Executive Summary: Basin/Indians Fire Complex
BAER Initial Assessment

NOTE: Cost and related information for different treatment tasks have been removed (redacted) from this version of the BAER Executive Summary and Report to ensure that no advantage is given to vendors who may be bidding on the various work items.

The Basin Fire/Indians Fire Complex combined and burned approximately 240,000 acres of federal, state and private lands. Of that, nearly 198,000 acres or 83 percent are National Forest System lands on the Monterey District of Los Padres National Forest (LPNF). Of the LPNF land burned, 93 percent is within the congressionally designated Ventana Wilderness. The remaining 42,000 acres, or 17 percent of the burn, are private, state, military (Army), Bureau of Land Management, and Monterey County land. The Indians Fire started on June 8, and was contained on July 10, at an estimated cost of $42.5 million. The Basin Complex Fire started on June 21, merged with the Indians Fire, and was contained on July 27, at an estimated cost of $77.2 million.

While the fires were still burning, Forest Service BAER Coordinators at the Regional and Forest level communicated regularly via email and phone with the State Office of Emergency Services and CAL FIRE representatives to request and help facilitate the mobilization of the State Emergency Assessment Team (SEAT) to work in concert with the Basin Complex/Indians BAER Team during the assessment effort. The U.S. Forest Service Remote Sensing Applications Center in Salt Lake City provided BARC (Burned Area Reflectance Classification) digital coverage for the entire fire area including private and state managed lands. This imagery was compared to helicopter and ground observations and further refined by the Forest Service BAER personnel and the final Soil Burn Severity maps were provided to the State SEAT team.

The BAER Team convened on August 11, 2008 and met with local LPNF personnel to identify values at risk and key contacts for state, local and other federal agencies with an interest in the BAER Team assessment. The BAER Team worked very closely with the SEAT throughout the assessment period in an effort to work efficiently and effectively between the different land ownerships. In addition, a series of three interagency meetings on August 14, 18 and 22 were hosted by the BAER Team in King City where technical information was exchanged, values at risk were further refined, and potential treatments were discussed.

Sixty percent of the total burn area is rated as moderate or high soil burn severity, with forty percent rated as low or unburned soil burn severity. The south side of the Indians Fire contains a large proportion of high soil burn severity. Most other drainages show higher soil burn severity indices primarily on the south facing slopes where chaparral grew, and lower indices on north facing slopes. While soil burn severity is largely low to moderate, watershed response to precipitation events is expected to be high in areas with moderate to high severity due to loss of cover on steep slopes, especially along the Highway 1 facing watersheds directly exposed to winter storms from the ocean. The exception to this would be areas of grassy slopes above Highway 1 that burned with low severity. The potential for increased stream flows leading to flooding and debris flows is high to very high, particularly above some of the slopes above Highway 1 and structures near Big Sur and the Tassajara Zen Center. Runoff and sediment yield is expected to increase substantially in the first three years, declining sharply after the first year's vegetative growth is established. Vegetation is expected to re-sprout in the majority of the burned area, with effective cover re-established within five years. Re-sprouting in many of the watersheds was already observed by the BAER Team in mid-August.

Within the fire perimeter there are multiple high value resources including, but not limited to: Highway 1, the community of Big Sur, a number of State Parks, the Los Padres reservoir, significant cultural resources, redwood stands, miles of hiking trails, recreation residences and roads that access these facilities, and habitats for federally listed species such as steelhead trout and Smith's blue butterfly. The fire burned immediately upstream of the community of Big Sur and several drainages crossing scenic Highway 1. These developments are within 0 to 5 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.

There are few viable short-term treatments (those allowed by BAER funding) that will mitigate or reduce the emergencies resulting from debris landslides, debris flows and rockfall. The hillslopes are generally too steep for soil treatments such as hydromulching to be effective. Off National Forest System lands there are possible locations for constructing debris catchment basins, debris racks, debris netting and other collector type structures where the stream gradients are less than those within the National Forest. Information about possible sites has been shared with the State or other agencies responsible for non-federal land.

Most of the areas at very high risk for flooding and debris flows are below National Forest System lands. The BAER Team recommends a Forest Service coordinator be designated to participate in ongoing coordination efforts with other State, County, and Federal agencies. The BAER Team has developed information regarding geologic risks, flooding risks, soil movement and other information that will be a valuable contribution to this coordinated effort. Recommended treatments to help protect human life and safety include participating in the establishment of an early alert system, storm patrols, and working with local agencies to help at-risk communities be prepared in the event of a storm.

Recommended treatments on National Forest System lands will cost (number redacted) and include the following:

- improvements of culverts, retaining walls and water crossings along (number redacted) Forest Service roads;
- safety treatments along approximately (number redacted) trails;
- coordination with CalTrans for the installation of (number redacted) debris catchment structures;
- large woody debris detection surveys to be conducted at specific locations upstream of key Highway 1 road crossings and other structures at risk;
- permitting the National Weather Service to place instruments on National Forest System lands;
- purchase and installation of (number redacted) signs to warn people of hazards such as falling trees, rock slides and flash flooding at critical areas, closed areas and archeological sites;
- noxious weed detection surveys;
- funding for continued interagency coordination;
- and contact private landowners within the boundaries of the National Forest this fall to discuss potential winter storm hazards.

For further information regarding the Basin/Indians Fire Complex BAER, contact: Forest Supervisor Peggy Hernandez, 805-961-5733; Deputy Forest Supervisor Ken Heffner, 805-961-5733; Forest Public Affairs Officer Kathy Good, 805-961-5759; BAER Team Co-leader Kevin Cooper, 805-925-9538; BAER Team Co-leader Carolyn Napper, 909-599-1267 x:229; and Forest BAER Coordinator Donna Toth, 805-925-9538.

Date of Report: August 29, 2008

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

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

[ ] 2. Interim Report #____
[ ] 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: Basin/Indians Fire Complex

B. Fire Number: Basin CA-LPF-001649, Indians CA-LPF-001491

C. State: CA

D. County: Monterey

E. Region: Pacific Southwest R-5

F. Forest: Los Padres

G. District: Monterey

H. Fire Incident Job Code: P5D8MA Basin (overide 0507) P5D7T3 Indians (overide0507)

I. Date Fire Started:
Indians Fire Started: June 8, 2008
Basin Fire Complex Started: June 21, 2008

J. Date Fire Contained:
Indians Fire: Contained: July 10, 2008
Basin Fire Complex Contained: July 27, 2008

K. Suppression Cost: Basin Complex Fire estimated at $77.2 million; Indians Fire estimated at $42.5 million; Total Cost: $119.7 million

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): approximately 80 (Basin Complex Fire) and 106 (Indians Fire)
2. Fireline seeded (miles): Not applicable
3. Other (identify): 4 fire camps and 5-6 helispots

M. Watershed Numbers: 1806000601 Big Sur River Frontal; 1806000602 Big Creek-Willow Creek Frontal; 1806000506 San Antonio River; 1806000511 Arroyo Seco; 1806001201 Upper Carmel River.

N. Total Acres Burned: **240,170** Indians Fire = 81,378; Basin Complex Fire = 162,818
NFS Acres (**197,497**) Other Federal (**13,066**) State (**5,248**) Private (**24,263**)

O. Vegetation Types: Coast redwood forest, mixed evergreen forest, oak woodlands, coulter pine, montane conifer forest, oak savanna, chaparral, annual grasslands, and coastal sage scrub

P. Dominant Soils: Cineba-Rock outcrop, Cineba-Sur-Rock outcrop complex, Rock outcrop xerorthents association, and Sur Junipero complex.

Q. Geologic Types: Salinian block composed of intrusive igneous rock (e.g. granitic plutonic rocks) associated metamorphic rock, sedimentary rocks and geologically recent deposits that include debris fans and aprons, terraces and landslides. Addtional components include the Sur and Franciscan complex.

R. Miles of Stream Channels by Class: class 1 = 292.98, class 2 = 156.48, class 3 = 37.46, class 4 = 83.75, and class 5 = 7.71.

S. Transportation System: Trails: 200 miles Roads: 78.9 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 56,804 (unburned/very low); 37,820 (low); 89,523 (moderate); 56,022 (high)
Percentages of 240,169 acres total: 24% (unburned); 16% (low); 37%(moderate); and 23% (high).

B. Water-Repellent Soil (acres): discontinuous throughout the burned area.

C. Soil Erosion Hazard Rating (acres):

96,300 (low) 57,359 (moderate) 86,510 (high)

D. Erosion Potential: 21 tons/acre

E. Sediment Potential: 13440 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

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

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

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

D. Design Storm Duration, (hours): 6

E. Design Storm Magnitude, (inches): 2.77

F. Design Flow, (cubic feet / second/ square mile): See Table 1 below

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

(Based on the reduction of soil cover in moderate and high burn severity areas. Water repellency was considered to be low and discontinuous througout the burn.)

H. Adjusted Design Flow, (cubic feet / second/ square mile): See Table 1 below

Table 1. Anticipated change in discharge of 6th field hydrologic unit (HUC 6 watersheds) as a result of the fire.

Watersheds Affected by the Basin /Indians Fire Complex		Discharge by Watershed in cfs		Discharge by Watershed in cfs/sq.mi.	
Watershed	Ws Area Sq.Mi.	Pre-fire	Post Fire	Pre-fire flow in cfs/sq. mi.	Post-fire flow in cfs/sq mi
Big Creek Frontal	39.76	897*	893*	23	22
Big Sur River	58.45	1516	3921	26	67
Cachagua Creek	46.78	711*	681*	15	15
Danish Creek-Carmel River	45.67	684	1214	15	27
Horse Creek-Arroyo Seco	47.79	736	808	15	17
Las Piedras Canyon Frontal	36.79	684	802	19	22
Little Sur River	40.08	906	2047	23	51
Lost Valley Creek-Arroyo Seco	47.08	718	2098	15	45
Partington Creek Frontal	33.27	703	1401	21	42
Piney Creek	57.97	1005	1135	17	20
Reliz Creek-Arroyo Seco	58.16	1010*	999*	17	17
San Antonio River/Mission Creek	63.34	1159	1767	18	28
San Clemente Creek-Carmel River (did not burn)	32.97	404	404	12	12
Tassajara Creek-Arroyo Seco	55.04	924	2243	17	41
Upper San Antonio River	40.49	563	798	14	20
Vaqueros Creek-Arroyo Seco	33.78	420	555	12	16

* When calculated post fire discharge values are equal or less than pre-fire discharge values, this indicates no expected increase in cfs discharge due to minimal amounts of the overall watershed burning.

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

In order to determine the values at risk, the Forest Service Basin/Indians Fire Complex BAER Team began by soliciting advice from the Monterey District Ranger and staff, local residences, and other agencies. They then conducted helicopter and field level reconnaissance over the entire Basin and Indians fires. The following table is a geographic breakdown by watershed areas to describe the critical values/resources and threats which are at risk from post-fire effects. The threats to life, safety, and property displayed in Table 2 below constitute an emergency determination in these watersheds. Coordination with the State Emergency Assessment Team (SEAT) and other agencies was conducted continuously throughout the initial BAER assessment. Findings of potential values at risk and potential treatments were shared between the SEAT and other agenices.

Table 2: Threat to life, safety and property by 5th field hydrologic unit (HUC 5 Watersheds).

HUC 5 Watershed	Hazards and Values at Risk
Arroyo Seco	Hazard: Flooding, loss of access, and rock fall. Values at risk: Life, safety, and property (agricultural land, Arroyo Seco Resort, Millers Ranch, Sycamore Flat, residences along Piney Creek, Santa Lucia Adobe, residences along Church Creek, Tassajara Hot Springs, Monterey County Sportsman Club, recreation residences near Santa Lucia Memorial Park, roads, trails, and stream crossings throughout watershed)
San Antonio River	Hazard: Flooding. Values at risk: Life, safety, and property (Fort Hunter Liggett, San Antonio Reservoir, private residences along Bear Canyon and Coleman Canyon, dams along Coleman Canyon, Indians Adobe, roads, trails, and stream crossings throughout watershed)
Highway 1 Frontal (Partington Creek Frontal)	Hazard: Flooding, debris flows, loss of access and rock fall. Values at risk: Life, safety, and property (Highway 1, Big Sur Inn, Henry Miller Memorial Library, Esalen Institute, private residences and businesses, Coast Gallery, pelton wheel exhibit at Julia Pfeiffer Burns State Park, roads, trails, and stream crossings throughout watershed)
Lower Big Sur River and Little Sur River	Hazard: Flooding, debris flows, rock fall, and loss of access. Values at risk: Life, safety, and property (private residences and businesses along Big Sur River, Pfeiffer-Big Sur campground and facilities, Big Sur Lodge, USGS stream gauge, Boy Scout Camp, Highway 1, roads, trails, and stream crossings throughout watershed)
Upper Carmel River	Hazard: Flooding. Values at risk: Life, safety, and property (Los Padres Reservoir, San Clemente Dam, private residences, roads, trails, and stream crossings throughout watershed)

The threat to life and safety throughout the burn area is from the following:

- Increased flooding potential of streams from sediment laden runoff generated from moderate and high burn severity areas above roads, stream crossings, hiking trails, private in-holdings, and private or state property downstream of National Forest System lands.
- Businesses, residents, recreationists, and tourists may be unaware of the burned watersheds and the increased hazards that may result during and after rain storms.
- Flooding, debris flows, and damage to the transportation infrastructure may result in loss of access to or from communities along the Highway 1 corridor. (Residences, businesses, Esalen Institute, State Parks, resorts, motels, private campgrounds, North Coast Ridge Road 20S05).
- Forest system roads and trails, county roads, and state highways will experience increased rockfall and debris hazards onto the roads due to loss of vegetation and increased hydrologic response from moderate and high burn severity hillslopes.
- Forest user safety is in jeopardy from hazard trees and other dangerous conditions along the trail and trail corridor including rock fall, debris sliding, and dry ravel. Trail users may become disoriented due to the loss of trail prism in remote and potentially dangerous environment.
- Visitors and residents at the Tassajara Zen Center are at high risk from flooding, debris flows, and loss of access to or from the facility during and after storm events.
- Visitors/staff to the Boy Scout Camp in Little Sur are at risk from increased runoff and stream flows that may result in loss of access to or from the facility during and after storm events.
- Visitors and residents along the Arroyo Seco area are at risk from flooding and loss of access to or from their homes and businesses during and after storm events. Low water crossings will become particularly dangerous due to the high percentage burn of the watershed (37% of the entire Arroyo Seco burned at a high, moderate, or low severity).

- Visitors and residents along Piney Creek and Bear Creek, and Coleman Creek are at risk from flooding and loss of access during and after storm events.
- Users of the road to Tassajara Zen Center (18S02) are at risk from rock fall and loss of water control at stream crossings because of culvert plugging and overtopping. Additionally, loss of water control and stream diversion on private land at the Tassajara Zen Center poses a threat to life and property.

Threat to Property:

- Salinas River agricultural lands below the Arroyo Seco confluence are at risk from flooding.
- Los Padres and San Clemente Reserviors will likely lose storage capacity. San Clemente dam is currently unstable and scheduled for removal.
- There is a large risk of damage to property (roads and trails) caused by the loss of water control, diversion potential, rockfall, and landslides throughout the burned area.
- Risk to infrastructure exists on 18S02 (Tassajara Road-coop agreement with county), 18S05 (Boy Scouts Road), 19S04 (The Caves), 19S09 (Arroyo Seco Road-coop agreement with county), 19S09J (Adobe Road), 20S03 (Borranda Road), and 20S05 (North Coast Road-coop agreement with county), due to expected increased runoff and sediment bulking in drainages with culverts. The risk to infrastructure arises from a high probability of drainages plugging and overtopping during the design storm which, if not controlled, could cause significant damage.

Loss of Access:

An emergency determination of loss of ingress and egress for property owners was made on 20S05 (North Coast Road), and Tassajara Road for property owners. Additionally, the potential loss of access along Highway 1 may occur from flooding and debris flows from Pheneger Creek in the north down to Rat Creek in the south. Flooding may also occur in the Arroyo Seco River, limiting access to properties and residences south of the Arroyo Seco River.

Threat to Natural Resources:

Aquatic Species:
An increase in soil erosion and sedimentation will decrease water quality which may have deterimental effects on aquatic habitat. Species potentially affected include the following:

- Tidewater Goby (*Eucyclogobius newberryi*) and their Critical Habitat
- South-Central California Coast Steelhead (*Oncorhynchus mykiss*) Distinct Population Segment (DPS) and their Critical Habitat
- Threat to spawning habitat for Steelhead from the loss of control of water on roads 18S02 (Tassajara Road), 19S09 (Arroyo Seco), 19S09J (Adobe Road), can lead to erosion and sedimentation to streams.

Terrestrial species:
Emergency conditions resulting from the Basin/Indians Complex fire exists for the following species:

Species	Emergency condition
California condor	Direct mortality from the fire
Smith's blue butterfly	Direct mortality from the fire and loss of habitat
California spotted owl	Temporary loss of habitat
Coast horned lizard	Direct mortality from the fire
California legless lizard	Direct mortality from the fire and loss of habitat

Threat to Cultural Resources:

Field review of the burned area identified two structures at risk from increased runoff and flooding potential – the Santa Lucia and Indians adobes. Additionally, there is an increase in accessibility and visibility of archaeological sites, making them more susceptible to vandalism/artifact looting and unauthorized recreational activity.

B. Emergency Treatment Objectives:

As noted above, the greatest threats are to life and property from increased erosion and sedimentation, flooding potential, rockfall, and increased debris flow potential. However, given the slope steepness, vegetative recovery, and amount of potentially treatable acreage within a subwatershed there are no land treatments (hillslope treatments) which could be effectively implemented to provide soil cover and minimize or reduce the threat. The team thoroughly scrutinized and identified treatments for roads and trails where the potential threat to life and property exists, which if implemented, would be effective.

Objectives:

1) Prevent injury, loss of life, and minimize damage of property by alerting the public to hazards that result from the post-fire emergency including the potential for flooding, debris flows, rock fall, and loss of access.
2) Reduce the likelihood of loss of infrastructure along forest, county, and state roads and trails. When undertaken solely to protect the road or trail investment, the cost for emergency stabilization should be less than the cost to repair damages after they occur (BAER Guidance Paper September 2004.) On roads subject to the cooperative agreement with the county, expenditures for performance of work beyond routine maintenance are shared through negotiation and documented in project agreements.
3) Create public awareness by posting signs at key point of ingress into the fire areas.
4) Maintain the ecological integrity, soil productivity and vegetative diversity of the burned area by reducing the increased risk of noxious weed infestations.
5) Mitigate high-risk large woody debris (LWD), where safe, effective, and feasible, that may become floatable to the extent that it may damage downstream values at risk during high streamflow events.
6) Maintain the cultural and heritage resources within and downstream of the burned area.

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

Land **95** % Channel **90** % Roads/Trails **50 *** % Protection/Safety **90** %

*concern with the ability to contract work in a timely manner and design retaining walls & debris racks.

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	80	90	90
Channel	90	100	100
Roads/Trails	75	80	90
Protection/Safety	90	95	100

E. Cost of No-Action (Including Loss): The team was joined by Keith Stockman, an economist who used the new cost risk tool to assess the cost/benefit of all the proposed treatments. Results of that analysis showed a positive cost-benefit ratio for all the road and trail work with the exception of two trails (Horse Pasture and Miller) (number redacted). The other treatments showed a positive cost-benefit ratio as well. See summary of cost-risk analysis report.

F. Cost of Selected Alternative: (number redacted)

G. Skills Represented on Burned-Area Survey Team:

[x] Hydrology	[x] Soils	[x] Geology	[x] Range	[x] Economist
[x] Forestry	[x] Wildlife	[x] Fire Mgmt.	[x] Engineering	[x] Documentation specialist
[ ] Contracting	[x] Ecology	[x] Botany	[x] Archaeology	
[x] Fisheries	[ ] Research	[ ] Landscape Arch	[x] GIS	

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H. Treatment Narrative:

Land Treatments:

Noxious Weed Detection Survey
Conduct noxious weed detection surveys, concentrating in the burned area along travel routes, dozer lines and helispots. Survey the potential sources which include the following: heliports, fire camps, and parking areas as potential sources of weeds. The 186 miles of fireline represent a potential seed bed for noxious weed expansion. A report will be submitted to the Regional BAER Coordinator. Evaluate need for further action and treatment.

Other land treatments considered:

Land treatment opportunities were thoroughly reviewed by the team to determine if there were any opportunities to reduce erosion and runoff by providing additional soil cover to high and moderate burn severity areas where the hydrologic response is greatest. Soil scientists, hydrologists, and geologists identified Pheneger, Juan Higuera, Pfeiffer/Redwood Creek, Hot Springs Creek (all along Highway 1 corridor), Carmel watershed and an unnamed watershed above the Tassajara Hot Springs Zen Center as potential sites for a hillslope treatment of either hydromulch and/or woodstraw. Helimulching was not considered due to its proven ineffectiveness in windy locations. Each potential location was tested against the following treatment effectiveness criteria:

- Slope class: less than 60% slope
- Vegetation type: chaparral vegetation (Areas of grass recover rapidly and most still had intact root systems).
- Land ownership: greater than 50% on National Forest System lands
- Values at Risk: threat to life and property below the proposed treatment area
- Percent of sub-watershed where treatment could be applied to provide effective cover and reduce downstream risks: require 30-40% of the hillslope be treated to change the hydrologic response and for the treatment to be effective.

Question: Would the treatment mitigate the threat (hazard) to identified values-at risk?

The BAER Team found limited acreage suitable for treatment in each of the aforementioned watersheds. Based on criteria and limited suitable acreage it was determined that hillslope treatments would not effectively mitigate emergency conditions downstream. Wood straw was also greatly limited in terms of the amount available by the manufacturer.

Instead the Team strongly recommended an Extended Emergency Coordination position be identified as a treatment to help participate in development of a post-fire emergency preparedness plan for flooding and debris flows in affected areas with specific emphasis in Big Sur, Highway 1 communities, Tassajara Zen Center, Arroyo Seco, and Cachuaga communities. The role of the FS coordinator would include assisting in the dissemination of the BAER team findings, identifying and scheduling technical specialist as needed for interagency coordination on various tasks, facilitating the processing of special use permits on National Forest System lands for emergency warning systems and other emergency requests. Additional roles would include participation in the plan itself with Monterey County Office of Emergency Services (OES) in identifying resources, actions and critical issues regarding a debris flow or flood event including monitoring, public information, evacuation planning and care and shelter.

Although debris flows often happen with little or no advance notice, the conditions that favor debris flows and flooding can be forecasted. It is through these conditions that this plan is predicated upon and used to help save lives and property in advance of a destructive debris flow or flood event.

Channel Treatments:

Large woody debris detection surveys - The strategy of this treatment is to evaluate current condition of large woody debris (LWD) and balance removal and retention to optimize mitigation of potential downstream problems. To do so, detection of existing LWD will be conducted as soon as possible after the fire. If a high-hazard area of LWD is detected, a subsequent interim report will be submitted to fund the actual treatment and condition monitoring throughout the winter.

Priorities

The overall priority is to focus on streams subject to transporting LWD during high streamflow events. This includes the larger stream systems in the fire area where key values at risk have been identified – streamside properties such as residences, commercial facilities, bridges, etc. The Big Sur River is the principal stream of concern due to the large amount of assets from Big Sur State Park downstream toward the ocean and the preponderance of large trees in the watershed. The Arroyo Seco is also of concern because of the residences here, however, the probability of LWD is less than those streams on the coastal side of the fire since this watershed is drier and has fewer large trees in the lower reaches. Large woody debris in the uppermost reaches and tributaries of these streams is best left in place to produce roughness in the channel which modulates the flow of water and sediment in the lower reaches where the risk of LWD/structural issues exists. Other streams will be evaluated if needed as determined by the BAER Treatment Implementation Team. Most small streams are subject to debris flows rather than flooding, and are a lower priority since LWD is less prevalent and not transportable as in flood flows. However, if there are small streams that may have LWD subject to flooding and likely to damage nearby structures, they will be surveyed.

- Woody debris detection assessment prior (September, October) to seasonal precipitation events in the Big Sur drainage to locate and quantify areas with large amounts of woody debris currently available for entrainment in a storm event. Targeted assessment locations would be depositional reaches lower in the watershed and within 4-5 bends upstream of potential values at risk. Coordination with State Parks is anticipated.
- Post-storm woody debris surveys would be conducted after storm events to assess if large woody debris may be building up in areas posing a greater threat to downstream values at risk. Debris reduction or removal treatments may be recommended in the event of a debris dam that poses an imminent risk to life or property.

Roads and Trail Treatments:

- Trail Closure: The trail system in the burned area should be closed until after the first winter following the fire. Conditions following the first winter should be evaluated to judge if additional time is needed to provide for user safety or for protection of the trails at risk. This can be completed through the issuance of a forest order for an area closure and posted at trailhead locations identified by the district. Coordinate with State Parks and other neighboring land managers to ensure other trails connecting with, or feeding into FS system trails are closed as well.

- Trail Storm Proofing: Storm proofing is only the minimum necessary trail work activity which will protect the trail investment in its current state and protect it from the expected seasonal weather. This is not an attempt to perform deferred maintenance objectives or improve the trail in any way. Improve drainage on trails affected by the fire by installing trail drainage structures to maintain natural drainage patterns to provide trail stability for the increased flows in the first winter.

- Trail: Armoring key ephemeral drainages and trail water diversion structures, to prevent undercutting and loss of trail tread. This will require the placement of rock in a rip-rap fashion below drainages to dissipate the energy of off trail water flows and decrease the possibility of down bank erosion. An average total of (number redacted) rolling dips per mile will need to be constructed. This frequency will help mitigate damage to trails caused by increased flow rates. These rolling dips need to be installed on sections of trails with long sustained grades with no grade breaks. When rolling dips are installed on steep side slopes frequency of structure placement should increase to lessen the volume and velocity of down trail water flow. Rolling dips will also be needed to compliment existing trail water diversion structures which could be compromised by increased water flows. An unknown amount of existing waterbars will need immediate maintenance. Trail stabilization will also reduce downstream values at risk.

- Trails: To provide for implementation crew safety, hazard trees should be removed at designated dispersed campgrounds where crews may need to camp. Along portions of trails that are used as a travel route to work projects, consideration should also be given to any individual work locations that require lengthy stays by crews. Removal of identified hazard trees could be completed with saws or the use of explosives. Selected trails not identified as key trails for treatment may need to have hazard trees removed and tread work done to allow for access by implementation crews and pack-stock. These non-key trails will be opened to a lesser standard than normal trail standards as they are only to allow for the safe movement of crews and pack-stock to implement trail prescriptions to affected trails.

Forest and County Roads - Consult Schedule “A” in the Coop Road Agreement with Monterey County for a listing of roads and assignment of routine maintenance responsibilities. The priority for road treatments are those sites where there is a threat to life (North Coast Ridge Road 20S05 and Tassajara Road 18S02). The retaining walls on these roads are the priority for safety of road users.

- Install warning signs on 18S02, 18S05, 19S03, 19S04, 19S09, 20S05 to protect life and property.
- Construct dips at stream crossing location with identified diversion potential on roads 18S02, 18S05, 19S04, 19S09, 19S09J.
- Perform storm patrol on 19S09, 18S02, and 20S03 to restore designed road drainage function and repair or maintain BAER treatments following each significant winter storm.
- Outslope the road in areas identified on 19S09, and 20S05 to prevent concentration of surface flows.
- Install risers at identified locations on 19S09, 19S04, 18S05, to prevent culvert plugging.
- Improve existing dips and protect the embankment from erosion by installing overside drains on 19S09J to prevent erosion at the outfall of drainage.
- It has been recommended to Monterey County on 8/18/2008 in conversation with Shawn Atkins that metal end sections, diversion prevention dips and possibly armored spillways be installed at identified locations on Tassajara Road and Arroyo Seco Road. Monterey County was contacted on 8/20/2008 and asked to request funds from FEMA through OES to help pay for BAER treatments on 20S05, the coast ridge road.
- Install debris racks at identified locations on 18S02, and 19S09 to prevent culverts from plugging with woody debris that may be mobilized.

- Construct retaining walls at identified locations where the fire has damaged or destroyed wooden retaining structures on 18S02, and 20S05 to prevent road collapse. Discussion: A Special Use Permit (Road) has been issued to the Federal Aviation Administration for Road 20S05. DTFA08-82L-10441. Big Sur VORTAC R/W. April 29, 1982. This permit requires the permittee "provide maintenance made necessary by his use of the road" and does not speak to extraordinary repairs.

Protection/Safety Treatments:

Closure of Burned Area The BAER team recommends that the Los Padres National Forest area within the burned perimeter be closed to public access from the present time until it is determined by the Monterey District and Supervisors Office staff that conditions are safe enough to open this area. Hazards include trees and limbs falling, flooding, washout of trails, and dry ravel covering trails. Areas where the public may access hazardous areas from outside of this closure should also be analysed and, if necessary, posted with warning or closure signs.

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. Components of this position includes the following:

- Protection and safety of human life and property is proposed through interagency coordination as needed throughout the first winter after the fire. Interagency coordination with OES and interested stakeholders is designed to reduce the threat to life and safety by creating an awareness of the post-fire conditions.
- The emergency coordinator will participate in development of a post-fire emergency preparedness plan for flooding and debris flows in affected areas with specific emphasis in Big Sur, Highway 1 communities, Tassajara Zen Center, Arroyo Seco, and other communities. Involvement would initially include the dissemination of the BAER team findings, facilitation of permits on National Forest System lands for emergency warning systems including sirens.
- Once the County OES and stakeholders are aware of the post-fire debris and flooding threats a thorough plan needs to be jointly developed outlining each agencies role and responsibilities. The interagency coordinator can assist in the development of the post-fire emergency preparedness plan with County OES. Responsibilities may include helping to identify necessary resources, actions and critical issues regarding a debris flow or flood event that may include monitoring, public information, evacuation planning and care and shelter. Components of the plan may include early warning systems with sirens, warning signs on Forest Service and private lands, public notification prior to storm events, development of flood preparedness brochures, reverse 911 calling, and community action items that promote awareness of post-fire hazards in areas (example Orange County).
- Emergency coordination work to assist in developing posters, brochures, and information for other media by participating in interagency meetings and other media regarding increased safety hazards associated with the Basin/Indians fires. The Forest Service contribution for these media presentation will be matched or exceeded by cooperating agency partners.

Early warning system coordination

- Coordination with USGS regarding installation of web cameras at the gauge station and at the narrows near the upstream end of the State Park on the main stem of the Big Sur River. The potential exists for large woody debris to become trapped within the gorge above the Pfeiffer Big Sur State Park and a web camera may safely assess the situation and provide downstream residents and Caltrans with necessary warning.
- Continue coordination with Monterey County Public works in providing access to National Forest System lands for maintainence of the existing ALERT system to ensure its operability. The county maintains the current system which is critical to providing emergency information to these communities along Highway 1 corridor, Tassajara Zen Center, and the Arroyo Seco area. Some units may have to be replaced since they were destroyed during the fire. Access to some of the remote units may be difficult due to the post-fire environment.

Warning Signs

(Number redacted) signs will be placed at key access points to inform Forest users of trail and road closures and safety hazards throughout the burned area. Additionally signs will be posted to reduce vandalism and theft of exposed cultural resources throughout the burned area. This treatment provides an avenue to prosecute looters within the burn area and prevent the destruction of important cultural resources. Informational signs increase the viability of criminal prosecution through the Archaeological Resource Protection Act of 1979 (ARPA). The signs will be in both English and Spanish and will be located at campgrounds, trailheads, and access points located around the fire perimeter.

Barriers and hazard reduction treatments

- Deflection Barrier (k-rail placement) and sand bags (Site 05075100456) will be used to protect the Santa Lucia adobe from increased runoff and flooding**.** The purpose of constructing a deflection barrier is to keep the stream from flooding and inundating the adobe. Sand bags will be used to augment the k-rail barriers.
- Hazard reduction: There is an old small reservoir owned by the Los Padres National Forest above the Indians adobe that is in jeopardy of failing due to erosion and ground squirrel tunneling in the dam. Because this is a Forest responsibility the team felt it could easily be drained and opened to reduce the risk of failure and flooding of the adobe ranch structure at Indians (Site 05075100047). Field review by the geo-technical engineers and hydrologist determined that if the structure breached it would flow towards the adobe structure and that breaching the dam would reduce the risk of failure. This would be a temporary emergency treatment until the vegetation above the impoundment has recovered. In addition there is an historic Sycamore tree that was damaged by the fire which is threatening a portion of the structure. The tree will be reviewed by a forester before any action is taken. If the tree needs to be taken down the district has fallers available for the removal of the tree.

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.)

Trail Monitoring

Storm Inspection and Response: Due to the high probability of intense erosion, water, and rockfall damage to proposed trail treatments during storms, drainage inspectors need to monitor treatment effectiveness after significant weather events. These inspectors will correct minor expected problems and report significant changes on and along the trail only where safe entry permits. Based on information gathered on treatment effectiveness monitoring, an interim request may be submitted to the region for consideration for additional funding to correct problems in response to unforeseen storm damage. Trails should be inspected before opening to public use. These inspectors could also check for public usage of the closed trails in an effort to inform law enforcement and to monitor the effectiveness of the forest trails closure for visitor safety.

(Numbers redacted)

Adobe structure protection effectiveness monitoring:

K-rails and sandbags will be placed above two adobe structures to prevent flooding damage. Treatments will be field monitored after storm events by examining the structural integrity of the sandbags and k-rails, minor shovel cleaning of debris behind the treatments, and compilation of an interim 2500-8 request if heavy equipment is needed to repair the treatments. Estimated cost: (number redacted)

Part VI – Emergency Stabilization Treatments and Source of Funds

(Table redacted)

PART VII - APPROVALS

1. */s/ Peggy Hernandez* — September 5, 2008
   Forest Supervisor (signature) — Date

2. _____ — _____
   Regional Forester (signature) — Date