posting of warning signs at trail heads to notify users of hazardous conditions as a result of fire activity in the area. Replacement of burned trail signs for user safety.

Treatment Costs:

Treatment	Unit	Amount	Cost
CCC Crew Provisions & Labor	Miles	8	32,000
Animal Packer and Stock Maintenance	Spikes	2	7,200
		Total	39,200

Natural Resource Values at Risk - Threatened and Endangered Fisheries

Treatment Recommendation:

Natural Recovery: Vegetation in the mixed conifer and fir forests will recover slowly. Even in areas of moderate soil burn severity, the canopy was mostly killed and the seed source removed. Stands with an element of Jeffrey, sugar, western, or ponderosa pine will likely recover more quickly, since at least a few mature trees are likely to have survived to produce seed into newly exposed mineral soil. Meadows dominated by grasses and forbs will recover within a year, because for the most part soil temperatures were not hot enough to kill root systems. The montane chaparral shrubs were mostly killed by the fire, but fire stimulates manzanita seeds stored in the soil to germinate. In riparian areas sedges and grasses were resprouting within 10 days of the fire, and most riparian shrubs are also likely to resprout.

Protection/Safety Treatments:

Road and Trail Warning Signs
Install signs warning of debris flows, landslides and rockfall. High priority areas for this are roads through areas of high and moderate severity fire with high debris flow and rockfall potential such as along road 28N10.

Notification of individuals and Agencies
Notify private citizens and other agencies of potential threats posed by geologic hazards. Elevated potential for debris flows are anticipated for most steep watersheds which burned at high and moderate soil burn severity, and any structures within these watersheds are at risk. Of particular note are drainage structures on the slopes above the South Fork of the Trinity River in the southern portion of the fire area.

Heritage Resource Prescriptions:

All of the 12 sites identified in and adjacent to moderate to high burn severity areas are not at risk and no treatments are recommended.

I. Monitoring Narrative:

(Describe the monitoring needs, what treatments will be monitored, how they will be monitored, and when monitoring will occur. A detailed monitoring plan must be submitted as a separate document to the Regional BAER coordinator.)

See Appendix B below for road and mulch monitoring.

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

Buck BAER Costs	NFS Lands					Other Lands				Money Left
Line Items	Units	Unit Cost	# of Units	BAER $	Spent $	Units	Fed $	Units	Non Fed $	Total $
A. Land Treatments (L)										
NX Weed Det. Survey	miles	$850	30	$25,500	$0		$0		$0	$0
Subtotal Land Treatments				$25,500	$0		$0		$0	$0
B. Channel Treatments (L)										
Subtotal Channel Treatments				$0	$0		$0		$0	$0
C. Road and Trails (R&T)										
Road Stormproofing	project	$17,250	1	$17,250	$0		$0		$0	$0
Trail Stormproofing	project	$39,200	1	$39,200	$0		$0		$0	$0
Subtotal Road & Trails				$56,450	$0		$0		$0	$0
D. Protection/Safety (P&S)										
Road hazard and warning signs	each	$350	5	$1,750	$0		$0		$0	$0
Trailhead signs	each	$350	2	$700	$0		$0		$0	$0
Trail warning signs	each	$150	3	$450	$0		$0		$0	$0
Subtotal Protection				$2,900	$0		$0		$0	$0
E. BAER Evaluation										
Assessment Team	0520	H5BAER	---	---	$24,041	---	$0	---	$0	$0
Subtotal Evaluation				---	$24,041	---	$0	---	$0	$0
F. Monitoring (M)										
Road & Trail Treatment Monitoring	ea	$1,000	2	$2,000	$0		$0		$0	$0
Subtotal Monitoring				$2,000	$0		$0		$0	$0
G. Totals				**$86,850**	**$0**		**$0**		**$0**	**$0**
Previously approved						Comments:				
Total for this request				**$86,850**						

PART VII - APPROVALS

1. David R Myers — Forest Supervisor (signature) — 10/25/17 — Date

2. Barnie T. Grant — Regional Forester (signature) — 11/14/17 — Date

APPENDICES: Supporting Information:

Appendix A: Buck BAER Team

Appendix B: Monitoring for Roads and Trails

Appendix C: Values at Risk Spreadsheet

Appendix D: Treatment Map

Appendix A: Buck BAER Team:

NAME	AGENCY	FUNCTION	OFFICE PHONE	CELL PHONE	E-MAIL
Brad Rust	USFS	Team Leader	530 226 2427	530 917 0434	brust@fs.fed.us
Dave Young	USFS	Zone Soil Scientist	530 226 2545	530 226 9050	daveyoung@fs.fed.us
Dennis Veich	USFS	Geologist/Roads	530 226 2423	530-515-7414	dennisveiche@fs.fed.us
Christine Mai	USFS	Lead Hydrologist	530 226 2428	530 949 4908	cmai@fs.fed.us
Ashely Knight	USFS	Range/Botany/Weeds	530 226 2432	209 535 6955	ashley.knight@fs.fed.us
Lusetta Sims	USFS	Botany/Weeds	530 623 1750	530 739 3595	lusettasims@fs.fed.us
Melissa Church	USFS	Admin/VARS	530 515 8175	531 515 8175	mchurch@fs.fed.us
Jesse Merrifield	USFS	Hydrologist	530 628 1272	541 659 0800	jessemerrifield@fs.fed.us
Tom Hall	USFS	District Ranger	530 628 1200	530 440 4112	thall@fs.fed.us

Appendix B: Monitoring Protocols:

Buck Fire
Road Effectiveness Monitoring

The 2500-8 report requests funds to monitor the effectiveness of road treatments on Buck roads.

4. Monitoring Questions
- Is the road-tread stable?
- Is the road leading to concentrating runoff leading to unacceptable off-site consequences?

2. Measurable Indicators
- Rills and/or gullies forming of the road
- Loss of road bed.

3. Data Collection Techniques
- Photo documentation of site
- Inspection Checklist (attached)

4. Analysis, evaluation, and reporting techniques

- Monitoring will be conducted after storm events. If the monitoring shows the treatment to be ineffective at stabilizing road and there is extensive loss of road bed or infrastructure an interim report will be submitted. A several page report would be completed after the site visit. The report would include photographs and a recommendation on whether additional treatments are necessary.

Road Inspection Checklist

Date:_____ Inspector_____
Time:_____ Forest Road_____

Describe locations reviewed during inspection:_____

_____

_____

Was there road damage?

Was culvert plugged?_____.

GPS _____

Describe damage and cost to repair? (GPS)_____

Photo taken of road damage_____

Recommended actions to repair:_____

Buck Fire
Trail Effectiveness Monitoring

The 2500-8 report requests funds to monitor the effectiveness of trail treatments on Forest Trails in the Whittier 2 Fire.

1. Monitoring Questions
   - Is the trail tread stable?
   - Is the trail leading to concentrating runoff leading to unacceptable off-site consequences?

2. Measurable Indicators
   - Rills and/or gullies forming on the trail
   - Loss of trail bed

3. Data Collection Techniques
   - Photo documentation of site
   - Inspection Checklist (attached)

4. Analysis, evaluation, and reporting techniques

   - Monitoring will be conducted after storm events. If the monitoring shows the treatment to be ineffective at stabilizing trail and there is extensive loss of trail bed or infrastructure an interim report will be submitted. A several page report would be completed after the site visit. The report would include photographs and a recommendation on whether additional treatments are necessary.

Trail Inspection Checklist

Date:_____ Inspector_____
Time:_____ Forest Trail_____

Describe locations reviewed during inspection:_____

_____

_____

Was there trail damage?
Did the trail crossing fail?_____.
GPS)_____

Describe damage and cost to repair? (GPS)_____

Photo taken of trail damage_____

Recommended actions to repair:_____

Appendix C: Values at Risk Spreadsheet

Buck BAER Risk Matrix

VAR #	Value	Type of Risk	Post Fire Threats	Probability: Life	Probability: Property	Probability: Other	Magnitude of Consequences: Life	Magnitude of Consequences: Property	Magnitude of Consequences: Other	Risk: Life	Risk: Property	Risk: Other	Treatment to Manage Potential Post Wildfire Impacts: Life	Treatment: Property	Treatment: Other	Responsibility
1	Hydrologic Function	Loss of hydrologic function	Flooding, Sediment	Unlikely	Possible	Possible	Minor	Moderate	Moderate	Very Low	Intermediate	Intermediate	Nothing	Nothing	Natural recovery	FS
2	Domestic water	Turbidity and sediment	Flooding, Sediment	Unlikely	Possible	Possible	Minor	Moderate	Moderate	Very Low	Intermediate	Intermediate	Advise	Advise	Natural recovery	Private
3	Soil Productivity from OHV Trespass	OHV trespass, loss of soil productivity	Erosion		Possible	Possible		Moderate	Moderate		Intermediate	Intermediate		Barriers	Barriers	FS
4	Roads															
	27N15: [illegible] crossing, [illegible]	Protection and safety	Flooding, Erosion and Sediment		Possible	Possible		Moderate	Moderate		Very Low	Very Low		Stormproof	Natural recovery	FS
	27N17: 4 Crossings, 2 [illegible]	Road prism failure, infrastructure, lack of cross drains for runoff relief	Flooding, Erosion and Sediment		Possible	Possible		Moderate	Moderate		Intermediate	Intermediate		Clean catchment basin, add riser, add [illegible]	Clean catchment basin, add riser, add [illegible]	FS
	28N06	No issues														
	28N17	No issues														
	28N30: [illegible]	Protection and safety	Flooding, Erosion and Sediment	Unlikely	Possible	Possible	Minor	Moderate	Moderate	Very Low	Very Low	Very Low		Stormproof	Natural recovery	FS
	28N40: 4 Crossings, 2 [illegible]	Road prism failure, infrastructure, lack of cross-drains for runoff relief	Flooding, Erosion and Sediment	Unlikely	Possible	Possible	Minor	Moderate	Moderate	Very Low	Intermediate	Intermediate		Clean catchment basin, add riser, add [illegible]	Clean catchment basin, add riser, add [illegible]	FS
	28N40	No issues														
	28N41: 5 Crossings	No issues														
	28N45: Down tree	Protection and safety	Flooding, Erosion and Sediment		Unlikely	Unlikely		Moderate	Moderate		Low	Low		Remove tree	Remove tree	FS
	28N42	No issues														
	Private: 2 Crossings, [illegible]	No issues														Private
5	Trails															
	[illegible]	Burn [illegible] for 3.5 miles), hazard trees (~10-15 per mile)	Flooding, Erosion and Sediment, public safety	Unlikely	Possible	Possible	Minor	Moderate	Moderate	Intermediate	Intermediate	Intermediate	Stormproof, repair trail	Stormproof, repair trail	Stormproof, repair trail	FS
	[illegible]	Minimal damage	Flooding, Erosion and Sediment		Unlikely	Unlikely		Moderate	Moderate		Very Low	Very Low		Stormproof, repair trail	Stormproof, repair trail	FS
	[illegible]	Minimal damage	Flooding, Erosion and Sediment		Unlikely	Unlikely		Moderate	Moderate		Very Low	Very Low		Stormproof, repair trail	Stormproof, repair trail	FS
	[illegible]	Minimal damage	Flooding, Erosion and Sediment		Unlikely	Unlikely		Moderate	Moderate		Very Low	Very Low		Stormproof, repair trail	Stormproof, repair trail	FS
	[illegible]	Burn [illegible], hazard trees (~10 per mile)	Flooding, Erosion and Sediment, public safety	Unlikely	Possible	Possible	Minor	Moderate	Moderate	Intermediate	Intermediate	Intermediate	Stormproof, repair trail	Stormproof, repair trail	Stormproof, repair trail	FS
	[illegible]	Minimal damage	Flooding, Erosion and Sediment		Unlikely	Unlikely		Moderate	Moderate		Very Low	Very Low		Stormproof, repair trail	Stormproof, repair trail	FS
6	Grazing Allotments															
7	Noxious weeds [illegible] native plant populations	Native vegetation [illegible] and diversity	Expansion of [illegible]			Likely			Moderate			High			[illegible]	FS
8	Fisheries and Aquatics (Sensitive and T&E)															
	Coho Salmon (main South Fork Trinity, East Fork of South Fork Trinity)	Habitat degradation of native populations	Habitat degradation			Possible			Moderate			Intermediate			Stormproof, road treatments	FS
9	Public Safety															
	[illegible] on road 28N12	Safe Travel	Rolling rocks	Unlikely	Unlikely	Unlikely	Minor	Moderate	Minor	Low	Low	Low	Warning signs	Warning signs	Warning signs	FS
	Debris flow potential [illegible]	Safe Travel	Debris Flow	Unlikely	Possible	Possible	Moderate	Moderate	Moderate	Intermediate	Intermediate	Intermediate	Warning signs	Warning signs	Warning signs	FS
	Flooding along [illegible] Trinity River at road 28N30 bridge	Safe [illegible]	Flooding	Unlikely	Possible	Possible	Moderate	Moderate	Moderate	Intermediate	Intermediate	Intermediate	Warning signs	Warning signs	Warning signs	FS
10	Heritage [illegible]															
	[illegible]	Erosion	Erosion		Possible	Possible		Minor	Minor		Very Low	Very Low			Cover or [illegible]	FS
11	Soil Productivity	Loss of productivity on [illegible] soils	Erosion		Possible	Possible		Minor	Minor		Very Low	Very Low		Stormproof, [illegible]	Stormproof, road treatments	FS

Appendix D: Treatment Map: