

Date of Report: September 9, 2011

BURNED-AREA REPORT

(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

- [X] 1. Funding request for estimated emergency stabilization funds
[] 2. Accomplishment Report
[] 3. No Treatment Recommendation

B. Type of Action

- ☒ 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)
- ☐ 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: Hill Fire

B. Fire Number: CA-BDF-12829

C. State: CA

D. County: San Bernardino

E. Region: 05

F. Forest: San Bernardino National Forest

G. District: Front Country (53)

H. Fire Incident Job Code: P5GD4L

I. Date Fire Started:09/02/2011

J. Date Fire Contained:09/04/2011

K. Suppression Cost: Approximately \$1,000,000 as of September 3, 2011.

L. Fire Suppression Damages Repaired with Suppression Funds

1. Fireline waterbarred (miles): 1.0 mile
2. Fireline seeded (miles): 0
3. Other (identify): n/a

M. Watershed Number:

Huc 6 watersheds: Upper Cajon Wash (180702030301), Oro Grande Wash (180902080704), Manzanita Wash (180902080503);

N. Total Acres Burned: 1158 ac

NFS Acres (486 ac) Other Federal (0 ac) State (0 ac) Private (672 ac)

O. Vegetation Types: The Baldy Mesa area vegetation is generally chaparral - high desert transition. The northern end of the burn area includes very slow to recover high desert species including Joshua trees (*Yucca brevifolia*) and California juniper (*Junipers californica*), while the remainder of the general vegetation in the burn area consists predominately of semi-desert chaparral. and scrub oak with a patchwork of chamise

chaparral, desert buckwheat, and scrub oak. Scrub oak and chamise can begin to recover from fire in as little as 3 to 5 years but may not achieve the pre-fire height for several more years. In the chaparral - high desert transition, the slower growing woody species and low rainfall means the vegetation will be slower to recover and may take as long as 20 years.

P. Dominant Soils:

Soil Map Units of the Hill Fire Burned Area (from BDF Soil Survey and County Soil Survey)

Map Unit	Map Unit Name	Acres	% Area
MoFG	Typic Xerorthents – Morical family, dry association, 30 to 75 percent slopes	111	9.6
BgEF	Morical family, dry – Badland association, 15 to 50 percent slopes	220	19.0
BeDE	Wrightwood – Morical, dr families association, 2 to 30 percent slopes	137	11.8
PsD	Avawatz-Oak Glen, dry families association, 2 to 15 percent slopes	11	0.95
102	AWAWATZ-OAK GLEN ASSOCIATION, GENTLY SLOPING*	59	5.1
111	BULL TRAIL-TYPIC XERORTHENTS ASSOCIATION, MODERATELY STEEP*	46	4.0
126	GULLIED LAND-HAPLOXERALS ASSOCIATION	382	33.0
134	HESPERIA LOAMY FINE SAND, 2 TO 5 PERCENT SLOPES	0	0
175	WRIGHTWOOD-BULL TRAIL ASSOCIATION, SLOPING*	192	16.6

Q. Geologic Types:

The East San Gabriel Mountains geologic units within the Hill Fire are predominantly Mesozoic metamorphic rocks; mostly muscovite- albite-quartz Schist, muscovite-plagioclase Schist and gneissic rock and marble. These rocks are heavily influenced by major and minor fault zones, often highly fractured, weathered and landslide prone.

R. Miles of Stream Channels by Order or Class:

Perennial = 0 mi; Intermittent = 1.3 mi; Ephemeral = 0 mi

S. Transportation System: Trails: 0.0 miles authorized Roads: 0.40 miles NFS, 1.5 miles Interstate-15; 1.6 miles private; 15.5 miles motorized trails on private lands

PART III - WATERSHED CONDITION

A. Burn Severity by total and FS (acres derived from GIS):

Sum of GIS_Acres	Column Labels			
Row Labels	Manzanita Wash	Oro Grande Wash	Upper Cajon Wash	Grand Total
Non Forest	337.6	335.0		672.6
Low	222.6	230.4		453.0
Moderate	115.1	104.6		219.6
USDA FOREST SERVICE	90.4	319.4	76.0	485.8
Low	64.9	219.2	66.8	350.9
Moderate	25.5	100.2	9.1	134.9
Grand Total	428.0	654.4	76.0	1158.4

B. Water-Repellent Soil (acres):

Increase in area of water repellent soils is estimated to be 0 acres for the entire burned area, because the fire had a majority of low soil burn severity and only isolated locations of moderate soil burn severity.

C. Soil Erosion Hazard Rating (acres):

0 (low) 1001 (moderate) 157 (high)

D. Erosion Potential:

ERMIT Erosion Model Outputs for the First Year Following the Hill Fire (assumes 20% probability, for 5-year storm; 250 foot long hillslope length; 20% rock, in chaparral)

Slopes	Erosion in tons/acre by Burn Severity		
	Unburned	Low	Moderate
Slopes 0-10%	0-1	0-2	0-3
Slopes 11-30%	0-1	4-6	5-8

The ERMIT model is storm event based; outputs represent a single event rather than over-winter. Model accuracy assumes +/- 50%.

Disturbed WEPP Mean annual averages for 30 years: Upland erosion rate: 0.4 tons/acre

E. Sediment Potential (cubic yards / square mile):

Sediment yield (cubic yards per square mile) comparison for first and second years after Hill Fire for areas of concern. Average annual results using multiple modeling protocols (Upper Canyon Wash watershed - using Rowe, Countryman, and Storey; Table 64; Oro Grande Wash and Ephemeral drainages above residences – ERMIT modeling converted to appropriate units).

		Sediment yield 1-year following Hill Fire		Sediment yield 2-years following Hill Fire	
Watershed area of concern	Normal	Post-fire	multiplier from pre-fire	Post-fire	multiplier from pre-fire
Hill Fire (76 ac contributing to Upper Cajon Wash)	5.3	18	3.5	9.5	1.8
Oro Grande Wash	120	2500	21	1000	8.3
Ephemeral drainage above residences	30	2200	75	580	19

This modeling indicates that Interstate 15 will likely see nuisance sediment that may get on the road following a storm. The Oro Grande Wash is long and wide with deep soils. Though it will likely move more sediment, there are no downstream values at risk where this sediment would be detrimental. The hillslopes above the residences, that flow ephemerally, are the most likely to yield nuisance sediment off of Forest Service property and onto private property. The low severity fire and the long term weather modeling indicate that though there is a 70% chance of runoff, there is only a 33% chance of erosion and a 63% chance of sediment delivery (30 year mean annual average).

F. Debris Flow Potential:

As a result of the removal of vegetation by the fire, excessive sediment and available transported material in channels and potential high runoff as a result of moderate to high rainstorms, debris-flow probabilities are high along and above the I-15 corridor.

Peak flow was estimated at various points in the watershed using the Rational Equation and Curve Numbers from the FS Peak Flow Calculator. A small 7 acre watershed above the residences in Section 6 modeled a flow of 8 cfs, compared with a background level of 2.5 cfs. The Oro Grande Wash, which discharges in allocation to not effect residences is modeled at the edge of the fire with a peak flow of 113 cfs, which is only 1.4 times above background. A test hillslope of 300 feet length above the Interstate-15 modeled a peak flow of about 6 cfs, only about 2 times background.

PART IV - HYDROLOGIC DESIGN FACTORS

- A. Estimated Vegetative Recovery Period, (years): 3-5
- B. Design Chance of Success, (percent): 64
- C. Equivalent Design Recurrence Interval, (years): 5
- D. Design Storm Duration, (hours): 3
- E. Design Storm Magnitude, (inches): 2.5
- F. Design Flow, (cubic feet / second/ square mile):

Peak discharge (cfs/sq.mi.) increases to the watersheds for the 2-year (Q2 – 2 inches in 3 hours), 5-year (Q5 – 2.5 inches in 3 hours), and 10-year (Q10 – 2.7 inches in 3.7 hours), storm events for the year following the Hill Fire (Note: The modeled peak flow values should only be used as an indicator of the relative increase in peak flows after the fire.) Peak flow was estimated at various points in the watershed using the Rational Equation and Curve Numbers from the FS Peak Flow Calculator.

Watershed area of concern	Normal watershed peak discharge per storm type (cfs/sq.mi.)		
	Q2	Q5	Q10
Hill Fire (76 ac contributing to Upper Cajon Wash)	425	790	1100
Oro Grande Wash – 378 ac on Forest	110	220	310
7 ac Ephemeral drainage above residences	30	225	460

- G. Estimated Reduction in Infiltration, (percent): 0%

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

Peak discharge (cfs/sq.mi.) increases to the watersheds for the 2-year (Q2 – 2 inches in 3 hours), 5-year (Q5 – 2.5 inches in 3 hours), and 10-year (Q10 – 2.7 inches in 3.7 hours), storm events for the year following the Hill Fire (Note: The modeled peak flow values should only be used as an indicator of the relative increase in peak flows after the fire.) Peak flow was estimated at various points in the watershed using the Rational Equation and Curve Numbers from the FS Peak Flow Calculator. The equivalent storm interval is provided (e.g. a Q5 result with Q10 indicates that the watershed is likely to respond as if there was a Q10 event occurring).

	1-year post burn peak discharge per storm type (cfs/sq.mi.) with approximate equivalent recurring storm rank		
Watershed area of concern	Q2	Q5	Q10
Hill Fire (76 ac contributing to Upper Cajon Wash)	600 (Q3)	970 (Q8)	1300 (Q17)
Oro Grande Wash – 378 ac on Forest	140 (Q3)	275 (Q7)	380 (Q18)
7 ac Ephemeral drainage above residences	260 (Q6)	730 (Q18)	1000 (Q100)

The 7-acre ephemeral drainage above the residences in Section 6 is comprised of about 5 acres on NFS lands and 2-3 acres of non-NFS lands prior to reaching a paved road where an identified low spot drains to an area between 2 residences. Even though the fire was low soil burn severity in the area, the reduction in cover still models with a significant increase.

PART V - SUMMARY OF ANALYSIS

BAER Risk Assessment Matrix

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

Probability of Damage or Loss: The following descriptions provide a framework to estimate the relative probability that damage or loss would occur within one to three years (depending on the resource):

Very likely- nearly certain occurrence (>90%)

Likely- likely occurrence (>50% to < 90%)

Possible- possible occurrence (>10% to <50%)

Unlikely- unlikely occurrence (<10%)

Magnitude of Consequences:

Major- Loss of life or injury to humans; substantial property damage; irreversible damage to critical natural or cultural resources.

Moderate- Injury or illness to humans; moderate property damage; damage to critical natural or cultural resources resulting in considerable or long term effects.

Minor- Property damage is limited in economic value and/or to few investments; damage to natural or cultural resources resulting in minimal, recoverable or localized effects.

A. Describe Critical Values/Resources and Threats:

Summary of fire burned area characteristics and watershed response:

The Hill Fire burned approximately 1158 acres with 486 acres on the San Bernardino National Forest, and 672 acres on non-Forest Service lands within the San Gabriel Mountains in San Bernardino County. The fire was within three sixth field watersheds; Upper Cajon Wash (76 acre draining to Santa Ana River), Oro Grande Wash (654 acres draining north to Mojave River basin), and Manzanita Wash (428 acres draining north to Mojave River Basin).

The Hill Fire started just before 1300 hours on September 2, 2011 in the center divide of Interstate 15. Mandatory evacuations were ordered for approximately 1500 homes in the Oak Hills area after the fire jumped the southbound lanes of Interstate 15 and traveled quickly north. The Hill Fire did force closure of Interstate 15 in both directions for a brief period and a closure of southbound lanes into the evening. The Interstate was fully open on September 3, 2011, though with lane closures for emergency vehicles. Good progress was made overnight and the fire did not grow significantly on September 3, 2011, allowing the evacuation orders to be lifted by 1400 hours. A total of 4 structures/homes were heavily damaged or lost.

The Hill Fire borders a number of residences and could pose a threat to Interstate 15, private landowners, as well as resources and cultural sites, and is adjacent to an area of the Forest that receives high use from the local OHV community. As part of the long-term management of the area, the Forest has been actively pursuing and implementing grants (\$100,000++) that allow for the rehabilitation of unauthorized trail development and use within the area. The Forest is concerned that this investment in long-term restoration work could be compromised as a result Hill Fire. The District Ranger detailed initial values at risk including life and property for sites adjoining and within the fire area (interstate, powerline road, gas line and road, off-Forest residences). The District Ranger also showed great concern for an assessment of potential threats to soil productivity, vegetative recovery, protection of cultural resources, and other similar damage from the increased opportunity of off-highway vehicle (OHV) incursions. The BAER team has been coordinating with Caltrans and the NRCS with regard to the initial BAER assessment, findings, and recommendations. Portions of the Hill Fire reburned areas associated with the Blue Cut Fire from 2002.

The BAER Team (Leader, Hydrologist, Hydrologist-trainee, Botanist, Archaeologist) mapped soil burn severity and compared the field findings with the BARC map provided. The BARC map showed a higher initial moderate soil burn severity than was verified in the field. Adjustments were made to the pixels of the BARC map until field observations were more closely represented. The final soil burn severity map shows the overall soil burn severity to be 69% low and 31% moderate. Accelerated hill slope erosion and watershed response is expected on slopes with moderate soil burn severity. Soils with low burn severity still have good surface structure, contain intact fine roots and organic matter, and should recover in the short-term once revegetation begins and the soil surface regains cover. The moderate class has evidence of severe soil heating in isolated patches; these areas could have long-term soil damage and high erosion hazard. Water repellency is present throughout the fire area, including unburned areas, and was only moderately exacerbated by the fire. While a proportion of eroded soil will remain on the hill-slope, delivery of eroded soil, by dry ravel or water erosion, to stream channels is expected to occur. These eroded sediments are a primary source of material for debris flows and sediment laden stream flows.

Watershed and Geology and Soils

The Hill Fire occurred in the Upper Cajon Pass area which bridges the Southern California basin to the south and the high desert environment to the north. The area is dominated by older slides, a broad alluvial wash, and numerous springs. A majority of the drainages only flow when rainfall is present, typically in the winter months.

The San Gabriel Mountains are some of the most tectonically active and rapidly uplifting mountains in the United States. The forces lifting the mountains to great heights are being counteracted by erosive forces tearing them down, such as gravity, moving water, wind, earthquakes and human activities. When the Hill Fire removed vegetative cover and burned surface soil structure, slopes and channels became even more unstable than normal. Rocks which have lost their supporting vegetation on steep slopes have already started to roll

down to roadways or canyon bottoms, or to places where they are stopped by obstructions or gentler slopes. Groundwater which previously fed vegetation may now surface as seeps and springs on some slopes and in canyon bottoms, and may initiate slope movements in some areas, even before the arrival of winter rains.

Deep seated rotational landslides and earth flows are relatively few in these mountains, but could occur in deep saturated slopes, especially if shaken by an earthquake. Many earthquake faults crisscross and border these mountains, and quakes could significantly increase all types of slope movements when slopes are saturated. Thin surficial slides and deeper translational debris slides will increase due to the destruction of soil structure and loss of root support.

Soils are dominantly coarse textured, sandy, and occur on steep to very steep slopes, rendering them naturally erodible. Relatively recent tectonic uplifting and high geomorphic erosion rates are responsible for relatively low amounts of soil development. The nearly flat high desert washes are broad and deep and indicate only moderate erosion potential. Pulse erosion following fire is a natural, long-term process in this region. Cover is critical for soil stabilization. Cover has been reduced in areas of moderate soil burn severity. Areas of low soil burn severity still show fine organic matter on the surface and skeletons of bushes that have fine branches remaining.

Threats to Life, and Property

Threats to life, safety, and property exist from the increased potential for flooding and sediment delivery along roads that border the fire area.

Interstate 15 Northbound lanes are located below steep, long slopes with moderate soil burn severity. Modeling indicates that flow and sediment yield will increase onto the Interstate.

- The probability of damage from the increased flows is estimated to be possible. Caltrans regularly does work to upgrade and storm proof these sections of the roadway.
- The magnitude of the consequences to the increased sedimentation and flow to the Interstate is minor given the 5-year storm event.
- Therefore the risk is considered Low, and no treatment, beyond coordination with Caltrans, is warranted.

Residences in Township 3N Range 5W Section 6 near the SW corner of the section are the closest to burned NFS lands. There is a small, 7 acre drainage with a low gradient that discharges from the fire area to the paved road that forms a low point between the homes. The Forest Service boundary is about 350 feet from the road along that drainage pathway. Modeling indicates that a 5-year event could cause the watershed to react like an 18-year event from this watershed that had a patchwork of low and moderate soil burn severity. The sediment yield from this watershed could also be substantial, though the flashy system already moves a lot of sediment during storms.

- Though the watershed response could be high, the location of property should limit the probability of damage or loss to “possible.”
- The magnitude of consequences is “minor”, with limited potential for damage to homes and the only likely scenario for injury would be a driver on the road during the damaging storm.
- The overall risk is “low.” No treatment on National Forest Land is recommended. Coordination with NRCS with NRCS will occur as needed.

Threats to water quality

Given that the Hill Fire only burned in an area of intermittent and ephemeral streams, the increase in sediment and ash from the burned area should not noticeably affect water quality. Only Oro Grande Wash is an intermittent blue-line, though during the BAER assessment, there was little indication of riparian vegetation. The geomorphology was characteristic of an ephemeral storm-dominated system deposited vast amounts of sand across a wide floodplain.

Burned buildings and vehicles on private land pose a threat to water quality from the release and mobilization of associated toxic chemicals such as gas, oil, and building materials.

- The probability of a reduction in water quality as a result of the fire is unlikely
- Any effects would be localized for the modeled storm event, indicating only minor consequences.
- The overall risk is “very low.”

Threats to Soil Productivity & Vegetative Recovery

A threat to long-term soil productivity comes from the threat of increased potential for establishment of noxious weeds. Despite high rates of post-fire soil erosion (dry ravel, increased overland flow, and wind), burned area soils will support recovery of fire adapted vegetation in the burned area. Slope stability is likely to recover to pre-fire conditions within 3-5 years, though full vegetative recovery of all species types may take up to 20 years.

Increased access due to the loss of vegetative barriers along access roads on the perimeter of the fire area is expected to result in unauthorized off highway vehicle use. Motorcycle tracks and historical/current use were observed by the BAER team in the fire area on dozer lines and open spaces within the fire. Vegetative recovery is critical for the reduction of sedimentation, stabilization of the watershed, and soil productivity.

- The probability of loss of soil productivity due to compaction is “very likely”, given the unauthorized OHV use in the area and the numerous new opportunities for incursion due to the loss of vegetative cover. Along with soil compaction, it is also “very likely” that vectors for noxious weeds will increase.
- The magnitude of the consequences of increase OHV use are “moderate” given some of the botanical species and the location of cultural resources (see below).
- The risk for soil productivity and vegetative recovery is “very high”, resulting in an emergency declaration and the need for treatment.

Threats to wildlife and botanical resources

The burned area has a history of unauthorized OHV use; there is now potential for increased use to occur as a result of the loss of vegetative barriers. Additionally, areas of ground disturbance (i.e. dozer lines) and regular equipment or crew presence (i.e. staging areas, safety zones, drop points) during suppression operations created a risk of invasive weed introduction, establishment and proliferation. Loss of vegetative cover which has acted as a natural barrier substantially increases this threat.

Invasive weed populations are known to occur along Interstate 15 and within the residential areas north of the Hill Fire. Within the burn there are no known weed populations. Invasive weeds are expected increase in the burn area due to naturally accelerated growth rates, high reproduction capabilities, and release from competition with native species. These weed populations could affect the structure and function of native plant communities within the burn area, weaken watershed integrity and soil stability, and threaten native wildlife habitat. The open vegetation structure of the post-fire landscape is extremely vulnerable to unauthorized OHV use. Impacts associated with this activity, including soil disturbance, compaction, and weed introduction/spread further exacerbate the recovery of multiple resources already at risk post-fire. These resources at risk include general vegetation, rare plants, wildlife, heritage resources, and watershed values. It is expected that most native vegetation would recover over time if noxious weed competition and OHV use are minimized.

The desert tortoise (federally threatened) is known to occur within the fire area (pers. comm. Uyen Doan, Resource Advisor). There are two primary concerns with the impacts of the Hill Fire to the desert tortoise and suitable habitat. Because of the removal of vegetation, there is increased potential of OHV use within the burn area, which could impact tortoises within the area. Also, the establishment of nonnative weeds would degrade the tortoise habitat.

The Baldy Mesa area vegetation is generally chaparral - high desert transition. The northern end of the burn area includes very slow to recover high desert species including Joshua trees (*Yucca brevifolia*) and California juniper (*Junipers californica*), while the remainder of the general vegetation in the burn area consists predominately of semi-desert chaparral, and scrub oak with a patchwork of chamise chaparral, desert buckwheat, and scrub oak. Scrub oak and chamise can begin to recover from fire in as little as 3 to 5 years

but may not achieve the pre-fire height for several more years. In the chaparral - high desert transition, the slower growing woody species and low rainfall means the vegetation will be slower to recover and may take as long as 20 years. Even after the faster recovering species like chamise, scrub oak and buckwheat get re-established, the open nature of the vegetation and the slow recovery of the woody species such as Manzanita and Ceanothus (that would serve as a barrier to illegal OHV activity) allows for an increase in illegal off-road vehicle travel. Continued disturbance from illegal OHV activity increases erosion and reduces soil/slope stability. This in turn, slows vegetative recovery by preventing germination and plant establishment, and may impact *Opuntia basilaris* v. *brachyclada*, a Forest Service Sensitive plant species with several known occurrences within the burn perimeter.

Reducing the introduction and spread of non-native invasive weeds has been identified as a Forest Service strategic goal, and the SFNF LMP includes detailed management direction to prevent the spread and introduction of noxious weeds. Several weed species are known from the Cajon Wash and I-15 corridor. Pampas grass, Spanish broom, tamarisk, tree of Heaven and fennel occur along I-15 in several locations near the fire boundary. In addition, invasive mustards, fennel and perennial pepperweed are known to occur along or nearby heavily used authorized OHV trails. The burn area is also a heavily used OHV area with both authorized and unauthorized trails. Transport of weed seed from one of these OHV areas to the other is quite likely.

Because of the potential for introduction of new weed species from equipment used for suppression on initial attack that was not washed prior to arrival on FS land, and the ease of transport of weed seeds on boots, tires, by wind water or animals, new infestations may occur within the burn area where native vegetation has been removed by the fire and soils are left vulnerable to invasion by these opportunistic weeds.

- The probability of damage or loss of botanical resources and impacts to desert tortoise (federally threatened) due to the Hill Fire is 'very likely', given the unauthorized OHV use in the area and the numerous new opportunities for incursion due to the loss of vegetative cover. It is also "very likely" that vectors for noxious weeds will increase.
- The magnitude of the consequences of increase OHV use are "moderate" given some of the botanical species and the location of cultural resources (see below).
- The risk to botanical resources and vegetative recovery is "very high", resulting in an emergency determination and the need for treatment.

Threats to Heritage Sites

There are three archaeological sites of Native Indian origin located close to the burn area, one of which is a NRHP-eligible large occupation site containing earth oven features, millingstones, handstones, and flaked stone tools dating to over 7000 years BP and currently the oldest known site on the Forest. The other two sites are smaller occupation sites consisting of similar artifacts and features and likely associated with the large site. The proximity of the cultural sites to recreation use makes this area particularly vulnerable and with the consumption of protective vegetation can increase access into areas that have not had vehicle access.

Several unauthorized off-highway-vehicle (OHV) trails originate from private lands off-Forest and continue through the burn area onto FS lands, with one continuing through the archaeological site.

- The probability of damage or loss to these sites is "likely" due to the potential for increased unauthorized OHV activity through the burn area where vegetative cover once protected the area from OHV access.
- The magnitude of consequences is considered "moderate" because the potential for increased and continual unauthorized activity in the area of these sites could result in additional user created trails into the site areas, erosion from these trails, damage to features, and displacement of artifacts and as long as problems are identified and corrected timely, it would not necessarily be irreversible, although it would contribute to long lasting effects to the sites.
- Therefore, the risk to these sites is considered "high", indicating an emergency determination, and warranting treatment.

Summary of Values at Risk and Emergency Determination

Value Category	Hazard	At Risk	Emergency Yes/No
Life/Health/Safety	Debris Flows, flooding, rockfall, sediment deposition	Private residences, Drivers on roads	Yes
Property/Infrastructure	Debris flows, flooding, rockfall, sediment deposition	Private Residences, Roads, and Interstate 15	Yes
	Debris flows, stream channel scouring	Gas pipeline	No
Water Quality	Increased sedimentation and turbidity	Water quality	No
	Hazardous material runoff from burned vehicles, structures	Water quality; public health	Unknown
Wildlife and rare plant habitat	Noxious Weed Invasion, Increased unauthorized OHV use	Vegetative recovery; wildlife and rare plant habitat	Yes
Soil Productivity	Increased runoff and debris flows, rock and debris fall, erosion and sedimentation, and landslides. Increased unauthorized OHV use leading to soil compaction	Soil productivity; vegetative recovery.	Yes
Cultural resources	Increased unauthorized OHV use	3 archaeological sites of Native Indian origin	Yes

B. Emergency Treatment Objectives:

The primary treatment objectives are to reduce threats to life, safety, and natural and cultural resources.

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

Land 80 % Channel N/A % Roads/Trails 80 % Protection/Safety N/A %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	80	80	60
Channel	N/A	N/A	N/A
Roads/Trails	80	80	60
Protection/Safety	90	90	90

E. Cost of No-Action (Including Loss): \$1,373,000 (Cost risk worksheet is in project file.)

F. Cost of Selected Alternative (Including Loss): \$358,012 (Cost risk worksheet is in project file.)

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Marc Stamer

Email: mstamer@fs.fed.us

Phone: 909-382-2828

FAX: 909-383-xxxx

Core Team Members:

- | | |
|--|-----------------------------|
| ▪ Robert G. Taylor – Hydrologist | ▪ Tracy Tennant – GIS |
| ▪ Debra Nelson – Botanist | ▪ Uyen Doan – Archaeologist |
| ▪ Mikaila Rimbenieks – Hydrologist Trainee | ▪ Travis Mason – OHV/Roads |

H. Treatment Narrative:

The proposed treatments on National Forest System lands can help to reduce the impacts of the fire from storm events, but treatments cannot fully mitigate the effects of the fire on the watershed. Detailed information of the treatments is summarized below. Hill slope treatments (such as hydromulching, aerial seeding, and straw application) were not proposed because they are infeasible and/or would not reduce the probability of damage to assets. The treatments listed below are those that are considered to be the most effective on National Forest System lands for the identified threats.

Land Treatments:

Noxious Weed Detection Surveys:

Surveys will begin in 2012 during the resprouting and flowering periods of weed species. Completion of surveys in roads, dozer lines, staging areas, safety zones, downstream from the weed washing station, known invasive and sensitive plant populations will be the first priority. The second survey priorities would be along riparian areas, hand lines, drop points, and prohibited plant plantations. Because of differences in flowering times for all the potential species, two visits are required. Detailed weed detection survey guidelines are in the Noxious Weed Detection Survey Plan.

Item	Unit	Unit Cost	# of Units	Cost
GS-11 Botanist	Days	\$390	4	\$1560
GS-9 Botanist	Days	\$300	4	\$1200
Supplies	Each	\$100	1	\$100
Vehicle Mileage	Miles	\$0.44	200	\$88
Total Cost				\$2948

Fencing (in combination with excavator work – see below)

Item	Unit	Unit Cost	# of Units	Cost
Installation work crew	Days	\$1500	5	\$7500
3-strand smooth wire for fencing	Bundles	\$70	25	\$1750
6-foot T-posts	Each	\$5.25	1060	\$5565
GS-11 Archaeology monitor	Days	\$390	5	\$1950
GS-11 Botany monitor	Days	\$390	2	\$780
Signs (includes installation)	Each	\$305	20	\$6,100
Vehicle Mileage	Miles	\$0.44	400	\$176
Total Cost				\$23,821

Channel Treatments: N/A

Road Treatments:

With the recreational use and vegetation types found in the Baldy Mesa area the Forest found the use of “chunking” with excavators an effective tool in protecting resources after a fire when combined with fencing, signs, and most importantly frequent patrols. Chunking is described as using the bucket of an excavator or articulating blade on small trail dozer to decompact roads/trails by digging into the compacted area and creating divets. These divets act as mini-catch basins (increasing infiltration), require minimal maintenance, and are found to collect seed and promote gemination (See photos below.)



Photo 1: Chunking with a small trail dozer that has an articulating blade.



Photo 2: Chunking with an excavator along a dozer line. First chunking occurs, then the equipment spread topsoil and slash from the dozer piles over the treated area.

With the Turtle Fire in 1999, which was in west end of Baldy Mesa, the Forest was able to control off road use with a combination of both fencing, chunking, and patrols. This was done with fire dozers, the forest sweco trail dozer and contracted excavators. The Blue Cut Fire of 2001, which burned in the same general location as the Hill Fire, used contracted excavators to rehabilitate dozer line and unauthorized OHV trail impacts within the burn area. The excavators were able to create bank turns on rehabbed chunked lines at road junctions to redirect the recreational public and protect the resources. These “banked turns” replaced the use of fence on many of the interfaced points. A lesson learned from the Turtle Fire that directing the user group instead of blocking routes with fence lasted longer with less maintenance costs, cut and/ or destroyed fence lines and employee time.

The Hill Fire burned a part of an OHV trail and also exposed some illegal trails from private onto forest lands. The recommended treatment is to use an excavator employing chunking and banked turns to help redirect the OHV trail and forest road recreation use away from cultural resources and out of the Hill burn area. The use of fence lines and fire recovery signage can help support the chunking along the impacted trail and road. Chunking has also proven to help bring vegetation back within impacted burn areas. After the Blue Cut Fire the Forest found vegetation coming back within one year. With high levels of recreational use and the knowledge that we have gained from past fires in the Baldy Mesa area, using these multiple closure methods discussed will have the greatest success on the Hill Fire rehabilitation and resource protection.

Item	Unit	Unit Cost	# of Units	Cost
Contract excavator	Hours	\$200	40	\$8000
Mobilization costs	Each	\$1000	1	\$1000
IDIQ contract preparation (GS-7 Roads/OHV; Inspector)	Days	\$220	5	\$1100
IDIQ contract administration/COR (GS-12 Engineer)	Days	\$450	2	\$900
Medium Duty Gate	Each	\$8000	1	\$8000
GS-11 Archaeology monitor	Days	\$390	1	\$390
Vehicle Mileage	Miles	\$0.44	200	\$88
Total Cost				\$19,478

Area closure

Closure would be implemented through the issuance of a forest order or area closure and trailhead signage. The area closure will be defined based on the southbound Interstate-15 and 3N24 gate (existing), a new gate (cost above) at the junction of 3N21 and 3N24, fencing (cost above) along the eastern border of the powerline road, and strategically placed fencing along the Forest boundary to where the fire boundary intersects with the southbound Interstate-15.

Item	Unit	Unit Cost	# of Units	Cost
GS-11 Recreation Officer	Days	\$350	3	\$1050
Total Cost				\$1,050

Protection/Safety Treatments:

BAER Implementation and Interagency Coordination:

This treatment ensures continued communication and coordination with NRCS and California Department of Transportation both of which have jurisdiction over adjacent lands and in holdings where life and property are at risk from post-fire conditions. Actions include working and coordinating with other agencies on the post-fire effects within and downstream of the fire such as potential road closures, Kinder-Morgan Pipeline operation and maintenance plan with regard to the fire, the County of San Bernardino regarding road closures, and the NRCS regarding private property in holdings.

Item	Unit	Unit Cost	# of Units	Cost
GS-11 Lands specialist	Days	\$355	1	\$355
Total Cost				\$355

I. Monitoring Narrative:

Heritage resource/vegetative recovery monitoring:

To protect unique and irreplaceable archaeological resources, fencing of potential access areas and associated “chunking” is the preferred land treatment. In order for this treatment to be effective, routine monitoring of the fencing and closure treatments should be conducted twice weekly (1/2 day per check). Treatment effectiveness monitoring would include inspecting and repairing the fence line as needed, and if access within the burned area is on-going. Key areas to inspect are along the fence line. Continued incursion may require archaeology support to assess potential damage and looting of resources. The burned area is accessible year round with most use occurring during the weekends. If monitoring shows the treatments are ineffective, the Forest may submit an interim request. The detailed monitoring plan is attached (See Appendix B).

Item	Unit	Unit Cost	# of Units	Cost
GS-5 Recreation technician (OHV)	Days	\$195	52	\$10,140
GS-9 Archaeology monitor	Days	\$300	3	\$900
Vehicle Mileage	Miles	\$0.44	3000	\$1320
Total Cost				\$12,360

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

Line Items	Units	Unit Cost	NFS Lands		Other \$	Other Lands			All Total \$
			# of Units	BAER \$		# of units	Fed \$	# of Units Non Fed \$	
A. Land Treatments									
Noxious Weed Detection	ea	\$2,948	1	\$2,948	\$0		\$0	\$0	\$2,948
Fencing Closure	ea	\$23,821	1	\$23,821	\$0		\$0	\$0	\$23,821
				\$0	\$0		\$0	\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0	\$0	\$0
Subtotal Land Treatments				\$26,769	\$0		\$0	\$0	\$26,769
B. Channel Treatments									
				\$0	\$0		\$0	\$0	\$0
				\$0	\$0		\$0	\$0	\$0
				\$0	\$0		\$0	\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0	\$0	\$0
Subtotal Channel Treat.				\$0	\$0		\$0	\$0	\$0
C. Road and Trails									
OHV route closures	ea	\$19,478	1	\$19,478	\$0		\$0	\$0	\$19,478
Area Closure Order	ea	\$1,050	1	\$1,050	\$0		\$0	\$0	\$1,050
				\$0	\$0		\$0	\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0	\$0	\$0
Subtotal Road & Trails				\$20,528	\$0		\$0	\$0	\$20,528
D. Protection/Safety									
Interagency Coord.	ea	\$355	1	\$355	\$0		\$0	\$0	\$355
				\$0	\$0		\$0	\$0	\$0
				\$0	\$0		\$0	\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0	\$0	\$0
Subtotal Structures				\$355	\$0		\$0	\$0	\$355
E. BAER Evaluation									
Assessment Team	ea	\$1,000	7	\$7,000			\$0	\$0	\$0
<i>Insert new items above this line!</i>				---	\$0		\$0	\$0	\$0
Subtotal Evaluation				---	\$0		\$0	\$0	\$0
F. Monitoring									
OHV closure/arch	ea	\$12,360	1	\$12,360	\$0		\$0	\$0	\$12,360
<i>Insert new items above this line!</i>				\$0	\$0		\$0	\$0	\$0
Subtotal Monitoring				\$12,360	\$0		\$0	\$0	\$12,360
G. Totals				\$60,012	\$0		\$0	\$0	\$60,012
Previously approved									
Total for this request				\$60,012					

PART VII - APPROVALS

1. /s/ Thomas F. Gillett
Acting Forest Supervisor (signature)

09/09/2011
Date

2. /s/ Daniel J. Jirón (for)
Regional Forester (signature)

09/20/11
Date

Appendix A

NOXIOUS WEED DETECTION SURVEY PLAN

Noxious weeds detection survey: Noxious weed infestations are very likely to increase dramatically following a fire due to an increase in available areas for germination, and the likely introduction of noxious weeds from heavy equipment and personnel, who may arrive from areas outside of the Forest, and from nearby roads and railroads. Areas of highest concern are along dozer lines, along hand lines, along the railroad and utility service roads, and near the I-15 Freeway, since these are the most likely areas where noxious weed seeds may be introduced and then distributed. Sensitive plant occurrences are also known and potential in and around the burn area. The weed detection survey plan is attached.

NOXIOUS WEED DETECTION SURVEY PLAN

a) Background:

Reducing the introduction and spread of non-native invasive weeds has been identified as a Forest Service strategic goal, and the SFNF LMP includes detailed management direction to prevent the spread and introduction of noxious weeds. Several weed species are known from the Cajon Wash and I-15 corridor. Pampas grass, Spanish broom, tamarisk, tree of Heaven and fennel occur along I-15 in several locations near the fire boundary. In addition, invasive mustards, fennel and perennial pepperweed are known to occur along or nearby heavily used authorized OHV trails. The burn area is also a heavily used OHV area with both authorized and unauthorized trails. Transport of weed seed from one of these OHV areas to the other is quite likely.

The SBNF LMP provides direction to avoid, minimize or mitigate negative long-term effects on threatened, endangered, proposed, candidate or Sensitive species and habitat. There are several known occurrences of *Opuntia basilaris* var. *brachyclada* within the Hill fire burned area. There is potential for other sensitive plant species to occur in this area as there have not been any focused sensitive plant surveys within the burn area in recent years.

b) Management concerns: Are noxious weed invasions interfering with habitat recovery and ecosystem health within the burned area and associated dozer and hand lines? In particular are noxious weeds interfering with the recovery of habitat especially in the riparian areas?

c) Objectives: To determine if the fire and associated ground disturbing activities associated with dozer and hand line construction has promoted the establishment and spread of noxious weeds to the extent that eradication efforts are necessary.

d) Parameters: Noxious weed presence, density and persistence.

e) Locations: Areas adjacent to roads, the freeway, rail lines, dozer lines, as well as within hand lines and dozer lines.

f) Weed Detection Survey Design and Methodology: Surveys would begin in the spring of 2012 during the flowering periods for weeds known to occur within or near the burned areas that may be difficult to detect otherwise. Because of differences in flowering times for all the potential species, two visits are required. Completion of surveys in roads, dozer lines, staging areas, safety zones, downstream from the weed washing station, known invasive and sensitive plant populations will be the first priority. The second survey priorities would be along riparian areas, hand lines, drop points, and prohibited plant plantations. Surveys of the general habitats in the burned area would be the lowest priority. Any locations of weeds would be mapped. Surveys would be completed using the

NRIS protocol available at the national web site:
<http://fsweb.ftcol.wo.fs.fed.us/frs/rangelands/index.shtml>.
Results would be entered into the NRIS database.

g) Reporting: A Weed Detection Survey Report would be submitted to Regional BAER coordinator and to the Front Country District Ranger. If weed introduction and spread has increased due to effects of the Hill Fire Incident, an Interim BAER report would be completed to request eradication funding.

Appendix B: Monitoring Plan

Hill Fire Fence Effectiveness Monitoring

The 2500-8 report requests funds to monitor the effectiveness of fencing. The fencing is to restrict access to known critical heritage resource sites that could be degraded from looting or vehicle traffic, diminishing the site integrity.

1. Monitoring Questions
 - a. Are the fences restricting vehicle access in to the burned area?
 - b. Have the fences been cut or tampered with since it was constructed or previously maintained?
 - c. Are there specific locations where the fences are being cut?
 - d. Are there signs of looting? Are specific areas being targeted?
2. Measurable Indicators
 - a. Number of times fence is repaired
 - b. Loss of artifacts from the site
 - c. Vehicle traffic signs
3. Data Collection Techniques
 - a. Photo documentation of site
 - b. Inspection Checklist (attached)
 - c. Cars parked in parking area
 - d. Use of standardized heritage resource form for looting
4. Analysis, evaluation, and reporting techniques

Due to the high resource values at risk the monitoring findings will be evaluated weekly. If the monitoring shows the treatment to be ineffective at restricting vehicle access and looting, an interim report will be submitted. Emergency funding for enforcement protection or other appropriate treatment may be required based on the monitoring findings. (Physical detection monitors)

5. Monitoring report timeframes

The report will be evaluated weekly and if the treatment is effective, fence inspection checklist findings will be compiled monthly and summarized by the following:

- a. Number of fence breaks
- b. Number of times vehicle entry
- c. Location of fence breaks
- d. Destination of vehicle access
- e. Looting characteristics
- f. Use of parking area

Fence Inspection Checklist

Date: _____

Inspector _____

Time: _____

Describe locations reviewed during inspection: _____

Was the fence cut? _____. If so at what location
(GPS) _____

Were there additional fence cuts? (GPS) _____

Were there signs of vehicle entry to the area? _____

Photo taken of vehicle tracks _____

Photo taken of fence break _____

Heritage site review findings: Signs of looting or vehicle traffic at any sites
_____ Yes _____ No?

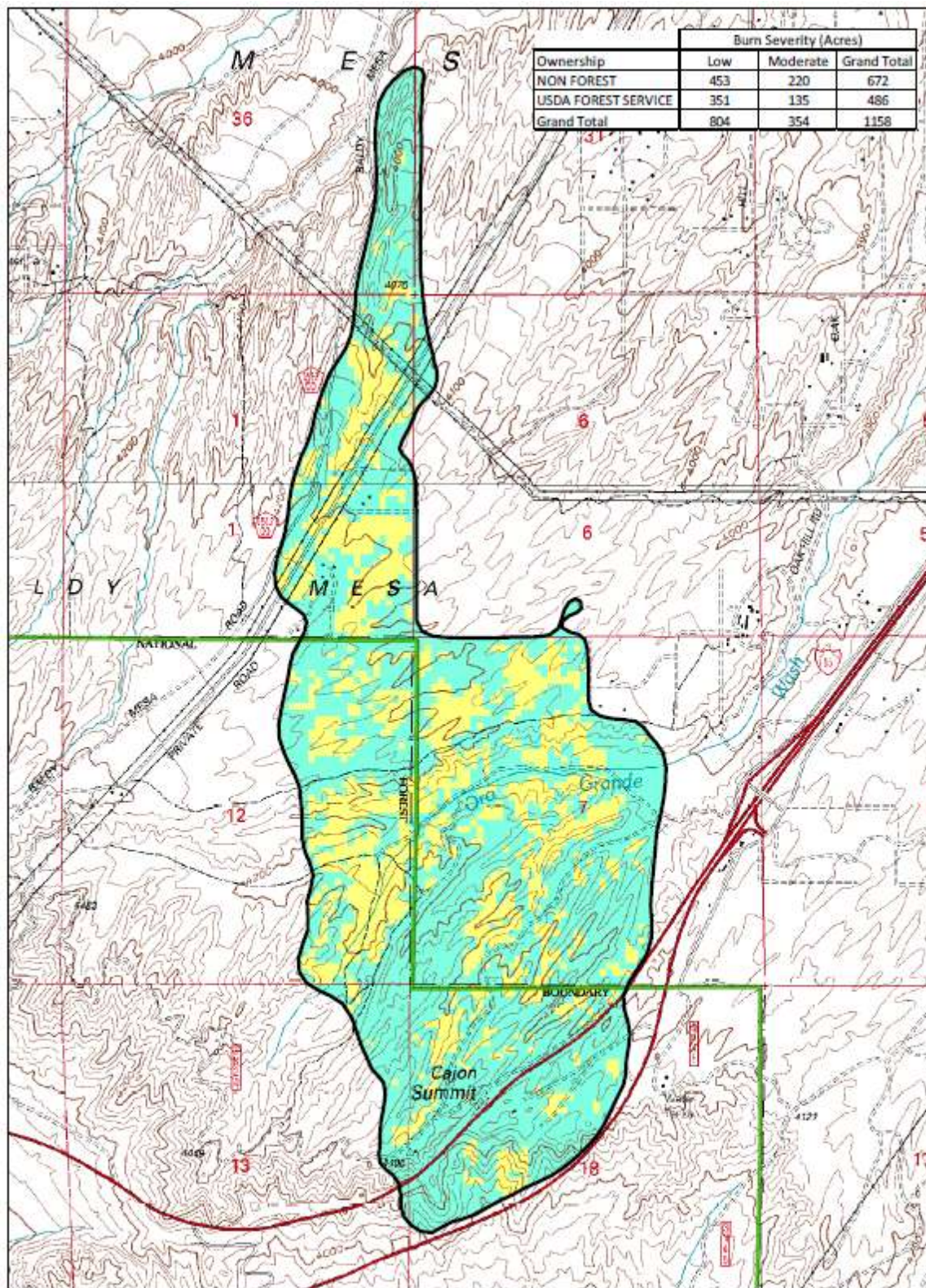
If so identify by GPS the location _____

Describe signs of looting _____

Was fence repaired? _____ Yes _____ No? If yes what was the approximate cost?

Were any new trail starts mulched/rehabilitated? _____ Yes _____ No? If yes, what was
the approximate cost? _____

Other comments:



 Fire Perimeter
  Low Burn Severity (804 ac.)
 Forest Land
  Moderate Burn Severity (354 ac.)

Burn Severity
 Hill Fire
 Sept. 2, 2011

Map Created by: T. Tennant, USFS, 9/8/2011
 File: HillFire2011_FinalBurnSeverityTopo_20110908.pdf

0 0.5 1 Miles

