

Date of Report: **07/16/2014**

**BURNED-AREA REPORT**  
(Reference FSH 2509.13)

**PART I - TYPE OF REQUEST**

A. Type of Report

- ☒ 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: Diego   | B. Fire Number: NM-SNF-000191                |
| C. State: New Mexico  | D. County: Rio Arriba                        |
| E. Region: Southwestern (03)  | F. Forest: Santa Fe NF (10)                  |
| G. District: Coyote (01)  | H. Fire Incident Job Code: P3H6NN            |
| I. Date Fire Started: June 25, 2014                                       | J. Date Fire Contained: July 8, 2014 @ 1800. |
| K. Suppression Cost: \$6,000,000 - projected final incident cost estimate |  |
| L. Fire Suppression Damages Repaired with Suppression Funds:              |  |
| 1. Fireline waterbarred (miles):  |  |
| 2. Fireline seeded (miles):   |  |
| 3. Other (identify):  |  |

M. Watershed Number:  
6<sup>th</sup> Code Watersheds within the Diego Burned Area

<i>6<sup>th</sup> Level Watershed</i>	<i>Watershed Name</i>	<i>Acres</i>
130201020803	Headwaters Rio Puerco	3570
130201020802	Coyote Creek	44

N. Total Acres Burned: 3,614 acres  
NFS Acres (3386) Other Federal ( ) State ( ) Private Acres (228)

O. Vegetation Types: Dry mixed-conifer and ponderosa pine with significant aspen in the drainage bottoms, and predominantly Gambel oak in the more upland drier locations.

P. Dominant Soils:

- Pachic Argiborolls and Cumulic Haplaquolls, LSC 5 (mu 5) Montane Grasslands
- Mollic Eutroboralfs, LSC 5, 0 with Rock Outcrop (mu 150) Gambel oak/Ponderosa pine
- Mollic Eutroboralfs, LSC 5, 0 fine, mixed (mu 155, 156) Ponderosa pine/Gambel oak
- Eutric Glossoboralfs, LSC 6, 0 fine, mixed (mu 136, 137) White fir/Douglas fir/ Ponderosa pine/Gambel oak
- Eutric Glossoboralfs, LSC 6, 0 with Rock Outcrop (mu 138, 139) White fir/Douglas fir/ Ponderosa pine/Gambel oak

Q. Geologic Types:

Permian sandstone and Tertiary clastics.

R. Miles of Stream Channels by Order or Class:

Intermittent: 9.43  
Perennial: 0.04

S. Transportation System

Trails: 0 miles Roads: 34 miles

### **PART III - WATERSHED CONDITION**

- A. Burn Severity (acres): Low/unburned: 1830; Moderate: 1463; High: 321
- B. Water-Repellent Soil (acres): approximately 1000
- C. Soil Erosion Hazard Rating (acres):  
Low: 0 Moderate: 1153 High: 2461
- D. Erosion Potential: approximately 6 tons/acre
- E. Sediment Potential: 2820 cubic yards / square mile

### **PART IV - HYDROLOGIC DESIGN FACTORS**

- A. Estimated Vegetative Recovery Period (years): 5 to 7 yrs.
- B. Design Chance of Success (percent): 50%
- C. Equivalent Design Recurrence Interval, (years): 25 year
- D. Design Storm Duration, (hours): 1 hour
- E. Design Storm Magnitude, (inches): 1.95 inches
- F. Design Flow, (cubic feet / second/ square mile): 227 cfs/mi<sup>2</sup>
- G. Estimated Reduction in Infiltration, (percent): 60%
- H. Adjusted Design Flow, (cfs per square mile): 319 cfs/mi<sup>2</sup>

### **PART V - SUMMARY OF ANALYSIS**

- A. Describe Critical Values/Resources and Threats:

The Diego Fire burned over 3,614 acres in the San Pedro Mountains on northern New Mexico. The fire occurred on the Coyote Ranger District approximately 6 miles southwest of Coyote, NM. The majority of the burn severity occurred in the headwaters of the Rio Puerco located in T21N, R3E, Sec. 7, 17, 18, 20; T21N, R2E, Sec. 1, 2, 3, 4, 10, 11, 12, 13, 14; and T22N, R2E, Sec. 34, 35, 36 in the southwestern portion of the Coyote Ranger District, Santa Fe National Forest, New Mexico. The project is located in the 3<sup>rd</sup> Congressional District of New Mexico, Rio Arriba County. Table 1 displays the area burned by ownership.

Table 1: Area Burned and Percent of Burned Area by Land Ownership

<i>Land Ownership</i>	<i>Acres</i>	<i>Percent of Burned Area</i>
USDA – Coyote Ranger District, Santa Fe National Forest	3386	94%
Private	228	6%
Total	3,614	100%

The Diego fire burned primarily Ponderosa pine, mixed-conifer (including aspen), and an understory consisting primarily of grasslands. The burned area consists of 3,614 acres primarily in the headwaters of the Rio Puerco 6<sup>th</sup>-level watershed, see Part 2 section M.

Field assessment of moderate and high burn severity within the fire perimeter showed a moderate amount of soil hydrophobicity. Watershed response to post fire storm events will be influenced directly by the loss of forest canopy cover and lack of effective vegetative ground cover.

### Critical Values Identified

Critical Values identified (FSM Interim Direction 2523.1 Exhibit 02) during the BAER assesment are:

1. Human Life and Safety
2. Property
3. Natural Resources (water quality of natural waters, domestic use, invasive species or noxious weeds, and soil productivity)
4. Cultural and Historic Resources (Traditional Cultural Properties, Traditional Uses, etc.)

The Diego BAER team evaluated the risk to those critical values per Exhibit 2, Interim Directive No. **2520-2013-1** (8/31/12) was used to evaluate the Risk Level for each value at risk identified during Assessment:

### 2523.1 - Exhibit 02

#### BAER Risk Assessment

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

**Probability of Damage or Loss:** The following descriptions provide a framework to estimate the relative probability that damage or loss would occur within 1 to 3 years (depending on the resource):

- Very likely. Nearly certain occurrence (90% - 100%))
- Likely. Likely occurrence (50% - 89%)
- Possible. Possible occurrence (10% - 49%)
- Unlikely. Unlikely occurrence (0% - 9%)

**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 critical natural or cultural resources resulting in minimal, recoverable or localized effects.

The very high and high risk categories are unacceptable risk levels due to threats to human life, property, infrastructure and resources (natural and cultural), therefore treatments should be applied. An Intermediate Risk could be unacceptable if human life or safety is the critical value at risk.

## 1. Human Life and Safety

The following table summarizes the threats, probability of damage or loss, magnitude of consequences, and associated risks with protecting human life and safety.

Threats	Probability of Damage or Loss	Magnitude of Consequences	Risk
Hazard Trees	Likely	Moderate	High
Flooding	Likely	Moderate	High
Use of system roads within the burned area	Likely	Moderate	High

There is a high risk to human life and safety due to hazard trees. The risk remains high within certain areas of the burn perimeter, particularly along Forest Service Road (FSR) 103, FSR 96, FSR 316, and along the boundaries that divide NFS lands and private property (i.e. Garcia and Martinez properties).

There is a high risk to human life and safety due to increased flooding.

Open system roads within the burn scar present a high risk to those who travel them. While the condition of many of these roads was poor prior to the fire, the erodibility of these roads will increase post-fire thus increasing the hazard of becoming trapped and stranded. Travel along the main Forest System Roads (FSR; i.e. FSR 103, FSR 93, and FSR 316) is rated to be a low risk, yet anytime an individual travels through a burned area, the threats discussed herein (for example a washed-out road) should be given careful consideration.

### ***Recommended Actions (to Reduce the Risk to Human Life and Safety)***

- Remove hazard trees where a threat to human life and safety remains. Continue to monitor hazard trees, particularly after high wind events and significant precipitation events.
- Post flood-warning signs to seek higher ground during flash floods, and post signs that discuss the hazards of traveling rough roads on the interior of the burn scar.
- Storm patrol monitoring of the main FSR, and clearing sediment and debris from culverts along these roads. These actions could prevent a road from washing out, and thus reduce the potential of entrapment or injury to those traveling the FSR.

## **2. Property**

The following table summarizes the threats, probability of damage or loss, magnitude of consequences, and associated risks with protecting property.

Threats	Probability of Damage or Loss	Magnitude of Consequences	Risk
Loss of Level 1 and level 2 roads (i.e. FSR 322 spurs)	Possible	Minor	Low
Loss of FSR 103 and associated culverts	Likely	Major	Very High
Loss of Range Improvements	Very Likely	Minor	Low
Damage to Private Property	Likely	Moderate	High
Damage to Highway 96 Bridge at Rio Puerco	Unlikely	Major	Intermediate

There is a very high risk to the road prism, the borrow ditches and culverts which drain FSR 103. Post-fire flood flows have occurred and are expected to continue. These flood flows are expected to increase from 39 to 141% over pre-fire values. Ash, sediment, and debris will be transported from the burn scar into valley bottoms along the stream network that drains into the Rio Puerco. Where the drainage network crosses FSR 103, the possibility exists for culverts to become clogged which could result in the road being washed away.

Due to the post-fire floods, there is a high risk that damage will occur to private property. Flooding within the Rio Puerco watershed has laid down flood deposits on and below the burn scar (Garcia and Martinez properties), and even deposited a small amount of ash on private property in the community of Coyote, adjacent to Arroyo del Agua. Stock tanks on private lands above FSR 103 have and will continue to fill until their storage capacities are exceeded.

Level 1 and level 2 roads within the burn scar, range improvements, and the Highway 96 bridge at Rio Puerco were also evaluated. At this time, a low risk for the roads and range improvements was assigned, and an intermediate risk was assigned for the Highway 96 bridge.

### ***Recommended Actions (to Reduce the Threats to Property)***

- Install an additional (36 inch CMP) culvert below the Garcia property at FSR 103 to increase drainage capacity and protect FSR 103 from damage and/or loss. Increasing the current culvert capacity so surplus water can be discharged under the FSR 103 below the Garcia property is needed to ensure that potential loss of this infrastructure is minimized.
- Storm patrol monitoring of the main FSR, and clearing sediment and debris from culverts along these roads. These actions could prevent a road from washing out. A small investment in monitoring the culverts to ensure they do not become clogged (includes removal of debris after rainfall events), can reduce the risk of a significant investment in major road reconstruction.
- Monitor and determine the condition of any stock tanks on NFS lands. While the risk to range improvements was determined to be low by the BAER team, an opportunity may exist to support the excavation of the stock tanks in order to regain storage capacity for sediment retention and to reduce peak flows.

### **3. Natural Resources**

The following table summarizes the threats, probability of damage or loss, magnitude of consequences, and associated risks with protecting natural resources.

Threats	Probability of Damage or Loss	Magnitude of Consequences	Risk
Loss of site productivity, increased soil erosion , and reduced water quality	Likely	Moderate	High
Spread of noxious weeds	Likely	Moderate	High
Impacts to New Mexico Meadow Jumping Mouse habitat	Likely	Moderate	High
Impacts to Rio Grande Sucker habitat	Possible	Moderate	Intermediate

There is a high risk associated with loss of site productivity in areas of moderate and high burn severity within the Diego burned area. The loss of effective ground cover, loss of canopy cover and the resulting exposed soil, much of which also exhibits a moderate degree of water repellency (  $\frac{1}{4}$  to  $\frac{1}{2}$  inch below the ground surface) creates conditions that will result in an increase in hydrologic response from precipitation events (i.e. water travels over the ground surface with more energy). These conditions allow for higher levels of soil erosion and sediment to be delivered to areas within and below the burn scar into the Rio Puerco watershed. Steep slopes where vegetative groundcover has been lost will almost certainly see soil erosion levels increase well above tolerance soil loss rates and storm events will deliver increased flood flows from 39 to 141% over pre-fire levels.

Additionally, there is a high risk of expanding known populations of invasive plant species/noxious weeds as a result of the Diego fire. Current known populations are concentrated along roads and within the burn scar. New disturbance of lands associated with suppression activities and fire damage is likely to lead to the expansion or establishment of new populations. High levels of soil erosion will also increase the likelihood of establishment of new populations of invasive species, as well as expansion of existing populations within the burned area.

Due to the increased flooding and erosion, there is a high risk to the potential habitat of the New Mexico Meadow Jumping Mouse.

#### ***Recommended Actions (to Reduce the Threats to Natural Resources)***

- Seed annual barley on approximately 740 acres of moderate and high burn severity areas within the Diego burn scar. In addition to seeding, mulch (agricultural straw) will be applied to 187 of the 740 acres. Seeding of annual barley seed at a rate of 50 pounds/acre is proposed. Mulch will be applied aerially at a rate of 1 ton/acre. Seed and agricultural straw are required to be “certified weed-free” per requirements of the State of Origin. This treatment is intended to reduce the threat to natural resources and risk of storm damage to downstream infrastructure and habitat along the Rio Puerco. By providing immediate ground cover to moderate and high burn severity areas, this will reduce the risk of sediment bulking of storm flows, protect existing water quality, protect long term site productivity, and mitigate impacts to potential New Mexico Meadow Jumping Mouse habitat within and downstream of the burned area.
- Monitor known populations of invasive species and noxious weeds. Treat any expansion of these populations promptly with the most appropriate method to control expansion.
- Monitor newly disturbed areas, especially along roads used to access the fire during suppression activities, dozer lines, hand lines, drop points, and staging areas for establishment of new populations of invasive and noxious weeds. Treat any newly established populations promptly with the most appropriate method to control expansion.

#### 4. Cultural and Historic Resources

The following table summarizes the threats, probability of damage or loss, magnitude of consequences, and associated risks with protecting cultural resources.

Threats	Probability of Damage or Loss	Magnitude of Consequences	Risk
Erosion to 19 Archeological Sites	Possible	Moderate	Intermediate

There is an intermediate risk to prehistoric or historic artifacts or structures which may provide further research potential opportunities. These sites are generally considered *eligible* for nomination to the National Register of Historic Places for their potential for national importance. The loss of ground cover and the resulting exposed soil creates conditions that allow moderate to severely burned areas to respond quickly from precipitation events. The movement of soil and debris across the watershed creates an opportunity to displace small artifacts such as lithics and historic trash scatters, thus removing them from their prehistoric or historic contexts. Additionally, the increase of moisture in the soil creates an opportunity for fire weakened trees to uproot and disturb below ground surface cultural deposits or to fall on structural sites.



Of the 20 sites considered during the suppression and BAER assessment efforts, fourteen are listed as *eligible* for nomination to the National Register of Historic Places (NRHP) and are considered Value at Risk (VARs) due to their potential for national significance. It is also recommended that the five sites considered *unevaluated* for nomination to the NRHP be considered as VARs as the listing of *unevaluated* does not preclude it from potentially yielding information which may make it *eligible* upon further research. None of these sites occur in high burn severity but retain the potential for impacts if located on slopes below severe or moderate burn areas in impacted watersheds. Four sites have been identified for protection.

***Recommended Actions (to Reduce the Threats to Cultural Resources)***

- Stabilize cultural sites through placement of log erosion barriers to divert overland flow of water and debris around four archaeological or historical sites.
- Monitor all sites on or below slopes with moderate to high burn severity to assess any potential damage from overland flow of water and debris.

**B. Emergency Treatment Objectives:**

- Reduce risk of injury or loss of life from hazard trees and post-fire flooding, particularly along Forest roads 103, 93 and 316.
- Protect and monitor infrastructure (roads, stock tanks, culverts) from damage or loss due to post-fire flooding and movement of debris.
- Protect cultural resources throughout the area.
- Reduce the risk of loss to natural resources from sediment movement, degraded water quality and loss of long term site productivity.
- Reduce the spread and/or establishment of invasive species and noxious weeds.

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

Land **50** % Channel **N/A** % Roads/Trails **50** % Protection/Safety **70** %

**D. Probability of Treatment Success**

	Years after Treatment		
	1	3	5
Land	70	70	80
Channel	N/A	N/A	N/A
Roads/Trails	60	70	70
Protection/Safety	90	95	95

**E. Cost of No-Action (Including Loss): \$3,369,778**

**F. Cost of Selected Alternative (Including Loss): \$1,374,778**

*\* Probability of treatment success and probability of treatment failure were both assigned a value of 0.5*

G. Skills Represented on Burned-Area Survey Team:

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

See attached list for team members names and resource speciality.

Team Leader: Greg Miller, Carson NF

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H. **Treatment Narrative:**

Land Treatments:

Seed annual barley on approximately 740 acres of moderate and high burn severity areas within the Diego burn scar. This seed would be applied by fixed wing aircraft. In addition to seeding, mulch (agricultural straw) will be applied to 187 of the 740 acres. Mulch would be applied by rotary aircraft at a rate of 1 ton per acre. This treatment will minimize erosion and sedimentation, as well as decrease post-fire peak flows within the Diego burned area.

Stabilize and protect 4 cultural resource site by stabilizing slopes using log erosion barriers to create a barrier diverting overland water and debris flows around archaeological or historic sites.

Channel Treatments: No Channel Treatments are proposed.

Road and Trail Treatments:

Install an additional (36 inch CMP) culvert below the Garcia property at FSR 103 to increase drainage capacity and protect FSR 103 from damage and/or loss.

Conduct storm patrols of the main FS roads. Clear sediment and debris from culverts (44) along these roads. These actions will prevent damage to FSR roads by maintaining positive drainage of these roads and reduce the potential hazards to those traveling FS roads resulting from flood damage.

Re-condition (crown road prism, clear bar ditches) 5 miles of FSR 103 to ensure positive road drainage is maintained from this roadway.

Clean out 3 cattleguards filled with sediment to maintain their function for appropriate grazing management in allotments affected by the Diego Fire.

Protection/Safety Treatments:

Monitor areas where high risk hazard trees remain, particularly after high wind and significant precipitation events. Reduce the risk to human life and safety with storm patrol monitoring of the main FS roads and clearing debris and sediment from the culverts along these roads. These actions could prevent a road from washing out and reduce the potential of entrapment or injury to those traveling on the roads.

Post flood warning signs to seek higher ground during flash floods and post signs warning of the hazards of traveling rough roads through the interior of a burn scar.

Acequia irrigation diversion structure protection is at risk of being damaged from increase post-fire flows, debris and sediment. Point protection will be placed to reduce the impact to these structures.

## **I. Monitoring Narrative:**

Monitoring of aerial seed and mulch applications would occur initially as a part of the contract compliance. Inspection of seed application rate would be measured by the number of seeds per square foot, and inspection of mulch would be evaluated based on visual observations of ground coverage of mulch over the targeted acreage. Monitoring for effectiveness of the treatment will be done monthly through the field season to evaluate the results of seed germination and mulch cover protection of the soil surface.

Invasive species and noxious weed populations will be monitored based on known existing populations (mapped areas). Newly disturbed areas resulting from suppression activities (dozer and hand lines, drop points and staging areas) will be mapped and monitored for expansion and establishment of new populations. Areas adjacent to roads will be monitored as well. Moderate and high burn severity areas will be monitored both in conjunction with seed germination monitoring and through the field season. Monitoring will allow for prompt treatment of any of these areas with the most appropriate control measures.

Monitor 4 cultural resources will be to insure effectiveness of placement of log erosion barriers to protect sites from overland flow of water and debris movement. Monitor all sites on or below slopes with moderate to high burn severity to assess any potential damage from overland flow of water and debris.

Continue to monitor hazard trees, particularly after high wind events and significant precipitation events. Remove hazard trees that pose a threat to human life and safety along high use Forest Service Roads (103/316/93).

Monitor stock tanks on Forest Service lands throughout the field season for impacts from sedimentation and flows that may compromise the structural integrity of the tanks. Evaluate opportunities to support the excavation of tanks to regain storage capacity for sediment retention and to reduce the duration of peak flows.

Detailed monitoring plans will be developed as part of the implementation of treatments by Coyote Ranger District staff personnel.

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

See Table on next page.

			NFS Lands				Other Lands				All
		Unit	# of		Other		# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER \$	\$		units	\$	Units	\$	\$
A. Land Treatments											
Aerial Seed - barley	ac	100	740	\$74,000				\$0		\$0	\$74,000
Aerial Mulching	ac	1000	187	\$0				\$0		\$0	\$0
Cultural Sites Stabilization	ea	400	4	\$1,600	\$0			\$0		\$0	\$1,600
Implementation Lead	ea	10000	1	\$10,000	\$0			\$0		\$0	\$10,000
Insert new items above this line!				\$85,600	\$0			\$0		\$0	\$85,600
Subtotal Land Treatments											
B. Channel Treatmen	mi		1	\$0	\$0			\$0		\$0	\$0
				\$0	\$0			\$0		\$0	\$0
Insert new items above this line!				\$0	\$0			\$0		\$0	\$0
Subtotal Channel Treat.											
C. Road and Trails											
culvert install/repair	ea	10837	1	\$10,837	\$0			\$0		\$0	\$10,837
culvert cleaning	ea	220	10	\$2,200				\$0		\$0	\$2,200
cleanout cattleguards	ea	350	3	\$0				\$0		\$0	\$0
road re-condition	mi	2110	1	\$2,110				\$0		\$0	\$2,110
storm patrol	day	2763.3	10	\$27,633				\$0		\$0	\$27,633
Insert new items above this line!				\$0	\$0			\$0		\$0	\$0
Subtotal Road & Trails				\$42,780							\$42,780
D. Protection/Safety											
Haz Tree Remove	ac	800	16	\$0				\$0		\$0	\$0
Haz Tree Warning signs	ea	125	4	\$500				\$0		\$0	\$500
Letter to governments	ea	200	1	\$200				\$0		\$0	\$200
Acequia Diversion Protection	ea	10000	1	\$10,000							
warning signs	ea	234.3	20	\$4,686				\$0		\$0	\$4,686
Insert new items above this line!				\$0	\$0			\$0		\$0	\$0
Subtotal Structures				\$15,386							\$5,386
E. BAER Evaluation	ea	60000	1		\$60,000			\$0		\$0	\$60,000
Assessment costs					\$0			\$0		\$0	\$0
				\$0	\$60,000			\$0		\$0	\$60,000
Subtotal Evaluation											
F. Monitoring											
Invasive monitor	day	260	20	\$5,200							\$5,200
Archy monitoring	day	260	5	\$1,300							\$1,300
Subtotal Monitoring				\$6,500							\$6,500
G. Totals											
Previously approved											
Total for this request				\$150,266							\$200,266

## PART VII - APPROVALS

1. /s/Joseph S. Norrell, Deputy FS 07/16/14  
Forest Supervisor (signature) Date
2. Jeanne M. Higgins (for) 7/19/14  
Regional Forester (signature) Date