USDA-FOREST SERVICE FS-2500-8 (6/06)

Date of Report: July 28, 2015

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: North Fire

B. Fire Number: CA-BDF-009001

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: 0512-P5JY2D

I. Date Fire Started: 07/17/2015

J. Date Fire Contained: 07/21/2015

K. Suppression Cost: Approximately $REDACTED as of July 21, 2015.

L. Fire Suppression Damages Repaired with Suppression Funds

1. Dozer line waterbarred USFS land: 1/8 mile; Hand line waterbarred USFS land: 10 miles
Note: all USFS hand and dozer line was also slashed to disguise to prevent unauthorized OHV use
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: 4246 ac
NFS Acres (1860 ac) Other Federal (0 ac) State/Private (2386 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 North 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	356	9
ChFG	Typic Xerorthents, warm-Typic Haploxeralfs-Badlnad complex, 30 to 100% slopes	64	2
BgEF	Morical family, dry – Badland association, 15 to 50 percent slopes	625	16
BeDE	Wrightwood – Morical, dr families association, 2 to 30 percent slopes	385	9
AbD	Soboba-Hanford families association, 2 to 15 percent slopes	477	12
102	AVAWATZ-OAK GLEN ASSOCIATION, GENTLY SLOPING*	98	2
114	CAJON SAND, 9 TO 15 PERCENT SLOPES	8	0
126	GULLIED LAND-HAPLOXERALFS ASSOCIATION	1541	39
175	WRIGHTWOOD-BULL TRAIL ASSOCIATION, SLOPING*	403	11

The WebSoilSurvey provides rating for off-highway vehicle recreational opportunities based on soil types. Off-road motorcycle trails are intended primarily for recreational use. They require little or no site preparation. They are not covered with surfacing material or vegetation. Considerable compaction of the soil material is likely.

The ratings are based on the soil properties that influence erodibility, trafficability, dustiness, and the ease of revegetation. These properties are stoniness, slope, depth to a water table, ponding, flooding, and texture of the surface layer.

Summary by Rating Value		
Rating	Acres in AOI	Percent of AOI
Somewhat limited	1,413.2	35.7%
Very limited	905.4	22.9%
Not limited	97.6	2.5%
Null or Not Rated	1,541.5	38.9%
Totals for Area of Interest	3,957.6	100.0%

Q. Geologic Types:
The East San Gabriel Mountains geologic units within the North 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:

	SoilBurnSeverity		
6th Level Watershed	Low	Moderate	Total Miles of Intermittent Stream
Manzanita Wash	3.2	9.5	12.7
Upper Cajon Wash	0.3	0.8	1.0
Grand Total Miles of Intermittent Stream	3.5	10.3	13.7

S. Forest Service Transportation System:

Miles of Forest Road Type vs. 6th Level Watershed and Soil Burn Severity

	Soil Burn Severity by 6th Level Watershed					
	Manzanita Wash	Oro Grande Wash	Upper Cajon Wash		Upper Cajon Wash Total	Grand Total
Forest System Road Type	Moderate	Moderate	Low	Moderate		
1 Roads Open to All Vehicles, Yearlong	1.856	0.528	0.385	1.810	2.195	3.938
3 Roads Open to Highway Legal Vehicles Only, Yearlong		0.787	0.617	0.242	0.859	1.646
Grand Total	1.215	1.315	1.001	2.053	3.054	5.584

Miles of Motorized Trail vs. 6th Level Watershed and Soil Burn Severity:

	6th Level Watershed and Moderate* Soil Burn Severity			
Trail Identifier	Manzanita Wash	Oro Grande Wash	Upper Cajon Wash	Grand Total
3W24	0.90	0.20	0.22	1.32
Grand Total	0.90	0.20	0.22	1.32

*Trail only occurred within "Moderate" Soil Burn Severity area.

PART III - WATERSHED CONDITION

A. Burn Severity by 6th level watershed and ownership (acres derived from GIS):

	Manzanita Wash			Manzanita Wash Total
Ownership	Unburned	Low	Moderate	
San Bernardino National Forest		2	922	924
Private/Undetermined	90	796	1,499	2,386
Grand Total Acres	90	798	2,421	3,309

	Oro Grande Wash	Oro Grande Wash Total	Upper Cajon Wash		Upper Cajon Wash Total	Total Acres
Ownership	Moderate		Low	Moderate		
San Bernardino National Forest	153	153	179	604	784	1,860
Private/Undetermined						2,386
Grand Total Acres	153	153	179	604	784	4,246

B. Water-Repellent Soil (acres):
Hydrophobicity testing showed that the soils in moderate burn severity near chaparral species are highly water-repellant (>2 minutes with no infiltration at 2 inches depth). The majority of the fire showed moderate burn severity.

The rainfall from the remnants of Hurricane Dolores that fell on the fire area on July 18 and more predominantly on July 19, 2015, showed a sheeting flow from the south draining slopes with little infiltration.

C. Soil Erosion Hazard Rating (acres) [Forest Service]:
0 (low) 862 (moderate) 1045 (high)

D. Erosion Potential:

ERMIT Erosion Model Outputs for the First Year Following the North Fire (assumes 20% probability, for 5-year storm; 300 foot long hillslope length; 35% rock, in chaparral)

	Erosion in tons/acre by Burn Severity		
Slopes	**Unburned**	**Low**	**Moderate**
Slopes 0-20%	0.08	5.5	7.3
Slopes 20-50%	0.16	11	15

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: 0.57-0.78 tons/acre

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

Sediment yield (cubic yards per square mile) comparison for first and second years after North 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 Manzanita at the Forest boundary –ERMiT modeling converted to appropriate units).

		Sediment yield 1-year following North Fire		**Sediment yield 2-years following North Fire**	
Watershed area of concern	**Normal**	**Post-fire**	**multiplier from pre-fire**	**Post-fire**	**multiplier from pre-fire**
Upper Cajon Wash (450 ac contributing to culvert under I-15)	31.3	535	17	193	6.2
Oro Grande Wash	120	2500	21	1000	8.3
Manzanita Wash at Forest Boundary	50	2500	50	1350	27

This modeling indicates that Interstate 15 will likely see nuisance sediment that may get on the road following a storm. The July 19, 2015 storms rated as a 10-year storm with a very low time of centration. The large culvert under the I-15 northbound lanes contained the flows, but Forest Service Road 3N21 was scoured out.

The Oro Grande Wash is long and wide with deep soils. Little of this watershed burned in the North Fire, and there is a long run (>1 mile) before reaching off-Forest properties.

Field work indicated that most of the private residences were on benches above the Manzanita Wash and local ephemeral drainages. 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.

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.

On the afternoon of July 19, 2105, the remnants of Hurricane Dolores passed over the area. In the Phelan Area (north end of the fire) the 3 hours of rain was rated as a 10-year storm. The spottiness of the cloudbursts, though, had a local fire station (just 1.5 miles from the south end of the fire) record the equivalent of a 2-year storm event. [One location on the Forest indicated a 25-year event, though not near the fire area.]

This storm scoured out Forest Service road 3N21 and more than half filled a 15 foot diameter culvert beneath Interstate 15. The approximately 450 acre watershed burned almost exclusively in the moderate soil burn severity and the time of concentration was less than 30 minutes. FS Peak Flow modeling indicated that the expected flow was 760 cfs.

Peak flow was estimated at various points in the watershed using the Rational Equation and Curve Numbers from the FS Peak Flow Calculator.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 3-5

B. Design Chance of Success, (percent): 60
Over the last four years since the Hill Fire there has been a drought in California. The vegetative regrowth of the chaparral species in the adjacent Hill Fire area is less than was expected when the 3-5 year estimate was made. For the 2015-2016 winter, NOAA is predicting a strong El Nino, which could be much rain to southern California. This moisture may help better establish regrowth of vegetation. In addition, actions taken after the Hill Fire to limit OHV unauthorized access had variable success rates.

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

D. Design Storm Duration, (hours): 1

E. Design Storm Magnitude, (inches): 0.8
Using NOAA Atlas 14 (Volume 6, Version 2) precipitation frequency estimates for California.

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

Peak discharge (cfs/sq.mi.) increases to the watersheds for the 2-year (Q2 – 0.6 inches in 1 hour), 5-year (Q5 – 0.8 inches in 1 hour), and 10-year (Q10 – 1.88 inches in 3 hours) storm events [per NOAA Atlas 14] for the year following the North 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.

	Normal watershed peak discharge per storm type (cfs/sq.mi.)		
Watershed area of concern	**Q2**	**Q5**	**Q10**
Upper Cajon Wash (450 ac contributing to culvert under I-15)	6	30	250
Oro Grande Wash – 153 ac burned on Forest (watershed within Forest is ~510 ac)	14	34	230
Manzanita Wash at Forest Boundary	8	38	95

G. Estimated Reduction in Infiltration, (percent): 75%

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

Peak discharge (cfs/sq.mi.) increases to the watersheds for the 2-year (Q2 – 0.6 inches in 1 hour), 5-year (Q5 – 0.8 inches in 1 hour), and 10-year (Q10 – 1.88 inches in 3 hours) storm events [per NOAA Atlas 14] for the year following the North 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).
The July 19, 2015 storm rated as a 10-year event, but the damage to the landscape modeled as equivalent to a 50-year event.

	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**
Upper Cajon Wash (450 ac contributing to culvert under I-15)	150 (Q8)	210 (Q10)	750 (Q50)
Oro Grande Wash – 153 ac burned on Forest (watershed within Forest is ~510 ac)	75 (Q6)	105 (Q7)	330 (Q15)
Manzanita Wash at Forest Boundary	95 (Q10)	240 (Q20)	460 (Q50)

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 North Fire burned approximately 4246 acres with 1860 acres on the San Bernardino National Forest, and 2368 acres on non-Forest Service lands within the towns of Phelan and Baldy Mesa in San Bernardino County. The fire was within three sixth field watersheds; Upper Cajon Wash (784 acre draining to Santa Ana River), Oro Grande Wash (153 acres draining north to Mojave River basin), and Manzanita Wash (3309 acres draining north to Mojave River Basin).

The North Fire started just before 1400 hours on July 17, 2015 in the center divide of Interstate 15. Multiple vehicles were destroyed during the burn and evacuations were ordered for the town of Phelan. Structures were lost. The North Fire did force closure of Interstate 15 in both directions for a brief period and a closure of southbound lanes into the evening. Caltrans had to test the structural integrity of the road after semis burned on the roadway. The fire laid down overnight and then the remnants of Hurricane Dolores put heavy precipitation on the fire area on July 18th and 19th. The rainstorm on the 19th caused major losses of Forest Service roads and much soil movement.

The watershed effects from the North Fire could pose a threat to Interstate 15, Los Angeles Department of Water and Power electrical lines, fiber optic lines, a Kinder Morgan fuel line from the Los Angeles Basin to Las Vegas, private landowners (off-Forest), soil productivity and vegetative regrowth, and numerous cultural sites. The burn also crossed a highly used recreational area for off-highway vehicles (OHV). As part of the long-term management of the area, the Forest (with partners) has acquired $REDACTED to allow for the rehabilitation of unauthorized trail development and use within the area. The primary use of this State OHV grant money is focused on the area to the west of and adjacent to the North Fire. The Forest is concerned that this investment in long-term restoration work could be compromised as a result of the North Fire. Forest Line Officers (Forest Supervisor, 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). Forest Line 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 OHV incursions. The BAER team has been coordinating with Caltrans, LADWP, Kinder Morgan, the US Fish and Wildlife Service, and the NRCS with regard to the initial BAER assessment, findings, and recommendations.

The BAER Team (Leader/Hydrologist) mapped soil burn severity, and the Liaison/Restoration specialist, Engineering group, OHV specialists, Special Uses liaison, GIS, Archaeologist) assessed the fire area starting on July 19, 2015 prior to the afternoon rain event. The speed of the fire coupled with the two days of intense rains made acquiring a BARC map impractical. The final soil burn severity map shows the overall soil burn severity to be 75% moderate, 23% low, and 2% unburned. Accelerated hill slope erosion and watershed response is expected on slopes with moderate soil burn severity, as was shown to be the case under the 10-year return interval event that occurred on July 19, 2015. 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, and in areas of moderate burn severity showed no infiltration for >2 minutes below the ash cover. 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 North 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 and during summer thunderstorms.

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 North 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 over the majority of the fire. 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.

The storm of July 19, 2015 (varied from a 2-yr to a 10-yr storm) washed out 3N21 and showed that OHV users would be in danger if they accessed the area prior to vegetative recovery. As of the date of this writing, NOAA is estimating the probability of an El Nino year being 90%, with comparisons being made to 1997 and 1982 (both large rain years in Southern California). Given this El Nino probability coupled with the effects seen from the 1- to 3-hour storm event in the fire area, the probability of damage or loss is set at Very Likely.

- With the consequences being loss of life or injury to humans, as well as substantial property damage, the Risk is “Very High.”

The transportation system within the fire perimeter consists of approximately 12 miles of National Forest System Roads (NFSR), 1.5 miles of Interstate freeway, and 12 miles of utility access spurs and roads. All of NFSR roads in the burned area are suitable for high-clearance vehicles (maintenance level 2), with the majority allowing non-highway legal vehicles (Green-sticker). NFSR 3N55 is open to the public and primarily serves as primary access to LADWP electric transmission towers. Other utility roads exist for access to petroleum pipeline access by Kinder Morgan utility company. Interstate 15 traverses the south area of the burned area and has two large 15 foot diameter culverts used for drainage and access under the interstate on NFSR 3N21. The south end of 3N21 is also used by the BNSF and Union Pacific railroads for access to infrastructure. NFSR 3N24 traverses the main divide ridge between the Cajon Pass and the high desert communities of Oak Hills, Victorville, and Phelan. Unauthorized roads also exist within the burned area and surrounding areas, which pose a high risk to post-fire vegetation recovery from off-highway vehicles.

NFSR roads were assessed in order to determine the level of risk of damage as a result of the changed watershed condition. Primary NFSR roads within and adjacent to the burn area include 3N21, 3N55, and 3N24. Risk ratings for the roads were assessed using the BAER risk assessment matrix. 3N55 and 3N24 were determined to have a risk rating of moderate based on probability and magnitude of road failure. 3N21 was determined to have a risk rating of high, based on probability and magnitude of road failure and threats to public safety (life).

Threats to water quality

Given that the North 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. The primary drainage to the north is Manzanita Wash, though multiple other unnamed channels are intermittent blue-lines. During the BAER assessment, there was little indication of riparian vegetation. The geomorphology was characteristic of an ephemeral storm-dominated system that deposited vast amounts of sand across a wide floodplain.

The storms of July 19, 2015 mobilized large amounts of sediment, which were delivered to Cajon Wash via an intermittent and ephemeral channel south of Interstate 15 to the west of NFSR 3N21.

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. Multiple burned cars were seen in Manzanita Wash on the private ground on the north end of the fire.

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

Threats to Soil Productivity & Vegetative Recovery

A threat to long-term soil productivity comes from the threat of increased access to the area. 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 (given normal rainfall), though full vegetative recovery of all species types may take up to 20 years.

3N21 through moderate soil burn severity

Retardant/fire line showing pre- and post-vegetation

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 in open spaces within the fire. Vegetative recovery is critical for the reduction of sedimentation, stabilization of the watershed, and soil productivity.

Prior fires in the area and management after fires indicate that the amount of unauthorized use increases when areas are denuded of vegetation.

- 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.
- 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. Loss of vegetative cover which has acted as a natural barrier substantially increases this threat.

The California desert tortoise (Gopherus agassizi) is a federally threatened species and is known to occur within the fire area. Desert tortoises are in decline across their range in California for multiple reasons. Subsidized predators including domestic dogs and ravens have drastically increased the predation of tortoises, particularly juvenile tortoises. Urban sprawl and other development have resulted in substantial loss of and fragmentation of habitat. Increased road development and use further fragment habitats and result in mortality of individuals from collisions. Impacts from off-highway vehicle (OHV) use include mortality of tortoises on the

surface and below ground, collapsing old desert tortoise burrows, damage or destruction of annual and perennial plant and soil crusts, soil erosion and compaction, and proliferation of weeds. Grazing and other disturbances have resulted in loss of native vegetation and type conversion of native vegetation. Another threat that has come to the forefront is the increased frequency of wildfire due to the invasion of habitats by non-native plant species. Changes in plant communities caused by non-native plants and recurrent fire can negatively affect the desert tortoise by altering habitat structure and species available as food plants.

The US Fish and Wildlife Service (though an emergency consultation conversation, with Kim Boss) prefers the use of post and cable fencing to protect the desert tortoise habitat.

The Baldy Mesa area vegetation is generally high desert transitional chaparral. 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 high desert transitional chaparral, the slower growing woody species and low rainfall means the vegetation will be slower to recover and may take as long as 20 years.

There are two primary threats to the desert tortoise and its habitat directly tied to the North Fire. First, there is increased potential of OHV use within the burn area. 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 species (that would serve as a barrier to illegal OHV activity) allows for an increase in illegal off-road vehicle travel. The second threat is increased potential for type conversion of native vegetation.

- The probability of damage or loss of botanical resources and impacts to desert tortoise due to the North Fire is “very likely”, given the high probability for increased unauthorized OHV use in the area due to the loss of vegetative cover and the likelihood of increased non-native vegetative species.
- The magnitude of the consequences of increased OHV use and type conversion to desert tortoise are “moderate”.
- The risk to desert tortoise is “very high”, resulting in an emergency determination and the need for treatment.

Threats to Heritage Sites

Summary of Cultural Resources BAER assessment – [REDACTED]

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	Drivers on roads, vehicle users in unroaded area	Yes
Property/ Infrastructure	Debris flows, flooding, rockfall, sediment deposition	Forest Service and Special Uses 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 – off Forest	Unknown

T&E Wildlife and rare plant habitat	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	[REDACTED]	Yes

B. Emergency Treatment Objectives:

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

1. **Roads** –
   - **a.** Protect and stabilize the transportation system roads at risk of damage as a result of increased sedimentation, stream diversion, and erosion from the fire.
   - **b.** Increased protection of water quality by reducing risk of road damage and failure.
   - **c.** Improve post-fire vegetation recovery and reduction of risk of unauthorized motor vehicle travel within the burned area.
   - **d.** Mitigate public safety hazards associated with flooding and debris flows along NFS roads.

2. **Ecological integrity -** Reduce the potential for impaired vegetative recovery. Minimize unauthorized OHV use in the burned area to prevent impaired vegetative recovery.

3. **Heritage** - Potential loss mitigation.

4. **Interagency Coordination** - Continue to work with affected parties and stakeholders to describe the findings of the BAER Team.

5. **Special Uses/Developed Recreation** – Re-evaluate the need for temporary closures.

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

Land **75** % Channel **N/A** % Roads/Trails **80** % Protection/Safety **95** %

D. Probability of Treatment Success

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

E. Cost of No-Action (Including Loss): See VAR Calculation spreadsheet

F. Cost of Selected Alternative (Including Loss): See VAR Calculation spreadsheet

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Robert Taylor

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Core Team Members:

- Robert G. Taylor – Hydrologist/Soils/Geology
- Dev Kopp – Botanist/OHV Restoration/Team Liaison
- Josh Direen – Engineering-Roads
- Jason Collier – Special Uses liaison
- Tracy Tennant – GIS
- Uyen Doan – Archaeologist
- Travis Mason – OHV/Roads
- Greg Hoffman – OHV coordination
- Kim Boss – Wildlife biology

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.

Previous fires and restoration activities in the area have given the Forest numerous opportunities to determine the best treatments that have the highest chance of success. After the Hill Fire (2011), the Forest attempted to conduct a closure using 3-strand smooth wire and 6-foot T-posts at the Forest boundary. Materials and installation in 2011 was $[REDACTED] per mile. After installation, these fences were cut and the T-posts stolen. For a closure to succeed, a heavier duty fence and gate system is required, and has been shown to be successful in other areas of the Forest undergoing OHV restoration treatments (Coxey area).

Protection/Safety Treatments:

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 by township-range-section (T3N R6W Sections 3 and 10 (eastern half), 11, 12, 14, and 23 to the northern edge of 3N53) lines. Within the area, usage would be allowed on Interstate 15, NFSR 3N24 and 3W24 and by permit (e.g. for special use permittees). The area closure would include Forest boundary post and cable fencing, three Angeles-style gates, and numerous signs. As this closure would effectively close the Baldy Mesa staging area to green sticker vehicles, one sign at the intersection of I-15, I-138, and 3N21 would provide direction to an alternative temporary staging area to accommodate OHV use.

The patrol component will take advantage of the Forest already using State OHV grant funds that have a designated -1039 employee with FPO training (ticket writing authority) for the Baldy Mesa area. This employee is beginning work in August for 6 months. Costs (below) will be used to maintain an FPO patrol to cover the full year required by the closure order until a re-assessment can be made next spring.

Following conversations with the Regional BAER Coordinator on the economic viability of the Area Closure methodology, a separate proposal was developed to limit existing access from unauthorized OHV incursion into T&E desert tortoise habitat and a NRHP-eligible large occupation site. The use of post and cable fencing would be reduced from 3 miles to approximately 1.25 miles along the boundary of the gas line in T3N R6W Section 12 (about ½ mile), a ¼ mile section along the north boundary of T3N R6W Section 12, a ¼ mile and two 1/8 mile stretches along the north boundary of T3N R6W Section 11. This reduction in length causes a similar reduction in time needed for survey, tortoise monitoring, and archeology monitoring. The reductions in cost associated with these changes is about $[REDACTED].

Item	Unit	Unit Cost	# of Units	Cost
Large Steel Gate (Angeles type)	Each	$[REDACTED]	[REDACTED]	$[REDACTED]
Road Closure signs	Each	$[REDACTED]	[REDACTED]	$[REDACTED]
Archeologist monitor	Day	$[REDACTED]	[REDACTED]	$[REDACTED]
Post and cable fencing – materials and installation	Mile	$[REDACTED]	[REDACTED]	$[REDACTED]
3 Surveyors to define Forest boundary for fencing	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
Desert tortoise monitor/education of crews	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
4' x 8' information signs	Each	$[REDACTED]	[REDACTED]	$[REDACTED]
Two panel information kiosk (metal)	Each	$[REDACTED]	[REDACTED]	$[REDACTED]
Law Enforcement – writing closure order	Day	$[REDACTED]	[REDACTED]	$[REDACTED]
FPO – monitoring closure order	Day	$[REDACTED]	[REDACTED]	$[REDACTED]
Total for closure				**$**[REDACTED]

Temporary Staging Area

Prior to authorizing use from the Baldy Mesa staging area, users were staging at a location just off Highway 138 near the western end of NFSR 3N24. Once Baldy Mesa staging area was opened and users directed to this authorized site, almost all use ended at this other location (Pers. Comm. Greg Hoffman, OHV program manager). The Forest believes that providing this location as a temporary staging area would be a viable location and could maintain its temporary status once the Baldy Mesa staging area is deemed to be a safe access route across the North Fire area. This action requires temporarily opening a section of NFSR 3N24 to mixed use (currently a street legal route) from Ebby Road/3N24 west to HWY 138.

Item	Unit	Unit Cost	# of Units	Cost
Installation work crew	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
2-strand smooth wire with T-posts	Mile	$[REDACTED]	[REDACTED]	$[REDACTED]
GS-11 Archaeology monitor	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
GS-11 Wildlife monitor	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
Two panel information kiosk (metal)	Each	$[REDACTED]	[REDACTED]	$[REDACTED]
Sign decals for temporary OHV trailering site	Set	$[REDACTED]	[REDACTED]	$[REDACTED]
Vehicle Mileage	Miles	$ [REDACTED]	[REDACTED]	$[REDACTED]
			Total Cost	**$**[REDACTED]

Road Treatments:

Increased runoff and sediment from the burned areas can negatively affect the road prism, damaging the road, eroding land downslope of the road and routing flow and sediment directly to stream channels. Stream diversion potential is high on NFSR 3N21 and the road has already sustained major damage from a post-fire thunderstorm on July 19, 2015. Public safety is a high concern on 3N21 as well, since the road travels through two large culverts under the northbound and southbound interstate freeway. Other roads in the burned area are located in lower soil burn severity or are located on ridgelines and are less susceptible to damage. The burned area is also lacking vegetation as a result of the fire and is more susceptible to cross-country and

unauthorized route travel, which is likely to negatively impact post-fire vegetation recovery. Closure of the burned area south of 3N24 is recommended for public safety and vegetation recovery. Roads along ridge tops that will not be affected by the changing watershed response are not a part of the restore drainage function line item. Storm inspection has been modified to only include hand tool response after two storms. If damage occurs that requires a larger response, then an interim report will be filed to request additional funds.

Treatment Descriptions and Costs: Descriptions and estimate of costs for proposed road treatments are located in the table below.

Item	Unit	Unit Cost	# of Units	Cost
Restore drainage function – 3N21/3N24	Mile	$[REDACTED]	[REDACTED]	$[REDACTED]
Install rolling dips with leadoff ditch	Each	$[REDACTED]	[REDACTED]	$[REDACTED]
Install Big Mac OD on 3N21 (MP 3.72, 4.22)	Each	$[REDACTED]	[REDACTED]	$[REDACTED]
Reset existing overside drain	Each	$[REDACTED]	[REDACTED]	$[REDACTED]
Riprap for drainage outlets	Tons	$[REDACTED]	[REDACTED]	$[REDACTED]
Archeologist monitor	Day	$[REDACTED]	[REDACTED]	$[REDACTED]
Biologist monitor	Day	$[REDACTED]	[REDACTED]	$[REDACTED]
Contract preparation and administration	Day	$[REDACTED]	[REDACTED]	$[REDACTED]
Contractor Mobilization	Each	$[REDACTED]	[REDACTED]	$[REDACTED]
Storm Inspection and hand tool response	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
Total for Road Treatments				**$**[REDACTED]

Land 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.

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 North 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.

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.

The North 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 North burn area. The use of fence lines and fire recovery signage can help support the chunking along the impacted trail and road. With high levels of recreational use and the knowledge that we have gained form past fires in the Baldy Mesa area, using these multiple closure methods discussed will have the greatest success on the North Fire rehabilitation and resource protection.

Chunking and improving bank turns

Item	Unit	Unit Cost	# of Units	Cost
Contract excavator	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
Mobilization costs	Each	$[REDACTED]	[REDACTED]	$[REDACTED]
IDIQ contract preparation (GS-7 Roads/OHV; Inspector)	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
IDIQ contract administration/COR (GS-12 Engineer)	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
Biological monitor	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
Archaeology monitor	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
Vehicle Mileage	Miles	$[REDACTED]	[REDACTED]	$[REDACTED]
			Total Cost	**$**[REDACTED]

3N24/3W24 drift fencing to keep public on road/trail and out of closure area

Item	Unit	Unit Cost	# of Units	Cost
Installation work crew	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
2-strand smooth wire with T-posts	Mile	$[REDACTED]	[REDACTED]	$[REDACTED]
GS-11 Archaeology monitor	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
GS-11 Wildlife monitor	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
Signs (includes installation)	Each	$[REDACTED]	[REDACTED]	$[REDACTED]
Vehicle Mileage	Miles	$[REDACTED]	[REDACTED]	$[REDACTED]
			Total Cost	**$**[REDACTED]

BAER Implementation and Interagency Coordination:
This treatment ensures continued communication and coordination with NRCS and special use permittees (Kinder Morgan, LA DWP, Caltrans). 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.

Coordination and implementation of the actions in a timely manner requires an Implementation Team Leader.

Item	Unit	Unit Cost	# of Units	Cost
GS-11 Lands specialist	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
Public Services Staff Officer	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
BAER Coordinator	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
Implementation Team Leader with per diem	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
Biological emergency consultation with USFWS	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
Vehicle mileage	Mile	$[REDACTED]	[REDACTED]	$[REDACTED]
Total Cost				**$**[REDACTED]

Channel Treatments: N/A

I. Monitoring Narrative:

Heritage resource/vegetative recovery monitoring:
[REDACTED]

Spring 2016 watershed monitoring for continued closure need
There is a need to conduct technical evaluations of temporary closure areas after storm events to determine if adjustments to use need to be made. In addition to post-storm assessments, closure restrictions will need to be re-evaluated in approximately spring of 2016 following winter precipitations events.

Item	Unit	Unit cost	# of Units	Cost
Hydrologist	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
Special use permit administrator	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
Engineer/OHV Manager	Days	$[REDACTED]	[REDACTED]	$[REDACTED]
Vehicle	Miles	$[REDACTED]	[REDACTED]	$[REDACTED]
Total Cost				**$**[REDACTED]

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

[TABLE REDACTED]

PART VII - APPROVALS

1. _____ 7/28/2015
Forest Supervisor (signature) Date

2. */s/ Barnie T. Gyant (for)*
RANDY MOORE
_____ 8/6/2015
Regional Forester (signature) Date