

Date of Report: June 25, 2004

BURNED-AREA REPORT

(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

- ☐ 1. Funding request for estimated WFSU-SULT funds
- ☒ 2. Accomplishment Report
- ☐ 3. No Treatment Recommendation

B. Type of Action

- ☐ 1. Initial Request (Best estimate of funds needed to complete eligible rehabilitation 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 DESCRIPTIONA. Fire Name: Three ForksB. Fire Number: P4A4KYC. State: ArizonaD. County: ApacheE. Region: SouthwesternF. Forest: Apache-SitgreavesG. District: AlpineH. Date Fire Started: 6-8-2004I. Date Fire Contained: 6-23-2004J. Suppression Cost: 2,900,000

K. Fire Suppression Damages Repaired with Suppression Funds

- 1. Fireline waterbarred (miles): 11.5
- 2. Fireline seeded (miles): 15.5
- 3. Other (identify): Wattled and mulched: 1 mile
Mulched: 3 miles

L. Watershed Number: 506010101 Upper Black RiverM. Total Acres Burned:

NFS Acres(7905) Other Federal () State () Private ()

N. Vegetation Types: Ponderosa Pine, Mixed Conifer, Spruce Fir, and GrasslandO. Dominant Soils: TES 551 Litic Argiborolls, TES 572/672/673 Utric GlossoboralfsP. Geologic Types: Basalt

Q. Miles of Stream Channels by Order or Class: 13.4 miles of perennial and 11.6 miles of intermittent.

R. Transportation System

Trails: 0 miles Roads: 58 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 6673 (low) 589 (moderate) 643 (high)

B. Water-Repellent Soil (acres): 0

C. Soil Erosion Hazard Rating (acres):
4750 (low) 970 (moderate) 2180 (high)

D. Erosion Potential: 8.4 tons/acre

E. Sediment Potential: 18860 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 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): 2.0

F. Design Flow, (cubic feet / second/ square mile): 68

G. Estimated Reduction in Infiltration, (percent): 23

H. Adjusted Design Flow, (cfs per square mile): 83

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency:

Life and private property: There is no known threat to life or property.

Water quality: An increase of ash flow is expected to create a chemical imbalance, i.e. pH and water ionic modification, and increase the biological oxygen demand. The increased sediment yield and bed load would increase turbidity and possibly interfere with nutrient cycling (spiraling). Greater fluctuations in temperature may result in the reaches within and immediately below the fire.

Water quantity: There are no hydrophobic soil conditions but the expected decrease in infiltration rates and increase in run-off will result in moderate short term increases in flood flows in response to monsoon rains that are expected to initiate in mid July. The greatest increase in per acre flood flow production will likely occur in the lower watershed of the North Fork of East Fork of the Black River which sustained the greatest overall extent of burn of those sub-watersheds involved in the fire. (This was modeled at an approximate 40% increase.) Overall increases in flood peak in the East Fork of the Black will be less since much of the watershed above the Three Forks remains unburned. Infiltration rates will increase because of the loss of vegetative ground cover and some soil structure deterioration due to the high and moderate burn severity.

Aquatic Species and Habitat: Three Forks is Critical and occupied habitat for loach minnow, *Tiaroga cobitis* (Threatened) and occupied habitat for Apache Trout *Oncorhynchus apache* (Threatened). A risk of high or complete fish kill may result from a significant ash flow event(s). Initial and chronic sediment inputs will have negative effects to survival and reproduction of individuals and local populations (East Fork of the Black River and its tributaries). Significant long-term perpetrations from sediment pulses related to the fire will threaten the viability of these local populations. Egg and larval (tadpole) life stages of the Chiricauha leopard frog *Rana chiricahuensis* (Threatened) will also be affected by the same affects as previously mentioned. The California floater *Anodonta californiensis* and Three Forks spring snail *Pyrgulopsis trivialis*, listed as sensitive species, occupy Boneyard Creek and the Three Forks drainage area. This location is the only inventoried population in Eastern Arizona. These species have little effective mobility to avoid the affects from the fire or for repopulating extirpated areas as a result of the fire.

Wildlife Species and Habitat: The two species of concern are a pair of Experimental Nonessential of Mexican wolves *Canis lupus baileyi* and one PAC of Threatened population of Mexican spotted owls *Strix occidentalis lucida*. Initial analysis indicates that the pair of wolves was not significantly impacted as a pair was sighted during the process of containing the fire. The owl PAC was severely burned. Note this PAC has not been surveyed in recent years. The proposed BAER treatment of mulch and seeding will accelerate the recovery of prey habitat for both species and forage for ungulate species regarding the wolves.

Soils Loss: The majority of the areas soil loss will not exceed tolerable levels because of the low burn severity. Some areas that have a high to moderate burn severity may exceed tolerable soil loss limits because of the loss of vegetative ground cover (VGC), soil structure deterioration, and overall organic matter loss. However, portions of the high to moderate burn severity sites will maintain tolerable soil loss because they are well armored with rock cover and have a gently sloping gradient.

The average pre-fire erosion rate for the entire fire was 3.6 tons/acre and the average post-fire rate is 8.4 tons/acre. The average pre-fire sediment yield for the entire fire was 11360 tons/yr. and the average post-fire sediment yield is 26404 tons/yr.

Roads and Trails: There are no trails within the fire perimeters. The majority of the roads within the site are level 2 roads that are not regularly maintained and classified as 4X4 routes that are not recommended for passenger vehicles.

The Three Forks Bridge on FR 249 is a 50 ft. X 10 ft. concrete span that is immediately downstream from the burned area. There is also a crossing located on the West branch of the North Fork on FR 249. Both of the crossings are expected to handle the predicted increased flows associated with the burn. However, there is a possibility of debris collecting behind the crossings that may compromise its integrity.

B. Emergency Treatment Objectives:

- Protect water quality from excessive sedimentation and ash flows.
- Protect the critical and occupied riparian habitat for Threatened and Sensitive aquatic species.
- Minimize soil erosion to protect long-term productivity.
- Reduce the potential from damage producing floods.
- Reduce the risk of damage to road crossings identified as being at risk from increased flows from the burned areas.

C. Probability of Completing Treatment Prior to First Major Damage-Producing Storm:

Land 60 % Channel 60 % Roads 70 % Other na %

D. Probability of Treatment Success

Years after Treatment			
	1	3	5
Land	80	80	80
Channel	70	75	70
Roads	85	85	85
Other			

E. Cost of No-Action (Including Loss): \$14,263,777

F. Cost of Selected Alternative (Including Loss): \$13,825,249

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Chris Nelson

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H. **Treatment Narrative:**

(Describe the emergency treatments, where and how they will be applied, and what they are intended to do. This information helps to determine qualifying treatments for the appropriate funding authorities. For seeding treatments, include species, application rates and species selection rationale.)

Land Treatments:

Aerial Seeding

Objective- Aerial seeding will occur in high and moderate burn severity areas where native plant recovery is too slow for effective erosion control to maintain adequate water quality and long-term productivity. A cover crop will be integrated with the native perennial seed mix to provide a quick vegetative ground cover response.

Methods- 1225 acres of moderate and high burn severity acres will be aerially seeded and 355 of those seeded acres will also be heli-mulched. The seed mix will entail the following species: Mountain Brome (*Bromus marginatus*), Slender Wheat (*Elymus trachycaulus*), Annual Rye (*Lolium multiflorum*) and Annual Barley (*Hordium vulgare*). The area will be seeded with 25 seeds/sq. ft. rate.

1225 acres of aerial seeding with above seed mix was completed 7/13/2004.

Straw Mulch

Objective - Protect the soil surface from raindrop impact, minimize soil loss and ash delivery to streams, enhance establishment of vegetation and reduce accelerated runoff where immediate ground cover protection is needed for effective erosion control and to protect water quality for aquatic habitat.

The mulching is expected to reduce the average erosion rate for the entire fire from 8.4 tons/acre to 6.5 tons/acre. The sediment yield is expected to reduce from 26404 tons/yr to 20173 tons/yr.

Methods – Approximately 355 acres will be mulched with certified weed free straw at 2000 lbs/acre rate. The mulch will be applied aerially through “heli-mulching”.

283 acres of straw mulch was applied at a rate of 2,000 lbs./acre and completed 7/19/2004.

The cost per acre for seeding and mulching was much higher than originally estimated. The contractor did high quality work, but at almost 75 percent higher cost for mulch than the KP fire implementation one week later. This difference is probably due to the contractor's inexperience in this type of operation. The 3-forks contractor, however, was the low bidder for this project. Seed application was included in the same contract with mulch, and also resulted in higher cost to the government. In-house contracting the aerial application of seed appears to be more cost effective, as the same seed application contractor was used for both KP (in-house) and 3Forks (contract). The Forest supplied an airport manager for the operation.

Contracting of aerial mulch application may be slightly higher than fire crew and forest contract helicopter, but forest personnel and availability of aircraft is limited when application is necessary during the height of fire season. The Forest supplied a helicopter manager.

Channel Treatments:

Strawbale Check Dams

Objective- Reduce ash flow and sediment delivery to the perennial riparian ecosystems. The strawbale check dams will promote channel stability by trapping sediment, slowing channel runoff and reducing down cutting of stream channels.

Methods- Install check dams in first order ephemeral drainages in tributaries to Boneyard and the North Fork of the East Fork of the Black River. The check dams will be placed in drainages that are no larger than 30 acres and that have moderate or high burn severity. Approximately 25 strawbale check dams will be installed.

25 straw bale check dams were installed by 8/13/2004. Straw was purchased and delivered through the aerial mulch contractor at a reduced price, which may have offset some of the high cost of aerial mulching.

Roads and Trail Treatments:

Road Stream Crossing

Objective- To maintain road crossing integrity from potential debris accumulation due to increased flows.

Methods- The 3-Forks bridge and West Branch crossing inlets will be cleaned and floatable debris immediately upstream will be cleared. The crossings will be monitored on a regular basis and especially during periods of high precipitation events to ensure passage of flood flows.

No maintenance of road crossing has been needed to date. The forest will continue to monitor the two major crossings.



Straw mulch applied @ 2,000 lbs./acre. Approximately 1 month after implementation



Straw bale check dam approximately 3 weeks after installation, after 1st precipitation event.



Example of fireline treatment through meadow with sensitive soils (suppression funds).

I. Monitoring Narrative:

(Describe the monitoring needs, what treatments will be monitored, how they will be monitored, and when monitoring will occur. A detailed monitoring plan must be submitted as a separate document to the Regional BAER coordinator.)

Noxious Weed: There are currently no known noxious weed sites within the burned perimeter. The site will be monitored for noxious weed infestation caused by the effects of the fire and BAER treatments. The monitoring will take place for 2 years to determine if there are any introductions of noxious weeds.

Land Treatments: Measure the effects of slope treatments as a result of implementing aerial seeding and mulching in high and moderate burn severity areas. Soil loss monitoring will be accomplished by evaluating soil stability quality indicators. The vegetative recovery will be evaluated to determine the need for further treatments. Qualitative monitoring will occur for approximately 2 years.

Channel morphology: Monitor changes in channel morphology and substrate at established cross sections within critical stream channels.

Aquatic health: Fish density will be monitored for 3 years to determine the effectiveness of BAER treatments. At a minimum, population densities should remain viable if treatments are effective.

FR 249 Three forks and West branch of the North Fork: The crossings will be monitored for debris accumulation and overall structural integrity for 2 years.

Monitoring plots were set up within fire boundary. These will be monitored after spring runoff has occurred and in the summer. Approved funding not utilized in FY04 will be requested in 05 to fund monitoring per monitoring plan.

Part VI – Emergency Rehabilitation Treatments and Source of Funds by Land Ownership

		NFS Lands				Other Lands				All	
		Unit	# of	WFSU	Other		# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	SULT \$	\$		units	\$	Units	\$	\$
A. Land Treatments											
Aerial Seeding	acres	35	1225	\$42,875	\$0			\$0		\$0	\$42,875
Aerial Straw Mulch	acres	983	283	\$278,189	\$0			\$0		\$0	\$278,189
				\$0	\$0			\$0		\$0	\$0
Insert new items above this line!				\$0	\$0			\$0		\$0	\$0
Subtotal Land Treatments				\$321,064	\$0			\$0		\$0	\$321,064
B. Channel Treatments											
Straw Check Dams	each	227	25	\$5,675	\$0			\$0		\$0	\$5,675
				\$0	\$0			\$0		\$0	\$0
				\$0	\$0			\$0		\$0	\$0
Insert new items above this line!				\$0	\$0			\$0		\$0	\$0
Subtotal Channel Treat.				\$5,675	\$0			\$0		\$0	\$5,675
C. Road and Trails											
Stream crossing	each	1250	0	\$0	\$0			\$0		\$0	\$0
				\$0	\$0			\$0		\$0	\$0
				\$0	\$0			\$0		\$0	\$0
Insert new items above this line!				\$0	\$0			\$0		\$0	\$0
Subtotal Road & Trails				\$0	\$0			\$0		\$0	\$0
D. Structures											
				\$0	\$0			\$0		\$0	\$0
				\$0	\$0			\$0		\$0	\$0
				\$0	\$0			\$0		\$0	\$0
Insert new items above this line!				\$0	\$0			\$0		\$0	\$0
Subtotal Structures				\$0	\$0			\$0		\$0	\$0
E. BAER Evaluation											
Team	days	1868	6	\$11,208	\$0			\$0		\$0	\$11,208
				\$0	\$0			\$0		\$0	\$0
Insert new items above this line!				\$0	\$0			\$0		\$0	\$0
Subtotal Evaluation				\$11,208	\$0			\$0		\$0	\$11,208
F. Monitoring											
BAER Monitoring Plan	Plan	3500	0	\$0	\$0			\$0		\$0	\$0
Baer Monitoring Plan to date		841	1	\$841							\$841
Insert new items above this line!				\$0	\$0			\$0		\$0	\$0
Subtotal Monitoring				\$841	\$0			\$0		\$0	\$841
G. Totals				\$338,788	\$0			\$0		\$0	\$338,788

PART VII - APPROVALS

1. _____
Forest Supervisor (signature)

Date

2. _____
Regional Forester (signature)

Date