

Date of Report: 9/22/2007

**BURNED-AREA REPORT**  
(Reference FSH 2509.13)**PART I - TYPE OF REQUEST**

## A. Type of Report

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

## B. Type of Action

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

Interim Request #1 is made here to re-direct unused spending authority approved from the Initial Request. Re-directed funds would be used in fall 2008 to maintain the roadside hazard tree mitigation that was performed along Plumas NF roads in fall 2007. \$274,300 was approved in 2007 for hazard tree mitigation but less than \$50,000 was used in 2007 because the number of trees that presented imminent danger to USFS staff or the public or to the functionality of road drainage systems was over-estimated by the BAER assessment team. Of the more than \$220,000 that remains unspent from the approved hazard tree mitigation, this Interim Request asks for re-direction of \$50,000 to maintain the mitigation along those 42.2 miles of road and fall hazard trees that, over the course of the past year, have deteriorated and now present a danger to USFS road maintenance staff and contractors and the public.

Closure of these Level 3 roads (and one high-use Level 2 road) is not feasible. All but 5.8 miles of these roads provide important access to private lands. Annual maintenance of all of the 42.2 miles of roads is required over the next few years because of the increased risk to road property due to increased flood and debris flows from the burned area. Road maintenance activities will result in concentrations of USFS staff and/or contractors along these roads, placing the road maintenance personnel at high risk of personal injury due to hazard trees. Parked vehicles associated with the road maintenance activities will be at high risk of property damage due to hazard trees. The list of roads that would receive maintenance of the hazard tree mitigation begins on page 11 of this Interim Request.

- ☐ 3. Final Report (Following completion of work)

**PART II - BURNED-AREA DESCRIPTION**

- |  |  |
|--|--|
| A. Fire Name: <u>Moonlight</u>           | B. Fire Number: <u>CA-PNF-000670</u>     |
| C. State: <u>CA</u>                      | D. County: <u>Plumas/Lassen</u>          |
| E. Region: <u>05</u>                     | F. Forest: <u>Plumas, Lassen</u>         |
| G. District: <u>Mt.Hough/ Eagle Lake</u> | H. Fire Incident Job Code: <u>P5DZC7</u> |

I. Date Fire Started: 9/03/2007

J. Date Fire Contained: 9/15/2007

K. Suppression Cost: 33 m

L. Fire Suppression Damages Repaired with Suppression Funds

1. Fireline waterbarred (miles): Approx. 140 miles

2. Fireline seeded (miles):

3. Other (identify): Pulled topsoil and vegetation into safety zones and drop points

M. Watershed Number: (HUC 5's) 1802012103, 1802012201, 1802012205, 1808000302

N. Total Acres Burned: 64,991

NFS Acres (46,358) Other Federal ( ) State ( ) Private (18,633)

O. Vegetation Types: Ponderosa Pine/Black Oak, Mixed Conifer,

P. Dominant Soils : Wapi , Inville, Cagwin, Toem families

Q. Geologic Types: Granodiorite, Andesite, Quartz Monzonite

R. Miles of Stream Channels by Order or Class:    : Perennial: 78 miles; Intermittent: 153 miles; Ephemeral: 381 miles

S. Transportation System

Trails: 3.1 miles

Roads: 266 miles

### **PART III - WATERSHED CONDITION**

A. Burn Severity (acres): 11,898 (low) 23,841 (moderate) 24,853 (high) 4389 Unburned

B. Water-Repellent Soil (acres): 797

C. Soil Erosion Hazard Rating (acres):

6,720 (low) 28,511 (moderate) 29,204 (high)

D. Erosion Potential: 46 tons/acre

E. Sediment Potential: 5,950 cubic yards / square mile

### **PART IV - HYDROLOGIC DESIGN FACTORS**

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

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

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

D. Design Storm Duration, (hours): 24

E. Design Storm Magnitude, (inches): 4.5

F. Design Flow, (cubic feet / second/ square mile): 49

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

H. Adjusted Design Flow, (cfs per square mile): 96

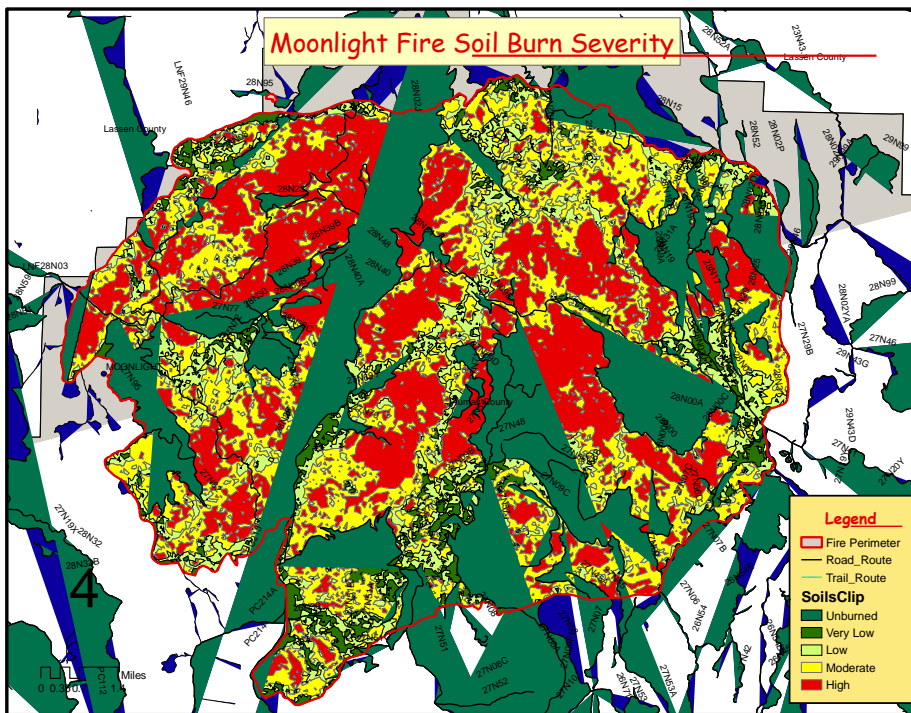
Design Flow (cfs/sq. mi.)	Pre-Fire	Post-Fire
Q <sub>2</sub>	11	22
Q <sub>5</sub>	32	62
Q <sub>10</sub>	49	96
Q <sub>25</sub>	85	166
Q <sub>50</sub>	116	225
Q <sub>100</sub>	163	317

## **PART V - SUMMARY OF ANALYSIS**

### **A. Describe Critical Values/Resources and Threats:**

Background: This fire started Labor Day weekend by an unknown cause. The Fire burned approximately 64,991 acres, making this the largest fire on the Plumas National Forest in recent times. A small portion of the fire burned on the Lassen National Forest. This fire is adjacent to the Antelope fire which burned earlier 2007 and the Boulder Fire which burned in 2006. Approximately 36% of this fire burned at high severity (see attached burn severity map). The BAER Team worked closely with the local NRCS office, and county road department. There are two Private timber companies' (SPI and Beaty and associates) that own large parcels in the Northern part of the fire area that were contacted to discuss future plans and emergency stabilization needs. The BAER team considered the proposed salvage harvesting when analyzing values at risk and developing treatments.

The BAER Watershed group stratified the fire into analysis watersheds and analyzed the amount of high burn severity, the predicted erosional response, and how much of the burn is on National Forest Lands to determine threats to identified values. The following subwatersheds were identified as having the greatest risk to identified values: East Branch Lights Creek (43% high severity), Lone Rock Creek (47% high severity), Middle Lights Creek (46% High severity), West Branch Lights (59% high severity) and Willow Creek (48% high severity)



## Threats to Life, Property and Safety

### Houses and Infrastructure North Arm Indian valley (Lights Creek) (Private lands):

- The BAER team spent several days evaluating the risk to housing and infrastructure in this area. There are houses on the east side of North Arm Road and Diamond Mountain Roads with high and moderate severity burn above them on National Forest lands. In addition, the team observed past debris flows within the channel going to the right (looking up) of the main house. We determined the risk of a debris flow reaching the house was low given the position of the house below the fire area. There is an increased risk of houses in this area that may experience nuisance ash and sediment around their houses during storm events. In addition, there is a risk of ash and sediment crossing the North Arm Road. There is one house in the Fred's Creek drainage that is at risk from an increased flooding potential. A list of potentially affected properties was provided to the NRCS in the Quincy Office.
- There is an increased risk of flooding of houses and infrastructure in North Arm Indian valley along Lights Creek. The Upper and Middle Lights HUC 6 watersheds burned at 41 and 37 percent high severity, respectively. Sediment and ash generated from the streams will increase the likelihood of streambed rock movement due to "bulking" of the water column increasing the risk of peak flows shifting the channel. There is also irrigation infrastructure in the valley. A list of potentially affected properties will be given to the NRCS Quincy office.

### County road (213)

- The County maintained road (213) in Lights Creek is at risk of washing out and/or experiencing damage within the fire area. The main risk is in the Middle Lights Creek watershed where the road traverses near the creek, there is a large amount of stream bed disturbance due to placer mining and the canyon is narrow in places. The BAER engineers contacted the county and they are aware of the risks.

### FS Roads:

- Fire area maps and on the ground reconnaissance of 39 miles of ML-3 roads and 27 miles of ML-2

were conducted over a three day period by the BAER engineers with additional input from BAER team members. In addition, map reconnaissance of approximately 90 miles of ML-2 roads was conducted to determine treatment needs. There are three Forest Service bridges within the fire perimeter; two are located on Indian Creek and one on Lights Creek. These bridges were inspected by the team and found to have no damage or structural concerns for the anticipated increase post burn run off and sediment / debris delivery. The Team recommends that further inspection of these bridges needs to be conducted by FS bridge engineer. There is a 144" bottomless arch culvert located on road 28N30 at the West Branch of Lights Creek, this arch culvert is consider to be at risk due to concrete footings at stream level showing signs of undermining.

- There is a risk to the following Forest Service maintained roads: 28N17, Pierce Creek Parallel: 27N10, Taylor Lake Road: 28N02, Lower Motorway: 28N31, Willow Road: 28N19, West Branch Indian Creek Road:28N30, West Branch Lights Creek 27N09, Hungry Creek:29N46, Ruby Mine Road:28N03, Boulder Road: 28N03, Boulder Road (Fruit Grower Blvd.): These roads can expect to experience increased peak flows and sediment bulked flows across the road system, which could make them impassable and damage the integrity of road prism. While existing culverts are functioning, there is a high likelihood of plugging during storm events which could result in structure failure and damage to the road system. As a result, there is a risk to life, property and watershed efficacy if they fail. Loss of ingress and egress along Forest roads could cause some visitors to become stranded in the interior of the fire area for short durations. There is a fish ladder structure on the 29N46 Ruby Mine road. A slurry of rocks and wood may easily lodge debris in the Lights Creek fish ladder crossing and divert channel flows in the braided streams.

#### Trail #11E17 –Taylor Creek to Antelope Reservoir Trail

- Approximately 3.1 miles of this trail are within the fire area. Multiple areas of this trail burned with high severity. There is a risk of loss of trail tread and increased watershed efficiency from increased flows off the hillslope intercepted by the trail.

## Threats to Water Quality

#### .Recreational fishing and dispersed recreation in Indian Creek and Antelope Reservoir

- Woody debris and litter burned in the small order 1 and 2 stream channels and released stored sediment. In the largest channels such as Indian, water flows will carry logs and large pieces of wood along with ash and sediment. This material will be either deposited on floodplains or at channel constrictions in the case of Indian Creek into Antelope Lake. With rainfall and runoff, stored sediment along with ash will move down stream to larger channels. This sediment will adversely affect water quality and aquatic resources. In addition, this area is popular for dispersed recreation. Antelope Lake and Indian Creek are popular fishing areas on the Mt. Hough Ranger District. With over 27,000 visitor days at the campgrounds at Antelope Lake, the total number of visitor days at Antelope Lake in 2005 was approximately 32,000 (Dyer, P., Northwest Park Management Year End Use Summary, 2005). The recreational fisheries and boating at Antelope Lake are a key component of the recreational opportunities provided at Antelope Lake. Without these components, campground use and day use at Antelope Lake would decline and could affect the economic viability of a campground concessionaire operating the campgrounds, boat launch and general store.
- Recreational fisheries are also a key part of the visitation along Indian Creek. Indian Creek received approximately 2,000 visitor days in 2005 (Hinton, Ralph, Dept. of Water Resources Recreation Use Survey of Indian Creek, 2005).

#### Mountain Yellow Legged Frog in Lone Rock Creek

- Mountain Yellow-legged Frog (*Rana muscosa*): The Lone Rock Creek and Boulder Creek Critical

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Aquatic Refuges (Final Supplemental Environmental Impact Statement for the SNFPA, USDA 2004) are within the Moonlight Fire, with both Pierce and Lone Rock Creeks supporting populations of mountain yellow-legged frogs (MYLF), a Plumas National Forest sensitive species and candidate for future listing on the Endangered Species List. Lone Rock Creek Watershed has 47% high severity burn with an expected erosion rate of 40 t/acre.

- High levels of sediment can fill deep pools, alter and fill interstitial spaces in streambed materials with fine particulates, change flow characteristic, reduce dissolved oxygen, and restrict waste removal (Chapman 1988). A large debris flow can scour all vegetation and change channel morphology with the potential to degrade and potentially significantly reduce the existing MYLF population in Lone Rock Creek. Loss of riparian vegetation, especially along shorelines, would increase access for predators and reduce aestivation sites.

### **Threats to Soil Productivity/Ecosystem Stability**

The BAER identified an emergency to the soil resource. Following are the conditions and rationale leading to that determination:

1. 75% of the fire area has moderate to high soil burn severity (38% high), combined with very high vegetative burn intensity.
2. The erosion rate over the entire fire was estimated to be 46 t/acre using the ERMIT model, this is far above normal erosion rates in a forested environment with native vegetative cover.
3. Soil cover is completely absent in the moderate and high soil burn severity; some potential cover is present in part of the moderate only.
4. Several of the major soils have high to very high erosion hazard ratings.
5. Modeled erosion rates and total hillslope sediment production are substantial.
6. There are a high proportion of steep linear slopes, with high drainage density, so potential for sediment delivery is high.
7. Low ground cover or vegetative recovery is expected for at least two years, following observations in adjacent older fires.
8. High priority watersheds with multiple on- and off-site values at risk are over threshold response levels.
9. The area contains relatively productive soils; soil productivity has been identified as key for long-term recovery of burned out California spotted owl and northern goshawk Protected Activity Centers (PACs).
10. Runoff laden with sediment has much higher erosive power, which will lead to increased risks of debris flow initiation and subsequent threats to life and property.

The conditions caused by the fire, combined with naturally erodible soils, lead to unacceptable consequences for soil productivity and stream sedimentation. Natural recovery is expected to be slow, as observed in adjacent recent fires over the last ten years. Administrative closure could minimize risks, but would not prevent unacceptable degradation of soil resources or downstream values. Therefore the BAER soils team considers active land treatments necessary to moderate threats to multiple values at risk.

#### Headcuts:

- There numerous small wet meadows in the fire area, especially in the Indian Creek watershed that have channel headcuts. Increased water flow from the fire area will increase headcut movement causing loss of a valuable resource. The high burn severity above these headcuts is likely to lead to increased runoff and peak flows adversely affecting the headcuts.

#### Noxious weed potential

The unknowing introduction of invasive noxious weeds into areas disturbed by fire suppression and rehabilitation has the potential to establish persistent weed populations. These persistent populations could affect the structure and habitat function of plant communities within the burn area. Forest Service direction is to minimize the establishment of non-native invasive species to prevent unacceptable

degradation of the burned area. In addition, reducing the introduction and spread of non-native invasive species has been identified as a Forest Service Strategic goal for 2003-2008. Forest Service policy requires washing of all equipment mobilizing onto wildfires, to prevent the introduction of noxious weeds into the burned area during suppression activities. The fire increased in size rapidly during the first several days due to extreme fire behavior. Because of the emergency nature of fire suppression and the threats to life and property some vehicles and equipment were not washed during mobilization. Delayed assessment of roads, dozer lines, drop points, and safety zones is necessary to detect the spread and introduction of weeds in the first year after fire. Assessing the establishment of weeds and treating small outlying populations before they expand will prevent the weeds from becoming serious threats to the recovery of native plants. The following species are known to be in the fire area:

- Yellow Starthistle is known from several locations in the Lights Creek drainage in the southern portion of the fire. It is also well established on private lands along Indian Creek just south of the fire area. Both Lights Creek and Indian Creek provide access to the fire area. These two roads were used extensively by fire suppression vehicles.
- Spotted knapweed is known from three locations in the fire. It is found along Lights Creek in the southern portion of the fire, and in the eastern portion of the fire. One known occurrence of spotted knapweed was disturbed by heavy equipment. The site potentially was used as a safety zone and it is likely that fire suppression vehicles either parked in the site or passed through. The equipment and vehicles act as vectors to spread seeds of this highly aggressive weed. The newly disturbed ground around throughout the fire and at the known infestation provide habitat that is very likely to favor the weed. Another known occurrence of spotted knapweed was burned.
- Canada thistle is also known from several locations throughout the fire area. Most of these known locations are along Indian Creek and its tributaries in the central portion of the fire. This area has had the most recent noxious weed surveys and it is likely that this invasive species is present on other unknown locations throughout the fire.
- Scot's broom is known from 2 locations in the fire area. There is one occurrence along a tributary of Middle Creek and two occurrences along Lights Creek.
- Bull thistle is known from many locations throughout the fire.

#### OHV incursion:

- Risk of OHV incursion exists in several areas throughout the fire. There is one known location within the Moonlight burned area where rehab efforts on a dozer line were unsuccessful due to the lack of native material to use as barriers, putting the dozer line at risk to OHV use. This also puts the soil and vegetative resources at risk while adding a new unauthorized road for the district to close through the OHV Route Designation Process. This dozer line is within the Diamond Mountain Restricted Vehicle Use area and leads to access along the Diamond Mountain ridge line. The fire area receives moderate OHV use.
- The Mud Lake RNA area could also be at risk to OHV use since the fire caused an opening in the RNA. On other areas of the fire where dozer lines were not properly rehabilitated due to difficult terrain or lack of natural barriers, there is a moderate risk of Off-Highway vehicles traveling on dozer lines. Because of the OHV Route Designation Process, there is a risk that this would create more unauthorized routes for the Plumas National Forest to sign or close off.

## Threats to Cultural Resources

There are two sites in the Lights creek drainage that were identified to be at risk of flooding and losing site integrity.

- Material culture indicates the latest occupation to be the late 1930s or early 1940s. The site is comprised of a structural pad, some privies and a scatter of associated refuse. This site is potentially eligible for listing on the National Register because it has qualities that contain information about the past that can be understood through further investigation. Feature four of this site, a can scatter, is located at the confluence of multiple burned drainages on a floodplain, and is in danger of being destroyed during a heavy rain.
- A historic mining camp with 19 features that include eleven cabin/tent terraces, four privy pits, and two large refuse scatters. This site is potentially eligible for listing on the National Register because it is associated with the mining era and it contains important information about the past that can be understood through further investigation. This site is located on both sides of a seasonal drainage that is a tributary to Lights Creek. This specific drainage suffered a high intensity burn with a loss of all foliage and duff. The refuse scatters are located downstream of a bend in the channel and are in danger of being washed away in the event of a heavy rain.

B. Emergency Treatment Objectives:

- Stabilize hillslopes that are likely to experience unacceptable accelerated erosion
- Stabilize roads and trail to prevent loss of road/trail prism and increased watershed response
- Reduce the risk of degradation to ecosystem function

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

Land 80 % Channel 80 % Roads/Trails 75 % Protection/Safety 80 %

D. Probability of Treatment Success

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

E. Cost of No-Action (Including Loss):\_ \$21,350,000

F. Cost of Selected Alternative (Including Loss):\_ 4,212,000

G. Skills Represented on Burned-Area Survey Team:

<input type="checkbox"/> Hydrology	<input checked="" type="checkbox"/> Soils	<input checked="" type="checkbox"/> Geology	<input checked="" type="checkbox"/> Range	<input type="checkbox"/>
<input checked="" type="checkbox"/> Forestry	<input checked="" type="checkbox"/> Wildlife	<input type="checkbox"/> Fire Mgmt.	<input checked="" type="checkbox"/> Engineering	<input type="checkbox"/>
<input type="checkbox"/> Contracting	<input type="checkbox"/> Ecology	<input checked="" type="checkbox"/> Botany	<input checked="" type="checkbox"/> Archaeology	<input type="checkbox"/>
<input checked="" type="checkbox"/> Fisheries	<input type="checkbox"/> Research	<input type="checkbox"/> Landscape Arch	<input checked="" type="checkbox"/> GIS	

Team Leader: Todd J. Ellsworth, Inyo National Forest, Joe Hoffman BAER coordinator Plumas N.F.



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FAX:

#### H. Treatment Narrative:

(Describe the emergency treatments, where and how they will be applied, and what they are intended to do. This information helps to determine qualifying treatments for the appropriate funding authorities. For seeding treatments, include species, application rates and species selection rationale.)

**Note:** Land treatments are broken into Phase 1 and Phase 2 due to the fire burning late in the season and to treat high priority areas before the first winter. Phase 2 treatments would be completed the next year based on monitoring of vegetative recovery and erosion potential in the winter of '08.

##### Land Treatments:

#### 1. *Aerial Heli-Mulch:*

##### Objectives:

To provide for immediate ground cover in high priority areas where natural ground cover is not anticipated and there is high probability of accelerated hillslope erosion and downstream values at risk.

##### Methods:

Helicopter sling weed free straw on approximately 1,300 acres (Phase 1) in Middle Lights Creek and Lower Lights Creek watersheds. The area above the houses in Lower Lights Creek (79 acres) is the highest priority as it can directly protect threats to life and property. The Treatment in Middle Lights Creek can be completed in 50 foot strips on the hillslope to expedite treatment before the winter. The Forest has experience with this treatment (Boulder Fire). Detailed specifications can be found in the Boulder implementation report and in the BAER catalog (SDTDC 2006). Phase 2 would consist of 1,151 acres of helimulch in the Bear Valley/Morton Creek, Middle Lights, and Willow Creek watersheds.

#### 2. *Mastication*

##### Objectives:

To provide for immediate ground cover in high priority areas where natural ground cover is not anticipated and there is high probability of accelerated hillslope erosion and downstream values at risk.

##### Methods:

Use a track mount masticator to shred standing dead material up to 16" DBH in areas where there are concentrations of suitable trees that burned with high severity, such as plantations, on approximately 521 acres (Phase 1). These areas are located in Willow Creek, West Branch Lights and Bear Valley/Morton Creek Watersheds. This treatment can be completed in 50 foot strips on the contour to expedite treatments before the winter. The Forest has experience with this treatment, and has contractors in the area with suitable equipment. Detailed specifications can be found in the BAER catalog (SDTDC 2006). Phase 2 would consist of 643 acres in East Branch Lights, Hungry, Lone Rock, and Smith/Fant watersheds.

#### 3. *Noxious Weed Detection Survey*

##### Objective:

Evaluate and eliminate the potential for noxious invasive weed establishment and spread, in all areas affected by the Moonlight fire. Early detection dramatically increases the likelihood of successful treatment.

#### Methods:

Inspect all areas and monitor for newly established weed occurrences. Monitoring will include documentation and hand pulling small new weed occurrences at the time of inspection. New weed occurrences will be pulled to root depth, placed in sealed plastics bags, and properly disposed.

Documentation of new infestations will include:

GPS negative and positive inspection results  
Incorporate data into GIS spatial database  
Establish photo points  
Map perimeter of new infestation  
Estimate number of plants per square meter  
Treatment method  
Dates of treatment  
Evaluate success in subsequent inspection

Results will be entered into the NRIS database. Inspections and monitoring should be accomplished during June, July, and August of 2008. Based upon findings in the first year's survey, additional surveying may be requested for up to three years.

### **Channel Treatments:**

#### 1. *Stabilize Headcuts-6*

##### Objective:

Stabilize 6 small headcuts in the Indian Creek watershed. Increased peak flows from the fire area and a road will cause the headcuts to migrate at a faster than the current rate, causing accelerated loss of the valuable meadow resource and increased sedimentation to Indian Creek and Antelope Reservoir.

##### Methods:

Place Filter cloth and rock in the headcuts filter cloth should be keyed into the top of the headcut to ensure piping does not occur. The headcuts may need to be reshaped to fit the contour of the slope to ensure treatment success. This is a proven, low cost treatment that is effective in retarding meadow degradation. In addition, approximately 4,500 feet of temporary fence or brush will be needed if livestock grazing is permitted in this area next year.

#### 2. *Stabilize Cultural Sites -2*

##### Objective:

The purpose of constructing a deflection barrier is to keep the stream from flooding and washing away the refuse scatter and destroying site integrity.

##### Method:

On Wednesday, Sept 21, 2007, Casey Shannon, hydrologist and BAER team member observed ground conditions at these site and recognized flood and erosion threats caused by fire. Shannon recommended the construction of an approximately 30 foot long x 4 foot wide x 4 foot high rock deflection barrier. The rock to be used for the barrier is easily obtained at the site and is plentiful; some rock obstructions can be removed from the channel bed to improve flow capacity.

#### 3. *Remove channel obstruction:*

##### Objective:

To remove an existing water hole dam in Hungry Creek to allow for clear storm water passage and not impair water quality.

Methods:

A backhoe is needed to remove the dam. The dam is below road intersection of 27N09/27N11 in the SWSW Section 24. Material should be placed above the expected floodplain so it doesn't get re-mobilized.

## **Roads and Trail Treatments:**

### *1. Road Treatments*

Objective:

The treatments are designed to stabilize the road prism and prevent enhanced watershed response from road prism failure.

The following treatments were identified as BAER treatments for the Moonlight Fire burn area:

- A. Restore and Improve Drainage Function
- B. Roadside Hazard Tree Mitigation
- C. Install Relief Dips
- D. Clean Culvert Inlets
- E. Install Culvert Inlet Treatments (MES)
- F. Install Drainage Armor
- G. Install Hardened Crossing (LWC)
- H. Install and Repair Overside Drains
- I. Remove and Install Culverts (upsized)
- J. Install Grouted Riprap
- K. Install Signs (BAER Warning / Information)
- L. Monitoring and Storm Patrol

Methods:

The following road by road description displays treatments per road:

Interim Request #1: Roads that would receive 2008 maintenance of the 2007 hazard tree mitigation are identified below. All but 5.8 miles of these roads provide important access to private lands; the Willow Road 28N31 does not access private land. Annual maintenance will occur on all of the 42.2 miles of roads because of the increased risk to road property due to increased flood and debris flows from the burned area. Treatments for road 28N03 were mistakenly left out of the Initial 2500-8 but were presented in the Engineer BAER assessment report and costs were approved for those roads. 28N03 treatment descriptions are added here for the Interim Request.

#### **28N17, Pierce Creek Parallel:**

Pierce Creek Parallel is a maintenance level-2 forest development road 2.3 miles in length. Restore and improve drainage function along 2.3 miles of road and install relief dips on 18" to 24" CMP's at 15 locations.  
No hazard tree mitigation maintenance.

#### **27N10, Taylor Lake Road:**

Taylor Lake road is a maintenance level-3 forest development road 2.7 miles in length. Restore and improve drainage function to 2.7 miles of road. At M.P. 0.5 install 10 cubic yards of drainage armor.  
No hazard tree mitigation maintenance.

#### **28N02, Lowe Motorway:**

Lowe Motorway is a maintenance level-2/3 forest development road 9.2 miles in length. Restore and improve 9.2 miles of drainage function. Hazard tree mitigation is required over 7.9 miles which includes clearing and removal of small trees and vegetation from roadside ditches and culvert catch basins. Install 3 relief dips and armor with 5 cubic yards of rip rap each. Install 1 BAER warning/information sign.

2008 hazard tree mitigation proposed: 7.9 miles

**28N31, Willow Road:**

Willow road is a maintenance level-3 high value forest development road ,with steep cuts and fills inside ditches with numerous cross drain and natural drainage culverts, this road appears to have adequate drainage to handle the anticipated increase post burn flow. the road is 5.8 miles in length. Restore and improve 5.0 miles of drainage function. Perform hazard tree mitigation along 5.8 miles of road, which includes clearing and removal of vegetation and debris from roadside ditches and culvert catch basins. Install overside drains with 20 to 30 foot flumes at the following mileposts: 0.6, 1.45, 1.60, and 1.80. 10 cubic yards of 3/4" A.B. is required to create berms around the overside drains to act as drainage armor. 10 cubic yards of rip rap are needed for drainage armor at the inlet of the CMP at milepost 2.50. Install a MES on a 48" CMP at M.P. 1.10. The 18" CMP at milepost 4.0 requires a 6' extension. Install a BAER warning/information sign.

2008 hazard tree mitigation proposed: 5.8 miles

**28N19, West Branch Indian Creek Road:**

West Branch Indian Creek road is a maintenance level-2 forest development road 4.7 miles in length. The single lane road has some aggregate base but is mostly native soil with a flat gradient. Restore and improve drainage function along 4.7 miles of road. Hazard Tree Mitigation over 4.7 miles which includes clearing and removal of small trees and vegetation and from roadside ditches and culvert catch basins. Install a MES for a 24" CMP at mile posts 2.1 and 4.5 providing 5 cubic yards of rip rap for each installation. Install dips and armor with 5 cubic yards of rip rap each at the corrugated metal pipes found at mileposts 2.7 and 3.85. At M.P. 3.0 remove logs and debris from the inlet of the 7' CMP.

2008 hazard tree mitigation proposed: 4.7 miles

**28N30, West Branch Lights Creek**

The west branch lights creek is a maintenance level-2 forest development road 6.4 miles in length. West Branch Lights Creek has a native soil base, flat gradient and inside ditch line. Restore and improve 6.4 miles of drainage function. Install relief dips and armor each with 5 cubic yards of rip rap for corrugated metal pipes found at mileposts 5.8 and 6.3. At mile post 1.0 remove existing 48"x60' culvert at the tributary to moonlight creek; Install Hardened LWC. At milepost 4.2 rip rap outlet of the 18" CMP with 3 cubic yards of material. At milepost 5.8 rip rap fill slope with 15 cubic yards of material. 5 cubic yards of rip rap is required at the outlet of the 24" CMP found at milepost 3.8. The 144" ( 12 foot) bottomless arch culvert on Lights Creek has evidence of undermining around the concrete footings at water level, install grouted riprap at undermined footing locations. Install BAER warning/information sign.

No hazard tree mitigation maintenance.

**27N09, Hungry Creek:**

The Hungry Creek road is a maintenance level-3 high value forest development road 9.0 miles in length. Hungry Creek is a single lane rock surfaced road. Restore and improve drainage function for 9.0 miles of road. Hazard tree mitigation along entire length of road includes clearing and removing of small trees and vegetation from roadside ditches and culvert catch basins. Install MES for 24" corrugated metal pipes with 3 cubic yards each of rip rap at the following mile posts: 0.4, 2.8, and 3.5. Install relief dips at milepost 7.3 and 7.4. A total of 75 cubic yards of rip rap will be required to armor drainage along this road. Install BAER warning/information sign.

2008 hazard tree mitigation proposed: 9.0 miles

**29N46, Ruby Mine Road:**

The ruby mine road is a maintenance level-3 high value forest development road 6.8 miles in length. The road is designed on a steep grade with large cuts and fills inside ditches with numerous cross drain and natural drainage culverts, the drainage features appear to be adequate to handle the anticipated increased post burn flows. Approximately 0.8 miles of the road is found on the Lassen National Forest. Restore drainage function along 6.8 miles of roadway. Hazard tree mitigation is required for the 6.8 miles of road and includes the clearing and removal of small trees and vegetation from roadside ditches and culvert catch basins. Install metal end sections on existing culvert at the following location 24" CMP at milepost 1.1, 30" CMP at milepost 3.1, an 18" CMP at milepost 3.15, a 24" CMP at milepost 3.8, a 24" CMP at milepost 5.4, and a 24" CMP at milepost 5.5. 30 cubic yards of rip rap will be required for drainage armor including installation around the

metal end sections. The steel grate low water crossing with fish ladder on Lights Creek will be monitored and patrolled by heavy equipment through out the winter. Install BAER warning/information sign.

2008 hazard tree mitigation proposed: 6.8 miles

#### **28N03, Boulder Road:**

The boulder road is a maintenance level-2 forest development road 9.8 miles in length. The road has a flat gradient and is up high in the watershed. Restore and improve drainage function for 9.8 miles of road. Remove large debris from 36" CMP inlet found at milepost 5.7. Install MES and surround with riprap for the 36" CMP at milepost 1.5, the 24" CMP at milepost 5.4, and the 36" CMP at milepost 8.3. Remove and upsize existing 36" diameter 60' length CMP at milepost 6.0. Install overside drain with 30' flume at milepost 5.4. Rip rap ditch at milepost 7.20. A total of 80 cubic yards of rip rap will be required for this road to provide drainage armor for fill slopes, metal end sections, culvert outlets and the length of ditch. NOTE: Milepost 8.5 to 9.0 is an approved ERFO site; this road segment will be rerouted using ERFO funding.

No hazard tree mitigation maintenance.

#### **28N03, Boulder Road (Fruit Grower Blvd.):**

This section of Boulder Road is a maintenance level-3 high value forest development road 9.3 miles in length. The rock surfaced road has a flat gradient and can be found at the bottom of the watershed. Restore drainage function along 9.3 miles of road that includes 5.5 miles of ditch line. Hazard tree mitigation is required for 8.0 miles of the road and includes clearing and removal of small trees and vegetation from roadside ditches and culvert catch basins. Remove and upsize existing 36" diameter 50' length CMP at milepost 6.0. Install metal end section for 36" CMP at milepost 5.8 and back with 5 cubic yards of rip rap. A total of 10 cubic yards of rip rap are recommended for this road section.

2008 hazard tree mitigation proposed: 8.0 miles

### **2. Trail Stabilization 11E17, Taylor Lake to Antelope Reservoir– 3.1miles**

#### Objective:

Stabilization treatments are needed to maintain trail stability and tread along with minimizing further watershed impacts, and protecting forest visitors. An experienced trail specialist should oversee and supervise the project.

#### Methods:

A hazard tree survey needs to be completed before any crews start treatment work. Hazard trees need to be identified by a qualified specialist and marked. After trees are identified, qualified sawyers should complete all tree falling before crews commence work. All downed trees on trail need to be cleared for access along with overgrowth on trail to allow safe access.

- Clear debris and accumulated sediment from existing trail earthen and rock waterbars to maximize efficiency. Add to water bar structure integrity by adding reinforcement materials to structures as needed.
- Clear stream channel crossings of debris and increase channel capacity at crossing to allow stream flow to bypass trail and not divert onto trail. Reinforce downstream side of crossing with water bar or berm to minimize diversion onto the trail.
- Install additional waterbars and grade stabilizers on sections of trail where there is a lack of adequate water controls, using local rock or earthen berms.
- Install signs at trail heads and other entrances informing public of post-fire hazards along the trail.

### **Protection/Safety Treatments:**

#### **1. Advisory Letter:**

#### Objective:

Inform Forest permittees (mining claim holders) of the risk of flooding and other hazards in fire area. This is an effective low-cost treatment.

Methods:

Draft a letter describing the risks of flooding and hazard trees across the road to Forest permittees (mining claim holders).

2. *Temporary Fencing*

Objective:

To protect an isolated population of Mountain Yellow-legged frogs (candidate for future federal listing on the Endangered Species List) in Lone Rock Creek from anticipated increased grazing pressure. Treatment will also enhance riparian vegetation used by riparian birds including willow flycatcher.

Methods:

Install 1.5 miles of temporary electric fence in low severity burn area in lower Lone Rock Creek drainage. The fence will be put up before livestock are released into the allotment and taken down in the fall when cattle are out of the area. Re-assess the condition of the site after two years to determine future action if necessary.

3. *Heritage Resource educational signs - 12*

Objective:

Provide an avenue to prosecute looters within the burn area and prevent the destruction of important cultural resources.

Methods:

Place educational signs that inform the public about the importance of cultural resources and the laws protecting them. These signs will be posted alongside post-fire interpretive signs and at the Lucky S Mining Complex. Informational signs increase the viability of criminal prosecution through the Archaeological Resource Protection Act of 1979.

4. *OHV signs - 20:*

Objective:

To protect soil and vegetative resources at risk in burned areas from OHV Incursion and prevent illegal OHV use on dozer lines not sufficiently rehabilitated.

Methods:

Install and purchase "No Motorized Vehicle Use" signs in 2 areas within the Moonlight Fire for the Mud Lake RNA and the Diamond Mountain Restricted area.

20 "No Motorized Vehicle Use" signs and posts will need to be purchased and installed by OHV staff and District Botany Specialists. Specific locations will be determined by District staff.

I. **Monitoring Narrative:**

See Appendices below

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

Line Items	Units	Unit Cost	NFS Lands		Other \$	Other Lands				All Total \$
			# of Units	BAER \$		# of units	Fed \$	# of Units	Non Fed \$	
<b>A. Land Treatments</b>										
Heli-mulch	acres	700	1300	\$910,000	\$0		\$0		\$0	\$910,000
Mastication	acres	450	521	\$234,450	\$0		\$0		\$0	\$234,450
Nox.weed detection	days	667	30	\$20,010	\$0		\$0		\$0	\$20,010
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<b>Subtotal Land Treatments</b>				\$1,164,460	\$0		\$0		\$0	\$1,164,460
<b>B. Channel Treatments</b>										
Stabilize headcuts	ea	2000	6	\$12,000	\$0		\$0		\$0	\$12,000
Stabilize cultural sites	ea	3000	2	\$6,000	\$0		\$0		\$0	\$6,000
channel obstruction	ea	1000	1	\$1,000	\$0		\$0		\$0	\$1,000
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<b>Subtotal Channel Treat.</b>				\$19,000	\$0		\$0		\$0	\$19,000
<b>C. Road and Trails</b>										
Road winterization	mi	8253	107	\$883,071	\$0		\$0		\$0	\$883,071
Trail Stabilization	mi	3225	3.1	\$9,998	\$0		\$0		\$0	\$9,998
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<b>Subtotal Road &amp; Trails</b>				\$893,069	\$0		\$0		\$0	\$893,069
<b>D. Protection/Safety</b>										
Advisory Letter	ea	350	1	\$350	\$0		\$0		\$0	\$350
Temporary fencing	mi	5000	1.5	\$7,500	\$0		\$0		\$0	\$7,500
OHV Signs	ea	86	20	\$1,725						\$1,725
Heritage signage	ea	83	12	\$996	\$0		\$0		\$0	\$996
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<b>Subtotal Structures</b>				\$10,571	\$0		\$0		\$0	\$10,571
<b>E. BAER Evaluation</b>										
personnel/travel	ea	4751	23	\$109,293			\$0		\$0	\$109,293
<i>Insert new items above this line!</i>				---	\$0		\$0		\$0	\$0
<b>Subtotal Evaluation</b>				\$109,293	\$0		\$0		\$0	\$109,293
<b>F. Monitoring</b>										
Hillslope	days	320	6	\$1,920	\$0		\$0		\$0	\$1,920
11E17 Trail	days	250	3	\$750						\$750
Fence monitoring	days	250	7	\$1,750						\$1,750
OHV Monitoring	days	250	5	\$1,250						\$1,250
Road patrol	days	300	7	\$2,100						\$1,500
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<b>Subtotal Monitoring</b>				\$7,770	\$0		\$0		\$0	\$7,170
<b>G. Totals</b>				\$2,204,163	\$0		\$0		\$0	\$2,204,163
Previously approved										
Total for this request				\$2,204,163						

## **PART VII - APPROVALS**

1. /s/ Alice B. Carlton October 22, 2008  
Forest Supervisor (signature) Date
2. /s/ Janice Gauthier (for) October 29, 2008  
Regional Forester (signature) Date

## **Appendix A**

### **Moonlight Fire Fence Effectiveness Monitoring**

The 2500-8 report requests funds to monitor the effectiveness of fencing. The fencing is to restrict access to that could be degraded from livestock utilization.

1. Monitoring Questions
  - Are the fences restricting livestock access in to the burned area?
  - Have the fences been cut or tampered with since it was constructed or previously maintained?
2. Measurable Indicators
  - Number of times fence is repaired
  - Length of damage to soil and vegetation
3. Data Collection Techniques
  - Photo documentation of site
  - Inspection Checklist (attached)
4. Analysis, evaluation, and reporting techniques
  - Due to the high resource values at risk the monitoring findings will be evaluated weekly during the. If the monitoring shows the treatment to be ineffective at livestock access and soil/vegetative damage, an interim report will be submitted.
5. Monitoring report timeframes
  - The report will be evaluated weekly and if the treatment is effective, fence inspection checklist findings will be compiled monthly and summarized by the following:  
Number of fence breaks  
Vegetative Damage assessment  
Bank – trample and Chisel assessment

### **Fence Inspection Checklist**

Date: \_\_\_\_\_  
Time: \_\_\_\_\_

Inspector: \_\_\_\_\_



Describe locations reviewed during inspection:\_\_\_\_\_

Identify by GPS the location and note on sketch map. \_\_\_\_\_

Describe signs of soil/vegetative damage\_\_\_\_\_

Describe damage to stream banks (trample and chisel)\_\_\_\_\_

Photo taken ?\_\_\_\_\_

Recommended repairs needed\_\_\_\_\_

Moonlight Fire  
Road Effectiveness Monitoring

The 2500-8 report requests funds to monitor the effectiveness of road treatments on Forest Roads in the Moonlight Fire.

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:\_\_\_\_\_

Taylor Lake to Antelope Reservoir Trail Monitoring  
Moonlight Fire

1. Monitoring questions:

- Were the trail treatments proposed for the Taylor Lake to Antelope Reservoir Trail effective in retaining trail tread and retarding erosion?

2. Measurable indicators:

- Integrity of trail tread
- Evidence of off-site rill or gully erosion.

3. Data Collection Techniques

- Photo Inspection (Before and after photographs would be taken to observe and document changes in trail condition. In addition, the monitoring would document effectiveness of specific treatments in specific areas to fine tune future prescriptions. )
- Trail Inspection Checklist (see below)

4. Analysis, evaluation and reporting techniques

- Monitoring will be conducted after storm events. If the monitoring shows the treatment to be ineffective at stabilizing the 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?\_\_\_\_\_  
(GPS)\_\_\_\_\_

Describe damage and cost to repair? (GPS)\_\_\_\_\_

Photo taken of trail damage\_\_\_\_\_

Recommended actions to repair:\_\_\_\_\_

#### Moonlight Fire Hillslope Treatment Effectiveness Monitoring

##### 1. Monitoring Questions

- Is there sufficient ground cover to retard accelerated erosion?
- Is natural vegetation recovery?
- Did the mulch/slash stay on site?
- Was the Treatment tested by a design storm?

##### 2. Measurable Indicators

- The amount of ground cover in treated and areas of high burn severity in completed in early summer.
- Rills, gullies or evidence of sheet wash erosion on the hillslopes

##### 3. Data Collection Techniques

- Photo documentation of sites
- Inspection checklist (see attached)

##### 4. Analysis, evaluation, and reporting techniques

- Monitoring will be conducted in early summer after vegetation has green-up for the season. An evaluation will be made as to whether "Phase 2" of the proposed hillslope treatments should be implemented. If the monitoring shows that vegetative recovery is ineffective at preventing unacceptable accelerated erosion the 2<sup>nd</sup> winter an interim report will be prepared and submitted. A several page report should be completed after the site visit. The report would include photographs and a recommendation on whether additional treatments are necessary.

#### Hillslope Inspection Checklist

Date:\_\_\_\_\_

Inspector:\_\_\_\_\_

Time: \_\_\_\_\_

Watershed:\_\_\_\_\_

Describe                      Location                      of                      inspected                      site:

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Ground Cover: \_\_\_\_\_(Complete at least 2 transects in inspection area of 10 points each)

Is there evidence of rill, gullies or sheet wash (describe extent and severity)?\_\_\_\_\_

Photo Taken of site?\_\_\_\_\_

Recommended Actions:\_\_\_\_\_

1. Monitoring questions:

- Were the sign effective in retarding OHV incursions into the fire area?

2. Measurable indicators:

- Evidence of Vehicle Tracks

3. Data Collection Techniques

- Photo Inspection
- OHV incursion Checklist (see below)

4. Analysis, evaluation and reporting techniques

- Monitoring will be conducted before the winter and when the public starts using the area. If the monitoring shows the treatment to be ineffective at retard OHV incursions 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.

OHV Incursion Checklist

Date: \_\_\_\_\_

Inspector: \_\_\_\_\_

Time: \_\_\_\_\_

Describe	Location	of	inspected	site:
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

GPS Location: \_\_\_\_\_

Is there evidence of vehicle tracks (describe extent and severity)? \_\_\_\_\_

Photo Taken of site? \_\_\_\_\_

Recommended Actions: \_\_\_\_\_