USDA-FOREST SERVICE

FS-2500-8 (7/08)
Date of Report:8/15/12
Revised Report:10/4/12

SALT AND COAL FIRES BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

Salt Ck. Fire burned hillslopes heading north on Interstate 5 to Lakehead, CA.

A. Type of Report

[x] 1. Funding request for estimated emergency stabilization funds
[ ] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

[ ] 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)

[x] 2. Interim Report # 1
[x] 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: Salt and Coal Fires

B. Fire Numbers: CA-SHF-002521 -2999

C. State: CA

D. County: Shasta

E. Region: 5

F. Forest: Shasta-Trinity

G. District: NRA

H. Fire Incident Job Code: P5G4HN

I. Date Fire Started: 8/1/2012

J. Date Fire Contained: 8/6/2012 & 9/23/12

K. Suppression Cost: $XXXXX

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): 2.5 miles

M. Watershed Number: Salt and O'Brien Creeks – (180200050403 & 180200050404)

N. Total Acres Burned: 980+241=1,221
NFS Acres(1000) Other Federal ( ) State ( ) Private (221)

O. Vegetation Types: Ponderosa Pine, scrub oak, and chaparral

P. Dominant Soils: Gravelly loams of the Goulding, Holland, and Marpa families on dominantly 20-60% slopes.

Q. Geologic Types: Bragdon (metasediments) and Baird formations (metavolcanics)

R. Miles of Stream Channels by Order or Class: 1.8 miles perenial, 1.3 mile intermittent

S. Transportation System:

Trails: .2 miles Roads: 7 miles

PART III - WATERSHED CONDITION

A. Burn Severity by total and FS (acres): 682 (56%) (low) 364 (30%) (moderate) 176 (14%) (high)

B. Water-Repellent Soil by total and FS (acres): Water repellency was low to moderate in severity and patchy in occurrence. No significant contiguous areas with moderate to severe repellency were discovered.

C. Soil Erosion Hazard Rating by total acres:

	Moderate	High	Very High
Acres	102	805	74
Percent	10%	82%	8%

3D, Erosion Potential:

ERMiT Estimates	2-year event		5-year event		10-year event	
Watershed	tons/ac	tons	tons/ac	tons	tons/ac	tons
McCloud Arm	**22.9**	**1,549**	**40.4**	**2,699**	**58.8**	**3,941**
Ycotto@ Shasta Lk	22.9	1,549	40.4	2,699	58.8	3,941
Salt Creek Inlet	**20.8**	**17,911**	**36.6**	**31,138**	**52.6**	**45,596**
LCoal Cr @ Gilman Rd	19.9	2,006	34.6	3,378	49.7	5,020
M Coal Cr Residence	21.8	9,074	38.2	15,987	54.0	23,134
U Coal Residence	19.1	2,402	33.9	4,105	49.3	6,120
Salt Cr @ Shasta Lk	18.5	1,551	32.5	2,724	47.9	4,043
Salt Cr Trib	23.8	2,878	41.8	4,943	59.9	7,279
O'Brien Creek Inlet	**15.4**	**4,069**	**26.9**	**7,097**	**38.9**	**10,527**
Obrien E @ Shasta Lk	13.8	537	24.3	937	34.3	1,319
Obrien W Blw Salt	9.8	20	17.3	36	25.6	53
ObrienT1	16.3	459	28.2	789	41.2	1,169
ObrienT2	19.3	2,092	33.9	3,670	49.2	5,558
ObrienT3	14.5	962	25.6	1,665	37.1	2,428
Grand Total	**18.9**	**23,530**	**33.2**	**40,934**	**47.9**	**60,064**

Part 3E, Sediment Potential:

Nearly 100% of erosion potential (part 3D), due to steep linear slopes and steep stream gradients.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 5 to 7

B. Design Chance of Success, (percent): 70-90

C. Equivalent Design Recurrence Interval, (years): 2 & 10

D. Design Storm Duration, (hours): 24

E. Design Storm Magnitude, (inches): 8.96

F. Design Flow, (cubic feet / second/ square mile): 288.2

G. Estimated Reduction in Infiltration, (percent): 60%

H. Adjusted Design Flow, (cfs per square mile): 415.3

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

Background: The Salt and Coal Fires started on Wednesday, August 1, 2012 and September 21, 2012 twenty miles north of Redding, California in Shasta County. The Salt and Coal Fires spread rapidly due to steep south facing slopes with low fuel moisture, low relative humidity, and strong winds. In one day, the fire grew to 500 acres consuming dry grass, chaparral, and scrub oak burning into Ponderosa Pine and Douglas fir. Approximately 40% burned at high and moderate soil burn severity (see soil burn severity map below). The rest of the fire 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.

General trends are forested areas that were north or east-facing slopes were low to moderate soil burn severity with 20 to 50 percent timber mortality. Chaparral (scrub oak and manzanita) areas had moderately high to high soil burn severities and most vegetation removed (see pictures below).

Salt and Coal Fires southwest-facing slopes above Interstate 5

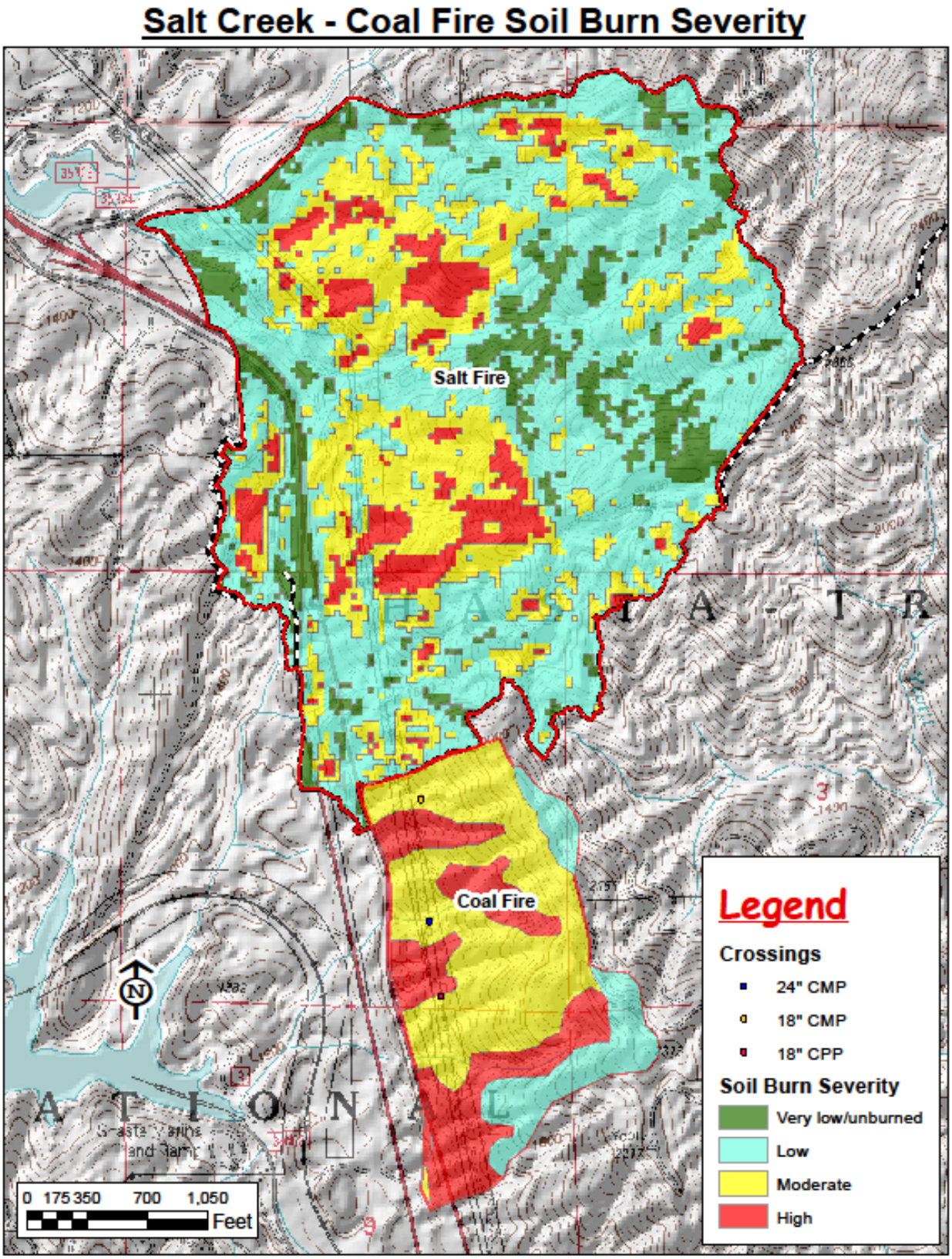
Moderately high soil burn severity in scrub oak chaparral

Moderate soil burn severity in mixed conifer along Coal Creek

Moderate soil burn severity with char down to 1.5 inches

Looking at the soil burn severity map below shows two areas that stand out as having the majority of moderate and high soil burn severity. These areas are above Interstate 5 and above Coal Creek that has three residents, two that could be at risk due to flooding.

Salt & Coal Fires Soil Burn Severity Map:



Values at Risk

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**

Life: The steep nature of the burned environment creates potential hazards to travelers of Interstate 5. It is important to note that travelers are normally at risk from falling rock and potentially hazardous road conditions during winter rain and summer thunderstorm events. However the potential for debris flows and flooding within and adjacent to I-5 and the Salt and Coal Fires has been changed as a result of fire, the burn has increased rock fall hazards and debris flow potential by removing vegetation, which once held rocks and boulders in place and provided soil cover, as such, travelers may be unaware of the fire effects. Exacerbating the situation is PG&E power-line road above I-5 that is a native surface poorly designed and maintained road that had its surrounding landscape severely burned. Failures along this road could cause a cascading of debris onto I-5.

Risk Assessment – Threats to travelers along Interstate 5

Probability of Damage or Loss: Likely. This determination is due to the frequency of travel along Interstate 5 that provides the major driving access through the burn.

Magnitude of Consequence: Major. This determination was made based on the potential outcome of travelers in vehicles being hit by a falling rock, or mud and debris on the road at night causing an accident/injury caused by trying to navigate around rocks and debris.

Risk Level: Very High – treatments considered for threats to human life or safety.

Property: Based on the watershed response, the BAER Assessment team determined that residences and private property within and below the fire area are at increased risk as a result of the Salt and Coal Fires. Forest roads within the fire area will be repaired as a result of suppression activity which is critical to protect road-bed and associated infrastructure. But because of the expected increase in watershed response, the assessment team feels that significant damage would occur to private Coal Creek residents, PG&E power-line road, Interstate 5, county roads (Gilman Road and Coal Creek) due to undersized culverts and poor drainage.

Risk Assessment - Private Property

Probability of Damage or Loss: Likely. This determination is due to the predicted change in watershed response because of moderate and high burn severity hillslopes above homes. Flooding and debris flows are likely for 2 homes along Coal Creek.

Magnitude of Consequence: Moderate. This determination was made based on the significant change in watershed response.

Risk Level: High – treatments should be considered for threats to life and property.

Risk Assessment – Interstate 5, Private (PG&E) and County roads

Probability of Damage or Loss: Possible. This determination is based on the expectation that increased sedimentation, debris flows, and flooding will occur and could plug drainage structures along roads.

Magnitude of Consequence: Moderate. This determination was made based on the amount of damage that would occur if structures (culverts) were temporarily plugged.

Risk Level: Intermediate.

Water Quality, Quantity, and Fisheries: The most noticeable effects of post fire effects on water quality would be increased sediment and ash from the burned area into drainages and water-bodies in and downstream of the fire area. During storm events this will increase turbidity and contribute to pool filling. Due to the moderate and high burn severity, water quality and quantity is expected to be significantly affected as a result of the Salt and Coal Fires within the Coal Creek watershed (see Hydrology Specialist Report, BAER Assessment Project File). Cole Creek is a residential water source for 3 homes along Coal Creek which has 60% of watershed burned hot (moderate and high soil burn severity) above. Coal Creek and Salt Creek are both fisheries for native residential trout and spawning gravels could be impacted by increased sedimentation.

Risk Assessment – Water Quality

Probability of Damage or Loss: Possible. This determination is due to the change in watershed response and increased turbidity affecting the drinking water for three domestic water sources along Coal Creek.

Magnitude of Consequence: Moderate. This determination is due to the change in watershed response.

Risk Level: Intermediate.

Risk Assessment – Fisheries

Probability of Damage or Loss: Possible. This determination is due to the change in watershed response and increased bedload turbidity affecting the fish habitat in Coal Creek and lower Salt Creek.

Magnitude of Consequence: Moderate. This determination is due to the change in sediments in the water and spawning gravel embeddedness that could occur.

Risk Level: Intermediate.

Threats to Soil Productivity: There is no emergency to soil productivity due to fire-adapted ecosystem and lack of productive timber stands due to transitional forest at this elevation.

Risk Assessment – Soil Productivity

Probability of Damage or Loss: Possible. This determination is due to the change in watershed response causing sheet and rill erosion of topsoil.

Magnitude of Consequence: Minor. This determination is due to the change in watershed response causing erosion of topsoil of low timber site habitat.

Risk Level: Low.

Threats to Cultural Resources: Archival research and GIS analysis indicates that no cultural sites occur on Forest Service lands within the Salt and Coal Fires perimeter. Post-fire assessment field work, conducted by the SHF heritage program staff, detected no sites.

No emergency exists for cultural resources as result of the Salt and Coal Fires.

Threats to Wildlife: There are no wildlife concerns for the Salt Creek or Coal Fire. Loss of vegetative cover and foraging habitat is minor and most of the fire's effect was habitat improvement due to 65% of the fire burning low to very low soil burn severity.

No emergency exists for wildlife habitat as result of the Salt and Coal Fires.

Threats to Botany: There are no potential values at risk for T&E plants within the Salt and Coal Fires area.

No emergency exists for T&E plant habitat as result of the Salt and Coal Fires.

Native Vegetation Recovery: Invasive weeds are an issue due to multi-dozer lines on the perimeter of the Salt and Coal fires. Initial attack units including dozers may not have been clean on arrival at scene and did not have access to a weed washing station. These areas are prone to noxious weed spreading and introduction throughout the Salt and Coal fires. Weed washing station was interrupted for 3 days during transition from Type 2 to Type 3 teams so weeds could have been distributed from lower locations to highland locations. The invasion of exotic vegetation, especially grasses, annual forbs, and brooms as a result of fires reduces or displaces native plant species, thus impacting native vegetative recovery. Due to the Salt and Coal Fires there is a concern about the recovery of native vegetation.

Risk Assessment – Native Vegetation Recovery

Probability of Damage or Loss: Likely. Type conversion of native vegetation to nonnative grasses has already been occurring as a result of a major interstate and several county roads intersecting the fire. The Salt Creek and Coal Fires have a possibility of increasing the extent of these invasive weeds.

Magnitude of Consequence: Moderate. The Salt Creek and Coal Fires, coupled with noxious weeds have caused damage to critical natural resources and could spread invasives along fire-lines.

Risk Level: High.

B. 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 OHV unfettered access.

Risk determination is dependent on the design storm selected and downstream values at risk. By using an above average storm (10-year event) emergency planning measures can be designed to mitigate and minumize anticipated risks. Using a 10-year design storm the values at risk can be evaluated to determine if an emergency exists. Emergency determination matrix displayed below shows if an emergency exists, probability of failure if untreated or treated, and treatment proposed to mitigate the emergency for all lands regardless of ownership.

Salt Creek Values @ Risk Emergency Determination Matrix

Value at Risk	Emergency U%(yes/no)T%			Reason	Treatment
Coal Creek private homes	70	Y	45	Flooding potential	Mulching hillslopes ?
Interstate 5 travelers	75	Y	40	Rocks and debris	Mulching hillslopes ?
Fish habitat – Cole/Salt Ck.	40	N	35	Eroded fine sediments	Mulching hillslopes ?
Interstate 5 culverts	75	Y	45	Undersized culverts	Upsize culverts, storm patrol
PG&E culverts	85	Y	35	Undersized culverts	Critical dips, upsize culverts, r-berms
County road culverts	80	Y	45	Undersized culverts	Culvert snorkels, storm patrol
Invasive weeds spreading	70	Y	30	Weed invasion	Detection survey
Travelers along Coal Ck.	45	M	25	Hazard trees	Hazard tree removal
U = untreated; T = treated; Where Y = yes, M = maybe, and N = no					

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	95%	80%	70%
Channel	-	-	-
Roads/Trails	95%	90%	85%
Protection/Safety	90%	95%	95%

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

F. Cost of Selected Alternative (Including Loss): $XXXXX

G. Skills Represented on Burned-Area Survey Team:

[x] Hydrology	[x] Soils	[x] Geology	[ ] Range	[ ]
[ ] Forestry	[x] Wildlife	[ ] Fire Mgmt.	[ ] Engineering	[ ]
[ ] Contracting	[ ] Ecology	[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

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: Invasive weed detection surveys, and hazard tree removal are the selected treatments (see treatment map).

Hazard trees will be removed where crews are working for safe ingress and egress.

Invasive weed detection survey on firelines for introduced weeds due to suppression will consist of detection, handpulling and bagging. Areas found to be too large for bagging will be treated by hired handpulling crews (addition of 1 mile due to the Coal Fire).

Hillslope mulching treatment by helicopter was not selected due to areas that burned hot were adjacent to high voltage power lines and Interstate 5 making operation too risky for public safety and powerline safety. Treatable ground on forest lands was also too steep for effective mulching.

Channel Treatments: none

Roads and Trail Treatments: Road stormproofing and storm patrol (see treatment map).

Road stormproofing will consist of removing outside berms where appropiate, installing critical dips and to allow safe passage of anticipated increased water flows due to burned landscapes. Road work will focus on U34N12C road in the section located in moderate and high soil burned area.

Protection/Safety Treatments: Barriers, burned area signing, and traffic road signs.

Posting of areas burned will alert the public to potential dangers of falling trees and rolling rocks. Repair of road signs burned will insure public safety. Two earthen/rock barriers will be constructed to deter unlawfal OHV intrusions (one on U34N12C intersection and one 35N79 intersection – see treatment map).

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 C below for roads monitoring.

Part VI – Emergency Stabilization Treatments and Source of Funds **Interim # 2**

Click red icons for notes.	NFS Lands					Other Lands				Money Left
Line Items	**Units**	**Unit Cost**	**# of Units**	**BAER $**	**Spent $**	**# of Units**	**Fed $**	**# of Units**	**Non Fed $**	**Total $**
A. Land Treatments										
NX Weed Det. Surv.	mi		2.2							
Hazard Trees	mi		0.5							
Subtotal Land Treatments										
B. Channel Treatments - none										
Subtotal Channel Treatments										
C. Road and Trails										
Road Stormproof	ea		2							
Subtotal Road & Trails										
D. Protection/Safety										
Warning Signs	ea		8							
Rock Barriers	ea		2							
Subtotal Protection										
E. BAER Evaluation										
Assessment Team	0520	H5BAER	---	---		---				
	---	---	---	---		---				
Subtotal Evaluation				---		---				
F. Monitoring										
Road Monitoring	ea		1							
Subtotal Monitoring										
G. Totals										
Previously approved						Comments: additional costs due to Coal fire that burned adjacent				
Total for this request										

PART VII - APPROVALS

1. _____ _____
Forest Supervisor (signature) Date

2. _____ _____
Regional Forester (signature) Date

APPENDICES: Supporting Information:

Appendix A: Salt and Coal Fires BAER Team

Appendix B: Salt and Coal Fires BAER Team Recommendations

Appendix C: Monitoring for Roads

Appendix D: Vicinity and Treatment Map

Appendix E: Summary of Soil and Hydro Cals.

Appendix F: Summary of Cost-Risk Analysis

Appendix A: Salt and Coal Fires BAER Team:

NAME	UNIT	FUNCTION	CELL PHONE	OFFICE PHONE
Brad Rust	Shasta-Trinity N.F.	Team Leader	530-917-0434	530-226-2427
Christine Mai	Shasta-Trinity N.F.	Forest Hydrologist	916-708-0272	530-226-2428
Dave Young	North Province N.F.	Area Soil Scientist	530-227-9050	530-226-2545
Melanie Stevens	Shasta-Trinity N.F.	Geologist	-	530-226-2423
Joe Zustak	Shasta-Trinity N.F.	Fisheries Biologist	-	530-242-5556
Phillip Brownsey	Shasta-Trinity N.F.	Botanist	-	530-623-1753
Todd Johnson	Shasta-Trinity N.F.	Wildlife Biologist	530-351-2442	530-242-5550
Pete Schmidt	Shasta-Trinity N.F.	Forest Archeologist	-	530-242-5533
Brian Camp	Shasta-Trinity N.F.	GIS	-	530-226-2312

Appendix B: Salt and Coal Fires BAER Team Recommendations (see specialists reports):

Recommendations for Shasta County, PG&E, CalTrans, and private landowners (see treatment map):

Shasta County:

Clean and brush culverts along Coal Creek road and the main culvert at Coal Creek and Gilman Road. Currently the main culvert at Coal Creek and Gilman Road is blocked by vegetation and down woody debris, cleaning of this culvert and the culverts along Coal Creek Road will allow increased flows to pass through the area more readily, thus decreasing the risk of flooding and road failure within the area which has the potential to affect residential structures along Coal Creek. See Treatment Map for locations, indicated by purple dots.

In areas that have burned at moderate and high severity along Cole Creek road, intercepting culverts will need snorkels installed for anticipated sediment flows.

PG&E:

Remove berms on power-line road, clean and brush culverts, upsize current 24 inch culverts to increase culvert capacity or create critical-dips to preserve road from failure.

Re-establish rolling-dips and increase the number of rolling-dips to deal with increased flows.

Re-design section that has two roads intersecting in burned draw (see treatment map, Erosion Control PG&E orange box) by creating rolling dips to prevent flows from traveling down the intercepting roads and installing a culvert in the drainage to prevent flow overtopping the road, thus preventing rerouting of flow down the road and possible road-fill failure and attached Coal Fire document.

Conduct Scotch-broom invasive weed treatment along PG&E road off Coal Creek Road, to stop the spread of invasive weeds into National Forest lands.

Install gate on north end after private residence (see treatment map, indicated by a red dot).

Mulch the entire length of the road, including spurs, extending south beyond the fire perimeter to the graveled section of road with ag straw at a rate of 2 tons/acre to prevent sediment mobilization.

Cal-Trans:

Culvert improvement on a 24” cmp under I5 (see Treatment Map, Upgrade Culvert Caltrans, purple and orange dot), clean and brush all other culverts for anticipated flows.

Install safety signs to warn motorists when entering the burned area for rolling rocks and debris.

Private Landowners:

Houses along Coal Creek should seek flood insurance.

Work with NRCS for appropriate erosion and flood control mitigations.

Seek consultation with private contractors for designed structures and erosion control.

Storm patrol to keep culverts open and free of debris.

Appendix C: Monitoring Protocol:

Salt and Coal Fires
Road Effectiveness Monitoring

The 2500-8 report requests funds to monitor the effectiveness of road treatments on Salt and Coal Fires roads.

1. 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 _____

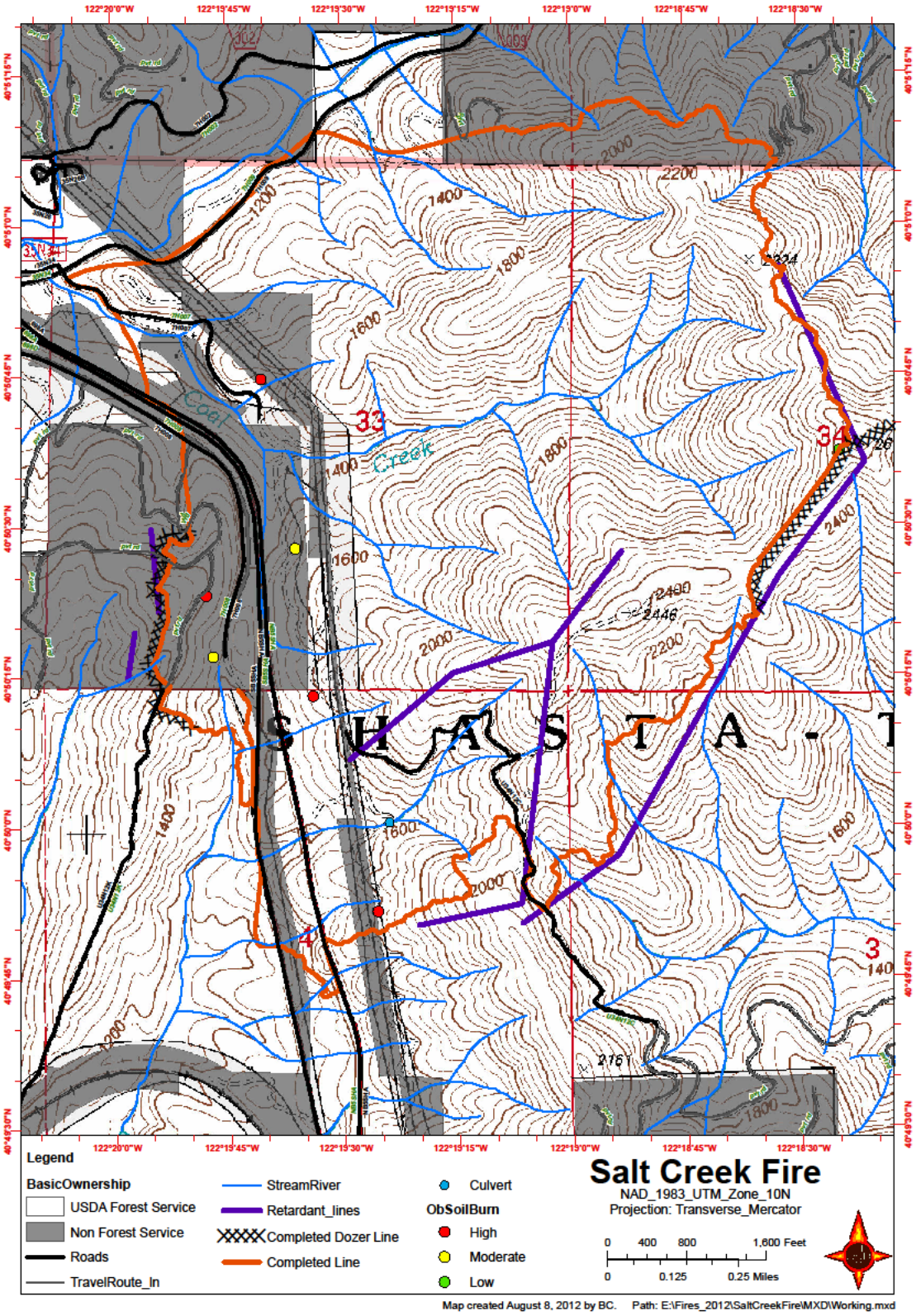
Describe damage and cost to repair? (GPS)_____

Photo taken of road damage_____

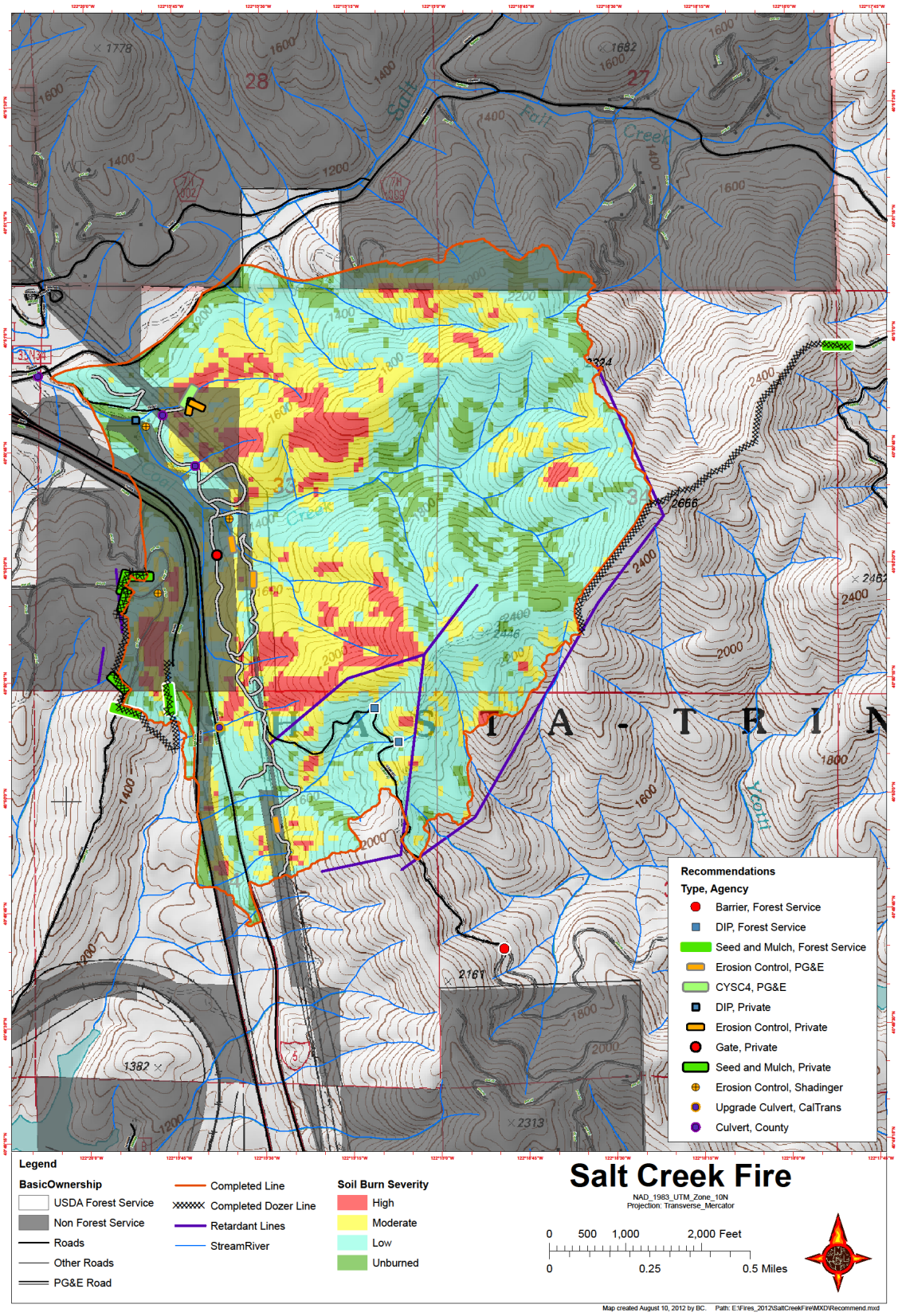
Recommended actions to repair:_____

Appendix D: Vicinity/Ownership Map and Treatment Map

Ownership Map:



Treatment Map:



Appendix E: Summary of Hydro and Soil Cals.

Hydrologic Calculations:

			Prefire				Percent Burned by Severity				Post Fire				
H8	HUCs for Resources of Concern	Acres	Q5 (cfs)	Q10 (cfs)	Q25 (cfs)	Q5 csm	% H	%M	%L	%UB	Unstable lands?	Water only Q5 (cfs)	Bulked Q5 (cfs)	% flow increase	Q5 csm
McCloud Arm @ Shasta Lake		1335	466.8	674.1	995.0	223.8	0.1%	0.9%	4.1%	94.9%		470	470	0.7	225.4
Salt Cr @ Shasta Lake		2640	753.9	1097.9	1619.2	182.7	2.7%	7.5%	13.4%	76.4%		793	793	5.2	192.3
	Salt Cr Tributary	112	71.8	104.3	155.9	410.5	5.8%	34.7%	43.0%	16.5%		85	85	18.2	485.2
	Coal Cr @ Gilman Rd	669	289.5	413.8	610.9	276.8	9.1%	21.9%	37.9%	31.1%	y	335	503	73.7	480.9
	Lower Coal Cr Residence	450	209.1	301.2	446.4	297.3	10.0%	25.2%	49.5%	15.3%	y	248	372	77.8	528.6
	Upper Coal Cr Residence	74	42.8	65.8	100.1	369.8	24.9%	60.2%	13.3%	1.6%	y	57	86	101.5	745.2
Obrien Inlet		2537	862.8	1200.8	1749.4	217.7	0.7%	1.7%	4.1%	93.5%		874	874	1.3	220.6
	Obrien E @Shasta Lk	416	179.4	265.2	396.0	276.0	4.3%	10.4%	24.5%	60.8%		194	194	8.2	298.5
	Obrien T1	24	16.0	25.6	39.5	425.9	7.5%	29.6%	44.7%	18.2%		19	19	17.9	501.9
	Obrien T2	96	49.8	77.5	118.1	331.8	2.2%	21.6%	63.5%	12.7%	y	57	85	71.2	568.2
	Obrien T3	34	20.7	33.2	51.2	390.3	31.1%	31.1%	33.6%	4.2%		27	27	31.4	512.7
		average				302.2	9%	22%	30%						415.3

Fire effects on runoff are determined by modeling pre-fire and post-fire discharges for watersheds using methods specified in the USGS Magnitude and Frequency of Floods in California (Waananen and Crippen, 1977). Elevated streamflows can be expected in the burned watersheds, with greater flow increases in drainages having higher percentages of high burn severity. Projected flow increases resulting from increases in runoff from the burn areas are shown above.

Soil Erosion Calculations:

Soil Erosion Hazard Rating:

	Moderate	High	Very High
Acres	102	805	74
Percent	10%	82%	8%

Erosion Potential:

ERMiT Estimates	2-year event		5-year event		10-year event	
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LCoal Cr @ Gilman Rd	19.9	2,006	34.6	3,378	49.7	5,020
M Coal Cr Residence	21.8	9,074	38.2	15,987	54.0	23,134
U Coal Residence	19.1	2,402	33.9	4,105	49.3	6,120
Salt Cr @ Shasta Lk	18.5	1,551	32.5	2,724	47.9	4,043
Salt Cr Trib	23.8	2,878	41.8	4,943	59.9	7,279
O'Brien Creek Inlet	**15.4**	**4,069**	**26.9**	**7,097**	**38.9**	**10,527**
Obrien E @ Shasta Lk	13.8	537	24.3	937	34.3	1,319
Obrien W Blw Salt	9.8	20	17.3	36	25.6	53
ObrienT1	16.3	459	28.2	789	41.2	1,169
ObrienT2	19.3	2,092	33.9	3,670	49.2	5,558
ObrienT3	14.5	962	25.6	1,665	37.1	2,428
Grand Total	**18.9**	**23,530**	**33.2**	**40,934**	**47.9**	**60,064**

Appendix F: Summary of Cost-Risk Analysis For All Resources:

Salt Creek Fire Benefit Cost Analysis (for all ownerships):

Total benefits of resources for whole fire regardless of ownership:

All Resource	Value $
all roads (FS, I5, PG&E, County, Pvt.)	[redacted]
native plants	
water quality	
aquatics/fisheries	
soil productivity	
public safety	

Proability of loss without and with treatments:

All Resource	Proability loss no treatments:	Proability loss w/ treatments:	Reduction in proability of loss
all roads (FS, I5, PG&E, County, Pvt.)	[redacted]	[redacted]	[redacted]
native plants			
water quality			
aquatics/fisheries			
soil productivity			
public safety			

Total cost of treatments on Forest Service:

Click red icons for notes.	NFS Lands					Other Lands				Money Left
Line Items	Units	Unit Cost	# of Units	BAER $	Spent $	# of Units	Fed $	# of Units	Non Fed $	Total $
A. Land Treatments										
NX Weed Det. Surv.	mi	[redacted]	1.2	[redacted]	[redacted]		[redacted]		[redacted]	[redacted]
Hazard Trees	mi		0.5							
Subtotal Land Treatments										
B. Channel Treatments - none										
Subtotal Channel Treatments										
C. Road and Trails										
Road Stormproof	ea		2							
Subtotal Road & Trails										
D. Protection/Safety										
Warning Signs	ea		8							
Rock Barriers	ea		2							
Subtotal Protection										
E. BAER Evaluation										
Assessment Team	0520	H5BAER	---	---		---		---		
	---	---	---	---		---		---		
Subtotal Evaluation				---		---		---		
F. Monitoring										
Road Monitoring	ea		1							
Subtotal Monitoring										
G. Totals										
Previously approved						Comments:				
Total for this request										

Benefit of treatments:

All Resource	Value $	Reduction in proability of loss
all roads (FS, I5, PG&E, County, Pvt.)	[redacted]	[redacted]
native plants		
water quality		
aquatics/fisheries		
soil productivity		
public safety		
cummulative water,fish,land		

Benefit/cost ratio:

All Resource	Benefit of treatment	Treatment Cost	B/C ratio	Justified
all roads (FS, I5, PG&E, County, Pvt.)	[redacted]	[redacted]	2.0	yes
native plants			1.2	yes
water quality			0.0	no
aquatics/fisheries			0.0	no
soil productivity			0.0	no
public safety			173.4	yes
cummulative water,fish,land			0.0	no