USDA-FOREST SERVICE

FS-2500-8 (7/08)
Date of Report: 8/14/2008
Updated: 10/28/08

SHU-LIGHTNING COMPLEX BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

Moon Fire looking at Shasta Bally portion of the SHU-Lightning Complex

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 notes in blue were added to the Initial Request by Brad Rust, STNF BAER Coordinator on 10/28/2008.

[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: SHU Lightning Complex

B. Fire Number: CASHU004727

C. State: CA

D. County: Tehama, Trinity, Shasta

E. Region: 5

F. Forest: Shasta-Trinity National Forest

G. Districts: NRA and SFMU

H. Fire Incident Job Code: P5D29H

I. Date Fire Started: 6/21/08

J. Date Fire Contained: 7/20/08

K. Suppression Cost: 35 million

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles):
2. Fireline seeded (miles):
3. Other (identify):

M. Watershed Numbers:

SHU Complex	
Lower Sacramento	
180200050406	180201530102
180200050407	180201530202
180201510104	180201530203
180201510105	180201530205
180201510106	180201530206
180201510201	180201530207
180201530101	180201530301
Klamath/Trinity	
180102110603	
180102110604	
180102110701	

N. Total Acres Burned: 88,538 acres (see Appendix C for map)
NFS Acres(6,151) Other Federal (25,140) State (0) Private (57,248)

	OWNERSHIP (acres)					
FIRE_NAME	NFS	NPS	BLM	BOR	Private	Total
Motion	5,544	2,450	5,474	214	14,614	28,297
Moon		6,608	1,202		28,050	35,860
Deerlick*	605		4,642		8,683	13,929
Noble*	2		3,309		5,569	8,880
Lower			1,236	3	70	1,309
Deck					263	263
Total	**6,151**	**9,059**	**15,863**	**218**	**57,248**	**88,538**
* Note total fire acres - a portion of Noble and the Deerlick Fires are in the Lime Complex with separate tracking.						

O. Vegetation Types: Mixed Conifer and chappral

P. Dominant Soils:

Motion Fire:
Type: gravelly and stony loams, hydro groups B-D, mostly high EHRs (unburned).
Series: Behemotosh, Goulding family, Chaix, Maymen

Moon Fire:
Type: sandy loams and loamy sands, hydro group B, mod to high EHRs (unburned).
Series: Corbett, Chaix, Josephine, Neuns

Deerlick Fire:
Type: very stony loams, hydro groups B-D, 10-75% slopes, mod to high EHRs (unburned).
Series: Stonyford, Maymen, Goulding, Sheetiron

Noble Fire:
Type: gravelly/very stony loams, hydro groups C-D, 10-75% slopes, mod to high EHRs (unburned).
Series: Parrish, Goulding, Stonyford, Lodo and Maymen

Lower Fire:
Type: gravelly sandy loams, hydro groups B-C, 30-75% slopes, moderate EHRs (unburned).
Series: Tallowbox, Valcreek, Minersville, Choop

Deck Fire:
Type: Gaviota sandy loams, hydro groups B-C, 5-50% slopes, moderate EHRs (unburned).
Series: Gaviota (83%), Millsholm, Sehorn

Q. Geologic Types: Great Valley Formation, metavolcanics, metasediments, and granitics

Q. Miles of Stream Channels by Order or Class: 267 miles

Streams Burned	Flow_Type			
	Ephemeral	Intermittent	Perennial	Grand Total
SHU Complex	59.1	161.0	46.8	266.9

S. Transportation System

OHV Trails: 312 miles Roads: 176 miles

PART III - WATERSHED CONDITION

A. Burn Severity by total and FS (acres): 60% unburned-light, 34% moderate, 6% high

		SOIL BURN SEVERITY (acres)				
FIRE_NAME	OWNERSHIP	Unburned	Low	Moderate	High	Total
Motion	NFS	1,604	1,809	1,832	299	5,544
	NPS	660	786	923	81	2,450
	BLM	1,559	1,726	1,907	282	5,474
	BOR	74	63	61	17	214
	Private	4,292	4,617	5,095	611	14,614
Moon	NPS	2,391	1,652	1,913	653	6,608
	BLM	567	293	173	169	1,202
	Private	6,633	9,026	10,220	2,171	28,050
Deerlick	NFS	240	207	157	2.2	605

	BLM	1,113	919	2,136	474	4,642
	Private	3,283	2,346	2,741	313	8,683
Noble	NFS	0.6	0.8	0.6	0.0	2.0
	BLM	828	948	1,482	51	3,309
	Private	2,278	1,835	1,381	75	5,569
Lower	BLM	477	730	28	1.7	1,236
	BOR	1.3	1.6	0.4		3.3
	Private	35	35	0.3		70
Deck	Private	59	184	21		263
NFS Total		**1,844**	**2,016**	**1,989**	**301**	**6,151**
Grand Total		**26,093**	**27,176**	**30,070**	**5,199**	**88,538**

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

Some water repellency is present in the high soil burn severity class, approx. 5200 acres (300 acres NFS and 4900 acres non-FS). Repellency is in the top ¾ inch of the soil, slight to moderate in severity, and patchy.

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

		SOIL EROSION HAZARD RATING (acres)				
FIRE_NAME	OWNERSHIP	Low	Moderate	High	Very High	Total
Motion	NFS	2.0	636	4,582	323	5,544
	NPS	86	514	1,814	36	2,450
	BLM	252	1,252	3,539	432	5,474
	BOR	52	42	118	2.8	214
	Private	1,130	2,791	9,896	798	14,614
Moon	NPS	648	1,792	4,168	1	6,608
	BLM	93	84	960	65	1,202
	Private	1,874	4,698	20,698	779	28,050
Deerlick	NFS		137	407	61.0	605
	BLM	211	376	3,506	548	4,642
	Private	185	1,115	6,726	656	8,683
Noble	NFS		0.3	1.7	0.0	2.0
	BLM	22	520	2,734	34	3,309
	Private		2,767	2,764	38	5,569
Lower	BLM	11	407	818		1,236
	BOR		1.3	2.0		3.3
	Private	0.8	15	54.0		70
Deck	Private		230	33		263
NFS Total		**2.0**	**774**	**4,991**	**384**	**6,151**
Grand Total		**4,565**	**17,379**	**62,821**	**3,773**	**88,538**

D. Erosion Potential:

An average winter has the potential to produce **16** tons per acre of hillslope erosion, ranging from 8 to 24 across the fires as a whole. Erosion potential was modeled using FSWEPP-ERMiT.

	First Year Erosion Potential (tons/ac)		**Second Year Erosion Potential (tons/ac)**	
FIRE_NAME	2-Year Winter	10-Year Winter	2-Year Winter	10-Year Winter
Motion	18.67	46.67	10.49	34.38
Moon	15.62	51.86	7.65	36.32
Deerlick	12.43	29.93	7.87	23.48
Noble	13.05	32.26	8.25	25.15
Lower	13.14	42.62	7.18	30.79

Deck	2.76	38.91	10.56	29.28
Average	**15.76**	**44.61**	8.65	32.46

E. Sediment Potential: 1434 cubic yards / square mile

An average winter has the potential to produce **1434** cubic yards per square mile of sediment, ranging from 720 to 2150 across the fires as a whole. Hillslope erosion was determined to have a 19% chance of sediment delivery potential.

PART IV - HYDROLOGIC DESIGN FACTORS

	Chapparal	Mixed Conifer Forest
Item A – Vegetative Recovery	5 years	20 years
Design Chance of Success	90	80
Equivalent Design Recurrence Interval	50	100
All stream crossings must be designed to pass 100 year storm however as directed by Northwest Forest Plan		
Design Storm Duration	25 year 6 hour	25 year 6 hour
Design Storm Magnitude	3.6 inches	3.6 inches
Design Flow csm	121	299
Reduction in infiltration	5	5
Adjusted Design Flow	185	380

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

Background: The Front Country BAER assessment area included the SHU-Lightning complex and part of the Lime complex (Telephone, Noble, Deerlick, Deadshot, Moon, Deck, Lower, and the Motion) fires that occurred on the front country of Tehama, Trinity, and Shasta Counties for a total acreage of 102,330 acres. The SHU-Lightning complex fires burned 88,550 acres in 30 days due to 5,000 Lightning strikes that ignited 150 fires on June 21th in Tehama, Trinity, and Shasta Counties. On the Shasta-Trinity National Forest alone, 35 fires named fires burned or are still burning. The fires started on ridgelines and slowly backed down the ridges over time causing a mosaic burn. The SHU-Lightning complex consisted of 6,151 acres of U.S. forestland and 82,388 acres of BLM, NPS, and private lands. To address the mixed ownership an interagency BAER team was formed to address the SHU-LIGHTNING COMPLEX and part of the LIME COMPLEX. SHU-LIGHTNING COMPLEX fires portion consisted of the Motion, Moon, Lower, Deck, Deerlick, and part of the Noble Fire. The Lower and the Deck fires were low to very low burn severity, were beneficial underburns and had no values at risk.

General trends are forested areas that were north or east facing slopes were nice underburns. Forested areas that were south or west facing slopes burned hotter and had tree mortality of 20-40% with ridges burning hot (see pics below).

Noble Fire

Deerlick Fire

Chaparral areas that were north or east facing slopes had moderate soil burn severity were patchy. Chaparral areas that were south and west facing, burned moderately high to high soil burn severity removing almost all vegetation (see pics below).

Deerlick Fire

Motion Fire

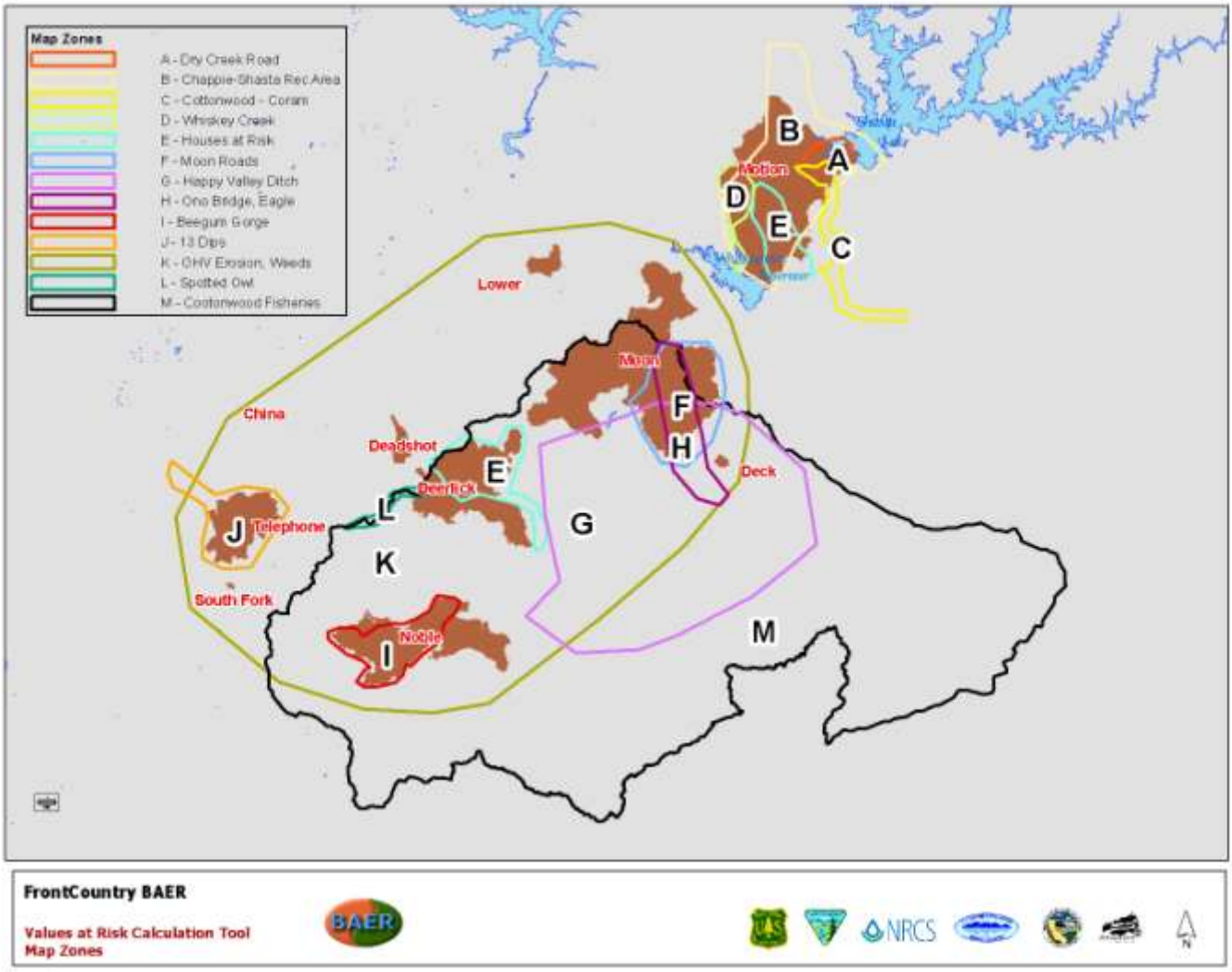
The BAER Watershed group stratified the fire into analysis watersheds, analyzed the amount of soil burn severity, and the predicted erosion response to determine threats to identified values. The following sub-watersheds were identified as having the greatest risk to identified values; upper Sac. - Squaw Creek, lower Sac. Motion Creek and Spring Creek, lower Sac. - Cottonwood Creek North Fork.

Approximately 40% (35,269ac) burned at high and moderate soil burn severity (see soils specialist report). The rest of the fire was either low or very low soil burn severity (53,269 acres).

Critical values at risk: (VAR)

Values at risk were identified based on field observations, helicopter reconnaissance, computer modeling, discussion with landowners, local and state agencies, and federal land managers. Based on the above data collected, critical value map zones were created to locate their influence on watersheds of concern (see map below).

This map identifies areas that have threats to life, property, and safety (Facility structures, homes, roads and trails). This map also identifies areas that have threats to water quality, fisheries, ecosystem stability, soil productivity, recreation, cultural, and wildlife resources.



Threats to Life, Property and Safety: Threats include facility structures and homes: The SHU-Lightning Fires burned on mixed ownership that has many facilities and homes that are now at risk from erosion and flooding. Roads and Trails: Many roads are now at risk due to increased flows from moderate to high soil burn severity, undersized culverts and stream crossing.

Threats to Water Quality and Fish Habitat: With Moderate to high soil burn severity water quality and fish habitat could be compromised due to steep burned erosive soils that have sandy loam surfaces.

Threats to Soil Productivity/Ecosystem Stability: Areas that have moderate to high soil burn severity are at risk from accelerated erosion and loss of stability and soil fertility.

Threats to Cultural Resources: With loss of cover and erosion cultural resources are now exposed and are vulnerable to vandalism.

Threats to Botanical Resources: With multiagency response to these fires the likelihood of noxious weed introduction is high.

Threats to Wildlife Resources: Burned areas are a loss of habitat and could threaten wildlife habitat.

Brief description of VAR-Threat relationships for each Map Zone	
Map Zone A	Motion Fire - Dry Creek Road and Recreational Use is at risk from fill failures on the Dry Creek Road, causing erosion in Lake Shasta Reservoir and preventing access.
Map Zone B	Motion Fire – Chappie-Shasta National Recreation Area Shasta Lake staging areas, trails, Keswick Reservoir / Sacramento River and fishery and perimeter roads and trails.
Map Zone C	Motion Fire - Coram road, bridge, arch sites and yellow legged frog BLM sensitive species presence are at risk from fire related sediment in the Cottonwood Creek drainage.
Map Zone D	Motion Fire - Whiskey Creek Road, Whiskey Creek, and Whiskeytown Lake National Recreation Area water quality and fisheries.
Map Zone E	Several residences may be at low risk from flash flooding on moderate and high severity soils upstream.
Map Zone F	Moon Fire - Private roads north of Route A16, at risk from high runoff.
Map Zone G	Moon Fire - Happy Valley Ditch System - NRCS DSR EWP.
Map Zone H	Moon Fire - Ono Bridge and Eagle Creek Road, water quality.
Map Zone I	Noble Fire - Beegum Gorge (remnant steelhead and Chinook spring run anadromous fishery, summer) and water quality.
Map Zone J	Telephone Fire - 13 Dips (Old Hwy 36) Road and 30N24 spur and Salt Creek trout fisheries.
Map Zone K	All Fires - OHV off trail erosion, mining related archeological site pilfering, and noxious weed introductions.
Map Zone L	Spotted Owl LSR along the Shasta-Trinity county divide, is at risk of Owl taking if the habitat is not restored by replanting trees on 5 miles of bare mineral soil dozer line.
Map Zone M	Telephone Fire - 13 Dips (Old Hwy 36) Road and 30N24 spur and Salt Creek trout fisheries.

MAP ZONE A - VALUES AT RISK (VAR)

OHV visitor safety - Trail problems connected with firelines, adjacent mining operations, and post fire erosion require a temporary administrative closure for the Chappie - Shasta Off-Highway Vehicle Area.

Water quality in Shasta Lake - The southern half of the road draining the area between Dry Fork and Squaw Creek, there are three obvious culverts that are either undersized and/or misaligned. Dry Creek Road (Westside Road #5G012- minor county road) fill (1.75 miles) 5,600 cubic yards that are at risk from erosion.

Recreational access to roads and trails in the area accessed by Dry Creek Road and Dry Fork Trail shore fishing access could be compromised by road and trail failures (further investigations needed).

MAP ZONE B - VALUES AT RISK (VAR)

OHV Visitors Safety - High post fire runoff potential with sediment, burnt bridges and trail problems connected with firelines, post fire erosion require a temporary administrative closure for Chappie - Shasta OHV Park.

Cultural Values - Historic mining features, and prehistoric artifacts. Fire related visibility and increased access create a temptation for damage, vandalism, and pilfering of historic mining features and prehistoric artifacts, particularly anything that can be transported. Increased access by wheeled vehicles could impact surface resources causing damage. Potential loss of research and public interpretation opportunities due to artifact and cultural deposit losses from looting, vehicular damage, accelerate erosion and deposition have the potential to decrease research and interpretive opportunities of undisturbed remains.

Water Quality in Keswick Reservoir and into the Sacramento River - Sediment will go into the reservoir, and be bled into the Sacramento River below the dam. Just below the dam is the terminus of the salmon run and water intake filters for the City of Redding and the Bella Vista water district that serves the adjacent communities of Bella Vista, Enterprise, and Palo Cedro.

Ecosystem Stability - Two million trees and hundreds of check dams were installed with manual labor in the past decades to prevent massive erosion due to copper smelting days are now at risk of failure.

OHV Trails Systems - Post fire situation of trails and adjacent burned areas would be at major risk if not protected from OHV use. Total impacted area estimated at 95 miles. Impacts include new, undesirable trails and associated resource damage, safety concerns with travel on unauthorized routes, and accelerated erosion on existing routes.

The Shasta Lake OHV staging area - currently provide motorized visitors a place to start and end their trips, parking vehicles and unloading. Trails will need repair work consisting of control fencing, mulching and closures. With 95 miles of trails impacted by the Motion Fire within the Chappie–Shasta OHV Park, the Shasta Dam OHV staging area is a key artery for recreation for the entire park. This area was severely burned over and lacks sufficient cover to impede erosion and overland flow. Key staging area trails (OHV03, OHV17, OHV19, and OHV76) have severely denuded landscapes that lack vegetative cover and live trees to control water to preserving current trails and recent SWECO treatment improvements. Lack of water control will release excessive water on to OHV trails and will cause excessive erosion of trails. This was confirmed after 3.0 inches of rainfall in a 24-hour period on October 4th, 2008 where excessive erosion was observed. Hillslopes had sheet erosion which ran onto trails causing riling and gulling. If winter precipitation is prolonged and soaks these shallow sandy soils, runoff rates will be excessive and main hub trails will be severely damaged (see pics below).

MAP ZONE C - VALUES AT RISK (VAR)

OHV visitor and resident safety - Residents may be at risk while driving roads, trail problems connected with firelines, adjacent mining operations, and post fire erosion require a temporary administrative closure for the Chappie - Shasta Off-Highway Vehicle Area.

Cultural Values - Historic town of Coram archeological sites (stone foundations and metal mining equipment from the historic mining town of Coram) is at risk from erosion and looting.

Ecological - Yellow legged frog habitat which is a sensitive species for BLM in this area. The area currently provides pool habitat at low flows and could be devastated by debris flows and flood torrents.

Water Quality in Keswick Reservoir and into the Sacramento River - Sediment will go into the reservoir, and be bled into the Sacramento River below the dam. Just below the dam is the terminus of the Sacramento River salmon run. We are expected 2.4 times normal peak for the first two years, and 2.2 times normal event, one of the highest changes following the fire. Also water intake filters for the City of Redding and the Bella Vista water district that serves the adjacent communities of Bella Vista, Enterprise, and Palo Cedro.

Coram road and Adjacent Recreation Trails - Road and trails are at risk from major erosion in the Cottonwood Creek drainage that feeds into the Keswick Reservoir.

Coram Road Bridge at Cottonwood Creek - The Coram bridge is at the base of two main drainages that shed water into Keswick Reservoir. Prior to the fire the bridge already had limited freeboard. The high severity burn in this area threatens this bridge that is an access route to Curtis Byron's Property, part of the Coram Ranch, along a county unmaintained road. BLM will be doing all the work, since they have maintenance responsibilities associated with the easement.

Coram Road Fill – A 50 foot stretch of road on low side of bridge toward incised channel uphill of bridge is at risk of failure due to increased runoff.

MAP ZONE D - VALUES AT RISK (VAR)

Ecological - Kokanee spring salmon run from Whiskeytown Reservoir could affect reproductive success due to increased sediments.

Clear water in Whiskeytown NRA - due to increased sediments and old Humboldt crossing could reduce visibility and user enjoyment in the Whiskey Arm of the Whiskeytown Reservoir.

Dirt Road Access above NPS - Lost revenue to the Whiskey Lake Lodge for one month due to loss of access because of crossing failure.

MAP ZONE E - VALUES AT RISK (VAR)

Potential Life and Safety of Residents - There is a small chance that flooding could threaten the life and safety of the residences of several homes along the banks, downstream from moderately and severely burned uphill slopes. AC Graves Ranch, Benson Rd Home plus irrigation pond, Benson Rd Bridge over Spring Creek, possible water removal system on Spring Creek, Benson Rd access to homes above the bridge, and Graves Ranch Rd access to ranchlands above the bridge.

MAP ZONE F - VALUES AT RISK (VAR)

Resident safety - Residents may be at risk while driving roads, trail problems connected with firelines, adjacent mining operations, and post fire erosion require a temporary administrative closure for the Chappie - Shasta Off-Highway Vehicle Area.

Eagle Creek Water Quality - Sediment from the roads may enter Eagle Creek deteriorating water quality.

Private road infrastructure in the Moon Fire area – roads may be compromised due to road and hillslope erosion due to high burn severity and erosive decomposed granitics. Loss of access to private lands if roads fail, residents and landowners may lose access, and there may be some inaccessible range lands.

MAP ZONE G - VALUES AT RISK (VAR)

Rainbow Historic Ditch - Built in the early 1900s. This ditch takes water coming from Rainbow Lake and distributes it to many farms, ranches and residences. It burned very hot in this area and banks are failing and trees are falling in compromising its water delivery capacity.

Happy Valley ditch system – Has been affected by the fire for approximately 3.8 miles section along with numerous laterals that have failing banks and falling trees. The Happy Valley Ditch services 55 clients and the town of Ono. It is used to irrigate 55 properties, and supplies the town of Ono with drinking water as well as supplying numerous livestock operations. Loss of agricultural and residential use on non irrigated pasture versus irrigated pasture is $140 per acre with 715 acres this equates to approximately $100,000 / year.

MAP ZONE H - VALUES AT RISK (VAR)

Residents and travelers of Road A16 – This road serves as the route to hospital from IGO and ONO area and travel to Redding.

Eagle and Cottonwood Creek Fisheries - Sediment from the Eagle Creek Road and east bank area could contribute to water quality problems.

Ono Bridge - The Ono bridge is in a 30-MPH zone on the Platina Rd (A16) from 273 to HWY 36. Peak discharge has been calculated as 2.6 times of normal, the ten year event would be roughly 1800 CFS exceeding the old 100 year event putting this bridge at risk.

MAP ZONE I - Beegum Gorge Fisheries Water Quality - VALUES AT RISK (VAR)

Hunters and recreating public safety – Slopes could fail and road wash out, with possibility of large landslides due to loss of vegetative cover and erosion. This could cause the loss of hunting and fishing access at Beegum Gorge Campground.

Cultural Values - Noble Fire ARCH site on BLM land and Noble Fire Chrome Site that are susceptible to erosion and looting associated with visitation.

Ecological - Spring Run Chinook and Central Valley Steelhead Year with year round anadromous fishery with summer coldwater refuge at risk from fine sediments (ash, soil from steep side slopes and roads including 29N06) and increased temperatures from reduced shade. Cottonwood Creek fisheries and keeping ash and fine sediment out of Cottonwood Creek which is an important winter and spring spawning area.

Road Fill Protection - 1000 yards off road fill currently at risk due to accelerated erosion along Hooker Creek road.

MAP ZONE J - Telephone Roads - VALUES AT RISK (VAR) – part of Lime Complex

Old Highway 36 - Will have high flows following the fire, and without treatment life, safety, and infrastructure will be at risk.

Cultural Values - Shiell Ranch could experience threats to historic ranch due to flooding.

Ecological - Rainbow Trout fishery which is a local fishery for Hayfork residents, at risk from erosion and sedimentation.

Water Quality - Road fill erosion will reduce water quality in Salt Creek and possibly in Hayfork Creek.

Road Fill on 30N19 and 30N24 - Two miles above the dips are at risk of failure from water running down the roadbed and undersized culverts and also are at risk of failure from water running down the roadbeds.

MAP ZONE K - VALUES AT RISK (VAR)

OHV visitors safety - High post fire runoff potential with sediment, burnt bridges and trail problems connected with firelines and post fire erosion, requires a temporary administrative closure for the Chappie - Shasta OHV Park.

Cultural Values - Historic and prehistoric site complexes have fire related visibility and increased access create a temptation for damage, vandalism, and pilfering of historic mining features and prehistoric artifacts., particularly anything that can be transported. Increased access by wheeled vehicles could impact surface resources causing damage. Potential loss of research and public interpretation opportunities artifact and cultural deposit losses from looting, vehicular damage, accelerate erosion and deposition have the potential to decrease research and interpretive opportunities of undisturbed remains.

Ecological & Ecosystem Stability - Native Plant Communities that provide high caloric forage and have higher aesthetic and recreation values to visitors. Native plants also hold soil and prevent erosion. Introduction of noxious weed species to new areas and disturbed sites are ideal habitat for noxious weed establishment and outcompete native species. Noxious weeds do not stabilize soil as well as native species.

MAP ZONE L - VALUES AT RISK (VAR) – part of Lime Complex

Ecological - Designated Critical Habitat within LSR for Spotted Owl on SHF lands, Hayfork District. County line between the Shasta and Trinity Counties along the western flank of the Deerlick Fire was bladed to bare mineral soil, as a perimeter/contingency line. This dozer line is parallel to 30N02 Road. All Late Successional Reserves are to be managed to improve late successional forest conditions.

MAP ZONE M - VALUES AT RISK (VAR)

Ecological - Fall run and spring run Chinook, central valley steelhead, resident rainbow trout and non game native fish including Hardhead. Foraging and reproductive success could be diminished by sediment. Cottonwood Creek provides 85 percent of the clean gravel in the upper Sacramento Fishery. Only a 10 percent increase on the 2 and 10-year events for Cottonwood Creek (600,000 acre)

drainage. Highest increase, 70 percent increase in upper North Fork Cottonwood Creek. Burn severity is 20 percent of this area which is moderate or severe.

B. Emergency Treatment Objectives:

The purpose of emergency treatments is to mitigate erosion, sedimentation, and flooding that threatens life, property, ecosystems, and recreation areas. To that purpose the goal is to:

- Stabilize hillslopes that are likely to experience unacceptable accelerated erosion.
- To control the loss of water and to allow free passage of water.
- Stabilize roads to prevent loss of road prism and fill due to increased watershed response.
- Reduce the risk of degradation to ecosystem function, for T&E species, and recreation.

Risk determination is depenent on the design storm selected and downstream values at risk. By using an above average storm (5-year event) emergency planning measures can be designed to mitigate and minumize anticipated risks (see hydrologist report). Using a 5-year design storm the values at risk can be evaluated to determine if an emergency exists. The emergency determination matirx displayed below shows if an emergency exists, why it is an emergency, and treatmenst proposed to mitigate the emergency. By using a determination matrix, decisions can be made to treat the the value at risk, monitor the value at risk, or not to treat the value at risk.

SHU-Lightning Complex Values at Risk Emergency Determination Matrix

Value at Risk	Emergency (yes/no)	Reason	Treatment
Map Zone A			
OHV access	y	Hillslope erosion	Temporary closure
Sac. Water quality	y	Flooding & mudflows	Road work
Map Zone B			
OHV park	y	Hillslope erosion	Temporary closure
Sac. Water quality	y	Flooding & mudflows	Debris basins, helimulch
Map Zone C			
Public safety	y	Hillslope erosion	Warning/closure signs
Sac. Water quality	y	Flooding & mudflows	Culvert and road work
Map Zone D			
Whiskey Ck. road	m	Culvert plugging - erosion	Storm patrol?
Whiskeytown water quality	n	Sediments and WQ	Upsizing culverts for flow?
Map Zone E			
Benson Rd. bridge	m	Possible flooding	Sheetpile wall defection?
RC Graves Ranch	n	Possible flooding	Reinforced headwalls?
Map Zone F			
Eagle Ck water quality	y	Erosion & sediments & WQ	Road work
Ono roads	y	Erosion and collapse	Upsizing culverts
Map Zone G			
Rainbow Ditch	y	Erosion and blockage	Ditch reconstruction
Happy Valley Ditch	y	Erosion and blockage	Repair and hazard trees
Map Zone H			
Eagle Ck water quality	y	Erosion & sediments & WQ	Advise and monitor
Ono bridge	m	Possible flooding	Early warning NWS ?
Map Zone I			
Public safety	y	Flooding/debris potential	Road closure
Beegum Gorge Ck. fisheries	y	Habitat destruction & seds.	Mulching and road work
Map Zone J (see Lime Cx)			

	-	-	-
	-	-	-
Map Zone K			
OHV access	y	Erosion	Early warning NWS
Cultural protection	y	Erosion and exposure	OHV patrol
Map Zone L (see Lime Cx)			
	-	-	-
	-	-	-
Map Zone M			
Cottonwood Ck area	n	Seds. In spawning gravels	Warning via. NWS?
Y=yes, m=maybe, n=no			

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

Land **90** % Channel **95** % Roads/Trails **95** % Protection/Safety **95** %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	95%	85%	70%
Channel	90%	80%	70%
Roads/Trails	95%	90%	85%
Protection/Safety	100%	90%	80%

E. Cost of No-Action (Including Loss): $5,255,650

F. Cost of Selected Alternative (Including Loss): $1,769,995

G. Skills Represented on Burned-Area Survey Team:

[x] Hydrology	[x] Soils	[x] Geology	[x] Range	[x] Economist
[x] Forestry	[x] Wildlife	[x] Fire Mgmt.	[x] 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: (Economic benefit/cost justifications are listed in Appendix N)

MAP ZONE A - VALUES AT RISK (VAR) – Motion fire area, Dry Creek Road

Land Treatments: none

Channel Treatments: none

Roads and Trail Treatments: Dry Creek road has high soil burn severity watershed above with misalined undersized culverts that could fail and overtop. The listed measures will allow passage of water without destroying part of this important recreational road along Shasta Lake (B/C – justified)

FS	Full maintenance on the one mile and dips reconstructed near all pipes, and removing berms. This may be done through a cooperative agreement with Shasta County (8 days at 1,000 a piece for the first mile).	$	8,000
FS	Hauling potentially heavy metal contaminated material away	$	2,000
FS	1.5" inch rock, akin to Cal Trans Spec 2. 1,000 yards @ 30/ton	$	30,000
FS	Outslope the insloped road in the area of the pipes, add 3 critical dips, removing the pipes, fill the ditch. Includes removing existing 36" pipes.	$	20,000
FS	Upsize culvert to Q100, (2) 40' 48"pipes, $7,500 each. And one 50', 60" culvert $10,000. Haul away costs of $600.	$	25,600
FS	600 yards at $30/ton gravel with some heavy some light gravel on reconstructed road surface	$	18,000
	Total:		**$103,600**

Protection/Safety Treatments: This is necessary while road repairs are taking place.

FS	Temporary administrative closure signs ($150/sign, 4 signs + installation). Administrative closure order ($ 300 for salary for closure order) will be implemented immediately and will remain in place until all safety and resource concerns have been addressed.	**$**	**900**

MAP ZONE B - VALUES AT RISK (VAR) – Chappie-Shasta OHV Park

Land Treatments: With multiagency fire response, know weed populations, high OHV use, numerious new fire lines, and open burned landsacapes this area is very prone to weed infestation. These treatments will reduce areas for weed infestation and detect infestions before they rapidly spread till native vegetation gets reestablished (B/C – justified).

FS/ BLM	Noxious weed detection monitoring surveys For the first year, GS-9. Cost to gov't . ($175 for GS-9 (12 days), $125 (12 days) 125miles/day = $750 for vehicle) . Total is $2,850, 21 percent of this is 599 (represents the size of this area vs. the whole area).	$	599
FS/ BLM	Seed $23,866 for FS lands (30lbs/acre grass, 2lbs/acre forb, portions of Motion, Telephone, Noble, Deerlick and Deadshot) and $2,120 for BLM (12.5lbs/acre, Motion, Moon, Deerlick, Deadshot and Noble) seed. Total = $5,457	$	5,457
FS/ BLM	Straw for FS lands $20,400, and for BLM $6,589. Mulching - $2,550/truckloads, 3 tons / acre. 396 bales per truckload. Total = $26,989	$	5,668
FS/ BLM	Seeding and mulching labor for FS, $16,280 and for $10,188 BLM. FS vehicle $2,250, and BLM vehicle $500. Total for all fires is $29,218. BLM overhead and indirect costs for all fires = $2,474.	$	6,655
BLM	Herbicide application via BLM (this will increase the success of seeding and mulching substantially). BLM cost $1560.	$	328
	Total		**$18,707**

With 95 miles of trails impacted by the Motion Fire within the Chappie–Shasta OHV Park, the Shasta Dam OHV staging area was severely burned and lacks sufficient cover to imped erosion and overland flow. Control of water is key to preserving current trails and recent SWECO improvements. Helimulching

140 acres will significantly reduce erosion and overland flow affecting key staging area trails used to connect the rest of the park. Trailside native grass seeding will be used to stablize trail fillslopes and reduce offsite erosion (B/C – justified, see Appendix).

FS	Helimulching slopes under 55 percent slopes ($1000/acre) 140 acres = $140,000 (Weed-free rice straw at 1.3 tons/acre, Chappie-Shasta OHV Staging Area and trail network hub).	$	140,000
FS	Trailside seeding to stabilize burned over fillslopes (1 mile = 2.4ac @ $1,200/ac)	$	2,880
	Total		**$142,880**

Channel Treatments: This flume collects water from the main stream behind the Chappie-Shast OHV park. It is currently choked with vegetation that will compromise its effectivesness allowing water to divert and sediments to deposit on the OHV staging area. With expected increased flows sediments could flow over the staging area into Sacramento River above Keswick Dam.

BOR	Flume vegetation removal to restore box canal effectiveness. Brush head on an excavator to masticate vegetation or field crew clearing, handpiling and pile burning (Make recommendation to the Bureau of Reclamation) Will need an excavator rental for a day and 2-3 days for two GS-5 crew, or a good eagle scout project. Rock armor the inlet to protect parking trail and parking lot.	**$**	**2,500**

Roads and Trail Treatments: Several OHV trails have been affected by intense burning and are now susceptilbe to bank failure and trail erosion (B/C justified).

BLM	Eiler Bike Trail. Some limited SWECO work to divert water ($500), because more water is coming off the hill onto the trail after the fire.	$	500
FS	SWECO trail work on OHV03, OHV17, OHV19 consisting of rolling dips (1 mile @ $7,500)	$	7,500
FS	Culvert clean-out and repairing stream crossings on OHV03, OHV17, OHV19 @$300/crossing, 5 ea = $1,500	$	1,500
	Total		**$9,500**

Protection/Safety Treatments: With so much burned land and loss of vegetative cover areas are now open to cross country travel and historical areas are exposed to vandalism. Cover and restriction of travel is necessary to protect these sites for the establishment of natural cover (B/C justified).

BLM/ FS	Temporary administrative closure will be implemented immediately and will remain in place until all safety and resource concerns have been addressed.	$	500
FS	Replace 8 bridge crossings on OHV76 with rocked culvert crossings @$750/ea	$	6,000
BLM	Eiler Mine Complex and Bike Route. 8' barrier Bollards and rail ($350).	$	350
BLM	Keystone - Balakala mining complex, three days archeological evaluation ($600)	$	600
BLM	Iron Mtn Mine Complex. Acid Mine Drainage. Treatment is install one pipe gate with Bollards on the side, with information signs. Location is on south fork road on section line between sections 2 and 3. With three days of archeological evaluation ($600)	$	3,600

BLM	Mad Ox Mine Complex. Intersection of Whiskey Creek road with Mad Ox Gulch, Pipe Gate and Bollards, with information signs. With one day of archeological evaluation ($200)	$	3,200
BLM	Intersection OHV routes 13 & 30. 100 feet of four strand, on T posts, pipe brace ends. $250 materials and 250 labor.	$	500
BLM	Intersection of OHV routes 30 & suppression line, section 27. 100 feet of four strand, on T posts, pipe brace ends. 250 materials and 250 labor.	$	500
BLM	Intersection of OHV routes 30 & suppression line, section 26. 100 feet of four strand, on T posts, pipe brace ends. 250 materials and 250 labor.	$	500
BLM	Bollards and Rail about 20' wide. 4 Posts 2 rails and a 24" gap. (100 in materials plus 250)	$	350
BLM	Stowel Mine. Pipe Gate and two 100' wing fences. $2,000 + $500 each wing fence	$	3,000
BLM	Coram Town Site. Major Historic Archeological Mining Town. 1200 foot of smooth strand wire, 4 end braces, 4 line braces, 4' and 12' powder river style gates, with hardware on T post. 6 Private property signs on metal posts ($2000). Hand or Aerial Mulch ($1700/acre for 80 acres = 80,000). Install 20 sand bags near Coram Boarding House foundation to prevent erosion ($200).	$	136,200
BLM	Tramway at Route 4 intersections with dozer lines (4). Each fence to be 50', 3$00 each.	$	1,200
BLM	To help enforce the OHV closure. Install two pipe gates and large signs at east fork road and Copley Mtn Trail.	$	5,000
BLM	Copley-Cottonwood Cabin one day archeological evaluation ($200)	$	200
BLM	Install three information signs (2 on Iron Mtn Road, Dam, East Fork Road, 500 each)	$	2,000
BLM	Entrance to OHV route 15 from Coram Road. 1500 feet of three smooth wire on T post, 10 line braces, two end braces. Hopefully we can work with volunteers to develop something more site appropriate.	$	3,500
BLM	SHA-646 Prehistoric midden evaluation ($200)	$	200
FS	Section 17 with route OHV 2, with suppression line.100 feet of four strand, on T posts, pipe brace ends. 250 materials and 250 labor.	$	500
FS	Section 9, Route 1 and suppression line, where the line towards the lake. 100 feet of four strand, on T posts, pipe brace ends. 250 materials and 250 labor.	$	500
FS	Intersection of Route 2 and dozer in section 7. 100 feet of four strand, on T posts, pipe brace ends. 250 materials and 250 labor.	$	500
FS/ BLM	One year specific area closures with 2 GS-5 Rangers, OHV enforcement patrol (50% of the 120,000 cost will be attributed to this area) to enforce closure and do trail maintenance, includes CTG and gas. These rangers would be patrolling for OHV use, cultural resource monitoring and conducting storm patrols. The BAER team envisions costs split between the two agencies rangers.	$	60,000
BLM	Hazard Tree Removal to protect rangers and work crews (GS-9 Surveys for hazard trees ten days, Three weeks of CDF 200/day)	$	4,175
	Total:		**$232,575**

MAP ZONE C - VALUES AT RISK (VAR) Cottonwood Creek along Coram Road - Keswick

Land Treatments: Headwaters of Cottonwood Creek is severely burned and could be a significant source of sediments into Keswick Reservior. This treatment would be very expensive and only undertaken if downstream values are at extream risk.

FS/BLM	Mulching up in the severely burned headwaters (Coram & Cottonwood Creek area mulching on 1,200 acres is included in the Chappie-Shasta Map Zone) – (Possible Treatment Area if Necessary)	$ 1,200,000

Channel Treatments: Cleaning of this rock culvert and excavating basins that will capture sediments expected to flow out of Cottonwood Creek along with other streams into Keswick that could compromise water quality in Sacramento River at the City of Redding water intake filters (B/C justified).

BOR	Cleaning of the roughly 10 foot historic stone culvert built by Eastern Europeans and constructing a small debris basin to capture sediments.	$4,000
BOR	Create basins at bottom of creeks that burned hot in selected areas from Cottonwood Creek down to Motion Creek BOR = 4 ea Recommendation for BOR only	$20,000

Roads and Trail Treatments:

NRCS	Rolling Dip - near Rheinhold residence- Recommendation for NRCS only	$ 500
BLM	Rip-rap the channel near the bridge, armor with 4 inch minus, 30 yards. Remove sediment. Install an armored 30' 24" inch culvert ($1,356) that would re-align the flow, with sufficient armoring to keep the overflow from eroding road fill. This drains 169 acres. 20 yards of rock (30/ton), 1 day at 1,000/day.	$ 3,000
BLM	Culvert Cleanouts for 10 culverts on Coram Road, starting at Cottonwood Cr Bridge ending at Matheson.	$ 1,000
	Total	**$4,500**

Protection/Safety Treatments: none

MAP ZONE D - VALUES AT RISK (VAR) Whiskey Creek area that drains to Whiskeytown

Land Treatments: none

Channel Treatments: none

Roads and Trail Treatments: Treatment of this area could alleviate possible flooding and erosion of main dirt road up to Whiskey Creek lodge (B/C justified).

NRCS	NRCS should recommend replacement with larger 24" culvert, with road work to create a critical dip as well.	$ 1,567
NRCS	NRCS should recommend removing berm in staging area. Machinery to replace the culvert, install dip and remove berm or at least make breaks in berm.	$ 1,000
	Total	**$2,567**

Protection/Safety Treatments: none

MAP ZONE E - VALUES AT RISK (VAR) Deerlick Fire area

Land Treatments: none

Channel Treatments: none

Roads and Trail Treatments: none

Protection/Safety Treatments: NRCS reccommendations and future assessment work.

NRCS	Damage survey report may be an option if the hazard appears eminent in the future.	$	-
NRCS	Possible sandbagging around the house as a mitigation measure.	$	-
NRCS	Work with the National Weather Service to provide flash flood warnings for areas near 2008 fires.	$	-

MAP ZONE F - VALUES AT RISK (VAR) Moon Fire area private roads

NRCS	NRCS further investigation and working with the private landowners through EQUIP	$	-

MAP ZONE G - VALUES AT RISK (VAR) Moon Fire area Happy Valley Ditch System

Land Treatments: none

Channel Treatments: (B/C justified).

NRCS	Remove hazard trees and all trees that threaten the ditch within 75 feet, 3.8 miles	$	4,560
NRCS	Debris Removal - storm inspection/response (backhoe) $65/hr		10,000
NRCS	Straw Mulch, Hand Application $1,000/acre 17 acres		17,000
NRCS	Straw Blower (450/acre) 6 acres	$	2,700
NRCS	NRCS Design Costs		15,000
NRCS	Replace 30" Diameter Steel Culvert (180 LF) 47/LF and stanctions		100,000
NRCS	Debris racks on 30" culvert (1)	$	1,500
NRCS	Rector Creek Flume Archeological assessment	$	500
	Total	**$**	**151,260**

Roads and Trail Treatments: none

Protection/Safety Treatments: none

MAP ZONE H - VALUES AT RISK (VAR) Moon Fire area at Ono Bridge – Eagle Creek

Land Treatments: none

Channel Treatments: The Ono Bridge is at risk of flooding and being chocked with woody debris due to expected increased flows of Eagle Creek. Excessive woody debris needs to be removed to allow water passage under the bridge. (B/C justified).

NRCS	Removal of the trees in the floodplain of Eagle Creek approximately 300 feet above the Platina Road bridge next to the Ono Grange.	**$**	**2,000**

Roads and Trail Treatments: Eagle Creek is expected to have increased flows due to burned headwaters and Eagle Creek road fill has been undercut and is expected to have increased undercutting

due to increased flows that threatens the use of this road. Also plastic culverts need replacing with steel for proper drainage of road (B/C justified).

NRCS	Water line along the road should be moved to the inside hinge of the road. Melted culverts should be replaced and relocated to reduce erosion in critical areas. Three days with a backhoe for waterline with ditchwitch (3 days@500/day = $1,500), Reinstall culverts for three days, 3 18"culverts. At $1,022 each = 3066 with 3 days $800/day = $2,400. Rip-rap the base of the failure. 20 ton of rip-rap @32/ton = $640. This is the best Forest Service estimate.	**$ 7,600**

Protection/Safety Treatments: none

MAP ZONE I - Beegum Gorge Fisheries Water Quality Hillslope- VALUES AT RISK (VAR)

Land Treatments: Hillslopes above Beegum Creek are completely denuded of vegetation due to moderately high soil burn severities. Soils are very erodable sandy loams on steep slopes in the Beegum Gorge. Below is a very important fishery for inland salmon and steelhead that represent the last population for Cottonwood Creek and are the farest inland species of salmon in California. These are listed senestive and threatened speices by the U.S. Fish and Wildlife Service. Potection of this threatened species is of great concern since numbers have dwindled down to counts of only 36 last year.

BLM/ FS	Mulching slopes under 45 percent slopes ($1700/acre) 514 acres = $873,800 (cooperative agreement could get the cost down to (1,000/acre), since 30 acres is FS), and about 484 acres is BLM land. This would drop the cost to $540,000.	$ **873,000**

Channel Treatments: none

Roads and Trail Treatments: Beegum Gorge Campground road is in the middle of the completely denuded hillslopes. Expected erosion and runoff will be very high thus necessitating emergency road work to allow water passage without eroding around undersized culverts and fill that will significantly contribute to sediment deposition into senestive fish habitat below (B/C justified).

FS	Road work on 29N06 – Rip-rap, inslope, more outsloping, maintenance ($1,000/day running the road crew, 15 days) Excavator = 5,600, includes USFS backhoe. Water Truck $1,000 day 15 days = 10,000	$35,600
FS	Gravel (60 tons at 32/ton = 1920) + rip wrap (44 tons of rip rap @ 30/ton) = 1320	$ 3,140
FS	Leave 2 large culverts for first year and pull pipes, create a low water crossing early summer 2009. Add 2 cross drain 36" pipes. Add $300 delivery for pipes. Replace undersized 36" with a 72" squash $10,000.	$19,000
	FS has maintenance responsibilities for this road **Total**	**$75,740**

Protection/Safety Treatments Public safety to keep people out of this are since it has evidence of past landslides that could be reactivated trapping people at Beegum Gorge Campround with no routes out. Also with bare exposed areas historical sites are open to looting and erosion and need protection.

FS	Seasonal Closure Gate, Installed	$ 2,000
BLM	Goldsborough Gulch Site Protection: Seeding and Mulching 1 acre $1,700/acre. Gating and signing ($1000), native American consultation ($250). Bank erosion, sand bags ($1500), Berm damage assessment and recontouring ($750) mapping ($500).	$ 5,700
FS	1 day evaluation of the Chrome mine assessment ($200), 1 day for Seeliger Ranch Assessment ($200)	$ 400
	Total	**$8,100**

MAP ZONE J - Telephone Roads - VALUES AT RISK (VAR) (see Lime Cx 2500-8)

MAP ZONE K - VALUES AT RISK (VAR) Fires in Cottonwood Ck except Motion Fire

Land Treatments: With multiagency fire response, know weed populations, high OHV use, numerious new fire lines, and open burned landsacapes this area is very prone to weed infestation. These treatments will reduce areas for weed infestation and detect infestions before they rapidly spread till native vegetation gets reestablished (B/C justified).

FS/ BLM	Noxious weed detection monitoring surveys For the first year, GS-9. Cost to gov't . ($175 for GS-9 (12 days), $125 (12 days) 125miles/day = $750 for vehicle). Total is $2,850, 79 percent of this is 2252. (This represents rest of the area excluding C-Shasta OHV)	$	2,252
FS/ BLM	Seed $23,866 for FS lands (30lbs/acre grass, 2lbs/acre forb, portions of Motion, Telephone, Noble, Deerlick and Deadshot) and $2,120 for BLM (12.5lbs/acre, Motion, Moon, Deerlick, Deadshot and Noble) seed. Total = $25,986	$	20,529
FS/ BLM	Straw for FS lands $20,400, and for BLM $6,589. Mulching - $2,550/truckloads, 3 tons / acre. 396 bales per truckload. Total = $26,989	$	21,321
FS/ BLM	Seeding and mulching labor for FS, $16,280 and for $10,188 BLM. FS vehicle $2,250, and BLM vehicle $500. Total for all fires is $29,218. BLM overhead and indirect costs for all fires = $2,474.	$	25,036
BLM	Herbicide application via BLM (this will increase the success of seeding and mulching substantially). BLM cost $1560.	$	1,323
	Total		**$70,461**

Channel Treatments: none

Roads and Trail Treatments: none

Protection/Safety Treatments: OHV and unauthorized cross-country travel these areas need closure and patrol to insure public safety and protection of historical sites (B/C justified).

FS/ BLM	Deerlick Springs Assessment (200), Moon (Jerusalem Creek log Cabin (200),	$	400
BLM	OHV Patrol - Hazard Tree Removal and storm patrol (2 GS-07, 1 year) + $11,000 for gas for truck, OHV, and saw (60% of the cost is attributable to this part of the Phase I fire patrol)	$	60,000
BLM	Gate Installation to Prevent Erosion, Archeological Pilfering, and Weed Spread. 20 gates, $2,000 for 8 inch pipe gates for (48,000 plus 400$ for installation, 30 sections of Fencing 100 feet of fencing 100 feet of four strand, on T posts, pipe brace ends. 250 materials and 250 labor.	$	63,000
BLM/FS	Administrative closure signs ($150 signs, with 50 signs) + Installation (9,000 costs)	$	9,000
	Total		**$132,400**

MAP ZONE L - VALUES AT RISK (VAR) Deerlick Fire area (see Lime Cx 2500-8)

MAP ZONE M - VALUES AT RISK (VAR) Greater Cottonwood Creek Watershed

NRCS/ FS	No treatments proposed - This is an important salmon fishery, but the BAER team is not very concerned that post fire effects from the Front Country fires in the Lime and SHU Lightning complexes will cause harm to this river system. The BAER team will explore the potential for cumulative effects from other fires burning in the watershed (Yollo Bolly Cx).	$?

I. Monitoring Narrative:

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

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

Click red icons for notes.	NFS Lands					Other Lands				All
Line Items	Unit	Unit Cost	# of Units	BAER $	Other	# of Uni	BLM/ BOR	# of Unit	Non Fed NRCS	Total $
A. Land Treatments										
Helimulching	ac	$1,700	30	$51,000		##	$822,800		$0	$873,800
Helimulching	ac	$1,000	140	$140,000			$0		$0	$140,000
Roadside mulch	ac	$1,000		$0			$0	17	$17,000	$17,000
Trailside seeding	ac	$1,200	2	$2,880			$0		$0	$2,880
Hand seed/mulch	ac	$375	50	$18,750		##	$65,625		$0	$84,375
Nx weed survey	mi	$41	30	$1,230		90	$3,690		$0	$4,920
Subtotal Land Treatments				$213,860	$0		$892,115		$17,000	#########
B. Channel Treatments										
Debris basins	ea	$5,000		$0		4	$20,000		$0	$20,000
Channel clearing	ea	$116,560		$0			$0	1	$116,560	$116,560
Canal restoration	ea	$117,000		$0			$0	1	$117,000	$117,000
Rock culvert clean	ea	$2,500		$0		1	$2,500		$0	$2,500
Subtotal Channel Treatments				$0	$0		$22,500		$233,560	$256,060
C. Road and Trails										
Road stormproof	ea	$179,340	1	$179,340			$0		$0	$179,340
OHV stormproof	ea	$500		$0		1	$500		$0	$500
SWECO trailwork	mi	$7,500	1	$7,500			$0		$0	$7,500
Trail crossings	ea	$300	5	$1,500			$0		$0	$1,500
Subtotal Road & Trails				$188,340	$0		$500		$0	$188,840
D. Protection/Safety										
C-Shasta closure	ea	$900	1	$900			$0		$0	$900
Stream crossing	ea	$750	8	$6,000			$0		$0	$6,000
Gates & fencing	ea	$91,000		$0		1	$91,000		$0	$91,000
OHV patrol	ea	$60,000	1	$60,000		1	$60,000		$0	$120,000
Cultural protection	ea	$144,000		$0		1	$144,000		$0	$144,000
Closure/warn signs	ea	$6,000	1	$6,000		1	$6,000		$0	$12,000
Subtotal Protection				$72,900	$0		$301,000		$0	$373,900
E. BAER Evaluation										
Assessment team	---	---	---	---	####	---		---		
	---	---	---	---	$0	---		---		$0
Subtotal Evaluation				---	####	---	$0	---	$0	$0
F. Monitoring										
Hillslope effective	ea	$1,000	1	$1,000			$0		$0	$1,000
OHV fencing	ea	$1,000		$0		1	$1,000		$0	$1,000
Road effective	ea	$1,000	1	$1,000			$0		$0	$1,000
Subtotal Monitoring				$2,000	$0		$1,000		$0	$3,000
G. Totals				**$477,100**	####		**$1,217,115**		**$250,560**	########
Previously approved				$289,220		Comments:costs are split between BLM &				
Total for this request				**$157,880**		FS on OHV closure and patrol				

PART VII - APPROVALS

1. /s/ J. Sharon Heywood — 4 Nov 08
   Forest Supervisor (signature) — Date

2. */s/ Kathleen E. Mick (for)* — *11/14/08*
   Regional Forester (signature) — Date

Appendix: shortened version (see initial 2500-8 for details)

Motion Fire Benefit Cost Analysis: - Chappie-Shasta OHV Staging Area

Chappie-Shasta OHV Staging Area Mulching Justification: (area of concern and its contribution - see map)

C-Shasta staging area loss of use	$750,000
C-Shasta staging area trail damage	$250,000
Contrib. to City of Redding water quality (10-15%)	$300,000
Loss of erosion control structures - past invest.	$200,000
	$1,500,000

Total benefits of resource:

Resource	Value $
OHV trails/recreation	$1,000,000
water quality	$300,000
aquatics/fisheries	$150,000
soil productivity/erosion invest.	$200,000
cumulative water,fish,land	$550,000

Probability of loss without and with treatments:

Resource	Probability loss no treatments:	Probability loss w/ treatments:	Reduction in probability of loss
OHV trails/recreation	70%	30%	40%
water quality	70%	40%	30%
aquatics/fisheries	70%	40%	30%
soil productivity/erosion invest.	90%	35%	55%
cumulative water,fish,land	75%	35%	40%

Total cost of treatments:

A. Land Treatments					
Helimulching	ac	$1,000	140	$140,000	
Trailside seeding	ac	$1,200	2	$2,880	
Subtotal Land Treatments				$142,880	
B. Road and Trails					
SWECO trailwork	mi	$7,500	1	$7,500	
Trail crossings	ea	$300	5	$1,500	
Subtotal Road & Trails				$9,000	
D. Protection/Safety					
Stream crossing	ea	$750	8	$6,000	
Subtotal Protection				$6,000	
D. Totals				**$157,880**	

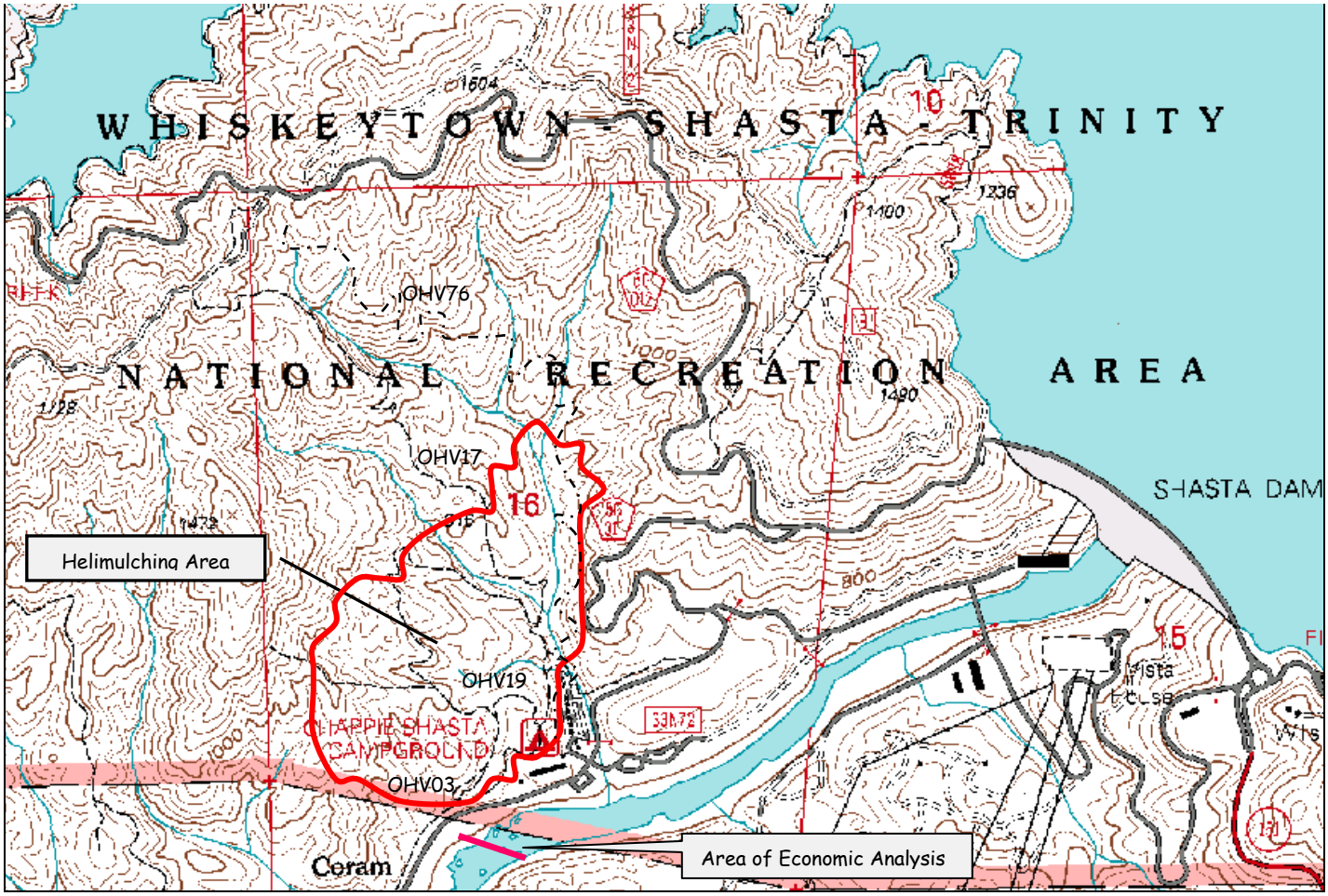
Benefit of treatments:

Resource	Value $	Reduction in probability of loss
OHV trails/recreation	$1,000,000	40%
water quality	$300,000	30%
aquatics/fisheries	$150,000	30%
soil productivity/erosion invest.	$200,000	55%
cumulative water,fish,land	$550,000	40%

Benefit/cost ratio:

Resource	Benefit of treatment	Treatment Cost	B/C ratio	Justified
OHV trails/recreation	$400,000	$157,880	2.5	yes
water quality	$90,000	$157,880	0.6	no
aquatics/fisheries	$45,000	$157,880	0.3	no
soil productivity/erosion invest.	$110,000	$157,880	0.7	no
cumulative water,fish,land	$220,000	$157,880	1.4	yes

Chappie-Shasta OHV Staging Area Helimulching & Trailwork



Fire Name	Motion - SHU Lightning		
Location	Shasta Trinity NF, BLM, Northern California		
Date	7/31/2008 - 8/05/2008		
EACH MAP ZONE REPRESENTS A SYSTEM OF LINKED TREATMENTS AND ASSOCIATED VALUES AT RISK			
MAP ZONE B - VALUES AT RISK (VAR)			
Map link #	***Life and Safety***	**Description**	
	OHV visitors safety	High post fire runoof potential with sediment, burnt bridges and trail problems connected with firelines and post fire erosion require a temporary administrative closure for the Recreation Chappie - Shasta Area	
PLEASE NOTE: IF PUBLIC SAFETY IS A FACTOR, B/C RATIO SHOULD NOT BE RELEVANT AND SHOULD STRICTLY BE AN ACCOUNTING EXERCISE			
Map link #	***Non-Market: Cultural Values***	**Description**	
	Historic mining features, and prehistoric artifacts.	Fire related visibility and increased access create a temptation for damage, vandalism, and pilfering of historic mining features and prehistoric artifacts, particulary anything that can be transported.	
	Historic mininng, residential, transportation, structures, cabins, townsites, mine complexes, and prehistoric sites (access issues and accelerated erosion and deposition)	Fire related visibility and increased access create a temptation for damage, vandalism, and pilfering of historic mining features and prehistoric artifacts., particulary anything that can be transported. Increased access by wheeled vehicles could impact surface resources causing damage.	
	Potential loss of research and public interpretation opportunities	Feature, artifact and cultural deposit losses from looting, vehicular damamge, accelerate erosion and deposition have the potential to decrease research and interpretive opportunities of undisturbed remains.	
Map link #	***Non-Market: Ecological***	**Description**	
	Water Quality in Keswick Reservoir and into the Sacramento River	Sediment will go into the reservoir, and be bled into the Sacramento River below the dam. Just below the dam is the terminus of the salmon run.	
Map link #	***Market Values: Direct***	**Description**	**Total**
	OHV Staging area parking lot fill	This is at risk of erosion from the drainage confluence at the head of the flume overtopping and sending low viscocity muddy water across the parking lot	$ -
	Intake filters for the City of Redding	Keswick contains the intakes for the city of Redding - Value is uncertain. Cleaning filters, Below the Keswick Dam are the Redding intakes 2.0 miles down and at 2.5 miles down are the Bella Vista water district intakes.	$ 1,000,000
	Revegetation investments on old mining soils	2 Million trees and hundreds of check dams have been installed with manual labor in the past decades to prevent massive erosion of the soil in this area.	
	OHV Trails	Post fire situation of trails and adjacent burned areas would be at major risk if not protected from OHV use. Total impacted area estimated at 95 miles. Impacts include new, undesirable trails and associated resource damage, safety concerns with travel on unauthorized routes, and accelerated erosion on existing routes. Trails will need repair work consisting of control fencing, mulching and closures.	$ -
Map link #	***Market Values: Loss-of-Use***	**Description**	
	The Shasta Lake OHV staging area currently provide motorized visitors a place to start and end their trips, parking vehicles and unloading.	The temporary closure will allow the OHV area to be reopened in the near future. $100/day recreation value, days. 16 people a day/all year plus the Hairscambles with 500 riders = 30,000 visitor days.Using Chappie-Shasta, and driving the area for pleasure and shore fishing access.	$ 3,000,000
			$ -
		Probability of experiencing the loss with no treatment (enter as decimal)	1.00
		Source of loss probability with no treatment: **Expert Opinion**	
		Market Resource Value	**$ 4,000,000**