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

Date of Report: 6/30/2016

BURNED-AREA REPORT
 (Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

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

B. Type of Action

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

[ ] 2. Interim Report #____
    [ ] Updating the initial funding request based on more accurate site data or design analysis
    [ ] Status of accomplishments to date

[ ] 3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Dog Head   B. Fire Number: NM-CIF-000277

C. State: NM   D. Counties: Bernalillo, Torrance

E. Region: 03   F. Forest: Cibola NF

G. Districts: Mountainair

H. Fire Incident Job Code: P3KAQ2

I. Date Fire Started: 06/14/2016   J. Date Fire Contained: 83% contained as of 6/23/2016

K. Suppression Cost: $10.8M as of 06/29/2016

L. Fire Suppression Damages Repaired with Suppression Funds
       1. Fireline waterbarred and brush brought back on line (miles): Handline: All handline, 7mi, has been rehabed. Dozerline: All dozerline, 6mi, has been rehabed.
       2. Fireline seeded (miles): 13 miles of hand and dozerline were seeded with a native grass mix
       3. Other (identify): N/A.

M. Watersheds – Affected 6th Codes

6th Code Watershed		NFS Acres Burned
Arroyo de Chilili	130500010402	294
Milbourn Draw	130500011103	4,549
Arroyo de Tajique	130500011102	1689
Middle Hell's Creek	130202030402	76

N. Total Acres Burned: 17,911 Based on IR Perimeter of 6/23/2016
Acres - Chilili Land Grant:(10,773) NFS:(6,608)   BLM: (27)   State: (4)   Private: (436)
Pueblo of Isletta: (63)

O. Vegetation Types: Pinon Juniper, Ponderosa Pine, Mixed Conifer

P. Dominant Soils: Argiustolls, calciustolls

Q. Geologic Types: Paleozoic Madera Group (Pennsylvanian); Sandstones, mixed sedimentary, and limestones.

R. Miles of Stream Channels by Order or Class:
Ephemeral: 32.9 miles
Intermittent: 3.5 miles

S. Transportation System
Trails: 0 miles
Roads: 21.3 total FS miles: ML 1 (closed) 0mi; **ML 2 – 21.3mi**; ML 3 – 0mi; ML 4 – 0mi;
ML   5 - 0mi;

PART III - WATERSHED CONDITION

A. Burn Severity **NFS (acres):**   1,593(low/unburned);   3,080(moderate);   1,917(high)

       Total (acres):   5,796(low/unburned);   8,241(moderate);   3,799(high)

B. Water-Repellent Soil (acres):   3,460 ac

C. Soil Erosion Hazard Rating (acres):

       1,962 slight (low)   3,099 moderate   1,594 severe (high)

D. Erosion Potential: 3 tons/acre (average across moderate and high severity)

E. Sediment Potential: 246 cubic yards / square mile (average across moderate and high severity)

PART IV - HYDROLOGIC DESIGN FACTORS

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

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

C. Equivalent Design Recurrence Interval, (years):   25

D. Design Storm Duration, (hours):   1

E. Design Storm Magnitude, (inches):   1.65"

F. Design Flow, Pre Fire (cubic feet / second/ square mile):   25

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

H. Adjusted Design Flow, Post Fire (cfs per square mile):   234

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

The Forest Service Dog Head Fire BAER Assesment was restricted to NFS Lands. Assessment of the Chilili Land Grant and private lands was performed by the Dog Head Fire Coordinated Rehabilitating Group and cooperating agencies. The Dog Head Fire cause is currently under investigation but is believed to be human caused. The ignition point was in T7N R5E sec 25 near the forest boundary at the northern end of the Manzano Mountains of the Mountainair Ranger District. The fire spread to the north east across FS lands and into the Chilili Land Grant. The majority of the fire (10,773ac)burned on the Land Grant, with approx. 6,600ac burned on National Forest System Lands, and 436ac of other private lands. The BLM, State of NM, and the Pueblo of Isletta each had burn areas of less than 100ac.

The burn area is comprised of moderate to gentle slopes reaching from Ponderosa Pine stands with small pockets of mixed connifer at 7,900ft elevation down through the pinyon/juniper landscape at 6,800ft towards the Estancia basin.

Soil burn severity mapping shows that roughly half of the affected NFS lands burned at a moderate level while roughly one quarter burned high and one quarter low/unburned. The Dog Head Fire soil burn severity data were created using several process steps. The first remotely-sensed BARC (Burned Area Reflectance Classification) product provided by the Forest Service Remote Sensing Application Center (RSAC) was acquired from a Landsat 7 post-fire satellite image on 06/22/2016; this image was problematic because nearly half the fire area was obscured by cloud cover. The image also had strips of no data because of the Landsat 7 data gaps. A second post-fire image of the Dog Head Fire burned area was acquired on 06/23/2016 by the Sentinel-2 satellite and used by RSAC to generate a second BARC product with much less cloud cover. The Dog Head BAER Team soil scientists conducted several field observations to record soil burn severity levels in the burned area on NFS lands. The field observations were used to classify the raw BARC 256 Sentinel-2 data into 4 classes of soil burn severity – unchanged (unburned), low, moderate and high. After reclassifying the raw BARC data to generate the soil burn severity data, there were still 1,079 acres of no data area due to cloud cover in the 06/23 Sentinel-2 data. Data from the first Landsat 7 06/22 BARC product were used to fill 785 acres of no data areas remaining in the soil burn severity. After mosaicking the Landsat 7 06/22 BARC data into the soil burn severity no data areas, 294 acres of small no data area were still scattered around the soil burn severity extent. The ArcGIS Nibble tool was used to fill the remaining areas of no data by interpolating cell values using the values of nearest neighbor cells. Finally, the ArcGIS

Majority Filter Tool was used to reduce the '*salt and pepper*' appearance and minimize the number of single-celled polygons of the soil burn severity data.

Hydrologic Modeling:

Peak flows have been estimated for four watersheds to assess post fire effects to the values at-risk identified within and below the burned area. These watersheds include the areas draining to Cañon del Troncon Negro (tributary to Tajique Creek), Cañada de la Perra, Cañon de la Miga, and Cañon del Pino. Wildcat 5 was used to simulate pre- and post-fire peak flows for the 25 year 1 hour storm event representing monsoonal storms. The results are presented in the table below. Curve numbers are included as an indication of runoff response in each watershed.

Dog Head Fire Wildcat5 Model Summary for individual drainages

Watershed	Acres	Curve Numbers	25 year 1 hour rainfall (in.)	Pre (cfs)	Post (cfs)	Post-burn % increase	pre cfs/mi^2	post cfs/mi^2	Post-burn % increase
Cañon del Troncon Negro at confluence with Tajique Creek	3,985	Pre 67 Post 71	1.63	90	179	98%	14	29	107%
Cañada de la Perra near the Forest Boundary	3,168	Pre 68 Post 85	1.65	126	1156	817%	25	234	836%
Cañon de la Miga near the Forest Boundary	2,884	Pre 70 Post 73	1.67	176	273	55%	39	61	56%
Cañon del Pino at Highway 337	2,847	Pre 71 Post 79	1.71	192	532	177%	43	120	179%

The value of modeling peak flows is not to arrive at an absolute number. The value in this modeling effort is the relative difference between pre- and post-fire flows. The difference between flows indicated by Wildcat5 are roughly supported by Rule of Thumb by Kuyumjian and modeling done with HEC-HMS v4.1.

Post-fire response in Cañada de la Perra has the greatest potential hydrologic response due to the high percentage burned at high and moderate severity. Given the 25 year/1 hour rainfall event, or any wide-spread heavy rainfall event, flows leaving the forest are likely to lose energy as the floodplain and overflow channels are accessed, floodplain widens and gradients decrease. As a result, post-fire high flows are likely to access areas in the valley bottom that they may not have in many years.

Critical Values Identified

Critical Values identified on NFS Lands (FSM 2523.1 Exhibit 01) during the BAER assessment are: Human life and safety, property, natural resources and cultural/heritage resources. The BAER team evaluated the risk to those critical values using the BAER Risk Assessment (FSM 23235.1 Exhibit 02).

The following risk matrix shown below, Exhibit 2 of Interim Directive No.: **2520-2013-1**, was used to evaluate the Risk Level for each value at risk identified during Assessment:

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	Loss of life or injury to humans; substantial property damage; irreversible damage to critical natural or cultural resources.	Injury or illness to humans; moderate property damage; damage to critical natural or cultural resources resulting in considerable or long term effects.	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.
	RISK		
Very Likely (>90%)	Very High	Very High	Low
Likely (>50% to <90%)	Very High	High	Low
Possible (>10% to <50%	High	Intermediate	Low
Unlikely (<10%)	Intermediate	Low	Very Low

The Very High and High Risk are unacceptable risk levels due to threats to human life, property, infrastructure and resources. Theses unacceptable risk levels trigger discussions on potential response actions taking into account proven treatments, treatments that substantially reduce risk, are economically justified, and the probability of success. An Intermediate Risk could be unacceptable if human life or safety is the critical value at risk. The above matrix only applies to values on National Forest System (NFS) lands. Contact was made between NRCS, NMDOT, and the Dog Head Fire Coordinated Rehabilitation Group.

Information was shared with the understanding that these cooperators would assess values on non-Forest Service lands.

Human Life and Safety

There is high risk of loss of life on NFS land within and downstream of the burned area. Individuals who may find themselves in drainages within or below the burned area or on roads affected by fire upstream are at very high risk during storm events. The drainages affected by high burn severity will be subject to higher than usual run off and debris flows which could cause injury or death. Hazard trees throughout the burn pose a very high risk to anyone entering the area.

There is a high probability that life and safety will be threatened by post-fire storm events on private lands and the Chilili Land Grant downstream from the burn area. There is also a high likelyhood that drainages could be contaminated by hazardous materials from private properties during a flood event such as septic waste and household chemicals.

Property

Forest Service transportation infrastructure within and downstream from high and moderate burn severity are at a high risk of damage. Tajique campground and the Albuquerque trail have the potential to be affected by post fire flows, but because of the low amount of burned acres above these values they are rated as an intermediate risk. There are no developed recreation sites or trails within the burn area. Stock tanks within the affedcted drainages are likely to fill with ash, sediment, and debris and may be overtoped or breached. The increase in peak flows predicted (shown in the hydrologic modeling table above) from Cañada de la Perra pose a significant threat of flood waters and debris flows that have the potential to impact downstream property and infrastructure (e.g. homes, businesses, roads, culverts, bridges and low water crossings.)

Natural Resources

Wildlife
There are many species of common wildlife (that are not federally listed or sensitive species) that have been displaced on FS lands and private lands due to the fire. The fire did not burn in any federally threatened or endangered species habitat or affect any species individually there is no effect to any T&E species or habitat. There are many areas that burned in habitats that support the Regional Forester's sensitive species, Management Indicator Species and Migratory bird habitats. However, this fire does not reduce the viability of the populations of these species nor will it lead to the federal listing of any of these species.

Invasive Plants

Invasive weed species are a major concern following wildfire. Removal of the extant vegetation by fire, and disturbances from suppression efforts such as bulldozer lines and staging areas, create openings for invasive plants to invade, and impede or prevent recovery of desirable vegetation. Areas within the Dog Head Fire that have the greatest potential for noxious weed invasion are burned areas of moderate or high severity and/or disturbed areas adjacent to or downstream of existing weed infestations. Disturbed areas should be monitored to catch new infestations and treat immediately to prevent spreading.

Soil Productivity

Soil loss tolerance is the threshold rate of soil loss, which once exceeded, indicates that soil loss is greater than the rate of soil development and thus soil productivity is reduced. The BAER handbook describes the assessment of site conditions following the wildfire and where necessary, implementing emergency response actions to reduce effects on soil productivity. BAER funding requests need to verify that the treatments and actions can be implemented in a timely manner, are technically feasible and practical, and will provide significant improvement over what would occur through natural recovery alone (FSM 2520, 2015; Robichaud et. al., 2000). The numbers modeled for soil erosion from Disturbed WEPP indicate that only one map unit (267) within the burn exceeds soil loss tolerance values and was exceeding these values pre-fire under natural conditions. This was the only map unit listed in the Cibola TEUI report in unsatisfactory condition within the perimeter of the fire. This unit comprised 333 acres in the moderate and high severity burn and had a total of 476 acres of all burn severity classes from unburned to high within the fire perimeter on forest service lands. The amount of soil loss resulting in a reduction of soil productivity is about 7% of the entire burn and was the same acreage pre-fire but now with increased erosion rates.

Hydrologic Function

Vegetative cover is critical to reducing erosion rates, improving hydrologic function and maintaining site productivity. Natural re-establishment of cover is the preferred BAER recommendation. The burn area contains oak species that typically re-sprout after fire; therefore conditions are expected to improve relatively quickly. Fire-induced soil hydrophobicity can negatively impacts hydrologic function, however these soil conditions are likely to dissipate within the first year. If wide-spread heavy rainfall events occur within the recovery period, erosion and sedimentation above pre-fire rates will occur. Accelerated erosion has the potential to delay vegetative cover re-establishment if it exceeds soil loss tolerance. There are soils within the burn area that had soil loss rates over tolerance before the fire; however, soil loss modeling indicates that accelerated erosion due to fire effects is not likely to exceed tolerance loss rates.

Cultural Resources

Prior to the beginning of the Doghead Fire, approximately 1,246 acres (504 hectares) (18.9%) had been previously inventoried for historic properties (archaeological sites, historic structures, and traditional cultural properties) within the area of the fire perimeter (6,608 acres on the National Forest lands). These inventories documented five (5) sites within the fire perimeter on National Forest lands. Inventory conducted to minimize impacts to cultural resources during suppression activities for the Doghead Fire identified three (3) additional sites on National Forest lands that had not been previously recorded. In addition, three (3) sites outside of the fire perimeter that have the potential to be affected by post-fire effects were also identified. Sites in the vicinity of the Doghead Fire are primarily Native American artifact scatters representative of temporary campsites, dating to the Archaic and Ancestral Pueblo eras, and Hispanic and Anglo domestic and industrial (logging) sites. After field assessments and analysis only three NRHP eligible sites were identified as having high risk for damage from post fire effects and are recommended for protection.

B. Emergency Response Action Objectives:

1. Place entire burn area and downstream channels in an administrative closure status to prevent injury to the public from hazard trees, flooding, debris flows, and potential entrapment within the burn area.
2. Install closure and hazard warning signs at key access points of the burn area to protect the public from entering the burned area and prevent exposure to the hazards of the burned area.
3. Mitigate damage to NFS roads within the burn area by preparing roads and existing drainage structures to handle increased modeled storm runoff.
4. Pump one vault toilet in Tajique CG that could be affected by post-fire flows. This is intended to prevent contamination of waterways and prevent risk to public health.
5. Stabilize two archaeological sites from post-fire storm runoff by seeding and mulching.
6. Provide point protection to two achaeological sites within Cañada de la Perra from high flows and flooding.
7. Mitigate the spread of noxious and invasive weeds within the burn area by conducting field visits (early detection) and treating infestations along roads, dozer line, and staging areas (rapid response).

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

Roads/Trails 80 %   Protection/Safety 95 % Arch Site Protection 90%
Probablilities assume onset of monsoonal storms on July 9th.

D. Probability of Response Action Success

	Years after Response Action		
	1	3	5
Protection and Safety	90	95	95
Heritage Site Protection	90	90	95
Roads/Trail	85	90	95
Weed monitoring and treatment	90	95	95

E. Cost of No-Action (Including Loss): $2,126,331

Critical values would be lost. See critical values described above, and in the Values At Risk table. The total cost for values at risk if no action were taken is estimated at $180,000, although this does not relfect the cost to potential injury or loss of life, or the potential loss of cultural resources. Selected examples are listed below:

There is a high risk of damaging impacts to two Forest Service System roads within and immediately down slope of high and moderate severity burns. 6 miles of NFSR 321 and 2 mile along NFSR260 are at risk of being lost if not prepared for storm run-off. These are the only two access points to the area for the public and an ongoing landscape management project area. Total estimated values of road loss is $180,000.

There is a high risk of damaging impact to three important Cultural Heritage Sites. The value of cultural resources are very difficult to limit to a monetary figure. Likewise there is a very high risk of injury or death to visitors in the burn scar or in drainages immediately below the burn, which is very difficult to quantify.

Although the cost of losing soil productivity to post fire erosion is relatively high, no proven effective treatments were determined to have a high probability of success on the Dog Head Fire. Probability of success was determined to be marginal at best due to the relatively low elevations and amount of southern aspects (warmer, drier sites) across the burn area.
The total value of soil lost was estimated at $1,946,331.

F. Cost of Recommended Responses (including loss): $2,089,166

G. **Skills Represented on Burned-Area Survey Team:**

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

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Addititional Team Members: Will Amy – Assistant Lead/Wildlife, Nori Koehler – Soils, Maureen Yonovitz – Soils, Livia Crowley – Hydro, Kate Lacey – Hydro Trainee, Nessa Natharius – Hydro Trainee, Esther Nelson – Wildlife, Brian Park – GIS, Jenn Dean – Engineering Trainee, Aaron Johnston – Fire Liason, Jeremy Kulisheck – Arch, Jess Gisler – Arch, Lydia DeHaven - Arch

H. **Response Action Narrative:**

Protection/Safety Response Actions:

Recommend the implementation of administrative closure orders for the entire burn area through the 2017 monsoon season and the 2018 spring winds. Signs should be installed at key access points, due to safety concerns within the burn area and in downstream channels especially during the monsoonal season and spring wind season. Install 10 closure signs on roads and approximately 10 hazard warning signs at key entry points around the burn area to inform the public of the dangers inherent in entering the burn scar. Install 3 additional hazard warning signs to be placed at Albuquerque Trail Head, Tajique Campground, and at the Forest Boundary on FSR 260 between FS and the Chilili Land Grant due to potential effects from post fire flows.

Pump 1 vault toilet located in Tajique CG that has the potential to flood.

Storm patrols will be scheduled for immediate monitoring after significant rain events targeting affected sections of FSR 321, FSR 260, and FSR 55 just below the confluence of

Cañon del Troncon Negro for debris and sediment removal. Storm patrol for debris jams: 2 teams of 2 employees times 7 storm events.

Roads Response Actions:

Recommend the inspection of existing drainage strucutres and removal of fire debris prior to the onset of the 2016 monsooon season on NFSR 260, the removal of fire debris, armoring of 20 water bars/rolling dips, and lead-off ditches. Storm monitoring and response of the drainage structures should be continued for the 2016, 2017 and 2018 monsoon seasons for NFSR 231, 260 in the burned area, and 55 from the Forest Boundary to where the road crosses the Arroyo de Tajique approximately 0.5 miles into the second parcel of private land.

Cultural Resources Response Actions:

Sites 490 and 995 will be seeded and mulched to protect the sites from errosion. The seed will come from leftover stock from fireline rehab work. Wood mulch will be provided by chipping on-site material.

Sites 490 and 644 will have point protection installed in the form of straw bale barriers staked down with rebar.

I. Monitoring Narrative:

Dog Head BAER treatments will be monitored to determine 1) if treatments were successful (effective ground cover, cultural resources protection, road damage minimization) and 2) if treatments resulted in undesirable results (i.e., introduction of invasive plants). Final summaries will be provided annually.

1) Treatment effectiveness:
   Archaeological site action responses will be monitored for effectiveness during the 2016 monsoon season. Mulching and seeding will be visited once halfway through the season and once at the end. Point protection treatments will be visited after up to 5 significant monsoonal storms.

2) Monitoring undesirable results:
   Monitoring for undesirable outcomes (i.e., invasive plants populations) will be done on the Dog Head Fire at archaeological sites where seed and mulch are applied. Invasive plants have been identified by the Chief of the Forest Service as one of the top four threats to National Forest System lands. Monitoring of invasive plants at the protected archeological sites will be conducted as part of the general post fire invasive plant EDRR strategy.

Part VI – Emergency Stabilization Response Actions and Source of Funds   Interim #

Line Items	Units	Unit Cost	# of Units	BAER $	Other $	# of units	Fed $	# of Units	Non Fed $	All Total $
				NFS Lands			**Other Lands**			**All**
A. Land Treatments										
Invasive Plant EDRR	acres	65.65	100	$6,565						
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$6,565	$0		$0		$0	$6,565
B. Channel Treatments										
	miles			$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Channel Treat.				$0	$0		$0		$0	$0
C. Road and Trails										
Drainage storm prep	miles	5,000	3	$15,000	$0		$0		$0	$15,000
Lead-out ditch armoring	each	2,000	20	$40,000						$40,000
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road & Trails				$55,000	$0		$0		$0	$55,000
D. Protection/Safety										
Road Closure Signs	per	600	10	$6,000	$0		$0		$0	$6,000
Hazard Signs	per	600	10	$6,000	$0		$0		$0	$6,000
Vault Toilet Pumping	per	1,000	1	$1,000	$0		$0		$0	$1,000
Arch Site Protection	per	10,070	1	$10,070						$10,070
Storm Patrol	event	10,000	7	$70,000						$70,000
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Structures				$93,070	$0		$0		$0	$93,070
E. BAER Evaluation										
assessment	per		1	---	$53,204		$0		$0	$53,204
Insert new items above this line!				---	$0		$0		$0	$0
Subtotal Evaluation				---			$0		$0	$53,204
F. Monitoring										
Arch Site Monitoring	per	550	5	$2,750						$2,750
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring				$2,750	$0		$0		$0	$2,750
G. Totals				$157,385			**$0**		**$0**	**$210,589**
Previously approved										
Total for this request				**$157,385**						

PART VII - APPROVALS

1.   /s/Elaine Kohrman_____   06/30/2016
   ELAINE KOHRMAN
   Forest Supervisor   (signature)

2.   /s/ Sandra Watts (for)   7/1/2016
   Regional Forester (signature)   Date