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Supplementary material

A synthesis of post-fire Burned Area Reports from 1972 to 2009 for western US Forest Service lands: trends in wildfire characteristics and post-fire stabilisation treatments and expenditures

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Example Burned Area Report

Sample Interim 2500-8 Burned Area Report from the 2008 Panther Fire in California

The original BAER assessment and initial Burned Area Report (funding request) for the Panther Fire were completed before the fire was fully contained. This interim report was filed to update the initial funding request based on more complete site data, design analysis and treatment contract specifications. Working from the initial report, the additions, changes and explanations were printed in blue italicised text.

US customary units were used in this report. Some potentially helpful conversions include:

1 inch = 25.4 mm

1 mile = 1.6 km

1 acre = 0.404 ha

1 sq. mile (mi^2) = 2.6 km^2 or 259 ha

1 cubic foot (ft^3) = 0.028 m^3

Note: cfs, cubic feet per second

1 cubic yard (yd^3) = 0.76 m^3

1 ton $acre^{-1}$ = 2.2 Mg ha^{-1}

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I – TYPE OF REQUEST

A. Type of report

[X] 1. Funding request for estimated emergency stabilization funds
[ ] 2. Accomplishment report
[ ] 3. No treatment recommendation

B. Type of action

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

[X] 2. Interim report # 1 *CHANGES IDENTIFIED IN BLUE*
[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: Panther Fire

B. Fire number: KNF-3624

C. State: CA

D. County: Siskiyou

E. Region: 05

F. Forest: Klamath National Forest & portions administered by Six Rivers National Forest

G. District: Ukonom and Happy Camp

H. Fire incident job code: P5EC9P

I. Date fire started: July 22, 2008; *new 10/01/08*

J. Date fire contained: no containment to-date

K. Suppression cost: $15 900 000 for Panther & Ukonom

L. Fire suppression damages repaired with suppression funds:
1. Fireline waterbarred (miles): 10 miles dozer line; 61 miles handline
2. Fireline seeded (miles):
3. Other (identify):

M. Watershed number: 18010209030202, 18010209030202, 18010209030203, 18010209030204, 18010209050301, 18010209050302, 18010209050401, 18010209050402, 18010209050403, 18010209050404, 18010209050503, 18010209070101, 18010209070102, 18010210040403, 18010210040403 *18010209030101, 18010209030102, 18010209030103, 18010209030104, 18010209030105, 18010209030201, 18010209030202, 18010209030203*

N. Total acres burned:
NFS acres (~~27 029~~ **37 994**) Other Federal ( ) State ( ) Private (6)

O. Vegetation types: Douglas-fir, canyon live oak, ponderosa pine, tanoak, black oak, madrone, deerbrush, manzanita

P. Dominant soils: Deadwook, Neuns, Kindig, Chaix, Dome, Holland, Chawanakee, Nanny

Q. Geologic types: Granitic rock (diorite), ultramafic rock, along with metavolcanic and metasedimentary rock (including slate-argillite of the Galice Formation), and marble.

R. Miles of stream channels by order or class: perennial: 48, ephemeral: 87; perennial: 19, intermittent: 25

S. Transportation system
Trails: 53 miles; *12.5 miles* Roads: 15 miles; *19 miles*

PART III – WATERSHED CONDITION

A. Burn severity (acres): 11 884 unburned; 7834 (low); 5896 (moderate); 1421 (high)
B. Water-repellent soil (acres): 3000
C. Soil erosion hazard rating (acres): 16 628 (low); 6673 (moderate); 3101 (high); 624 (very high)
D. Erosion potential: 0.2 to 15 tons/acre average = 3.2 tons/acre
E. Sediment potential: 123 cubic yards / square mile

A. Burn severity (acres): 1655 unburned; 1646 (low); 4099 (moderate); 3565 (high)
B. Water-repellent soil (acres): 5000
C. Soil erosion hazard rating (acres): 3301 (low); 1442 (moderate); 3857 (high); 2365 (very high)
D. Erosion potential: 0.2 to 25.6 tons/acre average = 7.4 tons/acre
E. Sediment potential: 1728 cubic yards / square mile

PART IV – HYDROLOGIC DESIGN FACTORS

A. Estimated vegetative recovery period (years):		
B. Design chance of success (%):	60	
C. Equivalent design recurrence interval (years):	5	
D. Design storm duration (h):	6	
E. Design storm magnitude (inches):	3.0	
F. Design flow (cubic feet / second / square mile):	191	*186*
G. Estimated reduction in infiltration (%):	22	*24*
H. Adjusted design flow (cfs per square mile):	245	

PART V – SUMMARY OF ANALYSIS

A. Describe critical values/resources and threats:

The expansion of the Panther Fire into the Elk Creek watershed created a new emergency as follows:

1. *Increase in landslide and debris flow potential, particularly in steep granitic watersheds burned at high and moderate severity. Landslide model runs suggest that landslide sediment production could more than double as a result of the fire in several seventh field tributaries to Elk Creek. The model assumes a 10 year return interval winter storm.*
2. *Increase in surface erosion potential (see soils report);*
3. *Increase in peak flows (see hydrology report);*
4. *Large increase in risk of culvert failure on roads 15N06, 15N03, 16N05, and 15N08A due to debris flows from upstream.*
5. *Increase in risk of sedimentation in Elk Creek above Sulphur Springs Campground. This could adversely affect water quality in Elk Creek, the water supply for the town of Happy Camp, and a prime anadromous*

fishery.

6. *Failure of road fills would deliver sediment directly into Elk Creek, Buckhorn Creek, and Bear Creek.*
7. *Debris flows will threaten a municipal drinking water system that diverts water for Happy Camp, CA near the mouth of Elk Creek at its confluence with Klamath River.*

Watershed response to the wildfire was modeled using the SCS curve number method described in the previous BAER assessment. Watersheds with the highest proportion of high severity burn were modeled in addition to Elk Creek just downstream of the burned sub-watersheds. Buckhorn Creek is a sub-watershed of Elk–Bear Creek 7th -field. Burney Creek is a sub-watershed of Elk–Granite Creek 7th -field. Elk Creek below the confluence of Doolittle Creek is composed of eight 7th-field watersheds affected by the Panther wildfire. Buckhorn Creek was used for the following Hydrologic Design Factors since it has existing culverts on FS road 15N06 with a large proportion of high severity burn.

Burney Creek had the highest modeled increase in peakflow due to the wildfire at 57%, followed by Buckhorn Creek at 31% (see Table 1). Both these watersheds had the largest proportion of high burn severity. Bear Creek and Elk Creek had a 23 and 15% peakflow increase, respectively (see Table 1). The lower peakflow increase in Elk Creek is due to longer distance for peakflow routing and larger watershed area without wildfire. Several face drainages of mainstem Elk Creek in Middle Elk and Stanza–Bishop 7th -field watersheds are expected to have similar peakflow increase as the watersheds shown in Table 1. These face drainages have very steep channel gradients and side slopes (>70%) in deeply weathered and dissected granitic parent material. Field evidence of sediment bulking and debris flow scarps along with historic information indicates that there will be debris flows transported into Elk Creek when rainfall intensities meet or exceed the design storm magnitude.

Table 1. Modeled Peakflow increases using the SCS curve number method

		Peakflow (cfs)		
Watershed Name	***Acres***	***Before Wildfire***	***After Wildfire***	***% Increase***
Buckhorn Creek	*1179*	*343*	*451*	*31*
Bear Creek	*6704*	*2378*	*2923*	*23*
Burney Creek	*2346*	*841*	*1324*	*57*
*Elk Creek**	*40 494*	*14 366*	*16 514*	*15*

**below Doolittle Creek confluence*

Proportion of Riparian Reserves burned by the wildfire was analyzed to address loss in stream temperature buffering and sediment filtering capacity. The buffer widths were based on the KNF Forest Plan. The Elk–Granite Creek 7th-field had nearly 250 out of 650 acres of Riparian Reserves burned at high burn intensity. The Panther Fire burned 965 acres of Riparian Reserve at high intensity.

Miles of burned intermittent and perennial streams indicate how much Riparian Reserves have been totally consumed. Elk–Granite Creek had 9.85 miles of burned intermittent streams. Elk–Bear had 5.39 miles of burned perennial streams. The Panther fire burned over 15 miles of intermittent and over 6 miles of perennial streams at high intensity.

Elk Creek is one of the most important Klamath River tributaries for supporting natural; non-hatchery influenced anadromous salmonid populations and has been designated a Key watershed for conservation of 'at-risk' salmonid stocks under the Northwest Forest Plan. Within the Panther Fire, Elk Creek is the most productive stream for anadromous salmonids, providing many miles of habitat for five distinct runs of salmon and steelhead. Elk Creek supports Southern Oregon–Northern California Coast ESU Coho Salmon (SONCC) (Oncorhynchus kisutch), Upper Klamath–Trinity River (UKTR) fall- and spring-run Chinook salmon (Oncorhynchus tshawytscha), and Klamath Mountains Province (KMP) winter- and summer-run steelhead (Oncorhynchus mykiss). Non-game fish species supported by Elk Creek include: Pacific lamprey, Klamath River lamprey, speckled dace, marbled sculpin, and Klamath largescale sucker.

SONCC coho salmon are listed as threatened species (62 FR 24588 and 70 FR 37160) under the Endangered Species Act*. Critical habitat (64FR24049) for the SONCC coho salmon ESU encompasses accessible reaches of all rivers (including tributaries) between the Mattole River in California and the Elk River in Oregon. The Klamath River and its' tributaries fall within this range. Elk Creek is one of the strongholds for coho salmon in that coho salmon spawn and rear every year in Elk Creek (all three cohorts are represented), the stream provides ~11 miles of habitat for coho salmon, and hundreds to thousands of juvenile coho are produced each*

year. Coho salmon occur in mainstem Elk Creek from the mouth to approximately the vicinity of the confluence with the Lick Creek tributary. The only Elk Creek tributaries that support coho salmon is the lower half-mile of East Fork Elk Creek and the lower few hundred feet of Cougar Creek. The uppermost limit of coho salmon range in mainstem Elk Creek approximately coincides the downstream section of the area of the Elk Creek watershed that burned in the Panther Fire.

The noxious weeds present in or adjacent to the fire perimeters are:

Cytisus scoparius*, Scotch broom – an unconfirmed population is located at the fire edge on Forest Service Rd 15N13;*

Isatis tinctoria*, Dyer's woad – two populations are present within the fire perimeter, ISTI-33 at Norcross Campground and ISTI-53 at Stanza creek near Sulfur Springs Campground.*

Lathyrus latifolius*, Sweet Pea – one population, LALA4-1, can be found at an old homestead site off the trail near Sulfur Springs in the burned area.*

In addition, Centaurea solstitialis*, Yellow star thistle; Centaurea pratensis, Meadow knapweed; and Cytisus scoparius, Scotch broom occur along the road 16N05 going into the fire area. The State of California classification of these species can be found on the Klamath National Forest Noxious weed list.*

No weed washing was conducted prior to suppression and rehabilitation efforts in this area. An emergency exits with respect to the spread of known noxious weeds into the fire perimeters and the possible introduction of new noxious weed species due to lack of weed prevention measures.

There were ~19 miles of road that were within the perimeter of the new burned area of the Panther Fire. Some of these roads, mostly within the Buckhorn drainage of the Elk–Bear watershed, have large fills with small 18 inch culverts draining intermittent drainages. This poses a very real threat of failure in the changed watershed condition. Small drainages or tributaries to Buckhorn Creek experienced severe fire effects and large increases in streamflow are expected. These small culverts are at a great risk of failure, which would compound debris flow impacts to Elk Creek fish habitat. It is expected that an initiation of debris flow events above this road system, if unmitigated, would cause unacceptable impacts to downstream beneficial uses.

Multiple trails (12.5 miles), two trailheads, a campground, and two corrals were burned during this new fire activity. The Norcross Campground was almost entirely consumed and lies in an area that received severe fire effects. Two toilets, two corrals, most of the picnic tables, and many signs were destroyed. Trails lie below severely burned hillsides and trailhead signing is destroyed. Both toilet vaults are now entirely exposed and unsafe to visitors.

The soil resource will experience very high increased erosion within high burn severity areas with a lesser amount in the moderate severity burned areas. Sandy loam soils in the granitic terane have and will experience dry ravel of soil material into intermittent draws. These sandy loam soils in high burn severity areas will also experience water repellency induced soil surface mud flows during storms with moderate to intense rainfall rates. Where high severity burn areas are adjacent to stream channels and inner gorge locations the potential for increased sediment is very high which will increase turbidity within Elk Creek and the Klamath River.

Soils that were burned in the 2002 Stanza Fire have experience another high erosion event. Soil loss was 2 to 3 times the soil formation rate for 2 to 3 years after the Stanza Fire. The Panther Fire soil erosion rate will also have soil loss rates at 2 to 3 times the soil formation rate. There is a high probability that these sandy loam soils have lost site productivity due to excessive soil erosion rates within the prevous 6 years.

Several resource values were assessed including: long-term soil productivity, water quality beneficial uses and associated aquatic habitat for T&E fish species, roads, and culverts were assessed as to their upstream/upslope hazard and associated potential risk from post-wildfire watershed conditions. Field investigations and subsequent analyses/models were used to determine their post-wildfire hazard and associated risk from potential debris flows, flooding, soil erosion and accelerated sedimentation.

A sequential evaluation process assessed the post-fire watershed conditions starting at the hillslopes and moving downslope or down the stream channels to determine potential hazards and associated risks to the various resource values. First the hillslope and stream channel burn severities were identified and mapped. A debris flow initiation and transport map was developed that is based on inherent soil-hydrologic characteristics. Based on the findings of the burn severities, the post-fire watershed stream flows were modeled and combined with the debris flow map to assist with determining the potential hazard and associated risk to the aforementioned resource values. Further field investigations of these resource values were conducted to determine if they were at risk from the post-fire induced hazards.

The soil erosion rates will increase with amounts varying based on burn severity and characteristics of individual landtypes. There are several areas that have an increased hazard of rill and gully erosion, sheet flooding, flash

flooding and debris flows. Erosion rates may reach or exceed soil loss tolerances in the 2 to 8 years following the fire. Unacceptable soil loss is dependent on several factors including burn severity, inherent soil characteristics, steepness of hillslopes, and climatic triggers. Long-term productivity may be negatively affected on steep hillslopes with high burn severities that experience high intensity rainfall from thunderstorms. At a minimum there will be a substantial increase in sedimentation to the drainages within the Panther Fire. There is a direct relationship of higher sedimentation associated with adjacent areas of high burn severities on steep hillslopes. Dry soil ravel has already been extensive on these areas. Sedimentation will increase dramatically depending on increasing rainfall intensities and initiation of debris torrents. In the short-term it is very likely that there will be negative effects to aquatic habitat within the analysis area due to increased sediment delivery from severely burned areas and increased temperatures from a reduction in stream channel shading. In the long-term, effects will be largely dependant on the climatic triggers and the spatial coverage of these storms that may occur over the next 3 to 5 years.

Fisheries – Southern Oregon–Northern California Coast ESU Coho Salmon (SONCC) (*Oncorhynchus kisutch*) are listed as threatened species (62 FR 24588 and 70 FR 37160) under the *Endangered Species Act*. Critical habitat (64FR24049) for the SONCC coho salmon ESU encompasses accessible reaches of all rivers (including tributaries) between the Mattole River in California and the Elk River in Oregon. The Klamath River and it tributaries fall within this range.

California Department of Fish and Game has subdivided each coho salmon ESU into watershed recovery units (recovery units). The recovery units are groups of smaller drainages related hydrologically, geologically, and ecologically, and that are thought to constitute unique and important components of the ESU. The Panther Fire occurs in the Ukonom hydrologic subarea (HSA). There is limited use of streams within the Ukonom HAS by coho that were burned in the Panther Fire. Coho have been occasionally found in the summer in low densities in lower gradient, more accessible reaches in Independence, King, and Ukonom Creeks. Coho use lower tributaries to likely escape high water temperatures in the Klamath River that can often exceed 80°F in some summers and cause occasional fish kills.

Summer steelhead (*Oncorhynchus mykiss*) is a sensitive species on both the Klamath and Six Rivers National Forest. This means these species must be managed to contribute to healthy, viable populations. Several other runs (e.g. winter, fall) of steelhead that are not sensitive also occur within tributaries or downstream of each fire. Fall and spring-run steelhead are the most widely distributed anadromous fish species within the subbasin, often occupying small tributaries and steeper gradient channels not commonly utilized by coho and chinook.

Within the Panther Fire winter and summer steelhead have been found in more accessible reaches in Independence, King, and Ukonom Creeks. Independence Creek provides the most habitat for winter steelhead (2.8 miles), followed by King Creek (1.7 miles) for winter steelhead, and Ukonom (0.72 miles) for summer steelhead.

Spring Chinook (*Oncorhynchus tshawytscha*) are sensitive species on both the Klamath and Six Rivers National Forest. This means these species must be managed to contribute to healthy, viable populations. Essential Fish Habitat (EFH) has been designated for spring and fall-run Chinook salmon under the Magnuson-Stevens Act. The act requires measures to conserve and enhance the habitat needed by fish to carry out their life cycles. Congress defined EFH as 'those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.' Within the Panther Fire fall-run chinook have only been found in the lower portion of Independence Creek.

The North Coast Regional Water Quality Control Board is in the process of developing total maximum daily loads (TMDLs) for the Klamath River in California. The Klamath River and their tributaries are listed on 303(d) for nutrients organic enrichment, dissolved oxygen, and water temperature.

The Klamath River beneficial uses that are impaired include: Cold Freshwater Habitat (COLD), Rare, Threatened, or Endangered Species (RARE), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, or Early Development (SPWN), Native American Culture (CUL).

The CUL beneficial use covers 'uses of water that support the cultural or traditional rights of indigenous people such as subsistence fishing and shellfish gathering, basket weaving and jewelry material collection, navigation to traditional ceremonial locations, and ceremonial uses. The CUL beneficial use in the Klamath River in California is currently impaired due to the decline of salmonid populations and degraded water quality resulting in changes to or the elimination of ceremonies and ceremonial practices and risk of exposure to degraded water quality conditions during ceremonial bathing and traditional daily activities.

Subsistence fishing (FISH) is also listed in the Basin Plan as a beneficial use of the waters in the region. Although, the specific areas in which this use exists has not yet been designated in the Basin Plan, this does not alter the need to protect this existing beneficial use. The FISH beneficial use is currently impaired in the Klamath River basin in California due to the decline of salmonid populations and other Tribal Trust fish populations resulting in decreased use, abundance, and value of subsistence fishing locations, altered diet and associated physical and mental health issues, and increased poverty.

Engineering – The reconnaissance of the roads during the field investigations found several issues pertaining to emergency stabilization. The issues associated with the findings requiring emergency stabilization included burned warning signs, burnt bridge, and road drainage problems (i.e. plugged culverts, filled in catchment basins and ditches, ruts in the road, etc.). The result of these field investigations identified threats to public safety and deterioration of water quality through possible road failures.

Most of the issues are typical of what is found on or above roads within the burned areas. These issues pertaining to most of the roads are a result of the roads template and location. To further elaborate, the roads template are constructed on steep mountain terrain which crosses steep side 'V' channels. Roads that are not maintained eventually have their catchment basins and ditches filled in from sediment that is washed down from normal storm events and spring runoff. The 'V' shape channels contain channel bottoms and side slopes with grades ranging 50º to 75º. These steep grades are able to deliver high erosive runoffs which can carry large amounts of sediment and debris in a short time span. With the landscape now burned, the runoff flows will be greater in intensity and more debris is available for transport above these crossings.

Noxious weeds – The fire has created suitable habitat for the spread of noxious weeds. While weed washing was required of vehicles used for fire suppression and rehabilitation, information on weed washing during the initial attack phase of the fire is unknown. Vehicles could have come from weed infested areas and weeds introduced through mud and debris. Water tenders used during the fire may have used drafting sites that contained weeds. Seeds may have been carried to the road system via water tenders. Monitoring will reduce the potential for establishment of new noxious weed sites.

B. Emergency treatment objectives:

The primary objectives of the Klamath Theater Burned Area Emergency Stabilization Plan were:

- To insure the BAER team's personal safety and provide for public safety during our assignment
- To coordinate with the NRCS, State, and County on private lands, if appropriate
- To assess the risk to human life and property or natural or cultural resources from impaired watershed conditions and to recommend appropriate stabilization actions to protect the following values:
    - Roads
        - All major or minor routes as identified
    - Administrative sites
    - Fish
        - Listed Coho, Spring & Fall Chinook, and Summer Steelhead
    - Water quality
        - TMDL
        - Nutrients
        - Essential fish habitat
    - Increased infestations of noxious weeds

The BAER assessment evaluated the above objectives for possible mitigation using an array of treatment options or actions allowable by Department of Agriculture (USDA) policy. A list of issues specific to the Panther Fire is listed below. Treatments will be designed specifically to mitigate the following list of issues:

- An increased threat to roads, culverts, and a bridge because of higher runoff and the likelihood that these facilities will plug, overtop, or wash away.
- Increase erosion and sediment delivery associated after fires will occur along the hillslopes and increase the likely hood for potential landslides. Especially in the areas containing erodible granitics.

- An increase to the streams TMDL's due to the increased sediment delivery and reduced upstream shade as a result of the increased runoff and loss of vegetation on the hillslopes. These increases will impact the fish habitat residing in the streams within and below the fire perimeter.
- The loss of vegetation increases the potential for introducing weeds.

C. Probability of completing treatment prior to damaging storm or event:

Land **70** % Channel **NA** % Roads/trails **70** % Protection/safety **90** %

D. Probability of treatment success

	Years after treatment		
	1	3	5
Land	*70*	*80*	*NA*
Channel	*70*	*70*	*70*
Roads/trails	*80*	*75*	*60*
Protection/safety	100	90	70

Note: The Panther Fire – October Addendum created a unique risk to downstream values based on compounding threats. A large portion of the Elk Creek watershed burned with moderate and high severity putting a very important fishery and downstream municipal drinking water system at risk. However, much of the area that burned is either in wilderness or is unroaded. The portion of the burned area that is roaded includes the Elk/Bear watershed. These roads were installed at very steep grades (>7%) and straightened using large fills across intermittent channels. Many of these intermittent stream crossings have small, 18 inch culverts installed at the bottom of each fill. Our assessment of cost/risk involves the following rationale:
It is necessary to temporarily control road drainage during the next three years due to the expected increase in flow and debris as a result of the fire. The temporary control would include culvert risers and other treatments, but due to the gradient of the road, it is near impossible to also install rolling dips to control flow over the fill in the case of a plugged riser/culvert. Therefore, the diversion potential remains high. Another compounding factor in considering treatments was storm patrols. Storm patrols are considered unsafe on this road system immediately following rainstorms because of slippery conditions on such a steeply graded road. Therefore, it is expected that storm patrols would have to provide enough time (at least a week) after large rainstorm events to allow the road to dry and ensure safety of personnel and contractors.
These channels draining to the road were burned at moderate and high severity and high intensity leaving very little standing vegetation. It is assumed for other, unroaded portions of the watershed, that it is not necessary to complete hillslope treatments to protect fisheries habitat. The potential for unmeasureably large debris flows because of fill failure warrants treatment of hillslopes to reduce the threat. While unmeasureable, field observation indicated that the fills are large enough to cause at least a doubling effect to scouring debris flows from the intermittent drainages upslope of the road system. This doubling effect would cause unacceptable degradation to fisheries habitat, damage municipal drinking water collection systems, and potentially threaten downstream private property.
The loss of the fills is unacceptable and catastrophic to the road, fishery, life and property, and municipal water system. This risk of fill loss is extremely high due to the small culverts and high probability of storm events that would threaten these small culverts/risers. The road treatment alone is estimated to be effective, unless clogged. In-channel tree felling is proposed to reduce delivery of large debris that would damage or clog the culvert inlet/riser. The aerial mulching treatment would reduce the volume of sediment delivered to the culvert inlet. This reduction of sediment volume would maintain the inlet catch basin capacity for a longer period of time and therefore allow for safe access following storms, even if the storm patrols cannot safely enter the road system until a week or more later.

E. Cost of no-action (including loss): **$1 832 475**

The values at risk directly lost through No-Action includes: damage to fish and their habitat below roads, loss of soil productivity (as impacted by noxious weed potential), impact of ground water quality below roads, impacts to system roads due to changed hydrologic conditions.

F. Cost of selected alternative (including loss): **$683 660**

It was assumed the primary treatments would be successful in reducing resource values lost through No-Action by 70%. The remaining resource values lost (as a factor of success) were added to the cost of the primary land treatment.

G. Skills represented on burned-area survey team:

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

Team Leader: [redacted]

Email: [redacted] Phone: [redacted] FAX: [redacted]

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.)

Land treatments:

Noxious weed detect and treatment

General description:

Monitor known weed populations and all areas within the perimeter of the Panther fire for weeds introduced or spread during fire suppression or rehabilitation. Dozer line and burn areas adjacent to roads or areas used for fire suppression or rehabilitation activities are high priority sites for monitoring. Treat and map any new or expanded weed populations.

Location (suitable) of sites:

All roads used within the Panther Fire for travel – 54 miles total. Areas used for fire suppression activities including dozerline (10.0 miles), drop points, helispots, spike camps, and staging areas. Scotch Broom, Dyer's Woad, and Star Thistle are present on FS road 14N14. Dyer's Woad is present on FD road 15N17Y (pop. num. 06ISTI-126). Star Thistle is present on FS road 15N10 near junction with 15N17Y. (Calculation of acres assumes 4 acres per mile)

All roads used within the new Panther fire perimeter for travel. Areas used for fire suppression and rehabilitation. Scotch Broom, Dyer's Woad, and Star Thistle are present on FS road 16N05. Scotch Broom has been reported on FS road 15N13 near fire perimeter. Sweet Pea is present at an old homestead site near the Sulfur Springs campground.

Design/construction specifications:

1. Monitoring will occur at multiple times during the growing season to catch both early and late maturing species. It is assumed that this treatment is conducted by personnel on the Klamath National Forest.
2. Monitoring will be conducted by a botanist or a technician under direction of a botanist qualified to identify target species. Weeds of primary concern are Meadow Knapweed, Spotted Knapweed, Yellow Starthistle, Scotch Broom, Dyer's Woad, and French Broom.
3. New population locations will be mapped using a GPS or 1:24 000 quad map and flagged on the ground. NRIS and Klamath survey and treatment forms will be filled out and entered into national database.
4. If new populations are small, plants will be hand dug and bagged for removal at time of discovery. Larger populations will be flagged for later treatment and a request for additional funding will be submitted.

5. Equipment washing for weed prevention is mandatory on all equipment or vehicles that may be harboring soil and debris prior to entering burned area for rehab or any other related activity.

Purpose:

- The fire has created suitable habitat for the spread of noxious weeds. While weed washing was required of vehicles used for fire suppression and rehabilitation, information on weed washing during the initial attack phase of the fire is unknown. Vehicles could have come from weed infested areas and weeds introduced through mud and debris.
- Water tenders used during the fire may have used drafting sites that contained weeds. Seeds may have been carried to the road system via water tenders.
- Monitoring will reduce the potential for establishment of new noxious weed sites.

Aerial mulch

General description:

Apply agricultural straw mulch to the ground surface by helicopter (and spread with hand crews as necessary) to achieve a continuous cover of uniform thickness, as specified below, to replace ground cover consumed by the fire. Ground cover is needed to maintain soil moisture, accelerate recovery of native vegetation, and to protect any seed remaining onsite. In addition, the organic mulch will protect soil from solar heating and drying, thereby improving the ability of seeds to germinate.

Location (suitable) of sites:

The treatment unit totals 908 acres that contains ~681 acres of treatable hillslopes. The location of this treatment is in drainages above roads and road crossings in the Buckhorn, Stanza, and Elk Creek watersheds. Refer to BAER Treatment Map for exact locations.

Design/construction specifications:

1. *Treat areas in designated units with 'High' and 'Moderate' soil burn severity that are less than 70% slope. Do not treat areas that have needles in trees, exposed rock outcrops, or slopes greater than 70%.*
2. *Straw application rate: Apply mulch to achieve a continuous cover of uniform thickness over 70% of treatment area at a depth of less than 2.0 inches. Application rate will be ~1.0 ton/acre (2000 pounds). This is ~0.25 inches or 3 straw shafts deep. Aerial application may not achieve desired ground cover, therefore ground crews will likely be needed to spread straw clumps by hand in select locations in each treatment unit.*
3. *Straw must conform to State Department of Agriculture (SDA), Certified Noxious Weed Free Standards for Noxious Weed Free Forage and Straw (NWFFS). All straw provided will have been planted, and harvested during the 2008 growing season. Straw shaft length will not exceed 12 inches. Suitable straw includes barley, rice, and wheat grasses.*
4. *The straw must be applied dry (less than 12% internal moisture content) to ensure proper dispersal during aerial applications. The Forest Service will randomly test bales using a moisture probe.*

Purpose:

This treatment is intended to achieve three sequential objectives:

1. *Improve conditions to protect soil productivity by replacing ground cover burned in the fire. Replacing ground cover will: a) decrease erosion by interrupting raindrop impact and surface soil detachment; and b) increase hillslope obstructions to decrease slope lengths which mitigate accelerated overland flow, thereby decreasing sediment delivery, and c) reduce the potential for soil repellency induced soil surface mudflows. Mulching also helps to protect the native seedbed and retain moisture on the burned slopes to facilitate vegetative recovery of the treatment areas.*
2. *Decrease overland flow and erosion from high soil burn severity areas upslope of roads, which can intercept surface runoff and result in damage or loss of the road infrastructure.*
3. *Decrease sedimentation from burned areas and roads upslope of streams that provide important spawning and rearing habitat for federally listed aquatic species.*

The mulching treatments are predicted to lower the estimated soil erosion and subsequent sediment delivery to the streams by ~75%. Mulching will also reduce downstream peak flows by absorbing and slowly releasing overland runoff which is likely to be increased due to reduced soil cover and hydrophobic soil conditions. Mulching treatments in the headwaters of the streams can protect a much larger

downstream area from cumulative runoff and sedimentation.
The purpose of the mulching treatment is to reduce the delivery of sediment from severely burned hillslopes to avoid sediment bulking of flows entering road culverts and causing failures that would then directly deliver to Elk Creek. Due to the large fillslope size and inadequate culvert size, any excess debris or surface erosion is likely to clog culverts resulting in fillslope failure and related channel scour below the roads. Elk Creek is one of the most important Klamath River tributaries for supporting natural; non-hatchery influenced anadromous salmonid populations and has been designated a Key watershed for conservation of 'at-risk' salmonid stocks under the Northwest Forest Plan. Within the Panther Fire, Elk Creek is the most productive stream for anadromous salmonids, providing many miles of habitat for five distinct runs of salmon and steelhead. Elk Creek supports threatened Southern Oregon/Northern California Coast ESU Coho Salmon (SONCC) (Oncorhynchus kisutch), Upper Klamath/Trinity River (UKTR) fall- and spring-run Chinook salmon (Oncorhynchus tshawytscha), and Klamath Mountains Province (KMP) winter- and summer-run steelhead (Oncorhynchus mykiss).
The mulching treatments were determined to be the minimum necessary to prevent unacceptable loss of occupied critical habitat in Elk Creek, as defined in FSM 2523.2.2.C. Based on pre-fire monitoring data, the Oregon/Northern California Coast ESU Coho Salmon occupy Elk Creek from its mouth to just below Lick Creek, which is just downstream of the burned area. Elk Creek provides critical spawning and rearing habitat all three cohorts of SONCC.

Spot mulch & erosion control

General description:
Apply agricultural straw mulch to the ground surface by hand or helicopter (and spread with hand crews as necessary) to achieve a continuous cover of uniform thickness, as specified below, to replace ground cover consumed by the fire. Ground cover is needed to maintain soil moisture, accelerate recovery of native vegetation, and to protect any seed remaining onsite. In addition, the organic mulch will protect soil from solar heating and drying, thereby improving the ability of seeds to germinate. This treatment will protect loss of important cultural sites.
Location (suitable) of sites:
The treatment unit totals 2 acres as determined and delineated by the Forest Service Archeologist. The location of this treatment is just upslope and east of Norcross campground. Refer to BAER Treatment Map for exact locations.
Design/construction specifications:
1. *Apply mulch to achieve a continuous cover of uniform thickness over 70% of treatment area at a depth of less than 2.0 inches. Application rate will be ~1.0 ton/acre (2000 pounds). This is ~0.25 inches or 3 straw shafts deep. Aerial application may not achieve desired ground cover, therefore ground crews will likely be needed to spread straw clumps by hand in select locations in each treatment unit.*
2. *Straw must conform to State Department of Agriculture (SDA), Certified Noxious Weed Free Standards for Noxious Weed Free Forage and Straw (NWFFS). All straw provided will have been planted, and harvested during the 2008 growing season. Straw shaft length will not exceed 12 inches. Suitable straw includes barley, rice, and wheat grasses.*
3. *The straw must be applied dry (less than 12% internal moisture content) to ensure proper dispersal during aerial applications. The Forest Service will randomly test bales using a moisture probe.*
4. *Wattles must be placed on the slope just above the area end to end. Each wattle should be 'smiled' with the ends slightly higher then the center. The entire wattle must be placed perpendicular to slope and leveled except for the ends. Each wattle must have 5 stakes driven through the center and evenly spaced out to the ends. The wattles should also be made to be flush with the soil surface, even if you must scrape the soil surface to fill in gaps.*

Purpose:
This treatment is intended to achieve three sequential objectives:
1. *Improve conditions to protect soil productivity by replacing ground cover burned in the fire. Replacing ground cover will: (a) decrease erosion by interrupting raindrop impact and surface soil detachment and (b) increase hillslope obstructions to decrease slope lengths which*

mitigate accelerated overland flow, thereby decreasing sediment delivery. Mulching also helps to protect the native seedbed and retain moisture on the burned slopes to facilitate vegetative recovery of the treatment areas.

2. *Decrease overland flow and erosion from high soil burn severity areas upslope of resources to protect, which can prevent damage or loss of the resource.*
3. *Decrease sedimentation from burned areas upslope of cultural sites.*

The mulching treatments are predicted to lower the estimated soil erosion and subsequent sediment delivery to the streams by ~75%.

Channel treatments:

In-channel tree felling

General description:

In-channel tree felling is prescribed to maintain channel stability and provide fish habitat. In-channel tree felling replaces woody material consumed by the fire. It also is used to treat steep drainages to reduce the risk of in-channel debris flow bulking for several years after a fire (Fitzgerald, unpublished paper).

In-channel tree felling involves directionally felling trees upstream so the tops of the trees are in the channel. The trees are felled at a diagonal along designated channel reaches. The trees are staggered from side to side along the stream in a herringbone design (Ruby, unpublished paper; Fitzgerald, unpublished paper).

Location (suitable) of sites:

This treatment totals ~30 000 feet of 0- to 1st-order channels located above road drainage features on the 15N03 and 15N06 roads. The location of this treatment is in drainages above roads and road crossings in the Buckhorn, Stanza, and Elk Creek watersheds. Refer to BAER Treatment Map for exact locations.

1. *Treat areas in designated drainages with 'High' and 'Moderate' soil burn severity where woody material has been consumed.*
2. *Channels where energy dissipation is necessary.*
3. *Channels with high values at risk such as road crossings or sensitive aquatic species.*
4. *Channels with unstable bedload and high sediment-loading potential.*

Design/construction specifications:

1. *Locate in channels with upslope watersheds no larger than 200 acres in size that have debris and floatable material that would accumulate and clog downstream culvert inlets. Refer to treatment map for specific locations.*
2. *Channels should be burned at moderate to high severity/intensity.*
3. *Use trees large enough to hold the expected runoff and debris load. Fall trees that are 12 inch diameter or greater at an angle from hillslope to channel, pointing upstream. Angle may vary between 15 degrees and 45 degrees depending on available trees and sideslope gradients.*
4. *Leave felled trees in one piece with the top attached. If necessary, slash the tree halfway through from underside to aid in the tree laying more flush to the ground surface. Slash cuts should not be distances any less than 25 feet apart.*
5. *Space 2 trees per 50 to 100 feet of channel, with 1 tree on each side of the channel for ~106 to 212 trees per mile.*
6. *Fell two trees from each side of the channel on top of each other to improve stability. The upper 1/3 of each tree should be in the channel and slightly on the opposite bank then the butt of the tree. The butt of each tree should be 'locked' from rolling down the hillslope by another standing tree just downslope.*
7. *Fell trees such that the top quarter to half of the tree is within the high-water level for that channel (Ruby, unpublished paper).*
8. *Fell the second tree just upstream from the first tree from the opposite bank or hillslope so that they cross in the upper 1/3 of their length.*

Purpose:

In-channel tree felling traps floatable debris and suspended sediment. Over time, woody material can

cause sediment deposition and channel aggradation. For seasonal channels the in-channel trees serve as dams to stabilize existing prefire bed material and to trap and store post fire sediment in the short term, while providing long-term channel stability (Fitzgerald, unpublished paper). In-channel tree felling reduces effects to critical natural resources (sensitive aquatic species) or downstream values (water quality and or road crossings) by restoring large woody debris to the channel and dissipating stream energy.

The ultimate purpose of the in-channel felling treatment is to reduce the delivery of debris from severely burned hillslopes to road culvert entrances to reduce risk of road fill failure and direct delivery to Elk Creek. Due to the large road fill size and inadequate culvert size, any excess debris or surface erosion is likely to clog culverts resulting in fillslope failure and related channel scour below the roads. Elk Creek is one of the most important Klamath River tributaries for supporting natural; non-hatchery influenced anadromous salmonid populations and has been designated a Key watershed for conservation of 'at-risk' salmonid stocks under the Northwest Forest Plan. Within the Panther Fire, Elk Creek is the most productive stream for anadromous salmonids, providing many miles of habitat for five distinct runs of salmon and steelhead. Elk Creek supports threatened Southern Oregon/Northern California Coast ESU Coho Salmon (SONCC), Upper Klamath/Trinity River (UKTR) fall- and spring-run Chinook salmon, and Klamath Mountains Province (KMP) winter- and summer-run steelhead.

Roads and trail treatments:

Road drainage reconstruction

General description:

The roads surveyed within the Panther fire were found to have issues with their drainage system due to the expected increase in flows. The minimal treatments required to remedy these issues are:

1. Drain dips (with or without armor) – Roadway dips modify the road drainage by altering the template and allowing surface flows to run off the road to prevent any excessive erosion of the surface. The armor consisting of rip rap is placed where runoff could possibly cause erosion to the road surface and fillslope.
2. Culvert cleaning – Includes the cleanout of catch basin culvert inlets, outlets, and the drop inlets. Also included is the replacement of lids covering the drop inlets. Cleaning culvert pipes and replacing the missing and damaged lids over the drop inlets will enable the drainage system to pass flows more intended design flow and reduce the chance of plugging.
3. Culvert repair – Using mechanical means to open up culverts to improve flow or cutting off sections too damaged to repair. This will improve culvert flow and reduce the chance of plugging.
4. Catch basin expansion – Expanding existing catch basins in size and remove debris in the channel above the inlet. The expanded catch basins will handle more sediment and removing debris will reduce the chance of the culvert plugging.
5. *Install slotted risers – Install slotted risers on the inlets of culverts to allow the culvert to pass water as the catch basin fills with sediment.* ~~Fill size reduction – Reduce the fill volume over undersized culverts and construct a channel over the culvert. The channel will normally have rip rap to protect the remaining fill. This keeps the flow and sediment in the channel and reduces road related sediment and total fill failure.~~
6. Fill slope protection – Place geotextile and rip rap on fill slopes where water flow over the fill is expected. This will reduce erosion and sediment delivery down stream.
7. Ditch cleaning – The cleanout of drainage ditches is required to remove debris that impede the flow or deflect it out of the ditch onto the road surface. Clean ditches will ensure that the flow reaches drainage structures.
8. *Grading roadway – Removing wheel ruts in the road surface, re-establishing the road cross slope, out slope or in slope to ensure the flow goes into a drainage structure or is allowed to sheet off outside edge of the road without concentrating the water. This reduces road related sediment.* ~~Roadway slope improvement – Out sloping or in sloping the road surface to ensure the flow goes into a drainage structure or is allowed to sheet off outside edge of the road without concentrating the water. This reduces road related sediment~~.
9. Culvert additions – Add additional culverts to drainage fills or upsize the existing culvert where

the expected increased flow is more than the existing culvert can handle. Reduces the chance of fill failure and associated sediment delivery down stream. Also allows replacement of fire damaged pipes and down drains to maintain existing drainage capacity and flow dissipation.

Location (suitable) of sites:

The treatments listed next to each road identified below are those treatments found during the initial survey and are not all inclusive to these sites. Also, additional roads within the fire perimeter still need to be assessed for any additional drainage issues. These additional roads shall be treated to eliminate the drainage concerns found during the survey.

ROADS

- 15N06
  - Grade roadway: 5.8 miles
  - Ditch cleaning: 5.8 miles
  - Clean catch basin: 52 each
  - Install slotted riser: 12 each
  - Fill slope protection: 25 cubic yards
- 15N03
  - Clean catch basin: 25 each
  - Install slotted riser: 2 each
  - Fill slope protection: 40 cubic yards
  - Culvert addition: 10 linear feet
- 16N05
  - Grade roadway: 2 Miles
  - Ditch cleaning: 2 Miles
  - Drain dips: 1 Each
  - Culvert cleaning: 12 each
  - Fill slope protection: 44 cubic yards
- 15N75
  - Ditch cleaning: 1 mile
  - Grade roadway: 1 mile
  - Culvert cleaning: 5 each
- 15N08A
  - Clean culverts: 8 each

Design/construction specifications:

1. Drain dips (with or without armor) – Construct rolling dips per Forest Service standards. Place rip rap across the roadway and on the fill slopes where potential runoff can occur if flow was to overtop the roadway from a plugged culvert or excessive runoff.
2. Overside drains – Install overside drains onto existing culverts that are extended out from the fillslope over steep grades. Place rip rap below the drain outlet to dissipate the energy from the flow. Overside drains may consist of drain pipe that lays flat along when no storm water is flowing through the pipe.
3. Ditch cleaning – All catchment-basins and drain ditches along the length of the roads shall have all existing silt and debris removed and either hauled away or spread out such that the material can not reenter the drainage structure during a runoff event.
4. Culvert removal/replacement – Removing and replacing culvert consists of removing the culvert and replacing it with an equal or larger culvert that is capable of handling the predicted increase flows.
5. *Grading roadway – Use a motor grader to grade the roadway in accortance with Forest Service road matinenace specifications. Removing ruts, berms, rocks and debris from the road surface and maintain road surfacing material.* ~~Roadway slope improvement – Outsloping and insloping typically 3% to 5%.~~
6. Culvert Repair – Replace the damaged inlet or outlet sections of pipe or cutoff the damaged end sections without compromising the pipes designed functionality . Pipe requiring cutting may require a cutting torch or an abrasive cutting wheel.

7. *Install slotted riser – Place a 36-inch diameter slotted riser on the inlet of culverts per Forest Service standards to allow the culvert to pass water as the catch basin fills with sediment.*

Purpose:

The purpose of this road treatment is to protect road infrastructure and minimize sediment delivery. The treatment measures proposed will help prevent unacceptable erosion, and minimize degradation to water quality, T&E anadramous fish habitat, and spawning habitat. These watersheds contain FS Sensitive steelhead and Chinook, essential fish habitat for Chinook, and Federally Threatened Coho and their critical habitat.

Protection/safety treatments:

Road burned area warning signs

General description:

This treatment is for the installation of burned area warning signs. Burned area signs consist of a warning to the public identifying of the possible dangers associated with a burned area. It shall contain language specifying of items to be aware of when entering a burn area such as falling trees and limbs, rolling rocks, and flash floods.

Location (suitable) of sites:

Burned area signs – These signs shall be installed at all entries into the fire perimeter. The location of these signs shall be along roads. All signs will be placed facing the direction of travel entering the burn area. The locations of these signs are listed below:

- Elk Creek Road at the 5 mile gate
- Norcross Trailhead
- Sulphur Springs Trailhead
- Johnsons Hunting Ground Trailhead

Design/construction specifications:

- Burned area warning signs along the roads shall measure, at a minimum, 4 feet by 4 feet and consist of 0.08' aluminum, sheeted in high intensity orange with black letters. The BURNED AREA lettering shall be a minimum of 5 inches in height and all remaining lettering, indicating the hazards, shall be a minimum of 3.5 inches in height.
- Ensure maximum visibility and readability of signs warning visitors of the hazards to human life and safety that exist in burned areas.

Purpose:

The purpose of the burned area signs is to warn the public of potential hazards resulting from the effects of the fire, such as rolling rocks, falling trees, road washouts, and flash floods.

Patrols for storm induced runoff

General description:

Roads within the Klamath Theater contain drainage structures that cross streams located in watersheds that have a high to moderate burn severity. These streams now have the potential for increased runoff and debris flows. These increases in flows pose a threat to the existing crossings which may result in plugging culverts or exceeding their maximum flow capacity. If these flows plug drainage structures the result could be massive erosion and debris torrents further down the drainage due to the failure of the fill slope. Also, there is an immediate and future threat to travelers along these roads within the burned area due to the increased potential for rolling and falling rock from burned slopes and increased potential for flash floods and mudflows. With the loss of vegetation normal storm frequencies and magnitudes can more easily initiate rill and gully erosion on the slopes and it is likely that this runoff will cover the roads or cause washouts. These events make for hazardous access along steep slopes and put the safety of users at risk. The patrols are used to identify those road problems such as plugged culverts and washed out roads and to clear, clean, or block those roads that are or have received damage. The storm patrollers shall have access to at least a backhoe and dump truck that can be used when a drainage culvert is plugged or soon to be plugged and to repair any road receiving severe surface erosion.

Location (suitable) of sites:

The patrols should focus on, but not be limited to, the following roads: 16N05, 15N06, 15N03, 15N03A, 15N75, 15N08A. Additional roads within the fire perimieter may be added if a concern for drainage issues occurs.

The patrols should focus on, but not be limited to, the following roads: 13N05, 14N01, 14N01B, 14N05, 15N07, 15N17, 15N17Y. Additional roads within the fire perimieter may be added if a concern for drainage issues occurs.

Design/construction specifications:

1. FS personnel will identify and direct the work. Immediately upon receiving heavy rain and Spring snowmelt the FS will send out patrols to the roads identified in section 'B' to identify road hazard conditions – obstructions such as rocks, sediment, washouts – and plugged culverts so the problems can be corrected before they worsen or jeopardize motor vehicle users. **Note:** Access for storm patrols may be restricted due to snow or Port Orford Cedar concerns.
2. Authorized Forest Service personnel shall bring in equipment necessary to mechanically remove any obstructions from the roads and culvert inlets and catch basins where necessary.
3. All excess material and debris removed from the drainage system shall be placed outside of bank-full channel where it cannot re-enter stream channels.

Purpose:

The purpose of the monitoring is to evaluate the condition of roads for motorized access and to identify and implement additional work needed to maintain or repair damage to road surfaces and flow conveyance structures across roads. These patrols are needed to provide safe access across FS lands and minimize deterioration of water quality due to road failures. Engineering and District personnel will survey the roads within the fire perimeter after high-intensity summer thunderstorms and high intensity winter rains in 2009, 2010 and 2011 and Spring 2009 and 2010 snow-melt. Survey will inspect road surface condition, ditch erosion, and culverts/inlet basins for capacity to accommodate runoff flows.

Norcross safety mitigation

General description:

Norcross Trailhead and Campground burned at high intensity -- none of the facilities remain in functioning condition. The corrals have burned at the bottoms and are unstable, debris from the toilet buildings, including nails, and partially burned picnic tables still remain, presenting a safety hazard. This project would fund a crew to remove remaining corrals and burned debris

The two toilet buildings burned to the ground leaving the underground 750 gallon vaults exposed. This project would pump, fill and crush the vaults.

Location (suitable) of sites:

Norcross Trailhead and Campground was a six site campground with corrals, 2 toilet buildings, picnic tables, fire rings and a water system. It is a popular entry point into the Marble Mountain Wilderness.

Design/construction specifications:

Replacement of permanent structures is not part of this treatment. The project would remove the burned remains of campground facilities including: corrals, picnic tables and toilet buildings. Material would be hauled to the district compound in Happy Camp.

Replacement of permanent structures is not part of this treatment. The project would decommission two toilet vaults, according to county standards:

1. pump vaults
2. fill with rock or sand
3. crush and bury the vaults

Purpose:

Corrals remain standing but posts are burned at the bottom, making them unstable. This could present a safety hazard for anyone leaning on the posts or children playing on or swinging on the posts.

The toilet buildings almost entirely burned – nails and roofing material remain and present a safety hazard for tripping or puncture wounds.

Picnic tables partially burned and are unstable – in this condition they could collapse and present a hazard to anyone trying to use them.

Toilet vaults, filled with human waste, that were left exposed after the structures burned could impact water quality and human safety if they are left untreated.
Norcross Campground is adjacent to Elk Creek, which is a key watershed under the Northwest Forest Plan and is the municipal watershed for the town of Happy Camp. Elk Creek provides habitat for Threatened coho salmon, Sensitive Chinook salmon, and Sensitive steelhead trout. If the vaults are left exposed, they will overflow with winter precipitation, bringing human waste to the surface and potentially into the creek.
The exposed vaults also pose a safety hazard. Open vaults, ~750 gallons, each present a significant hazard for falling into the vault.

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

			NFS lands				Other lands			All
Line items	**Units**	**Unit cost**	**# of units**	**BAER $**	**Other $**	**# of units**	**Fed $**	**# of Units**	**Non-Fed $**	**Total $**
A. Land treatments										
Noxious weed detect & treat	Acres	38	96	$3648	$0		$0		$0	$3648
Aerial mulch	Acres	1214	681	$826 734	$0		$0		$0	$826 734
Spot mulch & erosion control	Acres	1955	2	$3910	$0		$0		$0	$3910
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal land treatments				$834 292	$0		$0		$0	$834 292
B. Channel treatments										
In-channel tree felling	Site	150	293.85	$44 078	$0		$0		$0	$44 078
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal channel treat.				$44 078	$0		$0		$0	$44 078
C. Road and trails										
Road drainage reconstruction	Miles	4661	16	$74 576	$0		$0		$0	$74 576
Storm patrols	Days	4198	5	$20 990	$0		$0		$0	$20 990
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal road & trails				$95 566	$0		$0		$0	$95 566
D. Protection/safety										
Road warning signs	Each	643	5	$3215	$0		$0		$0	$3215
Norcross Safety Mitigation	Each	12526	1	$12 526	$0		$0		$0	$12 526
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal structures				$15 741	$0		$0		$0	$15 741
E. BAER evaluation	Days	1750	5	$8750						
				---			$0		$0	$0
Insert new items above this line!				---	$0		$0		$0	$0
Subtotal evaluation				---	$0		$0		$0	$0
F. Monitoring										
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal MONITORING				$0	$0		$0		$0	$0

			NFS lands				Other lands			All
Line items	**Units**	**Unit cost**	**# of units**	**BAER $**	**Other $**	**# of units**	**Fed $**	**# of Units**	**Non-Fed $**	**Total $**
G. Totals				$989 677	$0		**$0**		**$0**	**$989 677**
Previously approved				$130 020						
Total for this request				**$859 657**						

PART VII – APPROVALS

/s/ [redacted]
Forest Supervisor (signature)

Oct. 15, 2008
Date

/s/ [redacted]
Regional Forester (signature)

10/20/2008
Date