USDA-FOREST SERVICE

FS-2500-8 (6/06)
Initial Request
Date of Report: August 19, 2016

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: Sand Fire

B. Fire Number: CA-ANF-003008

C. State: CA

D. County: Los Angeles

E. Region: 05

F. Forest: Angeles National Forest

G. District: 51 and 53

H. Fire Incident Job Code: P5KG9X

I. Date Fire Started: July 22, 2016

J. Date Fire Contained: August 12, 2016

K. Suppression Cost: $36 million

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): 55 miles of hand line, 62 miles of dozer line
2. Fireline seeded (miles): None
3. Other (identify): None

M. Watershed Number: 180701020104 Aqua Dulce Canyon, 180701020105 Arrastre Canyon-Santa Clara, 180701020107 Sand Canyon-Santa Clara River, 180701020401 South Fork Santa Clara River, 180701050104 Little Tujunga Creek, 180701050105 Lower Big Tujunga Creek, 180701050205 Upper Pacoima Wash, and 180701050206 Lower Pacoima Wash

N. Total Acres Burned: 41401
NFS Acres (34,795) State (274) BLM (343) Private (5,989)

O. Vegetation Types: Mixed Chaparral, Chamise Chaparral, Big-cone Douglas Fir Forest, Canyon/Coast Live Oak Woodland, California Bay Woodland, Cottonwood/Sycamore Riparian Woodland, Riparian Willow Scrub.

P. Dominant Soils: Caperton-Trigo, granitic substratum- Ludo families complex, 50-85 percent slopes (**40.2%**); Pismo Family-Rock outcrop complex, 50 to 80 percent slopes (**19.9%**);Tollhouse-Stukel-Wrentham families complex, 60 to 90 perecnt slopes (**9.6%**); Pismo-Chilao-Shortcut families complex, 45 to 80 percent slopes (**5.4%**); Rock outcrop-Chilao family- Haploxeroll, 15 to 20 perecnt slopes (**5.1%**)

Q. Geologic Types: The burned area is located in the Transverse Province, on the southern flanks of the San Gabriel mountain range. The San Gabriel Mountains are an east-west range bounded by the San Andreas and San Gabriel faults. Primary rock types are Precambrian and Cretaceous gneisses and granodiorite granitics, which produce toppling rockfall failures.

R. Miles of Stream Channels by Order or Class: Perennial = 2.8 miles, Intermittent = 95.7 miles, Ephemeral=92.0 miles

S. Transportation System

Trails: 2.8 miles Roads: 21.7 miles Railroad: 5 miles

PART III - WATERSHED CONDITION

A. Burn Severity for
a). Total Fire Area (acres): 7,748 (17.8%) (unburned), 16,977 (37.9%) (low), 14,765 (29.5%) (mod) 1,911 (14.8%) (high)

b). USFS Fire Area (acres): 5,594 (12.6%) (unburned), 13,556 (25.1%) (low), 13,859 (30.4%) (mod) 1,786 (13.2%) (high)

B. Water-Repellent Soil (acres): 24,725 acres has low to moderate water repellency
16,676 acres has high water repellency

C. Soil Erosion Hazard Rating (acres):
7,748(low) 16,977 (moderate) 14,765 (high) 1,911 (very high)

D. Erosion Potential after fire: 6.1 tons/acre after a 2 year storm
12.1 tons/acre after 5 year storm
26.9 tons/ acre after 10 year storm

Erosion potential before fire: 0.2 tons/acre after a 2 year storm
0.3 tons/acre after 5 year storm
1.3 tons/ acre after 10 year storm

E. Sediment Potential: reported as tons per acre in D.

G. Estimated Reduction in Infiltration, (percent): 20

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 5 - 15

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

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

D. Design Storm Duration, (hours): 0.5

E. Design Storm Magnitude, (inches): 0.452 – 0.543

F. Design Flow, (cubic feet / second/ square mile): 11.1

G. Estimated Reduction in Infiltration, (percent): 20%

H. Adjusted Design Flow, (cfs per square mile): 26.8

PART V - SUMMARY OF ANALYSIS

Background

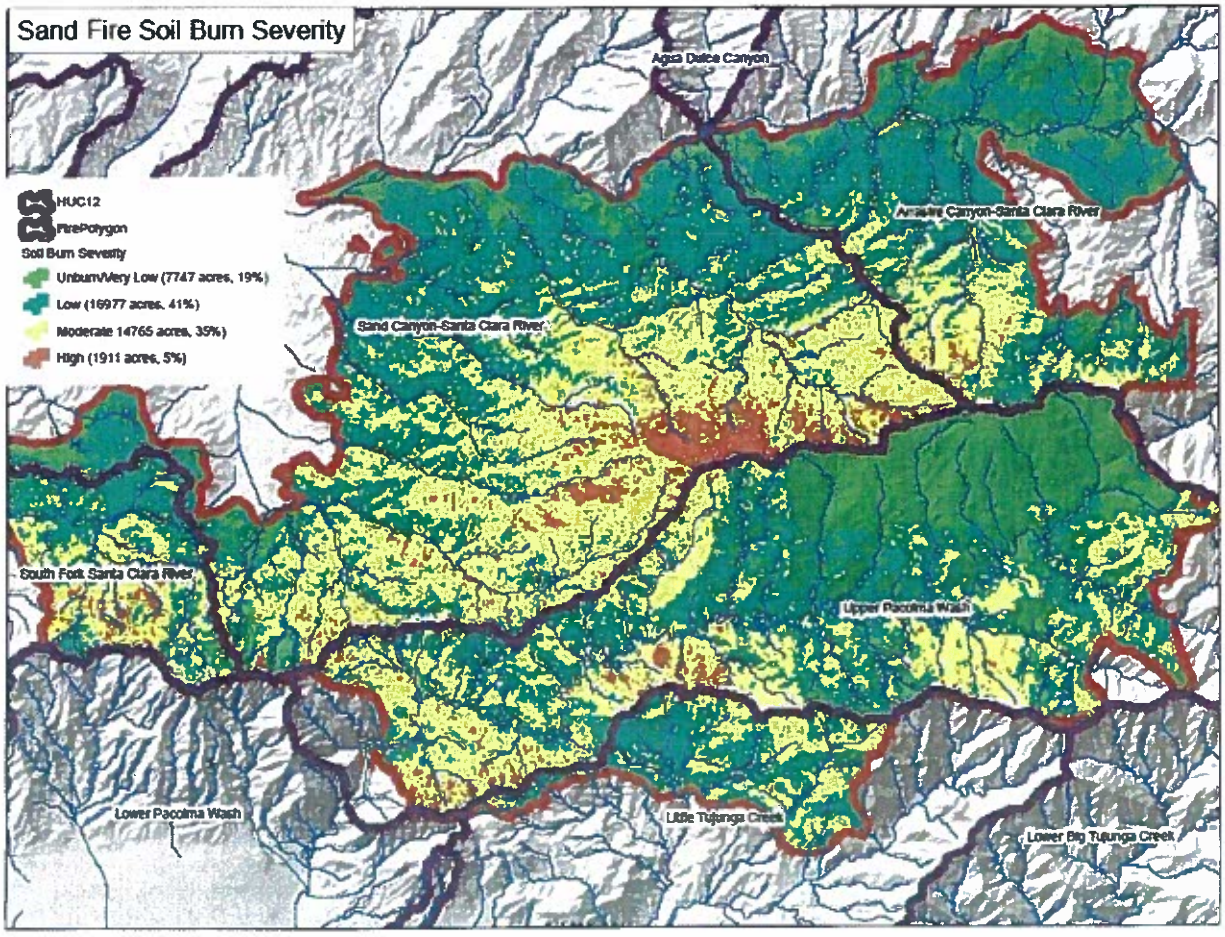
The Sand Fire began on Friday, June 22, 2016, on private lands, but driven by steep terrain, wind and low relative humidity the fire quickly spread onto land administered by the Santa Clara/Mohave River Ranger

District, Angeles National Forest. At its height, nearly 3,000 firefighters and support personnel were assigned to the fire, with a very steep ramp up of resources.

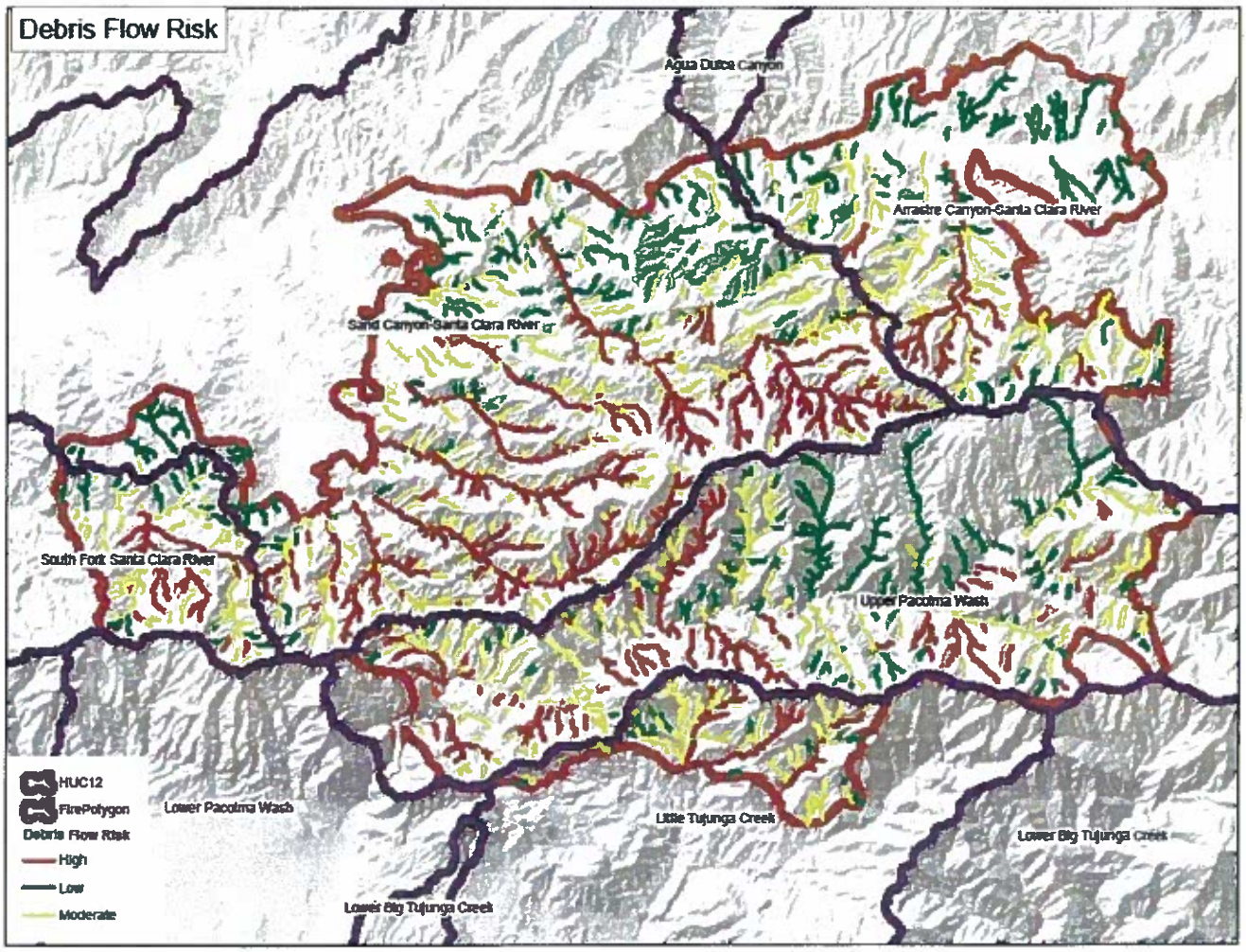
Approximately 45% of the burn area burned at a high and moderate soil burn severity (see soil burn severity map below). The rest of the fire was either low or very low soil burn severity. It is very important to understand the difference between *fire intensity* and *burn severity* as discussed by fire behavior, fuels, or vegetation specialists, and *soil burn severity* as defined for watershed condition evaluation in BAER analyses. Fire intensity or burn severity as defined by fire, fuels, or vegetation specialists may consider such parameters as flame height, rate of spread, fuel loading, thermal potential, canopy consumption, tree mortality, etc. For BAER analysis, we are not mapping simply vegetation mortality or above-ground effects of the fire, but soil burn severity. Soil burn severity considers additional surface and below-ground factors that relate to soil hydrologic function, runoff and erosion potential, and vegetative recovery.

In addition to having a high percentage of high and moderate soil burn severity, the fire burned on steep slopes that have inherently high soil erosion hazards. The fire effects are expected to increase the high erosion hazard due to loss of vegetation canopy, effective ground cover, and formation of water repellent soil layers at varying depths. The burned, steep drainages have the ability to generate sudden releases of storm runoff at high velocities. The ensuing runoff from storm events can also erode and mobilize sediments and debris stored at the base of the slopes and in channel bottoms, leading to major deposition of sediment along the lower reaches and possibly into the San Gabriel Wash (see debris flow modeling map below).

Sand Fire Soil Burn Severity Map:



Sand Fire Debris Flow Modeling Map:



A. Describe Critical Values/Resources and Threats:

The risk matrix below, Exhibit 2 of Interim Directive No.: **2520-2010-1**, was used to evaluate the Risk Level for each value identified during the Assessment:

Probability of Damage or Loss	**Magnitude of Consequences**		
	Major	Moderate	Minor
	RISK		
Very Likely	**Very High**	**Very High**	**Low**
Likely	**Very High**	**High**	**Low**
Possible	**High**	**Intermediate**	**Low**
Unlikely	**Intermediate**	**Low**	**Very Low**

Values at Risk and Risk Matrix Table[1]

Risk Type	Value at Risk	Potential Threats	Owner ship	Probability of Damage	Magnitude of Conseq	Risk	Forest Service Treatment Method
Life	Human Life and Safety w/in the Burn Area	rock fall, debris flows, flooding, hazard trees	ANF	possible	major	high	ANF lands fire area closure, signage, gates, storm inspection and response on PCT
Life/ Property	Amtrak Rail	TBD by Amtrak	Amtrak	TBD by Amtrak	TBD by Amtrak	TBD by Amtrak	Coordination w/ Amtrak
Life/ Property	Soledad Canyon Residences	debris flows, flooding	Private	Likely	Major	Very High	Coordinate with County Public Works and NRCS
Life/ Property	Placerita Canyon Residences	debris flows, flooding	Private	Very Likely	Major	Very High	Coordinate with County Public Works and NRCS
Life/ Property	Little Tujunga Canyon Residences	debris flows, flooding	Private	Possible	Moderate	Intermediate	Coordinate with County Public Works and NRCS
Life/ Property	Patolma Canyon Residences	debris flows, flooding	Private	Very Likely	Major	Very High	Coordinate with County Public Works and NRCS
Life/ Property	Sand Canyon Residences	debris flows, flooding	Private	Very Likely	Major	Very High	Coordinate with County Public Works and NRCS
Life/ Property	Gold/Alder Creek Residences	debris flows, flooding	Private	Possible	Major	High	Coordinate with County Public Works and NRCS
Life/ Property	Placerita Canyon State Park	debris flows, flooding	State / County	Very Likely	Major	Very High	Coordinate with County
Life/ Property	Los Pinetos Trail	Hazard trees, sediment, flooding	County (permit on FS land)	Possible	Major	High	Trail closure for one year, then further evaluation
Life/ Property	Indian Canyon Trailhead	nuisance sediment	FS	Likely	Minor	Low	Signage
Life/ Resources	Bear Divide Residence Compound	hazmat, debris flows, flooding	FS	Possible	Major	High	Containment and removal of hazmat
Life/ Property	Bear Divide Fire Station	hazmat, debris flows, flooding	FS	Possible	Major	High	Closure of fire station until hazmat removed, sand bags/k-rails

Life/ Safety	Abandoned Mines	increased visibility and access	FS	Possible	Major	High	Signage and exclosure
Life/ Property	Hanglider Point on Kagel	flooding, sediment	FS	Unlikely	Minor	Low	None
Life/ Property	Pacoima Reservoir	sediment, debris flows	County	TBD by County	TBD by County	TBD	Coordinate with County
Property	Santa Clara Divide Rd. (3N17) Bear Divide to Camp 9	rock fall, sediment, flooding	ANF	likely	moderate	high	storm inspection & response, culvert maintenance, restore timbers on retaining wall
Property	Santa Clara Divide Rd. (3N17) Camp 9 to Wilson Canyon	rock fall, sediment	ANF	possible	moderate	intermediate	none
Property	Santa Clara Divide Rd. (3N17) Bear Divide to North Fork	rock fall, sediment, burnt out guardrail	ANF	very likely	moderate	very high	storm inspection & response, diversion of water around headcutting
Property	Mendenhall Rd (3N32.1)	rock fall, debris flows, flooding	ANF	very likely	moderate	very high	macdrain replacement
Property	Soledad Canyon Rd.	rock fall, debris flows, flooding	County	very likely	moderate	very high	Coordinate with County Roads
Property	Little Tujunga Canyon Road	rock fall, debris flows, flooding	County	very likely	moderate	very high	Coordinate with County Roads
Property	Placerita Canyon Rd	debris flows, flooding	County	Very likely	moderate	high	Coordinate with County Roads
Property	Kagel Canyon Road (3N32.2)	rock fall, sediment, flooding	FS	likely	moderate	high	Drainage armor (rip/rap)
Property	Burma Road (3N37)	rock fall, debris flows, flooding	FS	very likely	minor	low	Gate entrance needs to be closed and locked.
Property	Sand Canyon Road	rock fall, debris flows, flooding	County	very likely	moderate	very high	Coordinate with County Roads
Property	Indian Canyon Road (4N37)	rock fall, debris flows, flooding	FS	very likely	minor	low	None

Property	Pole Canyon Road	rock fall, debris flows, flooding	FS	very likely	minor	low	None
Property	Gold Creek Road (3N29)	rock fall, sediment, flooding	FS	possible	minor	low	None
Property	Alder Creek Road (3N41)	rock fall, sediment, flooding	FS	possible	minor	low	None
Property	Pacoima Wash Road (3N37/4N35)	rock fall, debris flows, flooding	FS	Very Likely	Minor	Low	Coordinate with DWP
Property	Pacoima Canyon Road (3N31)	rock fall, debris flows, flooding	FS	Unlikely	Minor	Low	None
Property	Pacific Crest Trail	sediment, flooding	FS	Possible	Minor	Low	Warning signage
Property	Live Oak Picnic Area	hazmat	FS	Unlikely	Moderate	Low	None
Property	Soledad Interpretive Site	debris flows, flooding	FS	Unlikely	Minor	Very Low	Coordinate with County Roads
Property	Vulcan Mine	flooding, sediment	Private	Likely	Minor	Low	None
Property	BLM Parcels and PCT	sediment, flooding	BLM	Likely	Minor	Low	Coordinate with BLM
Natural Resources	Native Plant Recovery/Soil Productivity	invasives	FS	Very Likely	Major	Very high	Invasive plant detection and eradication, OHV Barriers
Natural Resources	Soil Productivity	erosion	FS	Very Likely	Moderate	Very High	OHV Barriers, invasive removal
Natural Resources	Unarmored Three Spined Stickleback	sediment and debris flows, water quality, invasive fauna	FS	Very Likely	Major	Very High	Translocate coordination invasive fauna removal
Natural Resources	Arroyo Toads	sediment and debris flows, water quality, invasive fauna	FS	Very Likely	Major	Very High	Invasive fauna removal

Natural Resources	Santa Anna Sucker	sediment and debris flows, water quality invasive fauna	FS	Very Likely	Major	Very High	Translocate coordination, invasive fauna removal
Natural Resources	California Condor	microtrash	FS	Very Likely	Major	Very High	Microtrash cleanup/cover-up
Natural Resources	California Gnatcatcher	vegetation type conversion	FS	Very Likely	Minor	Low	Invasive plant detection and OHV barriers
Natural Resources	Wildlife Guzzlers	hazmat	FS	Very Likely	Moderate	Very High	Disposal
Natural Resource	Water Quality	hazmat, debris flows, sediment	FS	Very Likely	Major	Very High	Hazmat containment/removal, OHV barriers, invasive removal
Cultural Resource	Heritage Sites (Site 55-12)	sediment, erosion	FS	Likely	Moderate	High	Slope treatment
Cultural Resource	Oak of the Golden Dream	debris flows, flooding	State / County	Unlikely	Major	Intermediate	None

Note: Only values at risk greater than intermediate will be addressed below. County and private property requires interagency coordination.

Threats to Life and Property

The combined factors of severely burned watersheds directly above private property, large volumes of loose, stored sediment in channels and on the steep slopes, moderate and high soil burn severity with water repellency, and the location of property in the floodplain directly below those watersheds indicate a high risk to life and property creating an emergency situation. Hikers, mountain bikers, and equestrians are also at risk from rock fall, hazard trees, debris flows and washouts while traveling along the Los Pinetos and user created trails across the burn area. Similarly, motor vehiclists and other travelers are also at a high risk from debris flows, rock fall, and flooding along Forest Service, County, City and private roads.

Soledad Canyon, Placerita Canyon, Little Tujunga Canyon, Sand Canyon and Pacoima Canyon Private Residences and Infrastructure

Probability of Damage or Loss: Very Likely and Likely (for Soledad). The hydrologic post fire response, debris flow potential and rock fall hazard are all expected to increase exponentially in these areas.

Magnitude of Consequence: Major. There could be substantial damage to property and loss of life or injury as a result of the post fire watershed response in these areas.

Risk Level: Very High. The BAER team recommends these land owners work directly with the NRCS and LA County to develop evacuation plans and potential point treatment to directly protect life and property. The BAER team has contacted NOAA with the pertinent information to issue burn area storm warnings.

Placerita Canyon State Park
Probability of Damage or Loss: Very Likely. The hydrologic post fire response and debris flow potential are both expected to increase exponentially in this area.

Magnitude of Consequence: Major. There could be substantial damage to property and loss of life or injury as a result of the post fire watershed response in these areas.

Risk Level: Very High. The BAER team recommends coordination with LA County Public Works and Fire to develop evacuation plans and potential point treatment to directly protect life and property.

Gold and Alder Creek Residences and Infrastructure
Probability of Damage or Loss: Possible. The hydrologic post fire response and debris flow potential hazard are all expected to increase in these areas.

Magnitude of Consequence: Major. There could be substantial damage to property and loss of life or injury as a result of the post fire watershed response in these areas.

Risk Level: High. The BAER team recommends these land owners work directly with the NRCS and LA County to develop evacuation plans and potential point treatment to directly protect life and property. The BAER team has contacted NOAA with the pertinent information to issue burn area storm warnings.

Los Pinetos Trail
Probability of Damage or Loss: Possible. The hydrologic post fire response and rock fall potential hazard are all expected to increase along the trail. Hazard trees are also prevalent along the upper elevation portion of the trail.

Magnitude of Consequence: Major. There could be loss of life or injury as a result of hazard trees and possibly post fire watershed response in these areas.

Risk Level: High. The BAER team recommends LA County close the trail for at least one year until hazard trees can be removed and to distinguish the level of impact and hazard risks after fall/winter storms.

Pacific Crest Trail
Probability of Damage or Loss: Possible. The impacts to the trail from hydrologic post fire responses are expected to be minimal along the burned portions of the PCT.

Magnitude of Consequence: Minor. Threats to the trail tread are minimal and could likely be repaired with minimum effort.

Risk Level: Low. The BAER team recommends installation of flood and sediment warning signs along the burned portions of the trail and periodic post-storm hazard patrols to ensure that trail conditions remain safe for use.

Bear Divide Residence Compound and Fire Station
Probability of Damage or Loss: Possible. The hydrologic post fire response and debris flow potential hazard are all expected to increase for the Bear Divide fire station area. For the residence compound there is a potential for hazardous material in the burned structures to become airborne and impact personnel at the fire station.

Magnitude of Consequence: Major. There could be injury to life as a result of hazmat in these areas.

Risk Level: High. The BAER team recommends the closure of the Bear Divide compound and fire station to prevent hazmat exposure to humans. In order to protect the fire station a water diversion structure (k-rails and sand bags) is recommended on the east side of the drainage crossing to the helispot.

Abandoned Mines
Probability of Damage or Loss: Possible. Previous to the fire, these mines were difficult for the public to see and access, due to thick vegetation coverage. The fire has removed this vegetation and the mines are now more visible and enticing for the public to enter.

Magnitude of Consequence: Major. There could loss of life or injury as a result of people entering these mines.

Risk Level: High. The BAER team recommends closing off access to the mines through fencing and signage.

LA County Roads (Soledad, Placerita, Sand, Little Tujunga)
Probability of damage or loss: Very likely. As a result of the burned watersheds it was determined that it's very likely that several drainage features at road crossings will be inadequate to handle post burn increased water flows and additional movement of sediment down slope and into these drainage features, causing water/debris/sediment to divert over and down the roadways. This could lead to road washouts and compromising of the roadbeds.

Magnitude of consequences: Moderate. These roads are important access routes for the public and various utilities.

Risk Level: Very High. The BAER team recommends coordination with LA County Roads to discuss potential flooding and debris flow impacts to these roads.

Forest Service Roads (Mendenhall, Santa Clarita Divide (from Camp 9 to North Fork Station) and Kagel Canyon)
Probability of damage or loss: Very likely. As a result of the burned watersheds it was determined that it's very likely that several drainage features at road crossings will be inadequate to handle post burn increased water flows and additional movement of sediment down slope and into these drainage features, causing water/debris/sediment to divert over and down the roadways. This could lead to road washouts and compromising of the roadbed.

Magnitude of consequences: Moderate. These roads are important access routes to Forest Service facilities, utility corridors and other permitted infrastructure.

Risk Level: Very High. The BAER team recommends coordination with SCE, DWP and LA County Fire to discuss potential flooding and debris flow impacts to these roads.

Threats to Ecosystem Stability/Soil Productivity
The Sand Fire burned approximately 41,401 acres east of Santa Clarita, CA. The Burned Area Emergency Response Team assessed the Sand Fire and found the overall soil burn severity to be 18% unburned & very low, 38% low, 30% moderate, and 15% high. Severe soil heating was fairly rare and restricted to steep ridgetop forested areas. Soil water repellency was common within moderate and high burn severity, and even in low burn severity areas. Hydrophobic strength was often high in the top 2 inches, and occur in 70% of the fire area. Roughly half of the moderate severity class resulted in near complete vegetation canopy and organic horizon removal, leaving surface rock as the only effective ground cover. In some, but not all pour-point watersheds, significant erosion and sedimentation is expected, averaging from 2 to 10 tons/acre for a 2-year runoff event.

Thus, erosion rates are elevated high enough to constitute an emergency situation to soil productivity, but no hillslope treatments are proposed due to no direct impingement on values at risk and slopes being too steep to treat. Point treatments on OHV trails and roads are recommended to protect localized / specific soil resources adjacent to infrastructure.

In most, but not all poursheads, significant erosion (over 2 tons/acre) and sedimentation is expected for a 5 year storm. Sediment increases are mostly pronounced on north facing slopes and in the a few main poursheads; Sand Canyon-Santa Clara River (below Fire), Upper Pacoima Wash (Pacoima Dam Reservoir), Lower Sand Canyon, Pole Canyon Quarry, and Sand Canyon Inholding. Naturally occurring erosion for this area is about 1 ton an acre for slopes less than 55 degrees. This increases to between 2 and 3 tons an acre for slopes 55-100 degrees, with the 3 tons occurring on the higher end of this range. Overall, a 2 year storm will produce about 6 tons an acre of erosion verse a 5 year storm producing around 12 tons an acre. If a 10 year storm occurred 26.9 tons an acre is expected to erode from within the fire perimeter.

Probability of Damage or Loss: Very likely. Based on the low ground cover and conditions in moderate and high severity burn, it is very likely that erosion and sedimentation will occur in the Sand fire in the first year. There is also a potential for unauthorized off-highway vehicle use within the dozer lines leading to the burn that could be highly detrimental to vegetation recovery, encouraging noxious weed invasion.

Magnitude of Consequence: Moderate. The ERMiT modeled results show with the most likely scenario (a 2-year runoff event) that the amount of soil lost will be relatively moderate, this leads to a conclusion that the magnitude of consequences of soil loss is moderate.

Risk Level: Very high. The BAER team recommends installation of OHV barriers to encourage vegetation recovery, limit weed invasion and protect soil structure. Because of the steep slopes, other treatments to reduce erosion risks are neither economically feasible nor effective. It was also determined that increased hydrophobicity and channel loading of sediment will increase the risk for other evaluated VARs downstream of the fire area.

Threats to Water Quality

Wildfires primarily affect water quality through increased sedimentation. As a result, the primary water quality constituents or characteristics affected by this fire include color, sediment, settleable material, suspended material, and turbidity. Floods and debris flows can entrain large material, which can physically damage infrastructure associated with the beneficial utilization of water (e.g., water conveyance structures; hydropower structures; transportation networks). The loss of riparian shading and the sedimentation of channels by floods and debris flows may increase stream temperature. Fire-induced increases in mass wasting along with extensive tree mortality can result in increases in floating material – primarily in the form of large woody debris. Post-fire delivery of organic debris to stream channels can potentially decrease dissolved oxygen concentrations in streams. Fire-derived ash inputs can increase pH, alkalinity, conductivity, and nutrient flux (e.g. ammonium, nitrate, phosphate, and potassium), although these changes are generally short lived. Post-fire increases in runoff and sedimentation within the urban interface, and burned structures and equipment within the fire perimeter may also lead to increases in chemical constituents, oil/grease, and pesticides.

The most noticeable effects on water quality will be possible increases in sediment and ash from the burned area into the Santa Clara River, Pacoima Creek, Little Tujunga Creek and other waterbodies in and downstream of the fire area. Damaging precipitation in the burn area could come in the form of summer thunderstorms occurring between late July and early August. Winter frontal systems are also common in this area and also have the potential to cause flooding in the fire area. Occasionally the area is subject to a rain-on-snow event, resulting in extensive flooding (more likely at higher elevations within the fire area). This is not, however, an annual event. The climate is characterized by cool, moist winters followed by hot, dry summers. Within the Sand Fire, the post-fire watershed threat should be reduced measurably after five to fifteen years with favorable precipitation.

In addition to ash and sediment, two hazmat sites, most notably the Bear Divide residence compound, were found in the burn perimeter. The California Integrated Waste Management Board (CIWMB) has stated that ash and debris from residential structures consumed by wildfires may contain concentrated amounts of heavy metals, such as arsenic, barium, beryllium, copper, chromium, cadmium, lead and zinc. It is also known that lead remains are found in burned debris and poses a threat when disturbed and airborne. Hazardous common household products such as pesticides, fertilizers, paints and thinner, automobile products and other petroleum based products are also found in the burned structures. Pacoima Reservoir, a municipal water supply, is downstream of the Bear Divide compound and there is a moderate chance that soluble hazmat from burned refuse could release into the soil and to nearby areas by overland flow or through ephemeral stream channels nearby.

Threats to Vegetation Recovery

Increase in Noxious Weed Populations: An emergency exists with respect to vegetative recovery as a result of the threat of post-fire weed introduction and spread. The unknowing introduction and dispersal of invasive weeds into areas disturbed by fire suppression and rehabilitation has the potential to establish large and persistent weed populations. In addition, it is highly likely that existent weed infestations along fuelbreaks will increase in the burn area due to their accelerated growth and reproduction and a release from competition with natives. These weed populations could affect the structure and habitat function of native plant communities within the burn area. It is expected that most native vegetation would recover if weed invasions are minimized. Approximately 60 miles of dozer line were also constructed outside and within the burn perimeter. In addition to causing an increase in weed invasion, the disturbances caused by dozer lines are expected to create accelerated erosion and soil compaction that may also inhibit the recovery of native plant populations. Approximately 13,000 acres (30%) of the Sand Fire also overlapped with six different fires that have occurred within the past 12 years. If weed infestations are not controlled it is expected that this short fire return interval will lead to vegetation type conversion in this 13,000 acre area, since the native vegetation has not been allowed to re-establish and was not mature enough for obligate seeders to produce necessary seed quantities to compete with aggressive non-native weeds.

Probability of Damage or Loss: Very Likely. This determination is due to the change in watershed response causing sheet and rill erosion of topsoil. There is also a potential for unauthorized off-highway vehicle use within the burn area and dozer lines that will be highly detrimental to vegetation recovery and encourage noxious weed invasion.

Magnitude of Consequence: Major. This determination is due to the high potential for vegetation type conversion to non-native annual grasslands across the burn area, most especially along dozer lines and in the Station Fire re-burn area.

Risk Level: Very High. The BAER team recommends early detection and rapid response weed surveys to locate and treat high priority infestations.

Threats to Wildlife Resources

Santa Ana sucker (Catostomus santaanae)

Probability of Damage or Loss: Very Likely. This determination is due to the likelihood that the stream habitat will be negatively affected by sediment and there is no suitable refugia for this species to use during debris flow or flooding events for several years. In addition, the high likelihood that the post storm peak flows and sedimentation modeled will result in extirpation.

Magnitude of Consequence: Major. This determination is due to the fact that if this population is extirpated this will likely result in a significant loss of genetic variation for this species since there are only two other areas that this species is found east of the dry gap within the Santa Clara watershed (San Francisquito and Valencia). Furthermore, extirpation of this species would likely result from storm flows and recolonization would be impossible because of the lack of connectivity between Soledad, San Francisquito and Valencia.

Risk Level: Very High. The BAER team recommends invasive fauna removal, coordination with USFWS and CADFW and early detection and rapid response of invasive plant species.

Unarmored threespine stickleback (Gasterosteus aculeatus williamsoni)
Probability of Damage or Loss: Very Likely. This determination is due to the likelihood that the stream habitat will be negatively affected by sediment and there is no suitable refugia for this species to use during debris flows or flooding events for several years. In addition, the high likelihood that the post storm peak flows and sedimentation modeled will result in extirpation.

Magnitude of Consequence: Major. This determination is due to the fact that if this population is extirpated this will likely result in a significant loss of genetic variation for this species since there are only one other area that this species is known east of the dry gap within the Santa Clara watershed (San Francisquito). Furthermore, extirpation of this species would likely result from storm flows and recolonization would be impossible because of the lack of connectivity between Soledad and San Francisquito.

Risk Level: Very High. The BAER team recommends invasive fauna removal, coordination with USFWS and CADFW and early detection and rapid response of invasive plant species.

Arroyo toad (Anaxyrus californicus)
Probability of Damage or Loss: Very Likely. This determination is due to the likelihood that the habitat will be negatively affected by nonnative fauna and vegetation. Nonnative vegetation will result in a habitat type conversion resulting in negative impacts to Arroyo toad survivorship. In addition, the high likelihood that the post storm peak flows and sedimentation modeled will result in extirpation.

Magnitude of Consequence: Major. This determination is due to the fact that if this population is extirpated this will likely result in a significant loss of genetic variation for this species since there are limited viable populations in Southern California. Furthermore, extirpation of this species would likely result from habitat type conversion and increased predation.

Risk Level: Very High. The BAER team recommends invasive fauna removal, coordination with USFWS and CADFW and early detection and rapid response of invasive plant species.

California condor
Probability of Damage or Loss: Very Likely. This determination is due to the known use of this area by condors.

Magnitude of Consequence: Major. This determination is due to the potential for microtrash ingestion to lead to injury or mortality of chicks and adult condors.

Risk Level: Very High. The BAER team recommends removal of microtrash in strategic places, known to be near high use areas for the condor.

Threats to Cultural Resources
Wildfires have the potential to damage, or destroy cultural resources through: (1) direct effects of the intense heat and smoke; (2) ground disturbing rehabilitation measures; and/ or (3) soil movement caused by subsequent storm episodes. These impacts may completely destroy historic and archaeological resources or alter the context of surface and subsurface cultural remains important to scientific analysis and interpretation. Also, fires may increase the accessibility and visibility of archaeological site locations, creating a heightened susceptibility to vandalism, artifact looting, and unauthorized Off-Highway Vehicle (OHV) activity.

In this case, vegetation at many of the inventoried 23 heritage sites within the perimeter of the Sand Fire was completely or mostly removed. It is expected that varying degrees of erosion will occur at all these sites during winter storms, but may be most pronounced at sites that are situated along creeks, at canyon floors or on a slope. BAER analyses indicate one "at-risk" cultural resource that has been considered viable for treatment.

Probability of Damage or Loss: Likely. This determination is due to the change in watershed response causing sheet and rill erosion of topsoil. There is also a potential for unauthorized off-highway vehicle use within the burn area that would be highly detrimental to the cultural site and encourage soil erosion.

Magnitude of Consequence: Moderate. This determination is due to the high cultural value of the prehistoric site.

Risk Level: High. The BAER team recommends a slope treatment of fiber wattle installation to stabilize soil within the cultural site.

B. Emergency Treatment Objectives:

• Provide for Public Safety– Ensure communication of potential post fire values at risk has occurred. Reduce threat to life and safety by closing hazardous areas and roads until watershed stabilization has occurred and/or the threats/hazards have been removed. Re-evaluate the burned area before lifting the closures. Further reduce threat to life and safety by installing and maintaining educational/safety signing in hazardous areas and roads until watershed stabilization has occurred and/or the threats/hazards have been removed.

• Limit Damage to Property- Private residences/businesses and roads within and downstream of the burn area are at greater risk from flash flooding and sedimentation after the fire. The treatment objective is to increase the awareness of the private property owners, Natural Resource Conservation Service (NRCS), LA County, and other agencies of the potentially hazardous conditions resulting from the fire.

• Noxious Weeds - Reduce the potential for impaired vegetative recovery and introduction/spread of noxious weeds by conducting detection surveys/rapid response and preventing unauthorized OHV.

• Road and Trail Treatments – Objective is to improve road drainage to protect the road system. Reduce erosion from the road surface and sediment delivery to stream channels. Reduce the threat to life and safety for road and trail users by implementing closures and installing hazard signs.

• Limit loss of soil productivity –Objective is to decrease rates of runoff water and erosion by conducting invasive species removal, area closure, and OHV barrier installation.

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

Land **90** % Channel **0**% Roads/Trails **90** % Protection/Safety **90** %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	90%	80%	N/A
Channel	N/A	N/A	N/A
Roads/Trails	90%	75%	70%
Protection/Safety	90%	80%	75%

E. Cost of No-Action (Including Loss): $163,620,000.00

F. Cost of Selected Alternative (Including Loss): $385,200.00

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Katie VinZant: Angeles National Forest

Email: kvinzant@fs.fed.us Phone: (626) 383-1626 FAX: (626) 574-5207

Core Team

Eric Nicita (Soils/GIS)
Chris Stewart (Hydrologist)
Kelsha Anderson (Hydrologist)
Leslie Welch (Wildlife)
Rusty LeBlanc (Engineering)
Anna Courtney (Soils trainee)
Joe Gonzales (Hazmat)
Aaron (Fisheries trainee)

Brad Rust (Soils)
Joanna Huckabee (Archaeologist)
Lauren Quon (Botany trainee)
Cliff Johnson (Lands)
Nathan Sill (Wildlife)
Belinda Walker (Hazmat)
Ray Kidd (Recreation)

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.)

Implementation Team
To provide for logistics and tracking of treatment implementation.

Implementation Team Cost

Item	Unit	Unit Cost	# of Units	Cost
Implementation Team Leader	Days	$400	20	$8,000
BAER Coordinator	Days	$400	5	$2,000
Vehicle mileage	Miles	$0.55	2000	$1,100
			Total Cost	**$11,100**

Land Treatments:

Slope Stabilization for Prehistoric Heritage Site
This treatment type consists of the implementation of water control devices called wattles. Evidence of past erosion can be seen below the road and in an area of the site that is burned. The majority of vegetation is gone due to the fire and suppression efforts. Post fire condition at the site will likely result in increased sheet wash and runoff through this area, exposing subsurface deposits and artifacts, causing these materials to erode down slope. The current lack of vegetation has exposed artifacts, increasing their potential of looting. This potential is even higher due to the sites location along a road and the Pacific Crest Trail. At risk is the integrity of this potential NRHP property, loss of data, and increased exposure of artifacts that may be looted. The area needing wattles is approximately 150 feet long by 350 feet wide.

Heritage Stabilization Cost

Item	Unit	Unit Cost	# of Units	Cost
1 GS-11 Archeologist	Days	$400	1	$400
2 GS-7 Techs	Days	$225	1	$450
3 GS-5 Techs	Days	$200	1	$600
Supplies (Wattles and Stakes)	Lump	$5,272	1	$5,272
			Total Cost	**$6,722**

Noxious Weed Detection and Rapid Response
Weed detection surveys and rapid response eradication treatments are to determine whether ground disturbing activities related to the Sand Incident and the fire itself have resulted in new or the expansion of existing noxious weed infestations. With 62 miles of dozerline, 55 miles of handline, 3 miles of trail, 191 miles of riparian corridors in the fire it is expected that new and expanding weed infestations will proliferate in and along these vectors if left unchecked, eventually leading to vegetation type conversion. As stated under the vegetation recovery threat section above, it is also expected that the 13,000 acre area reburned within the past 12 years will also face type conversion impacts given the rapid fire return interval that is much more frequent than historic fire events. In addition, given that more than half of the Sand Fire is in Wilderness and Inventory Roadless Areas it is imperative to keep new infestations from establishing in the backcountry and to keep infestations on the road perimeters from expanding into dozerlines, riparian areas, and trails. Surveys and rapid response eradication treatments will begin in 2017 during the flowering periods of weed species. Because of differences in flowering times for all potential species, two visits will be required during the growing season. If timing is such that all the target species are detectable/treatable in one visit, the actual costs would be lower than displayed below. Completion of surveys in riparian areas, dozer lines, roads, staging areas, safety zones, known invasive plant populations and critical habitat for California gnatcatcher would be the first priority. The second survey priorities would be along handlines and drop points. Surveys of the general habitats in the burned area would be the lowest priority. Detailed weed detection survey guidelines are

attached in Appendix A.

Weed Detection and Rapid Response Cost

Item	Unit	Unit Cost	# of Units	Cost
1 GS-11 botanist	Days	$400	5	$2,000
4 GS-7 weed technicians	Days	$225	85	$76,500
Supplies (mainly herbicide)	Each	$3,000	1	$3,000
Vehicle gas mileage	Miles	$0.55	6000	$3,300
Vehicle Lease	Month	$600	4	$2,400
			Total Cost	**$87,200**

Condor Protection: Lead and Micro-trash Removal

Sites with a concentration of microtrash pose a risk for condors. The fire has removed vegetation and exposed areas with concentrations of microtrash that is now easily accessible to foraging condors. The primary treatment for removal of microtrash is manual clean-up of the site. The sites included for treatment are in proximity of FS Road 3N17.8 and are located next to trails, roads, turnouts, parking areas and the Bear Divide water tanks. Volunteers will be used when possible.

Condor Protection and Removal of Microtrash				
Item	Unit	Unit Cost	# of Units	Cost
GS-11 biologist	Day	376	5	1,180
Mileage	Miles	0.33	100	33
Type 2 crew	Days	4000	5	20,000
Mileage	Miles	1.00	100	100
Misc. supplies	Each	200	1	200
Total				21,513

Removal of Non-Native Aquatic Species

African clawed frogs and goldfish have been found in two locations directly adjacent to occupied UTS/SASU streams segments in Soledad Canyon. Post-fire events may facilitate the spread of non-native aquatic species into previously unoccupied habitats. This concern is elevated for streams with special status species where high water flows have the potential for washing non-native aquatic species into downstream reaches beyond their original location. Removal will be accomplished by installing silt fencing around the existing chain-link fence around the pool at the upstream site. Then the pool will be drained. In addition, the outlet hose will be fed into a net to catch any tadpoles or metamorphs that may get through the pump. As the pool gets drained adults and juvenile frogs will be captured using nets and will be euthanized and properly disposed of. The silt fencing will be left in place to ensure that any individuals that are missed are not able to escape the pool area and enter the stream. Periodic visits will be made to ensure that no frogs were missed during the initial removal phase. Once we are confident we removed all the frogs the silt fencing will be removed. Removal of frogs in the White Rock campground will utilize electrofishing units, seines, dipnets and traps. Baited traps will be used initially as they have been found to be very effective with African clawed frogs. Then remaining frogs will be captured with backpack electrofishing units and dipnets.

Invasive Aquatic Removal Costs

Item	Unit	Unit Cost	# of Units	Cost
GS-11 biologist	Day	387	8	3,096
GS-7 fisheries techs	Day	225	15	3,375
2 GS-5 fisheries techs	Day	200	15	6,000

Materials (silt fencing, sand bags, zip ties, bait)	Lump sum	2529	1	2,529
Total Cost				**$15,000**

Road and Trail Treatments:

Road Infrastructure Treatments
Because much of the vegetation adjacent to and above the roads has been completely burned, nearly all of the drainage structures are undersized for the expected increased runoff of water and debris. Some of the structures have been damaged by rolling or falling debris and plugged by rocks or soil.

All of the road drainage structures are located in natural drainage channels or have road dips constructed to these drains. Since highly increased runoff is expected during winter storms, and is concentrated and directed to these channels, it is anticipated that most of these structures will fail and will be lost downhill. With structure failure and loss, most of the adjacent road sections will be severely damaged. This increased soil loss will increase the sediment load of downstream channels.

These treatments will be focused on mid to lower slope road locations where stream bulking will be the greatest, impacting crossings and road surfaces.

Road Treatment Costs

Item	Unit	# of Units	Unit Cost	Total
Road Dips / excavation	Each	4	350	1400
Install culvert inlet treatment	Each	1	1700	1700
Install Drainage Armor	Cubic Yard	25	150	3750
Install Overside drains / flume	Each	3	3500	10500
Excavate culvert inlet	Each	1	400	400
Install K-Rails and sand bags	Each	3 & 50	350	1050
Replace retaining wall timbers	Each	4	125	500
Replace guardrail post	Each	30	150	4500
Storm inspection and response	Days	5	900	4500
Storm inspection and response	Days	7	3600	25200
Contract Mobilization & prep	Each	1	16050	16050
				$69,550.00

Protection/Safety Treatments:

Interagency Coordination
Interagency coordination started during the fire and continued throughout the BAER Assessment and is a critical component to the BAER process. Continuing this coordination by providing the BAER Assessment Report, specialist reports and attending meetings is anticipated.

Interagency Team Cost

Item	Unit	Unit Cost	# of Units	Cost
BAER Coordinator/Hydrologist	Days	$400	6	$2,400
Special Uses Administrator	Days	$450	1	$450
Wildlife Biologist GS-12	Days	$450	5	$2,250
Fisheries Biologist GS-9	Days	$300	10	$3,000
Vehicle mileage	Miles	$0.55	1000	$550
			Total Cost	**$8,650**

Pacific Crest Trail Signage and Post-Storm Hazard Monitoring
Post fire surveys of the section of the Pacific Crest Trail in the burn area revealed that the trail tread is intact, no hazard trees are present and it currently has minimal dry ravel and rock fall. Given the PCT's location along the very edge of the burn and its intactness, the treatment recommendation is to keep the trail open to the public, but to install hazard warning signage and to conduct periodic trail hazard monitoring (after fall/winter storms) to assess the saftey of the trail for continued public use. Costs for signage are covered below under the general signage treatment.

PCT Treatment Cost

Item	Unit	Unit Cost	# of Units	Cost
1 GS-7 Recreation Technician	Days	$300	12	$3,600
Vehicle mileage	Miles	$0.55	1200	$660
			Total Cost	**$4,260**

Barriers for Unauthorized Off Road Vehicle Use and Protection Monitoring
Unauthorized access is a threat to the burned watershed due to the dozerlines created for the fire. The ANF is the most urban Forest in the nation with one of the highest use levels. The challenge for the ANF is managing the high number of users who gain unauthorized access to the Forest by driving/riding/entering through or around a locked gate or closure sign. This type of unmanaged use can cause damage to natural resources. In order to manage OHV potential access onto dozerlines and the burned area, the BAER team requests funding to purchase and install no-dig barriers, which have been proven to be effective and cost efficient barriers on the ANF in past fires.

Through past BAER experience, the ANF has determined that signage, barriers and other hard closures that are installed to discourage soil disturbance and assist in allowing natural vegetative recovery are not effective by themselves. Patrolling within and adjacent to the burn area is needed to enforce the closure and deter unauthorized access, vandalism, and damage to National Forest System lands. The following treatment is needed.

OHV Barrier Installation and Protection Monitoring Cost

Item	Unit	Unit Cost	# of Units	Cost
No-digs barrier materials	Each	$36.25	100	$3,625
Installation Supplies	Each	$100	1	$100
Labor (4 GS 5 Techs)	Days	$800	8	$6,400
GS-9 LEO Patrol	Day	$370	75	$27,750
GS-5 OHV - FPO	Day	$225	8	$1,800
Mileage	Miles	$0.55	400	$220
			Total Cost	**$39,895**

Human Life and Resource Protection (Fire Area Closure and Hazard Warning Signs)
To ensure safety for Forest visitors and protection to Forest resources during the recovery period, fire area closure and warning signs will be placed at designated and user-created trailheads and road locations adjacent and within the fire perimeter. Given the typical amount of vandalism on the ANF, it is highly likely signs will need to be checked and replaced periodically.

Forest Infrastructure: To protect life and property associated with the public use of the hiking trails and roads within and downslope/downstream of the Fish Fire, the BAER Assessment Team recommends the temporary

closure of portions of the burn area to all recreational users (the closure boundaries would be the ANF boundary adjacent to Soledad Canyon Rd and Placerita Canyon Road for the northern side , just west of Los Pinetos Trail for the western side, Santa Clara Divide Road (Wilson Canyon to Bear Divide)/Little Tujunga Road/Mendenhall Road for the south and Lightening Point/Messenger Flats Campground/PCT for the east). The closures will be accomplished by various means such as placement of signs and informing the public at strategic locations of access points outside and within the fire perimeter which will effectively close off the burn area.

Closure and Hazard Signage (Trails, Roads, and Recreation Areas)

Item	Unit	Unit Cost	# of Units	Cost
GS-11 Recreation Officer	Day	$360	2	$720
2 GS-5 Recreation Technicians/ FPO	Days	$440	10	$4400
Large Area Closure Signs & install	Each	325	10	$3250
Large Area Warning Signs & install	Each	650	12	$7800
Trail closure signs (12"x 18") Hi density plastic.	Each	$6	100	$600
Small Area closure signs (14" x 20")	Each	$33	30	$330
Posts and hardware	Each	$18	100	$1800
Vehicle mileage	Miles	$.55	1000	$550
Vehicle FOR	Month	$350	0.5	$175
Total Cost				**$19,625**

Road Closure

Gates will be installed at specific locations within and at the edge of the burn to implement the Sand Closure Order. Precise locations (GPS Latitude/longitude coordinates) are listed below. Boulders are needed along with the gates in order to tie the road barrier to vegetation or rock faces/slopes.

Road Closure Treatment Cost

Item	Unit	Unit Cost	# of Units	Cost
Steel Road Gates – Standard ANF road gate w/ sign kit 1) 3N17 @ Bear Divide – double gate 2) 3N17 @ Indian Canyon- double gate 3) 3N17 @ Messenger Campground– single	Each	$10,000	3	$50,000
Boulders – placement w/gate installation	Load	3	$1,500	$4,500
Boulder Barrier Placement (Labor and Vehicle)	Days	$1500	7	$10,500
Vehicle Mileage	Mileage	.55	700	$385
Misc. Supplies (locking pins and locks)	Unit	1,500	1	$1,500
Sec 106 Compliance (new gate sites)	Day	$400	2	$800
			Total Cost	**$67,685**

Bear Divide Compound Hazmat

Treatment includes installation of silt fencing around downslope perimeter of the five burned residences until cleanup and disposal action can be conducted. Monitoring and maintenance of this fencing should be also conducted after large storm events and corrective measures taken. In addition, hazmat containers and water heaters in nearby drainages should be removed and properly disposed of off-site.

Hazmat Containment/Removal Cost

Item	Unit	Unit Cost	# of Units	Cost
Mobilization	Each	$3000	1	$3000
Health and Safety Plan	Each	$2500	1	$2500
Containment of Hazmat (Ash, Appliances)	Lump Sum	$1400	1	$1400
Cleanout and Removal of Propane Tank	Each	$700	1	$700
Removal of Water Heaters from Drainages	Lump Sum	$1000	1	$1000
Removal and Disposal of Visible Hazmat Containers	Lump Sum	$3500	1	$3500
Hazmat Testing (Suite of Test Per Housing Unit)	Each	$500	5	$2500
GS-11 Hazmat Specialist time	Per Day	$450	5	$2250
Vehicle gas mileage	Miles	$0.55	1300	$715
			Total Cost	**$17,565**

Bear Divide Fire Station Sediment Protection

Treatment includes installation of k-rails and sand bags along the eastern side of the low water crossing which leads to the helispot. This will cover approximately 15 linear feet across the access road itself, which is channeling water/sediment into the fire station.

Item	Unit	Unit Cost	# of Units	Cost
Sandbags	Each	$1	800	$800
K-rails and install	Feet	$200	15	$3000
GS-11 Technical Supervisor & Monitoring	Days	$400	2	$800
			Total Cost	**$4,600**

Abandoned Mines: Fencing and sign installation

This treatment provides for public safety and resource protection by reducing the potential for the public to explore exposed adits, reducing the potential for exposure to hazards, and protect bats and their habitat from vandalism and disturbance. The fire has removed vegetation and exposed previously concealed adit portals. Mines with high visibility will have fencing installed around the adit portal and signs installed to warn the public of the potential hazards. If the sign installation and fencing closure are not effective, or if additional sites are discovered, the Forest may request additional funding in an interim request. Six abandoned mine adits have been identified as needing treatment.

Abandoned Mine Sign/Fence Treatment Costs				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
GS-11 biologist	Day	$387	3	$1,161
Site Closure – 3 GS-4, Materials	Site	$1,200	6	$7,200
GS-9 Archaeology Survey	Day	$275	4	$1,100
Mileage	Miles	$0.33	500	$165
			Total Cost	$10,626

PART VII - APPROVALS

1. Forest Supervisor (signature) — Date: 8/23/16

2. Regional Forester (signature) — Date: 8/29/2016

Part VI – Emergency Stabilization Treatments and Source of Funds

Initial

Click red icons for notes	NFS Lands					Other Lands				Money Left
Line Items	Units	Unit Cost	# of Units	BAER $	Spent $	# of Units	Fed $	# of Units	Non Fed $	Total $
A. Land Treatments										
Heritage Site Slope Stabilization	ea	$6722	1	$6,722	$0		$0		$0	$0
Implementation Team	ea	$11,100	1	$11,100	$0		$0		$0	$0
NX Weed Det. Survey	ea	87,200	1.0	$87,200						
Microtrash Removal	ea	$21,513	1	$21,513						
Non-native Aquatic Removal	ea	15,000	1	$15,000	$0		$0		$0	$0
Subtotal Land Treatments				$141,535	$0		$0		$0	$0
B. Channel Treatments – none										
				$0	$0		$0		$0	$0
Subtotal Channel Treatments				$0	$0		$0		$0	$0
C. Road and Trails										
Road Infrastructure Treatments	ea	$69,550	1	$69,550	$0		$0		$0	$0
Subtotal Road & Trails				$69,550	$0		$0		$0	$0
D. Protection/Safety										
Interagency Coordination	ea	$8,650	1	$8,650	$0		$0		$0	$0
PCT Signage and Hazard Patrol	ea	$4,260	1	$4,260						
OHV Barriers	ea	$39,895		$39,895						
Closure and Warning Signage	ea	$19,625	1	$19,625	$0		$0		$0	$0
Road Closure	ea	$67,685		$67,685						
Hazmat Stabilization/Cleanup	ea	$17,565	1	$17,565	$0		$0		$0	$0
Bear Divide Fire Station Protection	ea	$4,600	1	$4,600						
Abandoned Mines	ea	$10,626	1	$10,626						
Subtotal Protection				$172,906	$0		$0		$0	$0
E. BAER Evaluation										
Assessment Team	0520	H5BAER	---	---	$82,330	---	$0	---	$0	$0
	---	---	---	---	$0	---	$0	---	$0	$0
Subtotal Evaluation				---	$82,330	---	$0	---	$0	$0
F. Monitoring										
Subtotal Monitoring				0	$0		$0		$0	$0
G. Totals				**$383,991**	**$0**		**$0**		**$0**	**$0**
Previously approved						Comments:				
Total for this request				**$383,991**						

Appendix A

NOXIOUS WEED DETECTION SURVEY PLAN

Fire Name: Sand Fire Month/Year: August 2016
Author: Katie VinZant
Author Duty Station: Angeles National Forest

A. Background

Forest Service policy mandates the Forest to minimize the establishment of non-native invasive species to prevent unacceptable degradation of the burned area. It is necessary to conduct noxious weed detection surveys to evaluate the potential for spread from both existing populations and from the activities associated with fire suppression. Therefore, noxious and invasive weed detection surveys are proposed for the first year following the fires to verify the suspected infestations and determine the fires' potential impact on weed populations within the burned area. Wild oats (*Avena* spp.), ripgut brome (*Bromus diandrus*), red brome (*Bromus madritensis*), cheatgrass (*Bromus tectorum*), tocalote (*Centaurea melitensis*), yellow star thistle (*Centaurea solstitialis*), shortpod mustard (*Hirschfeldia incana*), tree tobacco (*Nicotania glauca*), castor bean (*Riccinus communis*), Russian thistle (*Salsola tragus*) and Spanish broom (*Spartium junceum*) are known to occur within the burn area and along access routes adjacent to the burn. Many plant dispersal vectors such as Forest roads, high winds, and waterways occur within the fire area. Even though a weed washing station was utilized after five days of suppression activities, seed could have been transported into the burn on suppression vehicles and equipment that arrived on the fire before the washing station was established. Fire is known to enhance the establishment of all weed species present.

B. Management Concerns

Noxious weed invasions interfere with habitat recovery and ecosystem health within burned areas and fire suppression sites. In particular, noxious weeds hinder the recovery of habitat, especially in arid and riparian ecosystems, by aggressive colonization and reduction of water quality and quantity.

C. Objectives

To determine if the fire and associated ground disturbing activities have promoted the establishment and spread of noxious weeds to the extent that eradication efforts are necessary. Early detection dramatically increases the likelihood of successful treatment. If weeds are detected, a supplemental request for BAER funds will be made for eradication.

D. Parameters

Noxious weed presence, location, density, population size, and persistence.

E. Locations

In and along roads, dozerlines, handlines, drop points, safety zones, riparian areas, and adjacent to known invasive plant populations.

Proposed Treatment Areas	
Dozerlines	64 miles
Handlines	55 miles
Riparian Corridors	190 miles
Roads	22 miles
Trails	3 miles

F. Weed Detection Survey Design and Methodology

Surveys will begin in 2017 during the flowering periods of weed species. Because of differences in flowering times for all potential species, two visits will be required during the growing season. Completion of surveys in roads, dozerlines, riparian areas, staging areas, safety zones, and known invasive plant populations will be the first priority. The second

survey priorities will be along hand lines, and drop points. Surveys of the general habitats in the burned area will be the lowest priority. All locations of weed species will be mapped, using the Angeles NF, "Invasive Weeds" list.

Surveying will include documentation and hand pulling/herbiciding new weed occurrences at the time of inspection. New weed occurrences will be pulled to root depth, placed in sealed plastic bags, and properly disposed or sprayed with the appropriate and approved herbicide.

Documentation of new infestations will include:

- Mapping perimeter of new infestations
- Filling out Weed Element Occurrence Form (Appendix A)
- Treatment method required
- Incorporating data into local GIS spatial database
- Entering data into National Resource Information System (NRIS) database
- Entering data into FACTS database
- Evaluating success of treatment in subsequent inspections

G. Reporting

If weed introduction and spread has occurred to the point that funding provided in the detection cost is not sufficient, an interim BAER report will be completed to request eradication funding. Reporting costs are included in figures below.

H. Costs: Weed Detection Surveys for One Year =$87,200.00

Weed detection surveys to determine whether ground disturbing activities related to the Powerhouse Fire have resulted in the expansion of noxious weeds is requested for the first year. Estimated costs are based on the assumption that two visits would be necessary because of the differences in flowering times. If timing is such that all the target species are detectable in one visit, the actual costs would be lower than displayed below.

Estimated Cost:	
1 GS-11 botanist ($400/day x 5 days)	$ 2,000
4 GS-7 weed technicians ($225/day x 85 days)	$ 76,500
Supplies	$ 3,000
Vehicle Lease ($600/month x 4 months)	$ 2,400
Vehicle mileage (6000 miles @0.55/mile)	$ 3,300
TOTAL	**$ 87,200**

I. Follow-up Actions

Design and implement follow-up treatments as needed. Plan for integrated weed management and NEPA analysis using non-BAER funding..