Executive Summary: Jesusita Fire BAER Initial Assessment

The Jesusita Fire started on May 5, 2009, and was contained on May 19, 2009. The fire burned approximately 8,741 acres within Santa Barbara County, of which 2,025 acres (23%) is National Forest System (NFS) lands, and the remainder is Bureau of Reclamation land and private land. The initial Burned Area Emergency Response Assessment has been completed and addressed all National Forest System lands within the burned area.

A high percent (78%, 6,800 acres) of the burn area was rated as moderate (44%, 3,802 acres) or high (34%, 2,998 acres) burn severity, with 22% (1941 acres) rated as low burn severity or unburned. The fire completely burned off all effective cover on the majority of the burned area with the exception of some of the riparian areas in the bottom of the larger drainages. While soil burn severity was largely moderate, watershed response to precipitation events is expected to be high over nearly all of the fire area due to loss of cover on steep slopes. The potential for increased flows leading to flooding and debris flows is high to very high. Runoff and sediment yield is expected to increase substantially in the first three years. Vegetation is expected to re-sprout in the majority of the burned area, with effective cover re-established within 3-5 years.

Within and downstream of the fire perimeter there are multiple high value resources at risk from damage as a result of potential post-fire watershed responses. Some of these values include residences, businesss, schools, a hospital and other medical facilities, orchards, other facilities, and associated infrastructure in the City of Goleta (San Antonio Creek-Atascadero Creek Watershed), the City of Santa Barbara (San Roque Creek-Arroyo Burro Creek Watershed, Mission Creek-Rattlesnake Creek Watershed, Sycamore Creek Watershed), and the City of Montecito (Sycamore Creek Watershed, Cold Spring Canyon Watershed), all within the County of Santa Barbara. State Highways 154 and 192 are immediately adjacent or downstream of the Jesusita fire, while State Highway 101 and one railway are also at potentail risk from post-fire watershed response. There are also several reservoirs, significant cultural resource sites, and important socioeconomic sites such as the Santa Barbara Mission, and Santa Barbara Botanical Gardens. These high value developments all lie within 0 to 4 miles downstream of the burned area. Given the predicted effects of the fire, all of the high value resources listed above are at serious risk for severe consequences should a storm of any significance rain on the burned area within the next three years. Impacts would occur from a combination of increases in flood flows, sediment yield, landslides and debris flows.

The BAER assessment team worked with cooperating agencies through interagency meetings to identify initial concerns and information needs, discuss potential treatment recommendations, and discuss the draft BAER report. These meetings helped the BAER team to identify downstream values at risk, and consider treatment options for NFS lands.

Given the terrain and access limitations, the BAER team identified aerially applied mulch to replace some of the lost cover as the most effective treatment on approximately 160 acres of NFS lands within the Maria Ygnacio Creek Watershed. Recommended treatment areas are on slopes less than 60 percent in moderate to high burn severity above State Highway 154 and several ranch style residences immediately downstream. Other treatments proposed consist of trail stabilization, warning signs, heritage protection signs, and interagency coordination. Additional treatments on NFS lands were evaluated but steep terrain and limited access made these treatments ineffective and unfeasible.

Proposed treatments on NFS lands will help to reduce the impacts of the fire following precipitation events, however, those treatments will not completely mitigate the effects of the fire, nor will they be as effective without additional treatments on private lands within and downstream of the fire perimeter. Given the topography of the burned area and lands downstream, the appropriateness and effectiveness of individual treatments varies by location. Treatments not justified on National Forest Lands should still be evaluated by other agencies for appropriateness on private lands. **Throughout the next 3-5 years it is critical that appropriate agencies maintain due diligence and continue to inform the public of the potential hazards resulting from post-fire watershed response. There is a high likelihood that access for emergency traffic along routes that provide for ingress and egress throughout and downstream of the burn area may become compromised.**

USDA-FOREST SERVICE FS-2500-8
Date of Report: ***August 9, 2009***
Interim #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***
[***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: Jesusita Fire

B. Fire Number: CA-LPF-1479

C. State: CA

D. County: Santa Barbara

E. Region: 5

F. Forest: Los Padres

G. District: Santa Barbara

H. Fire Incident Job Code: P5EV5C

I. Date Fire Started: May 5, 2009

J. Date Fire Contained: May 19, 2009

K. Suppression Cost: $20 million as of 05/18/2009

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): 27 miles
2. Fireline seeded (miles): None to date
3. Other (identify): approximately 26 miles hand line

M. Watershed Number: 6th field HUC: 180600130202 (Mission Canyon); 180600130201 (San Jose Cr)

N. Total Acres Burned: 8,741
NFS Acres (2,025, 23%) Other Federal (97, 1%) State ( ) Private (6,619, 76%)

O. Vegetation Types: Alternating soft and hard chaparral follow bands of faulted and folded sedimentary rock formations across the landscape. Predominately south-facing slopes are dominated by chaparral with oak woodlands and avocado and citrus orchards at lower elevations. Conifers exist in small patches along

ridgetops and on north-facing slopes. Narrow riparian corridors contrast sharply with the otherwise dry landscape.

P. Dominant Soils: Soils in this area are derived from a variety of parent materials. Sandstones and shales are dominate. Old alluvial gravel deposits are found on low ridges in the foothills. Younger alluvium is found in the bottom of drainages. Soil mapping units Rb – Rock Outcrop-Maymen complex, 75-100% slopes;; MbH-Meymen Rock Outcrop complex, 50-75% slopes; LcG – Lodi-Sespe complex 50-75% slopes are the common soil units. Soil textures are keyed to geology, sandy loams and fine sandy loams associated with sandstone and finer textures on the shales.

Q. Geologic Types: The fire area is underlain entirely by sedimentary rock formations, ranging in age from the oldest Eocene (~60 million years old) to younger Miocene (~25 million years old), and overlain by Quaternary alluvial and surficial sediments to present age. The majority of those rock types are of sandstone or shale composition with some conglomerate. Invariably, rock formations mapped as sandstone have thinner interbeds of shale, and formations mapped as shale have relatively thinner interbeds of sandstone. Strata of all the older rock types typically dips (inclines) steeply, usually towards the south or southwest, but sometimes is overturned and dips towards the northeast. Steeply dipping sedimentary rock, predominantly sandstone, crossed by east/west to northwest trending faults.

R. Miles of Stream Channels by Order or Class:

Perennial: 4.7 miles
Intermittent: 29 miles

S. Transportation System

Trails: 11 miles Roads: 0 miles USFS Roads

PART III - WATERSHED CONDITION

A. Burn Severity by total and FS (acres): 1,941 (USFS: 158) (unburned/low) 3,802 (USFS: 908) (moderate) 2,998 (USFS: 959) (high)

B. Water-Repellent Soils: 2,559

C. Soil Erosion Hazard Rating by total and FS (acres):
3090 (low) 2661 (moderate) 1798 (high), 1199 (very high)

D. Erosion Potential: 82 tons/acre

E. Sediment Potential: 53, 039 cubic yards / square mile/1st year

Table 1: Summary of Soil Burn Severity and Sediment Yield to "Pour Point" Watersheds

Analysis Watersheds (appendix A)	Low & Unburned Burn Severity Acres [1] (all lands)	High & Mod Burn Severity Acres [1] (all lands)	Fraction of watershed mod & high	Erosion per acre [2] 1st year (yd3)	Sediment Yield[2] 1st year (ac-ft)	Erosion x backgrd[3]
Atascadero Creek	165.35	101	0.38	39.9	6.6	11.3
Atascadero East	158.63	123	0.44	45.4	8.0	12.9
Cold Spring Canyon	1,896.99	360	0.16	22.7	32.0	6.4

Fire area outside delineated watersheds	19.45	10	0.35	39.0	0.7	11.9
Lauro Canyon	160.20	209	0.57	61.3	14.2	17.4
Maria Ygnacio Creek	3,367.06	400	0.11	13.3	31.3	4.1
Mission Canyon	540.46	1,312	0.71	80.3	93.0	22.7
Rattlesnake Canyon	988.13	1,121	0.53	61.1	80.6	17.3
San Antonio Creek	1,868.00	989	0.35	26.1	46.7	8.0
San Roque Creek	834.09	1,479	0.64	68.8	99.5	19.5
Sycamore Tributary	413.00	47	0.10	16.7	4.8	4.5
Upper Arroyo Burro	219.16	649	0.75	79.8	43.3	22.6

[1] Soil burn severity as mapped by satellite BARC imagery and ground survey
[2] Erosion as modeled by RCS
[3] RCS considers background erosion rates at 10 years post-fire

F. Debris Flow Potential: High to very high in all major drainages.

PART IV - HYDROLOGIC DESIGN FACTORS

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

B. Design Chance of Success, (percent): 80

C. Equivalent Design Recurrence Interval, (years): 5

D. Design Storm Duration, (hours): 6 hour

E. Design Storm Magnitude, (inches): 4.66 inches

F. Design Flow, (cubic feet / second/ square mile): 65

G. Estimated Reduction in Infiltration, (percent): 34%

H. Adjusted Design Flow, (cfs per square mile): 179*

(*Using Rowe et al method, see hydrology specialist report for peak flow data – Jesusita Project File)

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

Summary

The Jesusita Fire burned approximately 8,741 acres of which 2,025 acres (23%) were on National Forest System lands, and 6,715 acres (77%) were on non-federal/private lands. National Forest System lands are located in the higher elevations with private land comprising the lower elevations. Soil burn severity within the Jesusita Burn Area was 34% High, 44% Moderate, and 23% Low. Approximately 31% of the entire burn area is on 60% slopes or greater. The fire completely burned off all effective cover on the majority of the burned area with the exception of some of the riparian areas in the bottom of the larger drainages. Because soil burn severity was largely moderate and high, watershed response to precipitation events is expected to be high over nearly all of the fire area due to loss of cover on steep slopes. The potential for increased flows leading to

flooding and debris flows is high to very high. Runoff and sediment yield is expected to increase substantially. Vegetation is expected to re-sprout in the majority of the burned area, with expected effective cover re-established within a 5 year period.

Soil Burn Severity

The Forest Service BAER team assessed both the National Forest System (NFS) lands as well as the private lands affected by the fire. Approximately 77 percent of the entire burn was mapped as having a moderate and high soil burn severity (44 % moderate and 34 % high). The burn pattern of the fire was such that generally the lower third of the fire area burned at low severity (low and moderate), with the upper two thirds burning at moderate and high severity. The rock outcrop concentrated in the upper watershed areas of San Roque and Mission Canyon produced more or a mosaic pattern of lower burn severity. The riparian drainage areas burned at low to moderate severity. See attached Soil Burn Severity Map, Figure 1.

Hydrologic Response

The fire was divided into 11 assessment watersheds with "pour points" established below the burn. The pour points are located one tenth to 2 miles below the edge of the burn depending on where the values at risk are located downstream. In most cases the pour points are located within one half mile of the burn perimeter. Watershed response (runoff and sediment yield) is referenced to these points.

The model delivers runoff to the mouth or pour point of the watersheds. Runoff was modeled using a 2 year, 5 year, 10 year, and 25 year storm events. The 5 year event was considered the "design storm" for the purpose of evaluating effects. Mission Canyon is one of the higher output watersheds with a 2.75 X normal (pre-fire) runoff response for a 5 year storm event. This increase in background is considered significant. Additional observations and detailed findings can be found in the Hydrology Specialist Report, Jesusita Project File.

Erosion Response

Rowe, Countryman, and Storey (RCS) was used to model sediment yield using the same pour points and 11 assessment watersheds discussed above (See Figure 1). The model displays outputs in terms of "average annual" erosion the first year following the burn. This sediment model does not report output in terms of a storm return interval concept.

- The publication is somewhat vague in describing what average annual discharge is. Rowe states "Since there is no way of forecasting what the character and number of storms will be in a given period in the future, the estimates of peak discharge and annual erosion presented are simple averages, or the most probable rates expected over a long period of time." The strength of the model is in the fact that empirical data was collected from burned and unburned watersheds by measuring sediment in debris basins.

Erosion outputs for the assessment watersheds reflect the size and amount of the watershed burned and include acres outside the burn. The Soil Burn Severity Map (Appendix A) delineates soil burn severity by watershed and also displays referenced "pour points". Small watersheds with lower burn severity such as Atascadero Creek and Atascadero East had lower outputs of approximately 6 ac-ft of sediment. Lauro Canyon, a small watershed with higher burn severity produced 14 ac-ft of sediment. In contrast, large watersheds with higher burn severity (Rattlesnake Canyon, Mission Canyon, and San Roque Canyon) have much higher outputs ranging from 80 to 100 ac-ft predicted. The increase in sediment yield from pre-fire to 1 year post fire rates is 23 times, 20 times and 17 times normal for Mission, San Roque, and Rattlesnake, respectively. The increase in background is considered significant and represents a large and serious threat to downstream values, structures or improvements built in the flood prone areas.

Erosion rates averaged for burned lands only are as follows:

- The post-fire 1st year erosion rate (modeled for all lands within the fire perimeter) was over 80 cubic yards per acre. This represented an average rate across the burn. Some areas will erode at a lower or

higher rate. This high erosion rate was derived from the expected combination of multiple watershed processes including sheet and rill erosion, gulley erosion, channel scour, and likely contribution from debris flows.

- Background erosion rates for all lands within the fire was approximately 3.5 tons per acre.

Additional observations and detailed findings can be found in the Soil Specialist Report, Jesusita Project File.

Geologic Response

Extensive areas of **pre-fire rockfall, debris sliding, sediment buildup** in concave slope catchments and stream channels, and channel cutting were observed in numerous locations across the burned area. The potential for increased landsliding, rockfall and raveling of steep slopes in the back country, erosion across the entire fire area, and flooding, hyperconcentrated flows, debris flows, mudslides and debris torrents is greatly increased by the removal of 45 year old vegetative cover, and alteration of the soil structure by large areas of high and moderate soil burn severity. The multitude of downstream values at risk mostly lie within 0 to 3 miles of the fire, and there is a high potential that they will be severely affected by increases in flood flows, sediment yield and powerful debris flows.

Debris flow probability, volume, and hazard was modeled for the Jesusita Fire and provided by USGS (Cannon, 2009) and is greatly increased due to the fire. The report states that:

> **"Of the 16 basins evaluated, the probability that a basin will produce a debris flow was calculated to be greater than 80% for seven of the basins in response to the 2-year recurrence storm, for nine of the basins in response to the 5-year recurrence storm, and for 10 of the basins in response to the 10-year recurrence storm. In our experience, these are very high probabilities of occurrence, and reflect the combined effects of extensive areas burned at high severity, the relatively steep slopes and low clay content-soils in the area.**
>
> **Debris flow volumes greater than 100,000 m3 were estimated for the San Roque Creek basin in response to the 2-year recurrence storm, and for both San Roque Creek and Mission Creek basins in response to the 5- and 10-year recurrence storms, indicating particularly hazardous conditions in these two basins.**
>
> **The Combined Relative hazard Rankings also indicate particularly hazardous conditions in the San Roque Creek basin in response to the 2-year recurrence storm, and for both San Roque Creek and Mission Creek basins in response to the 5- and 10-year recurrence storms."**

The upper portions of all watersheds within the fire boundary, although to a lesser degree in Maria Ignacio and Sycamore Canyon, are mostly rated at **high and moderate burn severity** on both steep rock covered slopes and steep exposed soil-covered slopes. Numerous debris slides, areas of loose rocks subject to rock fall, and slopes with deep deposits of dry ravel and loose soil deposits were observed in both the steep upper and moderately steep lower parts of the watersheds. The likelihood of additional slope instability following the fire is very high. Mission, Rattlesnake and W. Fk. Cold Spring watersheds burned most of the top of the drainages, while San Roque and San Antonio drainages left a wide buffer of unburned vegetation on the uppermost slopes. Additional observations for specific watersheds are summarized in the Geologist Specialist Report, Jesusita Project File.

Values at risk

The rapid assessment method and short reporting deadline required by the BAER program did not permit the BAER team to evaluate all the threats at site specific locations, given the complexity of values at risk within and downstream of the burned area. However, the BAER Assessment Team worked with cooperating agencies through interagency meetings to identify general initial concerns and information needs, discuss potential

treatment recommendations, and discuss the draft BAER report. These meetings helped the BAER team identify general areas of downstream values at risk, and consider treatment options for NFS lands.

Within and downstream of the fire perimeter there are multiple resources at risk from damage as a result of potential post-fire watershed responses. Some of these values include residences, businesss, schools, a hospital and other medical facilities, orchards, other facilities, and associated infrastructure in the City of Goleta (San Antonio Creek-Atascadero Creek Watershed), the City of Santa Barbara (San Roque Creek-Arroyo Burro Creek/Barger Canyon Watershed, Mission Creek-Rattlesnake Creek Watershed, Sycamore Creek Watershed), and the City of Montecito (Sycamore Creek Watershed, Cold Spring Canyon Watershed), all within the County of Santa Barbara. State Highways 154 and 192 are immediately adjacent or downstream of the Jesusita fire, while State Highway 101 and one railway are also at potentail risk from post-fire watershed response. There are also several reservoirs, significant cultural resource sites, and important socioeconomic sites such as the Santa Barbara Mission, and Santa Barbara Botanical Gardens. These developments all lie within 0 to 4 miles downstream of the burned area. Given the predicted effects of the fire, all of the high value resources listed above are at serious risk for severe consequences should a storm of any significant rain on the burned area occur within the next three to five years. Impacts would occur from a combination of increases in flood flows, sediment yield, landslides and debris torrents when potential debris dams fail.

Given the predicted effects of the fire, all of the resources listed above are at serious risk of severe consequences should a storm of any significance rain on the burned area, particularly if antecedent moisture conditions are high.

Threats to life: Threats to life have been identified, and an emergency exists within or adjacent to the Jesusita Fire from increased runoff and flooding potential, erosion and sedimentation, debris flows, rockfall, and landslides. Lives are potentially at risk along trails, within developed residential, business, and agricultural areas, and along roads occurring in flood prone and debris flow prone areas, or where flash flooding may cause washouts, loss of infrastructure, loss of water control, and debris torrents when potential debris dams fail.

Threats to property: The BAER Assessment team determined that an emergency exists with respect to properties within and downstream of the Jesusita Fire. Increased flooding, sedimentation, and debris flow probability have the potential to damage residences, business properties, and agricultural areas. Damage to State Highways 154, 192, and potentially State Highway 101 and the railroad could result in closure and temporary delays for public transit and emergency medical services. There is potential for damage to domestic water supplies as a result of increased sediment and ash delivery, as well as hazardous materials from burned residences and debris torrents when potential debris dams fail.

Threats to Cultural Resources: There is one cultural site within the burn perimeter on USFS lands that may be at risk by anticipated increase of stream flow, however no protective measures are recommended. Direct impacts to known cultural resources on USFS land have been minimal, but there is potential for increased vandalism due to increased access from loss of vegetation. Additional observations for cultural resources are summarized in the Archaeologist Specialist Report, Jesusita Project File.

Threats to Wildlife and Botanical Species: The Jesuit Fire did impact habitat for a number of wildlife species and may have displaced or killed a number of individuals. Subsequent flooding events may cause additional impacts in the future. However, since the Santa Inez Mountains, as well as most of Southern California, has a very long history of such events the wildlife and their habitats have evolved or adapted to cope with such events will recover on their own over time. No emergency rehabilitation specifically for wildlife or habitat is needed. Additional observations for wildlife resources are summarized in the Wildlife Specialist Report, Jesusita Project File.

There are no known occurrences of Federally Listed or Regional Foresters Sensitive plants within the fire area. Therefore, an emergency does not exist with respect to special status botanical species. However, there is a emergency with respect to vegetative recovery due to the potential for nonnative invasive plants that are known within and adjacent to the burn area. The potential for increased spread within the burn areas along roads, trails, and dozer lines is high. Additional observations for Botanical resources are summarized in the

Botany Specialist Report, Jesustia Project File.

Appendix A summarizes the values at risk and emergency determinations by sub-watershed.

B. Emergency Treatment Objectives:
As noted above, the greatest threats are to life and property from increased erosion and sedimentation, flooding potential, and increased debris flow potential. For these reasons the primary treatment objectives are to minimize loss of life and risk to human safety, and minimize threats to property. Other treatments are identified to reduce the risk of degradation of significant natural resources including the potential spread of noxious weeds, and protection of cultural resource sites.

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

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

D. Probability of Treatment Success: The probability of success listed below is for reduction in hillslope erosion and reduction in downstream flooding from 2-5 year storm events on NFS lands. However, without treatment to private lands downstream of NFS lands, the probability of success in significantly reducing overall erosion and flooding downstream to the values at risk will be lower.

	Years after Treatment: This refers only to NFS lands, not all lands downstream		
	1	3	5
Land	65	80	100*
Channel	n/a	n/a	n/a
Roads/Trails	80	80	90
Protection/Safety	80	80	90

*It is assumed that there will be a full vegetative recovery by year 5.

E. Cost of No-Action (Including Loss): See Appendix B: Summary of cost-risk analysis.

F. Cost of Selected Alternative (Including Loss): See Appendix B: Summary of cost-risk analysis.

G. Skills Represented on Burned-Area Survey Team:

[X] Hydrology	[X] Soils	[X] Geology	[ ] Range	[X] Public Information
[ ] Forestry	[X] Wildlife	[ ] Fire Mgmt.	[X] Engineering	[X] Inter-agency coordinator
[ ] Contracting	[ ] Ecology	[X] Botany	[X] Archaeology	[X] NRCS
[X] Fisheries	[ ] Research	[ ] Landscape Arch	[X] GIS	

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Kyle Kinports – Recreation
Bob Jarvis - Engineering
Kerry Kellogg - Recreation

H. **Treatment Narrative:**

The BAER Assessment team met with officials from the Santa Barbara County Flood Control, Santa Barbara City Public Works Dept., Santa Barbara County Office of Emergency Services Dept., California Dept. of Transportation, and Natural Resource Conservation Service to identify initial concerns and information needs, to discuss potential treatment recommendations on National Forest Lands. These meetings helped the BAER team to identify downstream values at risk, and consider treatment options. The BAER Assessment team also conducted a debriefing summarizing our findings with Santa Barbara County Flood Control, Santa Barbara City Public Works Dept., Santa Barbara County Office of Emergency Services Dept. It is critical that through continued coordination, California Dept. of Transportation, and NRCS are provided with the BAER Assessment team findings, as well as final reports.

The proposed treatments on National Forest System lands can help to reduce the impacts of the fire from precipitation events, but treatments will not completely mitigate the effects of the fire, nor will they be as effective without additional treatments applied by non-Forest Service agencies on the private lands within and downstream of the fire perimeter. Given the topography of the burned area and lands downstream, the appropriateness and effectiveness of individual treatments varies significantly by location. Cumulatively the greatest potential to reduce impacts to downstream values would be through implementation of a variety of treatments appropriate for the site specific topography and setting.

The treatments listed below are those that are considered to be the most effective on National Forest System lands given the local setting including topography and access. Other treatments that were considered but not carried forward are identified in Appendix C. There may be opportunities for non-Forest Service agencies to implemented these on private lands downstream that would make the treatments on NFS lands more effective.

Land Treatments:

Aerial Mulch Application – The BAER assessment team recommends the use of either hydromulch, a wood and paper mulch matrix with a non water-soluble binder; or wood straw, a wood strand erosion control material; on approximately 160 acres of moderate/high severity slope within the Maria Ygnacio sub-watershed, above State Highway 154 and private residences. Frequent and high winds are common in the area and a mulch material that resists blowing after application must be used. Mulch would be applied to National Forest System lands directly above State highway 154, on slopes <60% where there are no rock outcrops.

State Highway 154 runs through National Forest Lands, and is a critical access route for commuters and emergency medical service personnel such as local fire suppression departments, through San Marcos Pass of the Santa Ynez Mountains. If left untreated, there is a high likelihood that road infrastructure could be plugged, resulting in flooding and sedimentation on the roadbed, creating hazardous conditions for motorists. Increased frequencies of road closures could potentially impact revenues of businesses along State Hwy 154, as well as cause increased costs to commuters.

Estimated cost is approximately $4,000/acre for either material. Due to numerous variables such as rock outcrops, high winds, effectiveness during intense storm events, and availability of product, the BAER Assessment Team felt the final recommendation on type of material should be made by the implementation team, at which time more intense reconnaissance of the proposed treatment area can be conducted.

This treatment, regardless of final product selection, is considered to be the most effective treatment available for National Forest System lands given the complete loss of vegetative cover, topography, and access. This treatment will reduce the potential for increased flood flows, erosion and sedimentation, but will not eliminate the potential for these adverse effects, nor the potential for debris flows. Therefore, it is critical to recognize that this treatment **coupled with the Cal Trans proposal** to:

1. Have 24 hour storm patrols during storm events,
2. Have equipment mobilized during storm events to maintain road infrastructure,
3. Be prepared to implement highway closures

would be the most effective combination of treatments to protect life and downstream properties at risk.

The BAER Assessment Team evaluated the effectiveness of applying mulch on all 11 sub-watersheds within the burn area, Table 2 below. The benefit of hillslope treatments was modeled on Forest Service and private lands, and outputs were calculated at watershed "pour points" shown in Figure 1. We developed the following criteria to identify possible treatment areas within these watersheds:

- Slopes of 25 to 50% on Forest Service lands (50 to 60% was also modeled)
- Slopes of 25 to 60% on private lands
- Areas of moderate and high soil burn severity
- Values at Risk are considered to be High
- % of Watershed to be treated….estimate 30-40% to be effective

Figure 2 delineates areas of moderate and high severity with slopes between 25% - 50%, and 50% - 60%. These areas represent potential treatable acres on National Forest and private lands, based on a GIS excersize. *Actual treatable acres may be reduced due to rock outcrops, and other geographic features. Therefore, treatable acres need to be verified on the ground.*

The expected effectiveness and benefits of treating Forest Service lands by mulching is generally low in most watersheds because of their very steep, rocky terrain and lack of suitable slope for treatment. The Maria Ygnacio Creek area is an exception. Maria Ignacio was subsequently sub-divided (The entire watershed is shown in Table 2; the East Fork is not spilt out) to analyze the benefit to Highway 154 and associated culverts. The burned area in the main stem Maria Ygnacio Creek will flow through a large box culvert that is adequate in size to accommodate the increased post-fire flow. However, the increased flow off of the burned area on Forest Service land, within the East Fork of Maria Ygnacio Creek, could compromise the small culverts on Hwy 154. It is feasble to aerially mulch approximately 160 Forest Service acres of mostly high soil burn severity in the East Fork of Maria Ygnacio Creek to help protect the Hwy. This area is located in the extreme NW corner of fire below the Painted Cave Road. This treatment is expected to reduce annual sediment yield by about half (a reduction from 10 ac-ft to 5 ac-ft) as modeled by RCS. As described above, this reduction or benefit should not be seen as "fixing the emergency". There is a low expectation that mulching will have any significant effect on mitigating the threat of debris flows.

Mulch Treatment Costs

Unit	Unit Cost	#Units	Total
Acre	~~$4,000~~	~~160~~	~~$640,000~~
Acre	***$3,500***	***203***	***$710,500***

Interim # 1

The implementation team has conducted field assessments to finalize the potential treatment acreage. The original 160 acres identified were high burn severity only. Moderate burn severity was predicted to react as high in the Jesusita Fire area. After a thorough field assessment, the final area was determined to be 203 acres, which includes both high and moderate burn severities. The estimated cost per acre for the contract is $3,500 per acre. A small team consisting of 1 COR, 4 field and airbase inspectors, and 2 road and traffic controllers will be necessary to implement this contract. The Santa Barbara area per diem rate is one of the highest in the nation. The costs for the Implementation Team and the support vehicles are estimated at $35,066 for one week. Project supplies are estimated at $10,000. Total aerial hydromulch treatment cost for 203 acres is $755,566 instead of the original estimate of $640,000. Through this Interim #1, we are requesting the difference in funding of $115,566.

$710,500 Contract
+ 35,066 Implementation Team
+ 10,000 Supplies
$755,566

Table 2: Estimated Erosion Benefit with Mulch Treatment on 25%-60% Slopes.

Watershed	FS Treatable with hydro-mulch (ac)	Non-FS Treatable with hydro-mulch (ac)	FS lands (cu yd) Benefit	Non FS lands (cu yd) Benefit	Combined Benefit (cu yd)	No Treatment (cu yds)	Percent Reduction Combined	Percent Reduction FS lands only
Atascadero Creek	0	65	0	4,981	4,981	10,633	47	0
Atascadero East	0	91	0	6,973	6,973	12,763	55	0
Cold Spring Canyon	21	135	2,010	12,920	14,930	51,165	29	4
Fire area outside delineated watersheds	0	5	28	440	468	1,164	40	2
Lauro Canyon	13	132	1,060	10,766	11,827	22,651	52	5
Maria Ygnacio Creek	288	37	21,726	2,791	24,517	50,014	49	**43**
Mission Canyon	190	350	17,913	32,998	50,912	148,786	34	12
Rattlesnake Canyon	133	483	12,539	45,538	58,077	128,929	45	10
San Antonio Creek	154	410	12,269	32,665	44,935	74,671	60	16
San Roque Creek	114	626	9,298	51,058	60,356	159,140	38	6
Sycamore Tributary (Tea Fire)	3	27	302	2,721	3,023	7,686	39	4
Upper Arroyo Burro	41	375	3,331	30,469	33,800	69,345	49	5

Total acres	957	2,736.00

Noxious Weed Detection Surveys: The treatment includes noxious weed detection surveys along dozer lines, safety zones, and selected roads affected by the Jesusita 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. If populations are located, an interim report will be completed, requesting funds for treatment/removal of nonnative species.

Noxious Weed Detection Survey Costs:

Unit	Unit Cost	#Units	Total
2 - GS-5/day	$202	10	$4040
1 – GS-11/day	$400	1	$400
Vehicle	$.85/mile	200	$170
Supplies	$100	1	$100
Total			**$4,710**

Channel Treatments: None recommended. See Appendix C.

Road/Trail Treatments:

Trail Structure Treatment Objectives: Minimize risk of trail failure in the burn area through the placement and maintenance of effective water control measures. Prevent the channeling of water on trails. Ensure the diversion of runoff in controlled intervals to reduce erosion and further watershed degradation. The trail segments selected for emergency BAER treatments have reliable access for trail crews to meet treatment objectives. No BAER monies will be used to improve trail tread to provide for public passage.

Treatment Description: Two areas of concern have been identified for BAER treatments: 1) decrease sediment flow; and 2) protect the trail infrastructure from failure (prescribed trail treatments will be similar to those prescribed for forest roads, such as improvements to existing water drainage structures). Four prescribed treatments include:

- Clearing and improving earthen, log, and rock water bars,
- Trail out-sloping and berm removal (as needed),
- Clear and improve locations on the trails where ephemeral streams cross the tread, and
- Armor spillways with native materials

BAER treatments will focus on mid-slope trails in areas of moderate to high soil burn severity. No treatments are recommended at major creek crossings or on trails found in major water ways or canyon bottoms. Monitoring points will be established with GPS and photo points to be used over time to check the progress of the recovery efforts.

Currently, the trails are closed for a short period (approximately 3 weeks) to allow the Forest Service, City and County time to mobilize fire crews and volunteers to remove some of the trail hazards. The trails will then be reopened to public. Due to multiple access points in the urban interface and popularity of the trails long term comprehensive trail closures cannot be effectively administered. Trailheads will be posted with hazard signs to warn trail users of the increased hazards from rockfall and dry ravel post-fire.

In the fall prior to the rain season, a 12 person organized trail crew from the California Conservation Corps will be utilized to re-construct many of the existing waterbars into rolling dips on those trails in the burn area on National Forest System lands. Rolling dips will be installed in place of existing waterbars in some locations to effectively handle increased water and sediment flow.

A seven person trail crew composed of a combination of District fire and recreation personnel will complete the emergency treatments. Work will consist of day work with no overnight stays. For the work on three trail segments identified on National Forest System lands it is anticipated to take six (2) day

tours to complete BAER emergency treatments. Initially, this crew will concentrate on opening and armoring all existing drainage features prior to the first major rain events. Mid-season, a second visit will be completed to clean sedimentation out of drainage structures after rain events. A final entry will be conducted at the end of rainy season in preparation for the following winter.

Treatment Costs:

Trails on National Forest System lands

Line Item	Units	Unit Costs	Total Funding
Hazardous Trail Signs	10	$500	$5,000.00
GS-9 Trail Manager	5 days	$250/day	$1,250.00
Trail Crew GS-5 (6)	12 days	$185/day	$13,320.00
Trail Supervisor GS-7 (1)	18 days	$200/day	$3,600.00
CCC trail crew	10 days	Contract Cost	$20,000.00
Archeologist (1) GS-9	2 days	$270/day	$540.00
FOR rate for vehicles	150 miles	$0.85/mile	$128.00
Total			$43,838.00

Total request for emergency BAER trail treatments is $43,838.00

Protection/Safety Treatments:

Extended Emergency Coordination – This involves communication and coordination with other federal, state, and local agencies with jurisdiction over lands where life and property are at risk from post-fire conditions. The Jesusita Fire will need follow-up activities due to the complexity of issues. Actions include but are not limited to coordinating treatments across administrative boundaries, cooperating with other agencies on hazard notification systems, permitting the siting of rain gages and soil moisture instruments to monitor conditions within the burn in support of National Weather Service forecasts, and exchanging information and coordinating the BAER implementation plan as needed when subsequent recovery plans are developed by other agencies. The initial cost request plans for this effort to include a primary coordinator assigned to the district to facilitate coordination and a technical specialist (i.e., geologist, hydrologist) to aid the coordination for the primary resource issues associated with this fire. Additional coordination needs may ensue, costs for which will need to be requested on an interim 2500-8. Throughout the next 3-5 years it is critical that appropriate agencies maintain due diligence and continue to inform the public of the potential hazards resulting from post-fire watershed response. There is a high likelihood that access for emergency traffic along routes that provide for ingress and egress throughout and downstream of the burn area may become compromised.

Interagency Coordination Treatment Costs

Unit	**Unit Cost**	**#Units**	**Total**
1 - GS-11 Forest Liason/day	$470	30	$14,100
1 – GS-11 Tech Specialist/day	$480	30	$14,400
Per diem/day	$160	30	$4,800
Total			**$33,300**

Heritage Resource Protection Treatment - Specific objectives of proposed treatments are to help protect cultural resources on National Forest lands that are now easily accessible and an attractant from being impacted or adversely effected by deliberate or inadvertent damage, vandalism, and/or looting. Treatment proposed for the Jesusita Fire area for archaeological site protection is the placement of signs at trailheads entering recreational areas within the Forest that will advise people of the sensitivity of cultural resources on public lands and the civil and criminal penalties associated with looting, damaging, and/or vandalizing these resources. Signs will be placed at the trailhead of Tunnel Trail and Lacumbre Lookout Tower along East Camino Cielo Road. Heritage Designs, a Forest Service enterprise team who has produced high quality interpretive heritage signs for the forest, will be contracted to produce the signs and sign mounts.

Heritage Resource Protection Treatment Costs

Unit	Unit Cost	#Units	Total
1 - GS-12 Archaeologist/day	$350	1	$350
1 – GS-9 Archaeologist/day	$250	7	$1,750
Plexi-glass, screws, and misc hardware	$75	1	$75
Misc. Supplies (arch field supplies)	$200	1	$200
Vehicle /day	$100	2	$200
Signs	$3,000	2	$6,000
Total			**$8,575**

I. **Monitoring Narrative:**

This monitoring is specifically designed to answer the question: Did BAER treatments provide the needed protection and rehabilitation of the burned area? The effectiveness monitoring efforts identified for the Jesusita Fire include: 1) Monitoring areas of high archaeological sensitivity and known significant cultural properties within recreational areas to monitor the effectiveness of implemented signage. Known cultural properties within the burn area will also be patrolled to discourage and watch for any looting or vandalism activities and to monitor the effectiveness of proposed treatments.

Unit	Unit Cost	#Units	Total
1-GS-9 Archaeologist/day	$250	7	$1,750
Total			**$1,750**

Recommendations:
This report is an initial funding request based on a rapid assessment. If additonal treatment needs are identified through more site specific on the ground investigation in cooperation with interested agencies, noxious weed detection surveys, interim requests for additional funding will be filed. These funding requests will identify the purpose for each treatment, and specific treatment specifications, locations, and number of each treatment. Additionally, it is recommened that the Regional Office consider effectiveness monitoring of the aerial mulch treatment.

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

Click red icons for notes.	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										
Aerial HydroMulch	ac	***$3,722***	***203***	***$755,566***			$0		$0	$755,566
Weed detection surveys	ea	$4,710	1	$4,710			#REF!		#REF!	
Subtotal Land Treatments				$760,276	$0		#REF!		#REF!	$755,566
B. Channel Treatments										
				$0			$0		$0	$0
				$0			$0		$0	$0
Subtotal Channel Treatments				$0	$0		$0		#REF!	$0
C. Road and Trails										
NF System Lands	ea	$43,838	1	$43,838						
Subtotal Road & Trails				$43,838	$0		$0		$0	$0
D. Protection/Safety										
Heritage signs	ea	$3,000	2	$6,000						#REF!
Heritage Overhead	ea	$2,575	1	$2,575						
Extended interagency c	ea	$33,300	1	$33,300			#REF!		#REF!	
Subtotal Protection				$41,875	$0		#REF!		#REF!	#REF!
E. BAER Evaluation										
Assessment team	ea	---	$60,207	---	$0	---		---		$0
				---	$0	---		---		$0
Subtotal Evaluation				---	$0	---	$0	---	$0	$0
F. Monitoring										
Treatment effectivene	days	$250	7	$1,750			$0		$0	$1,750
				$0			$0		$0	$0
Subtotal Monitoring				$1,750	$0		$0		$0	$1,750
G. Totals				**$847,739**	**$0**		**#REF!**		**#REF!**	**#REF!**
Previously approved						Comments: Costs for the assessment team have already been spent, and therefore are not				
Total for this request				**$847,739**						

PART VII - APPROVALS

1. /s/ Peggy Hernandez 8/20/09
   Forest Supervisor (signature) Date

2. _____ _____
   Regional Forester (signature) Date

The Appendix items are provided in a separate document to reduce file size. They include:

Figure 1: Soil Burn Severity Map

Figure 2: Treatment Evaluation Map

Appendix A: Summary of Values at Risk and Emergency Determination by Sub-Watershed.

Appendix B: Summary of cost-risk analysis

Appendix C: Treatment Justification Table