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

Date of Report: 07/22/2016

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: Scott Fire

B. Fire Number: AZ-KNF-000498

C. State: Arizona

D. County: Coconino

E. Region: 3

F. Forest: Kaibab

G. District: 04

H. Fire Incident Job Code: P3KC6S

I. Date Fire Started: 06/13/2016

J. Date Fire Contained: 07/18/2016

K. Suppression Cost: $1,045,000

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred/slashed (miles): 5.8 miles
2. Fireline seeded (miles): 0
3. Other (identify): N/A

M. Watershed Number: Upper Lee Canyon (150200160904).

N. Total Acres Burned: 2,556 ac.
NFS Acres (2,556) Other Federal ( ) State ( ) Private ( )

O. Vegetation Types: ponderosa pine, pinyon pine, Gambel oak (982 ac.); pinyon pine, Utah juniper, Gambel oak (1,373 ac.); big sagebrush, blue grama (185 ac.); mountain muhly (15 ac.)

P. Dominant Soils: Typic Haplustalfs (1,281 ac.), Udic Haplustalfs (974 ac.), Typic Ustochrepts (180 ac.), Fluventic Ustochrepts (44 ac.), Lithic Ustochrepts (62 ac.), Cumulic Haploborolls (15 ac.)

Q. Geologic Types: Gray to tan cherty limestone of the Kaibab and Toroweap formations, and underlying white to tan Coconino sandstone (gypsum, mudstone, dolomite, orthoquartzite).

R. Miles of Stream Channels by Order or Class: 12.16 miles of 1st order streams, 1.43 miles of 2nd order streams, and 0.54 miles of 3rd order streams.

S. Transportation System

Trails: 1.9 miles (Arizona Trail) Roads: 7.1 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres) 1,433 (low/unburned) 75 (moderate) 1,048 (high)

B. Water-Repellent Soil (acres): approx. 875

C. Soil Erosion Hazard Rating (acres):
1192 (slight) 693 (moderate) 673 (severe)

D. Erosion Potential: 8.56 tons/acre

E. Sediment Potential: 1,506 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 4

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

C. Equivalent Design Recurrence Interval, (years): 10

D. Design Storm Duration, (hours): 1

E. Design Storm Magnitude, (inches): 0.9

F. Design Flow, (cubic feet / second/ square mile): 4.5

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

H. Adjusted Design Flow, (cfs per square mile): 22

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

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 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.

Human Life and Safety

There is risk to human life and safety for visitors and forest personnel using Forest Roads 307 or visiting the burned area. These risks include: a) entrapment due to flood flows or downed trees, b) vehicle accidents where road surfaces fail, c) falling trees. The probability of risk to human safety or loss of life is *possible* and the magnitude of consequences is *major*.

Cultural Resources

There are approximately 85 potentially eligible archeological sites within the fire perimeter that are now at risk of damage and loss from looting because they are now easily accessible and visible without the vegetation to obscure them. Protection of these resources is important for understanding prehistoric and historic context of human habitation and uses of this portion of the forest. Sites on burned ridgetops are at risk from erosion and feature damage as burned trees fall on ruin walls or uproot when windthrown, dislodging rock walls. Some sites on flat terrain (terraces, canals, and rock structures) are at risk of being eroded in stormwater runon and runoff. Access is very easy in downslope areas, given the openness that's been created by the fire and the relatively flat terrain in the lower portion of the burned area. Additionally this is in a remote part of the Tusayan RD and is a desirable location for fuelwood collecting, so when illegal OHV traffic occurs, it is not readily

detected or controlled. The probability of damage or loss of cultural resources is *likely* and the magnitude of consequences is *major*.

Forest Road Infrastructure

Forest Road 307 road is an ML3 arterial road that the Forest Service has invested approximately $900,000 in over the last 5 years. The road has been reconstructed over its entire length, including the addition of 4 inches of new base material and replacement of several cuverts. This road is the primary access route to this part of the district for the Navajo Tribe for collecting fuelwood and pinyon nuts and for ceremonial purposes. There are 4 locations where the road has diversion potential within the burned area. Road surface and culvert washouts are possible if the road captures and diverts stormwater runoff from the burned area. With sediment delivery rates estimated at 1,506 cu. yds. per acre, there is risk of culverts being obstructed and diversion potential on Forest Road 307. The probability of damage or loss of road infrastructure is very *likely* and the magnitude of consequences is *major.*

B. Emergency Treatment Objectives:

1. Install warning signs to alert forest visitors/travelers on roads and trails entering burned area about post-fire hazards hazards.
2. Protect approximately 70 of the 85 archaeological sites from potential damage or destruction from either flooding or looting/desecration.
3. Protect/harden Forest Road 307 to prevent or minimize damage to the road since significant investment has been made to reconstruct/upgrade this road.

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

Land **70** % Channel **N/A** % Roads/Trails **75** % Protection/Safety **N/A** %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	75	85	100
Channel	N/A	N/A	N/A
Roads/Trails	80	95	100
Protection/Safety	90	100	100

E. Cost of No-Action (Including Loss): The cost of no-action includes damage or loss of Forest Road 307 within the fire perimeter. There are 3 culverts that have potential to fail and the road prism has potential to divert flow. If culverts fail and the road diverts flow, then road reconstruction would be necessary. The estimated cost of replacing 4 culverts, reshaping the road traveled way, and resurfacing (adding crushed aggregate) are expected to cost $150,000. The cost would increase if it failed more than once.

The cost of loss of archaeological resources cannot be estimated with reasonable accuracy. However, if each site has a value ranging from $500 to $200,000 in the cultural information that it can provide, then the value of archaeological resources would be over $7M.

Estimated erosion rates of approximately 8.5 tons per acre across the 70 archaeological sites would result in approximately 595 tons of soil loss. At a commercial value of $25.00 for topsoil, the value of soil loss from archaeological sites would be approximately $14,875.00

The total cost of no-action is estimated to be over $7,200,000.

F. Cost of Selected Alternative (Including Loss): The funding requested is $72,360. Given the projected probability of success is 75 percent (i.e., probability of failure is 25%), the potential cost of the selected alternative, including loss of the aforementioned resources $217,965.

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Kit MacDonald

Email: cdmacdonald@fs.fed.us Phone: (928) 527-3451 FAX: (928) 527-3620

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:

1) Stabilize high priority archaeological sites (70 sites) in moderate and high burn severity areas by removing remaining dead trees from within and around cultural features.
2) Strategically place cut tree boles, limbs, and other woody debris to divert erosive forces, roughen ground surfaces, and conceal artifacts.
   (Items 1 and 2 above are approximately 50 percent completed due to assistance from fire personnel during fire suppression rehabilitation).
3) Seed all archaeological sites to stabilize soils and conceal artifacts to the greatest extent practicable using a rapid growing cover crop.
4) Seed Forest Roads 307K and 307KA to prevent erosion of the road surfaces now that these roads are removed from the system.
5) Monitoring of seeding effectiveness and presence of invasive or noxious weeds at archaeological sites and Forest Roads 307K and 307KA.

Estimated Cost:

- 10 fire personnel for 8 days $20,000
- Supervisory Archaeologists (2 archaeologists) $6,400
  GS11 – $3600
  GS9 – $2800

Total Estimated Personnel cost: $26,400

Seed Cost:

Common Name (species)	**Rate (lb. ac.$^{-1}$)**
Barley (*Hordeum* sp.)	10
Western wheatgrass (*Pascopyrum smithii*)	10
Sideoats grama (*Bouteloua curtipendula*)	5

Seed mix cost: $11,400

Total Estimate: $37,800

Channel Treatments:

None recommended.

Roads and Trail Treatments:

Road hardening measures should be implemented on Forest Road 307 as described below:

1. Clean sediment from all water diversion structures (wing ditches) and 5 cross drain culverts to prepare for expected flood flows and potential sediment delivery to road infrastructure (completed).
2. Install broad-based dips (4) above all cross drain culverts to control surface flow on Forest Road 307 and minimize diversion potential. This will require hauling and placing 40 cu. yds. of material (4 ten-wheel dump truck loads) and installing the water contol features with a dozer and grader.
3. Install rip-rap at all culvert inlets (5) to prevent culvert washouts. This will require 50 cu. yds. of rip-rap fill material (5 ten-wheel dump truck loads) and installing fill material around culvert inlets.
4. Conduct storm patrols after major precipitation events to identify any unacceptable risk to life and safety or Forest Service road infrastructure so mitigation measures can be implemented in a timely manner.

   Slash from burned trees has already been placed on Forest Roads 307K, 307KA, and user-created roads to prevent visitors from accessing dangerous burned areas within the fire perimeter, cutting fuelwood, and damaging or looting archaeological sites.

   Estimated Cost of Road Hardening Treatments:

Rock:	
Gravel for broad-based dips: (40 cu. yds. @ $14 per cu. yd.)	$560.00
Rip-rap for culverts: (50 cu. yds. @ $14 per cu yd.)	$700.00
Rock hauling cost:	
(10 cu. yds per load, 2 loads per day @ $600 per day)	$3,000.00
Personnel time on machines:	
3 machine operators (grader, dozer, back hoe)	
300.00/day, 5 days each	$13,500.00
Machine cost	$13,500.00
Total estimated cost of road hardening	**$31,260.00**

Protection/Safety Treatments:

Burned area hazard warning signs are recommended at all entry points to the burned area to warn visitors of hazards from flooding, falling trees, etc.

I. **Monitoring Narrative:**

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

			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										
Arch Site Protection	job	$37,800	1	$37,800						
Invasives EDRR		$350	3	$1,050			$0		$0	$37,800
Subtotal Land Treat.				$38,850	$0		$0		$0	$37,800
C. Road and Trails										
Forest Road 307 hardening	job	$31,260	1	$31,260	$0		$0		$0	$31,260
							$0		$0	$0
Subtotal Road & Trails				$31,260			$0		$0	$31,260
D. Protection/Safety										
Warning signs	ea.	$300	4	$1,200	$0		$0		$0	$1,200
Subtotal Structures				$1,200	$0		$0		$0	$1,200
E. BAER Evaluation										
Person Days	days	$380	4	---	$1,520		$0		$0	$1,520
Vehicle mileage	mi.	$0.34	344		$117					
Subtotal Evaluation				---	$1,637		$0		$0	$1,520
F. Monitoring										
Effectiveness Monitoring	days	$350	3	$1,050	$0		$0		$0	$1,050
Subtotal Monitoring				$1,050	$0		$0		$0	$1,050
G. Totals				$72,360	$1,637		**$0**		**$0**	**$72,830**
Previously approved										
Total for this request				**$72,360**						

PART VII - APPROVALS

1. /s/ Heather Provencio _ 7/28/2016
   Forest Supervisor (signature) Date

2. _____ _____
   Regional Forester (signature) Date