

Date of Report: 08/23/2009

BURNED-AREA REPORT

(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

- ☒ 1. Funding request for estimated WFSU-SULT funds
☐ 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
☐ 3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTIONA. Fire Name: CrossingB. Fire Number: AZ-ASF-090261C. State: Arizona (04)D. County: CoconinoE. Region: Southwest (03)F. Forest: Apache-Sitggeaves (01)G. District: Black Mesa (02)H. Fire Incident Job Code: P3E4V7I. Date Fire Started: August 07, 2009J. Date Fire Contained: August 13, 2009K. Fire Suppression Cost: 781,000

L. Damages Repaired with Suppression Funds

1. Fireline waterbarred (miles): < 1
2. Fireline seeded (miles): 10
3. Other (identify): 0
(8,7 miles of dozer line, 1.6 miles of handline will all be seeded and < 1 mile of dozerline will be waterbarred)

M Watershed Number: 1502001001 Upper West Chevelon CanyonN Total Acres Burned: 2,769

NFS Acres(2,769) Other Federal () State () Private ()

O. Vegetation Types: Ponderosa Pine, Mixed ConiferP. Dominant Soils: TES MU 196, 199, 203, 206. Udic Haplustalfs, clayey-skeletal, mixed (LSC 5-0)

Q. Geologic Types: Cononino Sandstone, Kailbab Limestone

R. Miles of Stream Channels by Order or Class: Perennial 18.5, Intermittent 27, Ephemeral 14.7

S. Transportation System

Trails: 0 miles Roads: 90 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 1932 (low/unburned) 630 (moderate) 215 (high)

B. Water-Repellent Soil (acres): 265

C. Soil Erosion Hazard Rating (acres):
1550 (low) (moderate) 1219 (high)

D. Erosion Potential: 21.2 tons/acre

E. Sediment Potential: 2714 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

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

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

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

D. Design Storm Duration, (hours): 1

E. Design Storm Magnitude, (inches): 2.0

F. Design Flow, (cubic feet / second/ square mile): 1252

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

H. Adjusted Design Flow, (cfs per square mile): 1878

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency:

Archaeology

AR03-01-02-3015 - Historic Log Cabin. Site 3015 is a historic log cabin with a sandstone chimney located on a flat embankment next to West Chevelon Creek at the base of West Chevelon Canyon (T 12N, R 13E, Section 14). The site is approximately 3500 square feet in size. The cabin is believed to have been an unpatented homestead that was constructed in the late 1800's to early 1900's. The cabin was most likely burned over on the first or second day of the Crossing Fire. The walls, which were collapsed, were made from 1.5 ft square hewn ponderosa pine pole. The artifact and feature assemblage at the site consists of an old

road, a wooden gate/corral, wooden posts, a large pile of sandstone cobbles, 27 metal fragments, 22 glass fragments, and 4 pieces of wire.

The site is in an area where there is a potential for erosion and soil movement to occur. In order to stabilize the area, hand seeding was proposed to promote ground cover in burned areas where trees, shrubs, and grass had previously protected the soil from eroding. Directional falling of nearby trees, which were killed by the fire, would also be beneficial to protect the site as well as public safety (recent camping observed on site). These treatments are expected to involve some ground disturbance; therefore a Heritage Resource Specialist should be present during the implementation of these measures. The cost for the recommended treatments is estimated to be approximately \$800. This cost includes: one day of work for a Heritage Resource Specialist (monitoring); two individuals to operate a chainsaw, remove brush and hand spread seed; and the purchase of one to two bags of grass seed.

Water Resources

On-site values at risk include water quality impacts to West Chevelon Creek and ephemeral/intermittent headwater drainages in other sub-watersheds due to increases in sedimentation from burned areas and fire suppression lines. Stream channel stability in headwater drainages and in West Chevelon Creek may be impacted by increases in storm runoff from burned areas. Sedimentation of the perennial pools in West Chevelon Creek are of particular concern due to the presence of Little Colorado spinedace (*Lepidomeda vittata*) recently reintroduced at two sites in the upper reaches within the burn area. The threat of sedimentation of these reaches is further compounded by the lack of flow in the channel. These pools represent local water table conditions. In addition, site productivity may be decreased due to accelerated erosion in moderately to severely burned areas of the fire.

Off-site values at risk include water quality impacts to West Chevelon Creek and Chevelon Creek due to increases in sedimentation from burned areas and fire suppression lines. Increased sedimentation may present some risk to downstream stock watering tanks. No significant risks to downstream property or to human life are anticipated.

Soil Resources

A map of soil burn severity was obtained from RSAC prior to the start of the assessment. Soils personnel verified TEUI and soil burn severity mapping and surface characteristics, including post burn ground cover and soil hydrophobicity. Soil loss and sediment production were modelled using the Erosion Risk Management Tool (ERMIT) (Robichaud,P,et.al, 2009). This tool compares soil loss with and without various treatment scenarios.

The following map shows soil burn severity classes within the Crossing Fire. Table 1 displays estimated tons of soil loss by soil burn severity class. Much of the high severity burn occurred on nearly level slopes and are considered to be lower risk for soil loss and sediment production. However, these area have higher risk for noxious or non-native plants establishment as these areas are easily accessible by vehicles and livestock. The area has not been inventoried for existing noxious and invasive species, however, bull thistle and mullien was detected in unburned areas within the fire perimeter and is expected to expand within the burned areas.

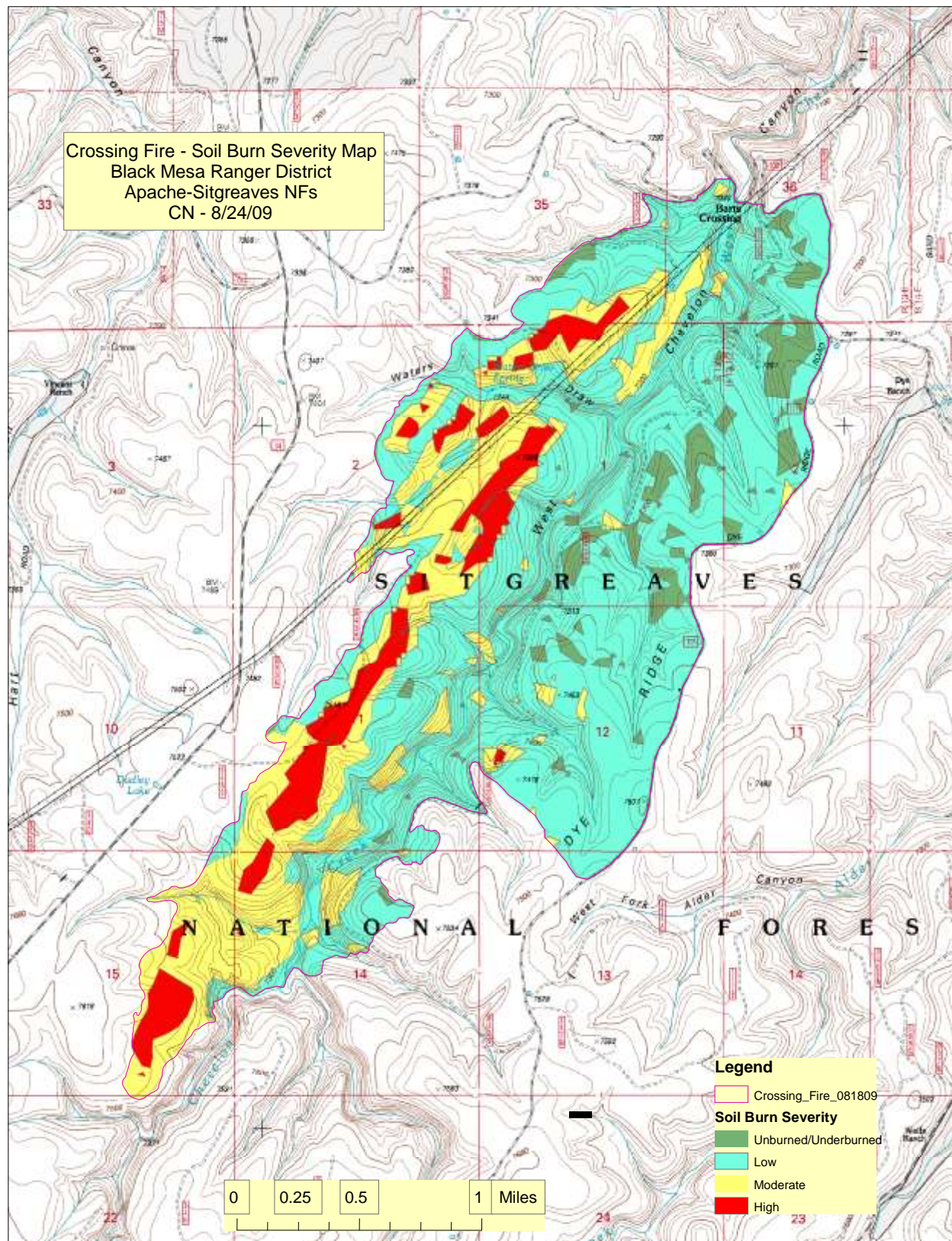


Figure 1: Soil Burn Severity Map of Crossing Fire area.

Table 1: Soil Burn Severity Classes by Terrestrial Ecosystem Survey Mapping Units within the Crossing Fire						
TEUI Map Unit Number	Soil Erosion Hazard	Soil Burn Severity Class Area (Acres)				
		Unburned	Low	Moderate	High	Total
196	Slight	117	964	312	157	1550
199	Severe	31	511	259	54	856
203	Severe			6	4	10
206	Severe	4	304	54		362
Total		153	1779	630	215	2778

Soils with slopes greater than 15 percent within the burn are rated as having severe erosion hazard (Laing et.al,1987). Decreased infiltration due to hydrophobicity was found on about half of the soils on high burn severity, and with a limited amount on areas of moderate burn severity. Vegetation, litter and duff was entirely consumed in high burn severity areas and mostly consumed under moderate severity. Some rilling was observed within this grouping from recent rainstorms. At a minimum, high severity and severe erosion areas should be treated to prevent accelerated erosion and sediment production.

Approximately 138 acres of the fire area with high and moderate soil burn severity have the highest risk to soil loss and sediment delivery. These soils are located in the headwaters of ephemeral and intermittent streams leading to the West Fork of Chevelon Canyon. It is estimated that these areas will deliver the most sediment because the soil that is detached from raindrop impact or overland flow has short distances to travel to a stream channel with little obstruction to flow such as provided by litter or woody debris. Successful treatment will reduce sediment by an estimated 90 cubic yards by year 2.



Figure 2: Example of high soil burn severity on area of severe erosion hazard where grass seeding is recommended



Figure 3: Example of high soil burn severity area on a flat (2 percent) slope with slight erosion hazard where no treatment is recommended

Fish

The Crossing Fire burned part of West Chevelon Canyon of the Upper West Chevelon Canyon watershed. West Chevelon Creek, within West Chevelon Canyon, constitutes suitable habitat for the Endangered Little Colorado (LC) Spinedace (*Lepidomeda vittata*) because it provides perennial aquatic habitat lacking non-native species. West Chevelon Creek is one of only 4 streams where the endangered Little Colorado spinedace are currently found. On July 23, 2007, 95 LC Spinedace were reintroduced into West Chevelon Creek. Surveys have been conducted over the past few years to determine the success of the reintroduction. The most recent survey, completed on August 3, 2009, verified that the LC spinedace were doing well and increasing their numbers through recruitment and spawning over the past couple years.

LC Spinedace determination: The Crossing fire has potential to adversely affect LC Spinedace

Severe burning occurred on the upland slopes of the Waters Draw drainage, which feeds West Chevelon Canyon, as well as the upland slopes of various other drainages on the west side of the canyon. Destabilization of the watersheds with the potential for chronic sediment transport into West Chevelon Creek is a risk to the maintenance of existing habitat conditions for these Endangered fish. It is a Forest management objective to minimize sediment input to the Chevelon Creek system to aid in recovery of the species.

Spot seeding of native grasses within high and moderate severity burn areas along the upland slopes in drainages that feed into West Chevelon Canyon should reduce potential effects of erosion and chronic sedimentation into LC Spinedace habitat. Failure of treatment will allow the full estimated sediment load to impact the habitat. It is unknown if the spinedace will survive the effects of the fire. Loss of the reintroduced species will result in re-evaluation of habitat, and when found suitable, future re-introduction effort, estimated to be between \$10,000 to \$20,000. Monitoring of the recovery population is necessary to determine the effect of the fire.

Wildlife

A variety of wildlife species ranging from elk to turkeys occur within the Crossing Fire perimeter. Of particular concern in relation to fire effects is the habitat of the Mexican Spotted Owl (MSO). The crossing fire burned through one PAC on the Black Mesa Ranger District – Waters Draw PAC. Occupancy in this PAC was first

documented on June 2, 2005, when a pair was found with two nestlings. On May 17, 2006 an MSO auditory response was heard during a nighttime inventory survey. No owls were revealed during the following daytime follow-up survey. Since then, the PAC has been surveyed every season with no results.

Approximately 92% of the Waters Draw PAC burned in the Crossing Fire, primarily at low fire intensity. 5% of this burned area was severe intensity while 7% was moderate. The rest was of low intensity. Given that the main habitat utilized by the MSO occurs in the low severity burn of the main drainage of West Chevelon Canyon, effects to the species should be minimal to absent. However, foraging owls could be affected in the severe to moderate burn areas due to a modification in Primary Constituent Elements for prey base on the short-term and forest structure on the long-term. As identified in the MSO Recovery Plan and demonstrated by fires in recent years, uncharacteristic wild fire continues to be the greatest risk to Mexican Spotted Owl populations in the Upper Gila Mountain Recovery Unit. It is believed that through treatments of the soil and watershed resources the risks will be mitigated to future Primary Constituent Elements for short term prey base and long term forest structure.

MSO determination: The Crossing Fire has not adversely affected Mexican Spotted Owls.

Seeding native grasses within high to moderate severity burn areas will aid in recovering prey species habitat. Felling trees within the high to moderate severity burn areas will aid in recovering forest structure for the MSO.

Range Resources, Noxious and Invasive Species:

The fire burned through portions of two allotments, the Chevelon Canyon and the Wallace Allotments. Somewhere between 200 to 400 acres burned on the Chevelon Canyon Allotment (Circle Bar Pasture), with the majority being low or underburned. The fire burned thru about 2 ½ miles of allotment boundary fence, which the corner post and stays were wood. There are also two small roadside tanks within the allotment/fire boundary that is on FR717.

The Fire also burned through approximately 700 acres of the Wallace Allotment (Waters Pasture). The majority of the severe and moderate burn severity occurred within this allotment. There was approximately 3 ½ miles of allotment boundary fence within the fire. This fence was mostly built with wood corners and wood stays. Also within this pasture, is an old ranger station site with a spring called waters draw spring, that does have a man made rock dam and rock well/spring. There are also two earthen dam tanks within this pasture. The majority of the acres burned lie within an unallocated area of the District. The majority of this area was low to underburned, with some moderate to high severity near the origin of the fire. There are no range improvements in the unallocated area of the burn.

There are no immediate range improvement structure concerns for the BAER funding. Damage to fences should be addressed through long-term rehab.

Noxious and Invasive Weeds:

Although this particular area has not been surveyed for noxious and invasive species, there are no known populations of class a or b species (a and b are of highest concern). The nearest population of this category of species occurs within about 1 ¼ miles (Musk Thistle located at Hart Canyon/FR 75). Although there are no known a and b classed species within the fire boundary, there are Class C species within the perimeter (Mullein and Bull Thistle). These species are scattered throughout the fire area. These two species have the ability to dominate highly disturbed sites with no cover, such as high severity areas. To prevent noxious weed invasion within the fire area, seeding would be recommended within areas of high severity.

Recreation resources

There are no designated recreation trails listed in or around the burned area, however there are sections of the fire that have hazard trees which present risk to human safety. Evidence of non-motorized camping was found near the cabin site described in the Heritage section, dispersed camping occurs along major roads that border the fire. Interior portions of the fire area currently show little recreation use other than that associated with

occasional hunting camps. Areas of high and moderate burn severity should be closed to camping until hazard trees are removed.

B. Emergency Treatment Objectives:

Limit loss of soil productivity due to erosion – Reduce the risk of damaging levels of soil loss and maintain basic soil productivity levels on those areas experiencing substantial increased risk due to fire effects (primarily in areas with high and moderate burn severity, severe erosion hazard).

Limit stream sedimentation and water quality impacts on ESA fish species - Reduce on-site soil erosion and subsequent delivery of sediment to the headwaters of stream containing or leading directly to streams with occupied and/or critical habitat for the threatened Little Colorado spinedace.

Limit noxious and invasive weed species encroachment into the burn area – a) Reduce the risk of introduction of noxious and invasive weed species into areas with high potential for establishment due to fire induced changes to soil, litter and native plant communities. b) Reduce the risk of spread of noxious and invasive weed species from area if they do become established within the Crossing Fire perimeter.

Limit damage to and protect the integrity of identified heritage resources – Reduce or prevent the risk of damage to three identified sites due to erosion or damage from falling dead or fire weakened trees.

Limit impacts to populations of Mexican Spotted Owl – Reduce the risk of and/or speed the recovery of impacts to the Primary Constituent Elements of prey base for the Mexican Spotted Owl in MSO PAC within the fire perimeter.

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

Land 50 % Channel NA % Roads NA % Other 80 %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	50	80	80
Channel	n/a	n/a	n/a
Roads	n/a	n/a	n/a
Other			

E. Cost of No-Action (Including Loss): \$35,500

F. Cost of Selected Alternative (Including Loss): \$33,481

G. Skills Represented on Burned-Area Survey Team:

<input checked="" type="checkbox"/> Hydrology	<input checked="" type="checkbox"/> Soils	<input type="checkbox"/> Geology	<input checked="" type="checkbox"/> Range
<input checked="" type="checkbox"/> Forestry	<input checked="" 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 checked="" type="checkbox"/> Fisheries	<input type="checkbox"/> Research	<input type="checkbox"/> Landscape Arch	<input checked="" type="checkbox"/> GIS

Team Leader: Chris A. Nelson

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FAX: 928-333-5966

H. Treatment Narrative:

Land Treatments:

Seed high soil burn severity areas and some areas of moderate soil burn severity on soils with severe erosion hazard rating to reduce loss of soil productivity and the risk of infestation of noxious or non-native plant species. Total area to be seeded is 138 acres of the highest risk. Species selected based on highly successful treatments on other ASNF BAER projects near to this project which have resulted in quick cover from cereal grain, and persistent cover of native grass species. Seeding rate approximately 15 lbs./acre for coverage of approximately 25 seeds per square foot.

Seeding mix and rate as follows:

Species	Percent by weight
Mountain brome <i>Bromus marginatus</i>	25
Slender wheatgrass <i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	13.5
Arizona fescue <i>Festuca arizonica</i>	1
Barley <i>Hordium vulgare</i>	60
Junegrass <i>Koeleria cristata</i>	.5
Total	100%

Expected Benefits of Land Treatments

- reduced soil loss resulting in protection and maintenance of on-site soil productivity beginning in year 2.
- reduced sedimentation in fire area streams and reduced water quality related impacts to critical habitats of the Little Colorado spindace, Canyon tree frog, Arizona toad, stream macroinvertebrates (a Management Indicator component).
- reduction of potential for introduction and/or spread of noxious and invasive weed species in treated areas.
- reduction of and/or speeded recovery of ground cover for prey base of the area's Mexican Spotted Owl population.
- indirect benefits to terrestrial and other avian wildlife species via rehabilitation of habitat for prey base, of cover, and of forage resources.

Other treatments:

The following measures are proposed to mitigate possible adverse post-fire effects to at-risk heritage sites in the Crossing Fire area.

Hand Seeding - It is recommended that hand seeding should be employed at site 3015. The proposed treatment will help stabilize the soil on the site and it will reduce the effects of soil movement, debris runoff and erosion.

Hand removal of trees - Heritage resource site 3015 has 3 medium (6-12 inch diameter) ponderosa pine trees within the site perimeter that were killed as a result of the fire. The trees are located near the cabin and will pose a threat to the feature if they were to uproot and fall. It is recommended that these trees be cut down using chainsaws and felled away from the interior of the site. The logs should then be bucked into manageable sections and removed from the site by hand.

Monitor Implementation -A Heritage Resource specialist will monitor the BAER implementation measures that have the potential to affect heritage resources, such as hand-removal of trees within the boundary of site.

If the proposed measures are not successful in controlling the adverse post-fire effects, it is recommended that the site should be extensively documented by Forest Service Heritage Resource staff. The process of extensive documentation is important to ensure that all possible information is gathered from the site prior to any further impact from soil movement, debris runoff and erosion. The estimated cost for this work is approximately \$1500. This cost is for one Forest Service Archaeologist (GS-9 level) to document the site over the span of approximately 5 days.

I. Monitoring Narrative:

BAER effectiveness monitoring will be conducted to determine whether seeding is effective in reducing soil loss and sediment. Effective groundcover will be monitored for seeding success after 1 growing season and until treated areas are stable (to an estimated 50% effective groundcover). This will be conducted prior to the 2010 monsoon season. Monsoon rains generally produce high intensity, short duration storms that lead to the greatest resource damage on disturbed areas and to downstream drainages. Lack of effectiveness may warrant additional treatments or additional seeding.

Noxious and invasive weed monitoring will occur as part of the original treatment on treated acres and in following years, especially where public access is allowed. This will be accomplished in year one and may continue if weeds are detected.

References and further information as found in the project record:

Bredemann, Eric. 2009, Heritage Specialist's Report for the Crossing Fire BAER analysis, project record.

Hughes, Kendell. 2009, Range, Vegetation and Noxious and Invasive Weed Specialist's Report for the Crossing Fire BAER analysis, project record.

Laing, Larry, et.al. 1987, Terrestrial Ecosystem Survey of the Apache-Sitgreaves National Forests. Southwestern Region. USDA Forest Service.

Nelson, Chris. 2009, Soils Specialist's Report for the Crossing Fire BAER analysis, project record.

Rihs, John, 2009, Hydrology Specialist's Report for the Crossing Fire BAER analysis, project record.

Robichaud,eter R.; Elliot, William J.; Pierson, Fredrick B.; Hall, David E.; Moffet, Corey A. 2006 , Erosion Risk Management Tool (ERMIT) Ver. 2009.02.23. (Online @ <http://forest.moscowfs.wsu.edu/fswep>;> Moscow, ID: U.S. Department of Agriculture).

Vaughn, Rachael. 2009, Wildlife and Fisheries Specialist's Report for the Crossing Fire BAER analysis, project record.

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

Line Items	Units	Unit Cost	NFS Lands		Other	Other Lands				All Total
			# of Units	WFSU SULT \$		# of units	Fed \$	# of Units	Non Fed \$	
A. Land Treatments										
Hand Seeding	acres	65.217	138	\$9,000	\$0		\$0		\$0	\$9,000
WL seeding AGFD	acres	62	50	\$0	\$3,100		\$0		\$0	\$3,100
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
Subtotal Land Treatments				\$9,000	\$3,100		\$0		\$0	\$12,100
B. Channel Treatments										
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
Subtotal Channel Treat.				\$0	\$0		\$0		\$0	\$0
C. Road and Trails										
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
Subtotal Road & Trails				\$0	\$0		\$0		\$0	\$0
D. Structures										
Cabin Stabilization	each	600	1	\$600	\$0		\$0		\$0	\$600
				\$0	\$0		\$0		\$0	\$0
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
Subtotal Structures				\$600	\$0		\$0		\$0	\$600
E. BAER Evaluation										
Team Salaries & vehi	each			\$0	\$8,800		\$0		\$0	\$8,800
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
Subtotal Evaluation				\$0	\$8,800		\$0		\$0	\$8,800
F. Monitoring										
Seeding/Nox weed	each	1500	1	\$1,500	\$0		\$0		\$0	\$1,500
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
Subtotal Monitoring				\$1,500	\$0		\$0		\$0	\$1,500
G. Totals				\$11,100	\$11,900		\$0		\$0	\$23,000

PART VII - APPROVALS

1. /s/ Chris Knopp
Forest Supervisor (signature)

8/27/2009
Date

2. /s/ C.L. Newman, Jr.
Regional Forester (signature)

9/01/2009
Date