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

Date of Report: 7/10/2012

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: Poco Fire

B. Fire Number: AZ-TNF-_000078

C. State: Az

D. County: Gila

E. Region: 03

F. Forest: Tonto NF

G. District: Pleasant Valley

H. Fire Incident Job Code: P3GX0P

I. Date Fire Started: 6/14/2012

J. Date Fire Contained: 7/3/2012

K. Suppression Cost: $4,000,000

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): 13.1 miles
2. Fireline seeded (miles):
3. Other (identify):

M. Watershed Number:

HUC6 Number	HUC6 Name	Acres
150601030401	Parrallel Canyon-Cherry Creek	6,041
150601030404	Gruwell Canyon-Cherry Creek	5,209
150601050201	Marsh Creek	303
150601050205	Haigler Creek	344

N. Total Acres Burned: 11,909
NFS Acres(11,908) Other Federal ( ) State ( ) Private (0.5)

O. Vegetation Types: Ponderosa Pine/Gamble Oak; Ponderosa Pine/Gray Oak; Chaparral; Pinyon/Juniper/Oak.

P. Dominant Soils: Typic Eutroboralfs, Mollic Eutroboralfs, Udic Haplustalfs, Typic Haplustalfs, Typic Argiustolls.

Q. Geologic Types: Rim Gravels, Troy Quartzite, Dripping Springs Quartzite, granite, diabase.

R. Miles of Stream Channels by Order or Class:

Perennial – 2.1 miles
Intermittent – 2.9 miles
Ephemeral – 26.1 miles

S. Transportation System

Trails: 0 miles Roads: 51.2 miles (29.5 mi ML1 rds, 18.9 mi ML2 rds, 2.8 mi ML3,4 & 5 rds)

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 6,521 (low) 3,272 (moderate) 907 (high)

B. Water-Repellent Soil (acres): 2,543

C. Soil Erosion Hazard Rating (acres):
1,357 (low) 3,903 (moderate) 6,636 (high)

D. Erosion Potential: 37 tons/acre for two years

E. Sediment Potential: 3,800 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 5-7

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

C. Equivalent Design Recurrence Interval, (years): 25

D. Design Storm Duration, (hours): 1

E. Design Storm Magnitude, (inches): 2.41

F. Design Flow, (cubic feet / second/ square mile): 60

G. Estimated Reduction in Infiltration, (percent): 20

H. Adjusted Design Flow, (cfs per square mile): 160

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

The Poco Fire started on June 14, 2012 and burned approximately 11,900 acres. The majority of the fire burned within the Cherry Creek watershed. A little less than 50% of the watershed was burned in the fire. Cherry Creek flows through the community of Young downstream of the burned area. Less than three percent of the burned area lies within the Marsh Creek and Haigler Creek watersheds respectively. The majority (75%) of the burned area is ponderosa pine, 20% of the burned area is chaparral, and the remaining 5% is pinyon/juniper vegetation. The majority (over 80%) of the soils in the burned area have a moderate to high runoff potential (hydrologic soil group C and D). The climate is semi-arid with precipitation averaging about 25 inches per year. The majority of the precipitation occurs either in the summer as high intensity summer thunderstorms or as frontal precipitation in the winter. Burn severity in the Poco Fire was about 8 percent high, 27 percent moderate, and 55 percent low with the remaining 10 percent underburned or unburned. Approximately 17% of the entire Cherry Creek watershed burned with moderate to high severity.

Flood Risk

The Poco Fire BAER team modeled watershed response from summer thunderstorms to assess flood risks downstream of the burned area. Recent research by the National Weather Service (Reed, et al, 2012) suggests that the greatest flash flood risk following a wildfire is from the first post fire runoff event. These “first flush”peak flows are often hyper-concentrated flows that are essentially sediment-carrying water flows with entrained post-burn debris. They occur during the summer thunderstorm season. Peak flows were modeled using equations developed by Reed and Schaffner (Reed et al, 2012) and with the HEC HMS computer model developed by the US Army Corps of Engineers (USACE, 2000). Hyper-concentrated peak flows predicted by the Reed-Schaffner Equation are displayed below.

Poco Fire Post-fire Peak Flows (cfs)

Watershed	Mod-High Burn Severity (fraction of wtrshd)	Drainage Area (sq mi)	Storm Recurrence Interval (yrs) 1	2	5	10
Upper Cherry Creek	0.02	15.1	21	35	72	124
Parrallel Canyon	0.36	7.52	839	1450	3017	5308
Parallel Canyon Trib	0.3	3.8	348	599	1234	2141
Saunders' Canyon	0.53	1.77	672	1160	2405	4211
Lower Cherry Creek	0.43	2.37	667	1152	2388	4182
Gruwell Canyon	0.04	4.68	50	85	174	300
Modified Wtrshed[1]	0.38	15.15	410	706	1456	2531
Cherry Creek	0.43	35.27	156	268	550	949

[1]Modified watershed is the sum of Parallel Canyon, Parallel Canyon Trib, Saunder's Canyon and Lower Cherry Creek

Peak Flow estimates developed by FEMA for the Gila County Flood Insurance Study for the community of Young are identified below.

Flooding Source and Location	Drainage Area (sq mi)	Peak Discharges 10 year	50 year	100 year	500 year
15,600 feet upstream from confluence with M.O. Creek	39.24	5,200	12,200	16,700	30,200

The peak flows predicted by the Reed-Schaffner Equation suggest the greatest post-fire peak flows approach the magnitude of the 10 year flood developed for the Gila County Flood Insurance study. The burned area was subdivided into smaller watersheds for modeling purposes. The modified watershed identified in the upper table combines the watersheds most affected by the fire into one watershed. The post-fire peak flow predicted from this watershed is about half the magnitude of the FEMA 10 year flood.

Prefire and post-fire peak flows estimated with the HEC HMS watershed model are displayed in the table below.

Prefire Peak Flows (cfs)		**Post-fire Peak Flows (cfs)**	
Storm	Peak flow	Storm	Peak flow
2yr 1hr	147	2yr 1hr	636
5yr 1hr	410	5yr 1hr	1996
10yr 1hr	863	10yr 1hr	3414
25yr 1hr	2070	25yr 1hr	5654
50yr 1hr	3374	50yr 1hr	7574
100yr 1hr	4957	100yr 1hr	9716

This model also suggests that the risk of flooding has not increased substantially. The greatest post-fire peak flows from a one hour thunderstorm are less than the 50 year flood from the FEMA study (which is based on a 24 hour storm).

BAER Risk Assessment

Probability of Damage or Loss:	Unlikely-review of floodplain maps and aerial photo images suggests less than about 15 structures are located within the limits of the 100 year floodplain.
Magnitude of Consequences:	Major-potential for loss of life or injury to humans exists if postfire flood flows reach the magnitude of the 100 year flood. Substantial property damage may occur to residences and other structures on private lands.
Risk Assessment:	Intermediate

Roads

Forest Highway 512 is the main route from Young to Payson and other communities above the Mogollon Rim. Approximately two miles of FH 512 pass beneath steep slopes that were burned in the fire. A geologic hazards assessment of these slopes suggests the geologic hazards posed by the Poco Fire along this section of Forest Road 512 include increased runoff and sedimentation from the hillslopes and zero order-drainages. Material may be transported as sediment-laden flood flows or possibly as debris flows. Regardless, the depositional area for these flows will be Forest Road 512. There is also potential for rocks to move down these slopes during significant rainfall events that pose a threat to users of the road. The highway infrastructure is at risk from the increased runoff and sedimentation and possibly debris flows.

BAER Risk Assessment

Probability of Damage or Loss:	Possible-vehicles traveling on the affected section of FH12 may be struck by or pass through rolling rocks, runoff and sediment, or debris flows.

Magnitude of Consequences:	Major-potential loss of life or injury to humans exists if a vehicle is struck by rolling rocks, runoff and sediment flows, or debris flows.
Risk Assessment:	High

Other roads within the burned area are located primarily on ridge tops and are at little risk of damage from runoff and sediment within the burned area. Roads outside the burned area are primarily bladed low water crossings that cross Cherry Creek in the community of Young.

BAER Risk Assessment

Probability of Damage or Loss:	Possible
Magnitude of Consequence:	Minor
Risk Assessment:	Low

Safety

Approximately one half mile of guard rail above steep slopes has been burned along Forest Highway 512 in the same area that is threatened by runoff, sediment, rocks, and possibly debris flows from steep slopes above the highway. Loss of the guard rail poses a safety hazard to users of the road.

BAER Risk Assessment

Probability of Damage or Loss:	Possible-potential for vehicles to impact damaged guardrail sections exists. Vehicles impacting damaged guardrail may plummet down the steep slopes protected by the guardrail
Magnitude of Consequences:	Major – Possible loss of life or injury to humans
Risk Assessment:	High

Hazard trees exist along Forest Roads within the interior of the fire. The majority of these roads are High Clearance Maintenance Level 2 roads.

BAER Risk Assessment

Probability of Damage or Loss:	Possible-potential for vehicles or forest users to be struck by falling limbs or trees exists.
Magnitude of Consequences:	Major-Possible loss of life or injury to humans if struck by falling limbs or trees.
Risk Assessment:	High

Threatened or endangered species habitat

The Chiricahua leopard frog is a federally threatened species that is known to occur at only 5 locations on the Pleasant Valley Ranger District. One of these sites, a large stock tank south of Forest Road 128 known as the Tank Northeast of Naegelin Rim Tank, is located inside the fire perimeter. Slopes in the vicinity of this tank burned with low severity, however the movement of even small amounts of ash into the site has the potential to adversely affect the habitat for this population of frogs. Chemical components of smoke and ash, such as nitrogen and phosphorus, can lead to changes in water chemistry that could result in physiological stress and potentially death for larval and adult frogs.

BAER Risk Assessment

Probability of Damage or Loss:	Likely-Even small amounts of runoff carrying ash to the tank can adversely affect water quality in the tank

Magnitude of Consequences:	Moderate-Damage to the habitat would likely eliminate the Chiricahua Leopard Frog population at this site.
Risk Assessment:	High

Invasive Species

Populations of Yellow Star thistle and other invasive species are present in Young. A weed washing station was set up in Young to wash vehicles arriving from other locations both on arrival and departure. The station was not set up until after most fire suppression equipment had arrived. These vehicles may have brought invasive species from their home locations. Fire suppression equipment may have carried seeds from invasive species present in the Young area as well as from home units into the burned area.

BAER Risk Assessment

Probability of Damage or Loss:	Possible-Invasive species from the Young area as well as from home units were likely transported to the burned area on fire suppression equipment.
Magnitude of Consequence:	Moderate-Expansion of invasive species into the burned area may have long term effects.
Risk Assessment:	Intermediate.

Cultural Resources

Twenty-four archaeological sites were burned over in the Poco Fire. These ranged from Apache mescal pits, to basque sheep camps, to historic homesteads. A site records search concluded the majority of these were not a concern for post-fire events or mitigation. The two sites that did raise concern were site numbers AR-03-12-05-361 and AR-03-12-05-362. These sites are Apache roasting pit locations with associated artifacts. They appeared to be at risk due to their locations on sloped hillsides and their proximity to nearby drainages.

A field survey conducted on 6/28/2012 was unable to locate either site. Either the sites are gone due to erosion (the sites were originally recorded in the 1970s and have not been visited since) or they were hidden under the thick coverage of ash and dead leaves, which blanket the post-fire ground surface. Observation of the areas where UTM coordinates indicate the sites should be, showed that neither site was located in a heavily burned area. The light burn effect allowed some vegetation to survive and the hilltops and slopes where the sites are located do not appear to place these sites at risk from post-fire runoff and erosion.

BAER Risk Assessment

Probability of Damage or Loss:	Unlikely
Magnitude of Consequence:	Minor
Risk Assessment:	Very Low

B. Emergency Treatment Objectives:

Treatment objectives would be:

- To reduce the threats to life and property that exist from post-fire flooding downstream of the burned area, from rockfall, runoff and sediment, and possibly debris flows from the steep slopes above FH512, from the burned up guardrail protecting motorists from the steep slopes below FH512, and from hazard trees along roads in the interior of the burned area.
- Reduce threats to the habitat of a population of the threatened Chiricahua Leopard Frog from the changes in water chemistry that would occur from ash carried into the tank where they live by post-fire runoff and erosion.

- Reduce the potential for noxious weeds to become established in the burned area from suppression equipment that may have transported seeds from the Young area or home units into the burn.

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

Land **80** % Channel ___ % Roads/Trails **70** % Protection/Safety **90** %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	80	80	90
Channel			
Roads/Trails	70	80	90
Protection/Safety	90	90	90

E. Cost of No-Action (Including Loss):
The benefits of the proposed treatments are primarily safety related. Quantification of these types of benefits is difficult. According to Wikipedia the Department of Transportation places a value of $6 million on a human life. If there is a 20% probability of a fatality without treatment then the benefit of the treatment would be about $1.2 million.

F. Cost of Selected Alternative (Including Loss): $122,200

G. Skills Represented on Burned-Area Survey Team:

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

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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:

- Install wattles on burned slopes above the tank that provides habitat for Chiricahua Leopard Frog.

- Detect and remove noxious weeds. Conduct surveys in the fall of 2012 and spring of 2013 to detect the presence of noxious weeds that may have been imported to the burned area and implement treatments to remove any populations detected from the surveys.

Channel Treatments:

Roads and Trail Treatments:

- Replace 2500 feet of burned guardrail on FH512.
- Excavate sediment basins above 1 culvert on FH512 below the steep slopes that represent a hazard to motorists along this section of highway
- Implement storm inspection and response along the section of FH512 that poses a threat to motorists. Close the threatened section of road when storms deposit rocks, debris or mud to the point that the road becomes impassable and clean debris from the roadway.
- Place road closure barriers above and below the hazardous section of FH512 when the road becomes impassable due to debris.

Protection/Safety Treatments:

- Install vehicle gate on FR 102 beyond the intersection with FR128 to protect forest users from hazard trees.
- Facilitate installation of an Alert raingage in the burned area to provide flood warnings to residents at risk from post-fire flooding in areas downstream from the burned area.
- Install standard rockfall and custom hazard warning signs on FH512 above and below the steep areas that pose a hazard to motorists.

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.)

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

A. Land Treatments										
Wattles abv CLF hbt	acres	1.1	2000	$2,200	$0		$0		$0	$2,200
Dtct & rmv Noxs wds	acres	240	100	$24,000	$0		$0		$0	$24,000
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$26,200	$0		$0		$0	$26,200
B. Channel Treatments										
				$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 Channel Treat.				$0	$0		$0		$0	$0
C. Road and Trails										
Sediment basins	ea	1	3000	$3,000	$0		$0		$0	$3,000
Strm Insp & Response	ea	6	2000	$12,000	$0		$0		$0	$12,000
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road & Trails				$15,000	$0		$0		$0	$15,000
D. Protection/Safety										
Guardrail FH512	ft	30	2500	$75,000	$0		$0		$0	$75,000
Alert Station install				$0	$0		$0		$0	$0
closure gate	ea	3000	1	$3,000	$0		$0		$0	$3,000
Hazard Warning Sgns	ea	500	4	$2,000	$0		$0		$0	$2,000
Road Closure Barriers	ea	125	8	$1,000	$0		$0		$0	$1,000
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Structures				$81,000	$0		$0		$0	$81,000
E. BAER Evaluation										
	ea	13500	1	---	$13,500		$0		$0	$13,500
Insert new items above this line!				---	$0		$0		$0	$0
Subtotal Evaluation				---	$13,500		$0		$0	$13,500
F. Monitoring										
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring				$0	$0		$0		$0	$0
G. Totals				$122,200	$13,500		**$0**		**$0**	**$135,700**
Previously approved										
Total for this request				**$122,200**						

PART VII - APPROVALS

1. _____ 7-10-12
Forest Supervisor (signature) Date

2. _____ _____
Regional Forester (signature) Date