USDA-FOREST SERVICE FS-2500-8 (7/00)

Date of Report: 7/9/2004

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[] 1. Funding request for estimated WFSU-SULT funds
[X] 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

[X] 3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Lizard

B. Fire Number: AZ-COF-042

C. State: AZ

D. County: Coconino

E. Region: 3

F. Forest: Coconino

G. District: Peaks

H. Date Fire Started: June 7, 2003

I. Date Fire Contained: June 20, 2003

J. Suppression Cost: $189,750 at containment, $200,000 estimated total.

K. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): 0
2. Fireline seeded (miles): 0
3. Other (identify): 0

L. Watershed Number: 15020015030

M. Total Acres Burned: 5127
NFS Acres(**5127**) Other Federal ( ) State ( ) Private ( )

N. Vegetation Types: Pinyon Pine/One seed Juniper/Cliffrose/sparse Blue Grama/Side Oats

O. Dominant Soils: Lithic and Calcic Ustochrepts, loamy-skeletal, carbonatic or mixed, mesic

P. Geologic Types: Kaibab limestone

Q. Miles of Stream Channels by Order or Class: .25 miles (1st Order)

R. Transportation System

Trails: 0 miles Roads: 15.75 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 4022 (Unburned and High Spots) Trace (moderate) __ (high) 1105

B. Water-Repellent Soil (acres): 880

C. Soil Erosion Hazard Rating (acres):
1902 (low) 3200(moderate) 25 (high)

D. Erosion Potential: 4 tons/acre (USLE)

E. Sediment Potential: NA tons/acre

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 2

B. Design Chance of Success, (percent): 75

C. Equivalent Design Recurrence Interval, (years): 50

D. Design Storm Duration, (hours): 6

E. Design Storm Magnitude, (inches): 2.6

F. Design Flow, (cubic feet / second/linear streamcourse: 5527 cfs (TR55 model, portion of 6th code)

G. Estimated Reduction in Infiltration, (percent): 15% (based on hydrophobicity)

H. Adjusted Design Flow, (cfs per linear streamcourse): 6356 (adjusted TR55)

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency: Post-fire digital aerial photographs, aerial mapping, and field survey were used to map burn severity classes. An interdisciplinary BAER team validated and evaluated on-site burn severity delineations. 78 percent of the burn perimeter (4022 acres) falls into the unburned and high burn severity class.and 22 percent (1105 acres) is high.

Analysis across the 6th code watershed identify about 11% in the unburned and high dual burn severity class and about 3% falls within the high class. Together, burned area classes within the Lizard fire account for approximately 14% of the 6th code watershed.

The fire burned in a mosaic of high and unburned burn severity classes. Two classes were selected (High, and Unburned and High) based on their dominance. In general, the herbaceous layer was very low or sparse in species composition and productivity and only burned in high areas. Because the understory is sparse to low in species composition, little seed bank and regeneration potential exists. For this reason, emergency conditions exists to short-term and long-term site productivity and seeding treatments are proposed to prevent invasion and expansion of noxious weeds by providing and encouraging select competitive grasses in their place.

The litter layer and tree canopy were completely consumed in high areas. The unburned and high class was predominantly a crown and litter fire and only burned in the high areas. The ground vegetation did not carry a ground fire in unburned areas.

The unburned and high class has an average aerial extent of about 65 percent unburned and 35 percent burned. The BAER team recommends seeding only the high burn severity acres adjacent to high infestations of invasive weeds with ground seeding due to the complexity of the burned pattern. Acreage in these areas is about 205 acres.

The high class has about 75 – 85 percent high burned and about 15 – 25 percent unburned. The majority of high burn severity classes are located on gentle slopes. Total acres burned in the high class are 1105 acres. The BAER team recommends only aerial seeding the high areas which equates to about 80 percent of the 1105 acres or 880 acres. Based on USLE erosion model estimates, these areas along with other burn severity areas should result in low to moderate amount of sheet and rill erosion. The majority are within tolerable soil loss thresholds.

One order 1, ephemeral drain is located along the burn perimeter on the west side. Some short-term deposition can be expected following initial monsoon storms before high burned areas revegetate.

Currently, there are large poplulations of invasive weeds (both cheatgrass brome and scotch thistle) directly adjacent to the fire. Historically, these areas were converted (pushed) and have since been invaded by invasive weeds. Futhermore, the 1977 Yellowjacket Fire, located south of the fire, never regenerated into acceptable native herbaceous vegetation and could be an additional source of invasive weed invasion. It is believed that if the Lizard Fire remains untreated, it will have unacceptable regeneration and degradation of resources similiar to the Yellowjacket Fire due to overall low seedbank and invasion of noxious weeds.

Scotch thistle is present along numerous roadsides and also poses a threat to natural regeneration of areas in high burn severity classes. The greatest risk of invasive species expansion is probably directly adjacent to converted areas, and roads.

Based on the results of the BAER assessment, the Lizard Fire poses a threat to site productivity and if untreated, would likely result in unacceptable resource degradation due to the invasion, establishment and expansion of invasive weeds.

There are numerous partially burned trees hanging across a few roads within the burn. These trees are likely to fall across the road. Several fallen trees are currently located across the road also. **These hazardous trees pose a safety threat to travellers by forcing them to drive over trees or outside of the road prism in precarious areas unsafe for passage.**

B. Emergency Treatment Objectives:

1) To prevent the unacceptable degradation of the vegetative and soil resource due to the invasion, establishment, and expansion of invasive weeds into burned areas. Anticipated desired vegetation cover is inadequate due to pre-fire extremely low herbaceous understory and dominance of invasive weeds in and adjacent to burned areas. Accelerated soil erosion will be minimized with establishment of more effective vegetative ground cover (perennial basal area and litter).

2) To establish and maintain healthy, weed-resistant plant communities (few resources are available, e. g. soil nutrients and water, to potential invaders.

3) To Mitigate the reestablishment of invasive plants in burned areas.

4) To remove the safety hazard associated with hazardous trees adjacent to roads.

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

Land **75** % Channel **NA** % Roads **100** % Other ___ %

D. Probability of Treatment Success 75%

	Years after Treatment		
	1	3	5
Land	75	85	90
Channel			
Roads	100	100	100
Other			

E. Cost of No-Action (Including Loss): $340,000.

F. Cost of Selected Alternative (Including Loss): $85,000 (**$60,722 treatment cost)**

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Rory Steinke

Email: rsteinke@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 Treatment Objectives:

1) To prevent the unacceptable degradation of the vegetative and soil resource due to the invasion, establishment, and expansion of invasive weeds into burned areas. Anticipated desired vegetation cover is inadequate due to pre-fire extremely low herbaceous understory and dominance of invasive weeds in and adjacent to burned areas. Accelerated soil erosion will be minimized with establishment of more effective vegetative ground cover (perennial basal area and litter).

2) To establish and maintain healthy, weed-resistant plant communities (few resources are available, e. g. soil nutrients and water, to potential invaders.
3) To Mitigate the reestablishment of invasive plants in burned areas.

We are proposing two types of treatment to achieve these three objectives. The BAER assessment team has determined that treatments should occur immediately and preferably before July 2003 monsoons begin. It is imperative to seed before monsoons begin to take advantage of existing ash layer with high nitrogen availability and to seed before soil crusting may occur. Experience shows that invasive weeds including cheatgrass do regrow 2 to 3 times during the growing season and will likely invade burned areas if left untreated.

The first type of treatment is a preventative seeding focusing on buffer strips near the heaviest sources of cheatgrass. Certified, weed-free seed will be used. Ground seeding with ATV's will focus on high burn severity areas within the unburned and burned class totalling 205 acres. A higher seeding application rate (13 lbs/acre) will be used in these areas. We will use higher seeding rates in buffer strips on the perimeters of the burned area near potential invaders to allow the natives more time to establish a healthy community. Species were selected from known local surveys based on their ability to compete with invasive weeds. These species were further refined through conversations with experts at NAU, RMRS, and Reggie Fletcher. If weather conditions are not favorable this August/September re-seeding may be necessary. It is possible reseeding may occur in FY 04.

A lower seeding application rate (8.2 lbs/acre) will be used on the interior of the burned area and in identified high burn severity classes. Aerial seeding will accomplish the seeding on about 880 acres. Because the high class includes about 20 percent unburned areas in the mosaic, it will be necessary for seeding to target the high burned areas only. These areas are currently clearly visible. See Tables below.

Post-Treatment Narrative and Results (6/30/2004). (Detailed information and photos can be seen in the attached Monitoring Plan)

1. **Thistle Eradication:** The first stage of this treatment was the prevention of seed set in 2003. We considered this step a success since fall 2003 we did not observe any mature seed heads on Scotch thistle plants in the immediate burn areas.

This second step was to eliminate Scotch thistle rosettes from known sites in 2004. This may have been possible with the use of pre-emergent herbicides, but the NEPA was not in place to allow this treatment alternative. Infested areas were monitored for reduction or elimination. We were able to eliminate (in 2004) all living plants in most Scotch thistle sites. Two populations were simply reduced, due to the inaccessibility and safety hazards of the areas. However, we hope to continue long term monitoring and spot treatments of these sites, since Scotch thistle seeds remain viable in the soil for 6 –12 years.

Healthy native plant communities were observed in most sites in 2004, during and after the manual control. They included native grasses and forbs, and some of the seeded species. There are several other exotics in the area including horehound (*Marrubium vulgare*), tumble weed (*Salsola kali*), cheatgrass (*Bromus tectorum*) and puncture vine (*Tribulus terrestris*). Only cheatgrass would pose a serious threat to the establishment of a healthy grassland in this area.

2. **Seeding to Prevent Cheatgrass Expansion:** Neighboring cheatgrass invasion was not observed into moderate or high burned severity polygons except in very few select areas. As of 6/30/2004 it appears as though cheatgrass has not expanded into burned areas although due to very limited precipitation, it may be too early to draw conclusions. Further monitoring will be performed by Forest Specialists from Forest project funds.

The initial response was limited due to lack of and the timing of precipitation. Annual precipitation data indicated well below normal precipitation and drought conditions continued to persist spanning several years. However, a more accurate determination for the initial response may be made after the monsoon precipitation this coming July and August. This would give the warm season grass seed a full year to respond. Our crew will be collected more data at that time.

Even though, success of the reseeding effort was low, last fall the areas that received precipitation indicated some success. The loss of the A horizon and ash due to high wind erosion before precipitation negatively affected seedling germination because there was little soft, fertile ash seedbed left in many areas. It looked like the moderately burned areas had some success and the highly burned areas had lower success. There was at least one storm event after the fire had occurred and before we seeded. The remaining ash appeared to slightly harden or "cap" the top 2 millimeters which negatively affected the seedbed and its ability to promote germination. It is unfortunate that we could not seed before the first storm event. Delays in contracting probably contributed to low seeding germination success.

Two areas were treated with on-site raking followed by seeding. Fall monitoring and ocular observations showed that these areas did germinate a little better than no-raked areas but seeding establishment was still very low and the difference insignificant.

Even though the soils have been greatly affected, the areas that had a lower burn severity had a better response. The established blue grama (BOGR) responded well to the fires and precipitation, producing an excellent seed crop which will help with the reestablishment of grasses in the higher severity burned areas. Areas that had dense PJ and are now open to reestablishment of grasses from this seed bank and the reseeding effort.

3. **Hazard Tree Removal:** Approximately 50 burned trees were successfully removed decreasing safety hazards to Forest users on established roads.

ESTIMATED COST OF SEED PER POUND OF PURE LIVE SEED = $ 4.38

Cost by Application Rate

FIRE	BURN Intensity	ACRES Burned	ACRES Seeded	COST per acre	TOTAL COST
LIZARD	HIGH (Interior burn:8.2lbs/acre)	1105	880	36	$ 31,680.00
LIZARD	Unburned/ High (treat buffers: 13lbs/acre)	4022	205	57	$ 11,685.00
	TOTALS	**5127**	**1085**	**$ 43.96**	**$47,701**

Estimated total cost for pure, live seed for 1085 acres includes an additional 10% for potential calibration error.

Proposed Seed Mix

COMMON NAME	SCIENTIFIC NAME (Genus – Species; Vatiety)	Pounds Pure Live Seed /Species /Acre	seeds per pound	seeds per acre	% By Weight	Percent By Seed	Estimated Cost Pure Live Seed Pound	Estimated Cost Of Mix Per Acre
Needle and Thread	Stipa comata	0	115,000	0	0.00%	0.00%	$40.00	$0.00
Blue Grama	Bouteloua gracilis; Hatchita	0.5	825,000	412500	3.85%	12.28%	$12.00	$6.00
Side Oats Grama	Boutelous curtipendula,	2	191,000	382000	15.38%	11.37%	$6.00	$12.00
Indian rice grass	Achnathrum hymenoides	2.3	141,000	324300	17.69%	9.65%	$5.00	$11.50
Sand dropseed	Sporobolus cryptandrus	0.3	5,298,000	1589400	2.31%	47.31%	$7.00	$2.10
Galleta grass	Hilaria jamesii; Viva caryopsis?	1.2	470,000	564000	9.23%	16.79%	$10.00	$12.00
Quick Guard	Wheat X Rye (sterile hybrid)	6.7	13,000	87100	51.54%	2.59%	$2.00	$13.40
	TOTALS	13		3359300	100.00%	100.00%	$4.38	$57.00

The second type of treatment involves eradicating all Scotch thistle populations on the perimeter of the burn site. Two to three treatments of this 10 acre area will be needed to prevent seed set and weed expansion over the next calendar year. These populations are patchy and will require individual spot treatment. The current local rate for herbicide/mechanical treatment of this type is ~$180/acre, this includes cutting and bagging all mature plants to prevent establishment of a seed bank in the first year, and herbicide application to rosettes. The second round treatment, the following spring, would be only herbicide at ~$110/acre.

($180*10) + ($110*10)= $2990

Roads and Trail Treatments: Hazardous trees were identified in the ground survey and to pose a safety threat to travel within the burn perimeter. There are approximately 20 burned trees fallen across a few roads or hanging across the roads and likely to fall. It is estimated hazardous tree removal can be accomplished in 1 day by a 3 person fire crew. Trees will be removed and scattered acorss burned areas seeded.

I. Monitoring Narrative:

A detailed monitoring plan will be submitted in the near future. **Estimated costs are $2500**.

The objective of monitoring is to evaluate the effectiveness of the treatments and decide if retreatment is necessary.

Noxious weed management focuses upon density and rate of spread of invasive exotic plant species, and the effect these aggressive plants have on the native vegetative community. As soon as possible and in FY 2003, all invasive species with the potential to invade the burned area should be accurately mapped. A general survey for the presence/absence of the target invasives in the burned area can be done in late fall of 2003(FY 2004) to guage preliminary effectiveness of proposed treatments. Then a more detailed survey recording cover (density) of all species in plots within the different treatment areas will be done the following spring (FY 2004) once the winter annuals are maturing. At the same time, spring return visits to the mapped populations will assess rate of spread over one year.

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

Line Items	Units	Cost	Units	SULT $	$	units	$	Units	$	$
A. Land Treatments										
Aerial Seed	acres	35	900	$31,500			$0		$0	$31,500
Ground Seed	acres	60	205	$12,300						$12,300
Aerial Application	acres	11	900	$9,900			$0			$9,900
Land Application	acres	14	208	$2,912			$0		$0	$2,912
Thistle Eradication	acres	375	10	$3,750			$0		$0	$3,750
Subtotal Land Treatments				$60,362			$0		$0	$60,362
B. Channel Treatments										
				$0			$0		$0	$0
				$0			$0		$0	$0
				$0			$0		$0	$0
				$0			$0		$0	$0
Subtotal Channel Treat.				$0			$0		$0	$0
C. Road and Trails										
Hazard Tree Removal	each	20	50	$1,000			$0		$0	$1,000
				$0			$0		$0	$0
				$0			$0		$0	$0
				$0			$0		$0	$0
Subtotal Road & Trails				$1,000			$0		$0	$1,000
D. Structures										
				$0			$0		$0	$0
				$0			$0		$0	$0
				$0			$0		$0	$0
				$0			$0		$0	$0
Subtotal Structures				$0			$0		$0	$0
E. BAER Evaluation										
	p.days	240	15	$3,600			$0		$0	$3,600
				$0			$0		$0	$0
F. Monitoring	p.days	200	30	$6,000			$0		$0	$6,000
G. Totals				**$70,962**			**$0**		**$0**	**$70,962**

PART VII - APPROVALS

1. /s/ Nora B. Rasure — August 9, 2004
   Forest Supervisor — Date

2. _____ _____
   Regional Forester (signature) — Date