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

Date of Report: 7/10/06

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

This report only applies to the wildfire portion of the Warm Fire. Wildland fire use acreage is not accounted for as fire use cannot be assessed under BAER. The team did map burn severity for the fire use area from a helicopter, but no ground truthing was conducted. Therefore, the fire use portion of the severity map should be used with caution.

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: Warm

B. Fire Number: 000143

C. State: Arizona

D. County: Coconino

E. Region: Southwestern (3)

F. Forest: Kaibab

G. District: North Kaibab

H. Fire Incident Job Code: P3CR0P

I. Date Fire Started: 6/8/2006

J. Date Fire Contained: 7/4/2006

K. Suppression Cost: $8,000,000 (estimate)

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): 30 (estimate)
2. Fireline seeded (miles): 30 (estimate)
3. Other (identify): Spike camp, safety zones, helispots, drop points

M. Watershed Numbers: 1501000101, 1501000302, 1501000307

N. Total Acres Burned: 58,568 total; 19558 as fire use; 39,010 as wildfire
NFS Acres(58,568) Other Federal (0) State (0) Private (0)

O. Vegetation Types: Popr/Feov/Bran, Popr/Agsm/Pipo, Feov/Bran/Mumo, Pied/Juos/Artr2/Stco4, Pipos/Pied/Quga/Artr2, Pipos/Quga, Psmeg, Abco/Psmeg/Pipos/Quga

P. Dominant Soils: Map units 5, 7, 9, 252, 263, 264, 271, 273, 293, 294, 297, 298, 299, 620, 621, 623, 624, 625, 642, 644 (from Kiabab NF TES)

Q. Geologic Types: Alluvium (recent), sedimentaries, limestone

R. Miles of Stream Channels by Order or Class: 276(intermittent/ephemeral)

S. Transportation System: Trails: 40 miles Roads: 184 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 15,495 (low) 6,235 (moderate) 17,280 (high)

B. Water-Repellent Soil (acres): 20, 400 (all high severity acres plus 50% of moderate severity acres)

C. Soil Erosion Hazard Rating (acres):
5,725 (low) 16,240 (moderate) 17, 045 (high)

D. Erosion Potential: 18 tons/acre

E. Sediment Potential: 2,600 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

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

B. Design Chance of Success, (percent): 70

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

D. Design Storm Duration, (hours): 0.5

E. Design Storm Magnitude, (inches): 1.0

F. Design Flow, (cubic feet / second/ square mile): 54

G. Estimated Reduction in Infiltration, (percent): 52

H. Adjusted Design Flow, (cfs per square mile): 149

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

Detailed descriptions of critical values/resources and threats may be found in specialist reports and other documents in the project file.

Threats to Life and Property

The fire has increased the risk of erosion, sedimentation, and flash flooding, particularly during monsoonal precipitation events that occur in July and August. Significant damage to Level 2 and 3 roads could occur, such as deposition of debris on running surfaces, downcutting of inside ditches, and breaching of road fills at culverted crossings. Low water crossings could experience flood flows that completely fill channels and valley bottoms. In addition to potential infrastructure damage, flash floods could create human safety issues due to debris on roads, washing out of culverts, and flash floods at low water crossings (fords).

The fire burned across several miles of the Arizona Trail, producing snags and presenting flash flood risk at stream crossings. Snags could fall on forest users hiking the trail. Forest users could be in danger during flash flood events if they try to cross a stream during flood or if they get trapped between flooded streams.

Eight heritage resource sites potentially at risk from erosion or flooding were identified and evaluated. After field investigation heritage resource specialists determined these sites are not at risk.

Threats to Water Quality, Fisheries, and Aquatics

All streams within the burn are intermittent or ephemeral. There are no developed water sources, such as drinking or stock water, of concern,. Apache trout were identifed as a potential species of concern but biologists determined known populations are not present in streams directly or indirectly affected by the fire. Thus, no significant threats to water quality, fisheries, and aquatic resources exist.

Threats to Long-term Soil Productivity and Ecosystem Integrity

The burn area is relatively weed free. There are small un-mapped populations of cheatgrass (*Bromus tectorum*) and musk thistle (*Carduss nutans*) in and around the burn that present a significant threat to ecosystem integrity and long-term soil productivity. There is also concern that suppression activities could have brought in seed of numerous species of invasive and noxious plants.

Of particular concern is spread of cheatgrass into areas occupied by Kaibab plains cactus (*Pediocactus paradinei*), a Region 3 sensitive plant being managed under a Conservation Agreement with the U.S. Fish and Wildlife Service. Cheatgrass could out-compete the cactus or it could result in higher frequency fires that could burn over cactus plants.

Much of the burn area is high-value timber land. Due to burn severity there is significant threat to long-term soil productivity from soil erosion. The fire produced a water repellant layer at and just below the soil surface that will impede infiltration of precipitation so significant overland flow and resultant erosion and sedimentation could occur.

B. Emergency Treatment Objectives:

Mitigate effects of the fire on human safety, particularly where roads and the Arizona Trail cross streams.

Mitigate effects of the fire on roads .

Mitigate effects of the fire on the spread of weeds, particularly in areas occupied by Kaibab plains cactus.

Mitigate effects of the fire on long-term soil productivity, particularly on high value timber lands.

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

Land 70 % Channel n/a % Roads/Trails 90 % Protection/Safety 90 %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	70	90	95
Channel	n/a	n/a	n/a
Roads/Trails	85	90	95
Protection/Safety	90	95	95

E. Cost of No-Action (Including Loss): n/a, see qualitative cost-risk assessment in project file

F. Cost of Selected Alternative (Including Loss): n/a, see qualitative cost-risk assessment in project file

G. Skills Represented on Burned-Area Survey Team:

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

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H. **Treatment Narrative:**

Treatment specifications sheets are available in the project file. Personnel responsible for treatment implemention should refer to these sheets for specific details on locations, design, construction, personnel, materials, contract criteria, etc.

Land Treatments:

Aerial Seeding – Area 1 – West of Highway 67

This area is approximately 3,290 acres of high and moderate severity burn. Within and downstream of this area are numerous roads with large cuts and fills, inside ditches, and culverted road crossings. Much of the area is high value timber land consisting of mixed conifer and ponderosa pine. Cheatgrass and musk thistle are known to occur in the area.

The area will be seeded with annual rye (*Lolium multiflorum*) at a rate of 15 PLS/ft^2, which will be about 3.5 pounds/acre. Appropriate standards will be used to certify the seed is noxious-weed free for weeds listed for the State of Arizona and for those additional ones on the Kaibab weed list. The seed will be applied by a contractor using fixed wing aircraft. Agency personnel will monitor the project to ensure application rates are met.

Seeding is expected to result in rapid growth of ground cover that will reduce flood risk, soil erosion, and invasion of noxious weeds.

Aerial Seeding – Area 2 – East of Highway 67

This area is approximately 6,750 acres of high severity burn. Downstream of this area are roads with numerous low water crossings (fords). Much of the area is high value timber land consisting of ponderosa pine with some mixed conifer. Cheatgrass and musk thistle are known to occur in the area.

The area will be seeded with annual rye (*Lolium multiflorum*) at a rate of 15 PLS/ft^2, which will be about 3.5 pounds/acre. Appropriate standards will be used to certify the seed is noxious-weed free for weeds listed for the State of Arizona and for those additional ones on the Kaibab weed list.. The seed will be applied by a contractor using fixed wing aircraft. Agency personnel will monitor the project to ensure application rates are met.

Seeding is expected to result in rapid growth of ground cover that will reduce flood risk, soil erosion, and invasion of noxious weeds.

Aerial Seeding – Area 3 – Pediocactus Area

This area is approximately 1,710 acres of high severity burn. Within and downstream of this area are roads with numerous low water crossings (fords). This block is in the Pediocactus conservation area and does contain known populations of the cactus. Cheatgrass is known to occur in the area and is expected to rapidly colonize the burn if not controlled.

The area will be seeded with Quick Guard®, a sterile *Triticale* hybrid, at a rate of ~~15 PLS/ft^2~~, which will be about ~~45 pounds/acre~~. Appropriate standards will be used to certify the seed is noxious-weed free for weeds listed for the State of Arizona and for those additional ones on the Kaibab weed list.. The seed will be applied by a contractor using fixed wing aircraft. Agency personnel will monitor the project to ensure application rates are met. **Note: Target rate was adjusted to 9 PLS/ ft^{2-} as part of RF approval.**

Seeding is expected to result in rapid growth of ground cover that will reduce soil erosion and invasion of cheatgrass.

Noxious Weed Detection

This area includes burned acres as well as locations impacted by suppression activities. The task involves site visits to targeted areas to detect infestation of invasive and noxious weeds to determine the necessity and extent of possible control treatments. The task may be completed by agency personnel or through contract.

Detection monitoring is expected to allow for protection of ecological integrity of native and sensitive plant communities.

Channel Treatments:

No channel treatments are recommended.

Roads and Trail Treatments:

Storm patrol

During the first year a “patrol” will be utilized to drive roads during or immediately after significant storm events to check for culvert plugging or other road drainage problems. Hand maintenance will be performed if possible. Backhoe or similar equipment will be ordered if needed. Road safety concerns will also be noted and recommendations on emergency road closures will be made if necessary.

This treatment is expected to provide for human safety and protect road infrastructure.

Stream Crossing Rolling Dips and Hardening of the Road Fill (Flood Proofing)

Peak flow modeling showed that post-fire runoff could be two to twenty-seven times greater than pre-fire runoff. Four existing culverted road crossings are at risk of plugging and breaching. To reduce this risk a rolling dip(s) will be constructed adjacent to the culvert to allow for flood flow relief. Rip-rap will be placed along the downstream side of road fill to reduce scour and erosion of the fill and running surface.

This treatment is expected to provide for human safety and protect road infrastructure.

Protection/Safety Treatments:

Flash Flood Hazard Warning Signs fpr Arizona Trail and Flood Prone Roads

Thirteen flash flood hazard warning signs will be installed at targeted locations. These locations are ingress areas to roads and a non-motorized trail that cross streams at risk of flash flooding due to fire effects. These signs are necessary to inform forest users of immediate danger posed by storm response to fire effects and hazards within burned areas (floods, snags, loose rock, et cetera). Ten road signs and three trail signs will be installed.

This treatment is expected to provide for human safety.

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.)

Monitoring is needed to determine if the three seeding treatments are effective. Monitoring will involve up to ten (10) site visits by Forest and District staff. During each trip staff will visit the targeted areas to determine if there is adequate plant growth to reduce flood risk, soil erosion, and infestation by cheatgrass. Photo documentation will occur. Transect data may be collected if warranted. Initial visits will occur within weeks of seeding to observe plant growth. Followup visits will occur toward the end of the 2006 growing season, particularly when cheatgrass is expected to germinate in October and November. Visits will also occur during spring 2007 to observe carryover germination of the seeded species and cheatgrass germination.

A more detailed monitoring plan will be submitted to the Regional Office after targeted areas are actually seeded and staff has additional time to fine-tune monitoring protocols.

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										
Seed area 1	acres	12.92	3289	$42,494	$0		$0		$0	$42,494
Seed area 2	acres	12.92	6745	$87,145	$0		$0		$0	$87,145
Seed area 3	acres	73.25	1712	$125,404	$0		$0		$0	$125,404
Weed detection	each	5310	1	$5,310	$0		$0		$0	$5,310
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$260,353	$0		$0		$0	$260,353
B. Channel Treatments										
				$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										
Storm patrol	trips	1597	10	$15,970	$0		$0		$0	$15,970
Crossing hardening	sites	6758	4	$27,032	$0		$0		$0	$27,032
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road & Trails				$43,002	$0		$0		$0	$43,002
D. Protection/Safety										
Hazard signs	each	237	13	$3,081	$0		$0		$0	$3,081
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Structures				$3,081	$0		$0		$0	$3,081
E. BAER Evaluation										
Team					$37,078		$0		$0	$37,078
Helicopter					$5,000		$0		$0	$5,000
Plotter ink/paper				---	$225		$0		$0	$225
Insert new items above this line!				---	$0		$0		$0	$0
Subtotal Evaluation				---	$42,303		$0		$0	$42,303
F. Monitoring										
Seeding effectiveness	trips	500	10	$5,000	$0		$0		$0	$5,000
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring				$5,000	$0		$0		$0	$5,000
G. Totals				$311,436	$42,303		**$0**		**$0**	**$353,739**
Previously approved										
Total for this request				**$311,436**						

PART VII - APPROVALS

1. /s/ Michael R. Williams — July 11, 2007
   Forest Supervisor (signature) — Date

2. /s/ Abel M. Camarena (for) — July 12, 2006
   Regional Forester (signature) — Date