

Date of Report: 09/19/2016

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 # 1
 - ☐ 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: Fuller Fire

B. Fire Number: AZ-GCP-000093

C. State: Arizona

D. County: Coconino

E. Region: 3

F. Forest: Kaibab

G. District: 0

H. Fire Incident Job Code: PPKC18-1502

I. Date Fire Started: 06/29/2016

J. Date Fire Contained: uncontained

K. Suppression Cost: \$10,278,700.00

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: Nankoweap Creek (150100010505) (4036 ac.), Bright Angel Creek (150100010608) (3826 ac.), Saddle Canyon-Colorado River (150100010506) (3198 ac.), Buck Farm Canyon-Colorado River (150100010504) (2,638 ac.), South Canyon (150100010406) (117 ac.), The Transept (150100010606) (79 ac.), Clear Creek (150100010605) (93 ac.)

N. Total Acres Burned: 14,988 ac.

NFS Acres (6,592) Other Federal Acres (NPS) (8,396) State (0) Private (0)

O. Vegetation Types: pinyon pine, oneseed juniper, big sagebrush needle and thread (3,382 ac.); white fir, Douglas fir, ponderosa pine, Gambel oak (726 ac.); ponderosa pine, pinyon pine, Gambel oak (563 ac.); big

sagebrush, crested wheatgrass, needle and thread, pinyon pine (530 ac.); Douglas fir (499 ac.), Engelmann spruce, subalpine fir, white fir, Douglas fir (423 ac.), Gambel oak, New Mexico locust (408 ac.), pinyon pine, Gambel oak, big sagebrush (128 ac.).

P. Dominant Soils: USFS Land: Lithic Ustochrepts (2387 ac.), Typic Ustochrepts (1637 ac.), Eutric Glossoboralfs (947 ac.), Typic Haplocryalfs (423 ac.), Udic Haploborolls (409 ac.), Mollic Eutroboralfs (359 ac.), Typic Paleboralfs (278 ac.), Typic Haploborolls (79 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); uconsolidated alluvium and eolian deposits poorly sorted and loosely

R. Miles of Stream Channels by Order or Class: 26.8 miles of 1st order streams, 14.3 miles of 2nd order streams, and 3.2 miles of 3rd order streams, and 1.7 miles of 4th order streams.

S. Transportation System

Trails: 7.6 miles Roads: 25.1 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres) very low / unburned (2998 ac.), low (3288 ac.), moderate (6951 ac.), high (1750 ac.)

B. Water-Repellent Soil (acres): 1,737 ac.

C. Soil Erosion Hazard Rating (acres):

USFS: 1,373 (slight) 1,655 (moderate) 3,504 (severe)

NPS: 1,303 (slight) 3,475 (moderate) 0 (severe) 3,661 (not rated)

D. Erosion Potential: 32.04 tons/acre

E. Sediment Potential: 5,469 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): 5

D. Design Storm Duration, (hours): 1

E. Design Storm Magnitude, (inches): 1.21

F. Design Flow, (cubic feet / second/ square mile): 53.5

G. Estimated Reduction in Infiltration, (percent): 60

H. Adjusted Design Flow, (cfs per square mile): 240

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

The BAER Risk Assessment Matrix below is used as a general guide for assessing values at risk, the probability of loss or damage to identified values at risk and the magnitude of consequences if those values are damaged or lost through post-wildfire effects.

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 BLM 8910 or visiting the burned area, including the Saddle Mountain Wilderness Trail. These risks include: a) entrapment due to flood flows or downed trees, b) vehicle accidents where road surfaces fail, particularly at low water crossings, c) falling trees. The probability of risk to human safety or loss of life is *possible* and the magnitude of consequences is *major*, resulting in a risk category of *high*.

Cultural resources sites

There is a high density of cultural resources sites (e.g., an average of one site per 3 acres) and associated artifacts throughout the lower portion of the fire where pre-historic farming was practice. Features such as pueblos, pit houses, terraces, and water control structures (rock dams) have been observed throughout the lower portion of the fire. These features occur in both non-wilderness and wilderness areas. Due to nearly

complete loss of trees in high burn severity areas and significant loss of trees (i.e., 50 percent) in moderate burn severities, cultural resources sites are exposed to water erosion and damage by falling trees. The probability of damage or loss of cultural resources sites is *very likely* and the magnitude of consequences is *major*, resulting in a risk category of *very high*.

Soil productivity

The table below is used for determining the probability of damage or loss of soil productivity and the magnitude of consequences of such loss. The table is used in the context of soil resilience and burn severity/soil development under *natural disturbance regimes* and is used only to evaluate risks associated with effects that are outside of the range of natural variability. **Unacceptable risks to soil productivity are those associated with very high risks only.**

BAER Soil Productivity Risk Assessment

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	RISK		
Very Likely	Very High	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 would occur within 3 years:

- 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 - Predicted post-fire erosion rates will result in significant changes in soil functions such that the area:
 - A. Will not support potential natural vegetation, pre-fire vegetation or will result in a state change as described in an Ecological Site Description or;
 - B. Will no longer provide the soil-dependent ecosystem services established in a Forest Plan (e.g. timber production, big-game winter range).

Significant= across large contiguous areas and >15% of soil map unit

Probability of permanent damage or loss of soil pedogenic processes and productivity

The probability of loss of soil productivity in moderate and high soil burn severity areas is *likely* and the magnitude of consequences is *moderate*, resulting in a risk category of *high*. The dominant soil orders throughout the lower portion of the Fuller Fire are Alfisols, which commonly occur under forest cover.

Persistent pinyon and juniper woodlands are the dominant forest cover type in areas that burned at moderate and high soil burn severity. While the fire return interval for this stand type is generally long, these stands

commonly burn with a stand replacement fire regime. Fire effects are therefore not outside the range of natural variability for this cover type. However, soil erosion and sediment delivery rates are expected to be very high due to relatively deep, loamy soil characteristics, resulting in a long term loss of soil productivity from areas subjected to moderate and high soil burn severities. Additionally, the burned area occurs in the House Rock Wildlife Management Area and provides winter range for bison that inhabit the WMA. While there has been a loss of available forage within the burned areas, the wildfire is not expected to result in long term reduction of available forage in the winter range of bison or other big game.

In the absence of protective vegetative ground cover, soil erosion rates in moderate and high burn severities are expected to be above tolerance threshold levels for the next 3-5 years, and possibly longer. Erosion rates as high as 32 tons per acre could occur in moderate and high burn severity areas. Areas where sufficient rock and gravel cover exist will experience substantially lower erosion rates than the maximum predicted, and therefore require no emergency stabilization/revegetation treatment. If the average post-fire erosion rate in areas of water repellant soils (1,737 ac.) is 16 tons per acre during the first year (half of the predicted rate), and 8 tons per acre during the second year, the total value of soil loss over the first two years of recovery is \$1,042,200 based on a commercial topsoil value of \$25.00 per cu. yd.

The risk of long term damage or loss of soil pedogenic processes, soil productivity, and ecosystem services is *high*. As displayed in the BAER soil productivity risk assessment matrix above, these conditions do not pose an unacceptable risk to soil productivity as no ecological thresholds have been exceeded and there is no anticipated state change to ecological conditions or ecosystem services within the burned area, so the risk level does not meet the criteria for a designation of *very high*.

B. Emergency Treatment Objectives:

1. Install warning signs to alert forest visitors/travelers on roads and trails entering burned area about post-fire hazards.
2. Protect soils and known archaeological sites (map provided) from erosion and potential damage or destruction from, falling trees and looting/desecration.

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

Land 70 % Channel N/A % Roads/Trails N/A % Protection/Safety 90 %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Protection/Safety	90	95	100
Land	70	85	100
Channel	N/A	N/A	N/A
Roads/Trails	N/A	N/A	N/A

E. Cost of No-Action (Including Loss):

The cost of loss of archaeological resources cannot be estimated with reasonable accuracy. However, if each site has a value of \$500.00 in the cultural information that it can provide, then the value of archaeological resources for 500 sites would exceed \$250,000.

Estimated erosion rates of approximately 16 tons per acre across 500 archaeological sites of approximately 0.5 acres in size each would result in approximately 4000 tons of soil loss. At a commercial value of \$25/cu.yd for topsoil, the value of soil loss from archaeological sites would be approximately \$100,000.00
The total cost of no-action is estimated to be approximately \$1,292,200.00.

F. Cost of Selected Alternative (Including Loss): Cost of treatment plus reduced erosion losses and losses due to probability of failure of the treatments (30%) would be \$864,300 .

G. Skills Represented on Burned-Area Survey Team:

<input type="checkbox"/> Hydrology	<input checked="" type="checkbox"/> Soils	<input type="checkbox"/> Geology	<input type="checkbox"/> Range
<input checked="" type="checkbox"/> Forestry	<input type="checkbox"/> Wildlife	<input type="checkbox"/> Fire Mgmt.	<input 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

Team Leader: Kit MacDonald

Email: cdmacdonald@fs.fed.us Phone: (928) 527-3451 or (928) 635-8354 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) Aerial seeding using a soil stabilization / rapid growing seed mix consisting of sterile barley (*hordeum* spp.) and two common native grasses (needle and thread (*Hesperostipa comata*) and western wheatgrass (*pascopyrum smithii*). Approximately 567 acres occur outside of the Saddle Mountain Wilderness Area and 424 acres occur within the Wilderness. The overall density of known cultural resources is approximately one site per 3 acres, but density is much higher on certain landscape positions.

Ground-based seeding was considered. However, it was determined that this method would pose an additional risk to cultural artifacts through increased human traffic across sites and through the easily noticeable "islands" of vegetation that would be created through seeding of individual sites.

Seeding will prevent soil erosion that could result in loss off cultural resources and it will prevent desecration by persons seeking prehistoric artifacts (i.e., looters) by concealing those artifacts under vegetative cover until native plant communities reestablish in 3-5 years.

Recommended seed and rates:

Common Name (species)	Rate (lb. ac. ⁻¹)
Barley (<i>Hordeum</i> sp.)	10
Western wheatgrass (<i>Pascopyrum smithii</i>)	5
Needle and Thread (<i>Hesperostipa coata</i>)	5

- 2) Strategically cut and place tree boles, limbs, and other woody debris to divert erosive forces, roughen ground surfaces, and prevent wind thrown trees from falling on sites or churning soils and damaging walls and other objects at archaeological sites.

Estimated Cost:

Aerial seeding cost: Estimated cost is \$115 per acre. Total cost: \$113,965.00

Tree falling around archaeological sites:

2 Sawyers (GS7) 10 days at 10 hrs. per day = (\$8,040 plus \$1,280 per diem) = \$9,320 total
 4 Archaeologists (AD Rate) 10 days/10 hrs. per day = (\$15,600 plus \$2,600 per diem) = \$18,200 total
 Supplies \$500

Total estimated cost for tree falling around archaeological sites \$26,400.

- 3) Monitoring of seeding effectiveness and presence of invasive or noxious weed where seed is applied. 6 days at \$350.00 per day = \$2,100.00

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.

4 warning signs at \$300.00 each

I. Monitoring Narrative:

Part VI – Emergency Stabilization Treatments and Source of Funds

Interim #_1

Line Items	Units	Unit Cost	NFS Lands		Other \$	Other Lands				All Total \$
			# of Units	BAER \$		# of units	Fed \$	# of Units	Non Fed \$	
A. Land Treatments										
Aerial Seeding	acres	\$115	991	\$113,965			\$0		\$0	\$113,965
Monitoring for weeds		\$350	6	\$2,100						\$2,100
Tree falling at arch sites	sites	\$264	100	\$26,400						\$26,400
<i>Subtotal Land Treat.</i>				\$142,465	\$0		\$0		\$0	\$142,465
C. Road and Trails										
					\$0		\$0		\$0	\$0
<i>Subtotal Road & Trails</i>				\$0			\$0		\$0	\$0
D. Protection/Safety										
Warning signs	ea.	\$300	4	\$1,200	\$0		\$0		\$0	\$1,200
<i>Subtotal Structures</i>				\$1,200	\$0		\$0		\$0	\$1,200
E. BAER Evaluation										
Person Days	days	\$380	5	---	1900		\$0		\$0	\$1,900
Per diem	days	\$148	4	---	\$592		\$0		\$0	\$592
Vehicle mileage	mi.	\$0.42	679		\$285					\$285
<i>Subtotal Evaluation</i>				---	\$2,777		\$0		\$0	\$2,777
F. Monitoring										
Storm Patrol (person days)	days	\$350	8	\$2,800	\$0		\$0		\$0	\$2,800
<i>Subtotal Monitoring</i>				\$2,800	\$0		\$0		\$0	\$2,800
G. Totals				\$146,465	\$2,777		\$0		\$0	\$149,242
Previously approved										
Total for this request				\$146,465						

PART VII - APPROVALS

1. /s/ Patti Turpin
 For Forest Supervisor (signature)

9/20/16
 Date

2.

Regional Forester (signature)

Date