Date of Report: 5/11/ 2015

MOONSHINE FIRE
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: Moonshine

B. Fire Number: MT- MCD - 00039

C. State: South Dakota

D. County: Harding

E. Region: Northern (1)

F. Forest: Custer Gallatin

G. District: Sioux

H. Fire Incident Job Code: 1502 PDJLC115

I. Date Fire Started: 04/01/2015

J. Date Fire Contained: 04/09/2015

K. Suppression Cost: TOTAL: approx. $650,000

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): approx. 1
2. Fireline seeded (miles): approx. 2
3. Other (identify): General dozer line rehabilitation (remove berm, respread topsoil and smooth, etc): approx. 9

M. Watershed Numbers: Sixth Level Watershed Acres by Severity

HUC ID	HUC Name	Low	Moderate	Grand Total
101303050406	Gap Creek	1348.7	469.1	1817.8
101303020206	Sioux Creek	312.6	698.2	1010.8
101303020504	South Fork Grand River- Prairie Dog Creek	0.1		0.1
Grand Total		1661.4	1167.3	2828.6

N. Burned Acres by Ownership

Ownership	Total
PRIVATE	633.6
USDA FOREST SERVICE	2195.0
Grand Total	2828.6

O. VegetationTypes: Grass, shrubs & ponderosa pine timber in rough and steep coulees

P. Dominant Soils: Dominant parent materials are slope alluvium and colluvium over residuum derived from semiconsolidated sedimentary beds. The majority soil series (Slimbutte-Reva Complex, 6 to 60 percent slopes) is classified as loamy-skeletal, mixed, frigid Typic Haploborolls. Other soils with significant representation within the fire perimeter include loamy-skeletal, mixed, frigid Typic Eutroboralfs.

Q. Geologic Types: The Slim Buttes consist of a series of primarily volcanic strata (chiefly the White River and Arikaree Formations) underlain by members of the sedimentary Fort Union and Hell Creek Formations. Alluvium and colluvium adjacent to the butte are also common.

R. Miles of Stream Channels by flow regime:

Stream Channel Type	Miles
Intermittent	3.0
Ephemeral	6.7
Grand Total	9.7

S. Transportation System:

	Jurisdiction			
Operational Maintenance Level	FS - FOREST SERVICE	P - PRIVATE	SH - STATE HIGHWAY	Grand Total
2 - HIGH CLEARANCE VEHICLES	1.4			1.4
3 - SUITABLE FOR PASSENGER CARS	2.8			2.8
(blank)	1.8	0.1	0.0	1.9
Grand Total	5.9	0.1	0.0	6.0

PART III - WATERSHED CONDITION

A. Burn Severity (Acres):

Burn severity class	Acres
Low	1661.4
Moderate	1167.3
Grand Total	**2828.6**

B. Water-Repellent Soil (acres): 549 (assuming 50% of all acres burned under moderate severity display moderate hydrophobicity)

C. Soil Erosion Hazard Rating (acres)

Erosion Hazard Rating	Acres	Percentage
Slight	142.3	5.0
Moderate	1558.0	55.1
Severe	1127.7	39.9

D. Erosion Potential: 4.3 tons/ac (ERMiT results for representative hillslope in fire, 20% probability of occurrence, moderate burn severity one year post-fire)

E. Sediment Potential: 7.4 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 1-5

B. Design Chance of Success, (percent): N/A

C. Equivalent Design Recurrence Interval, (years): N/A

D. Design Storm Duration, (hours/minutes): N/A

E. Design Storm Magnitude, (inches): N/A

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

G. Estimated Reduction in Infiltration, (percent): N/A

H. Adjusted Design Flow, (cfs per square mile): N/A

PART V - SUMMARY OF ANALYSIS

A. Critical Values/Resources and Threats:

Fire Context/Burn Pattern and Severity Summary:

The Moonshine Fire started on private land to the west of the Slim Buttes. As a result of strong winds, the fire quickly grew over a multi-day run to its final extent of nearly 3,000 acres. Fire crews worked to secure the fire perimeter using a combination of dozer and hand line along with burnout operations, particularly off of Highway 20 and at the northwest end of the fire adjacent to private land.

Burn intensity increased as the fire spread onto National Forest lands, in part attributable to complex terrain and presence of overstory fuels. As winds abated, fire spread slowed, in part aided by minimal accumulation of understory fuel and substantial moisture persisting in the soil profile. Southerly aspects through the east end drainages of the fire burned under higher intensities and severities than north aspects (Figure 1). In some cases, minor concavities on north facing slopes supporting primarily shrub vegetation held enough extra moisture to cause the fire to go out upon contact.

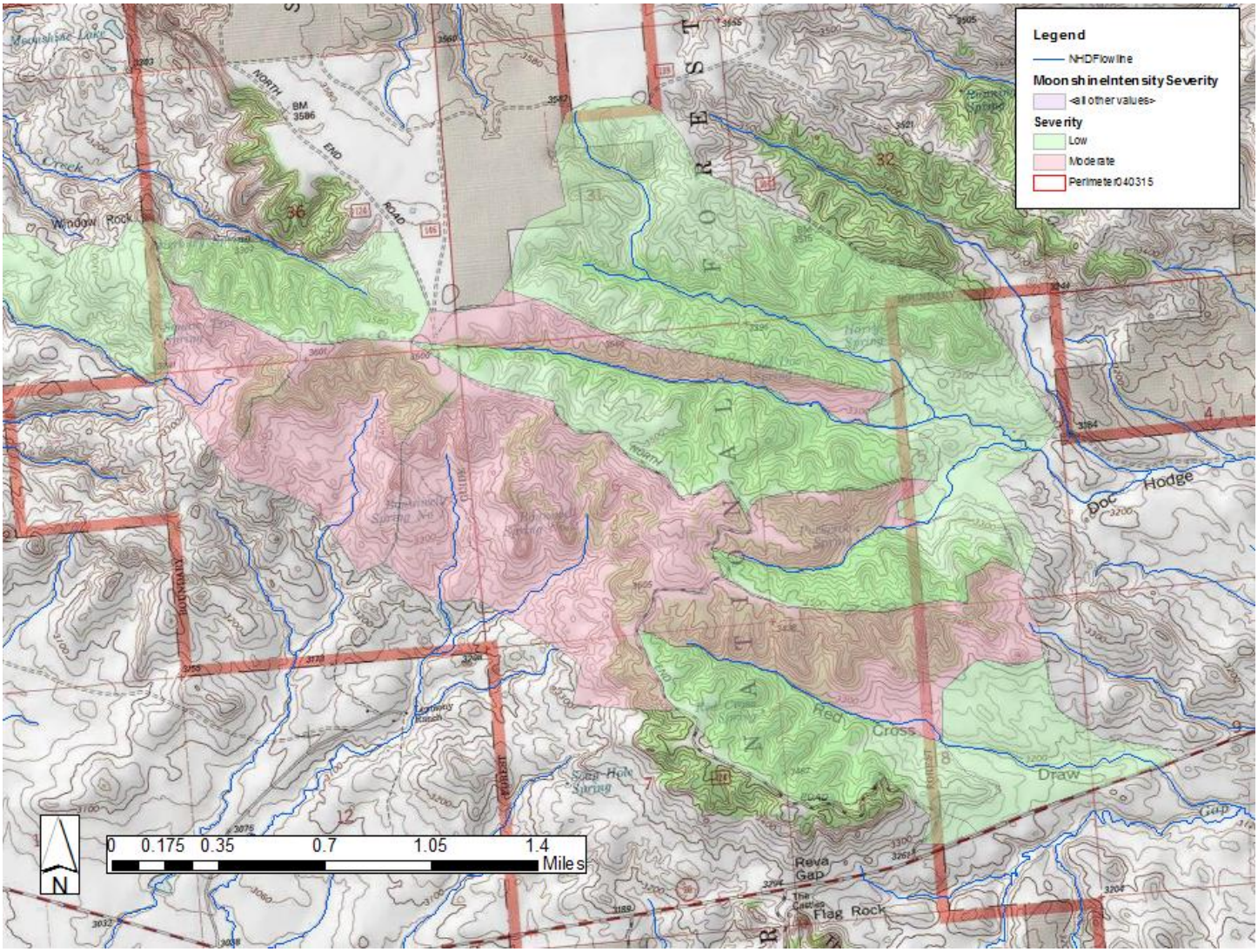

Figure 1. Moonshine Fire Burn Severity Map (Red=Moderate; Green=Low).

Burn severity did not correlate with burn intensity across all intensity/severity classifications. In stands deemed to have burned under low intensity, no hydrophobicity was observed. Fine roots in the upper portion of the soil profile were frequently found to be intact and pliable across these areas. Singed grass shoots and shrub buds were observed during BAER assessment. In these locations, low intensity burning did correlate with low severity burn conditions. With intact fine roots, minimal soil heating, and plenty of available soil moisture, much of the fire that burned under low severity will likely experience rapid recovery.

The southcentral portion of the Moonshine Fire was observed to have the greatest contiguous area burned under moderate to high intensity. Mild to moderate hydrophobicity was observed to be discontinuous within this

portion of the fire. Fine roots and surface mineral soil structure were both observed to be largely intact within these areas. These areas burned under moderate to high intensity were deemed to have burned with moderate severity. See Photo 1 for an example of what conditions looked like that were burned under moderate severity.

Photo 1. Example of moderate severity burn conditions within the Moonshine Fire perimeter.

Drainages falling within this area, including the drainage above Bonniwell Springs 1 and 2, are approximately 4-5 square miles in area. These catchments drain down to Highway 20 off-forest. Fire-caused tree mortality was observed in the headwaters portions of these catchments. Some delayed mortality is likely.

FS Values at Risk:
Risks were assigned based on Interim Directive No. **2520-2010-1**.

The BAER interdisciplinary team identified issues that result from fire effects within the Moonshine Fire. Protection of life and property were given high priority. After examination of the fire area the BAER team, in consultation with other specialists, identified the following values at risk. The following post-fire effects and identified values at risk were identified and addressed where appropriate with BAER treatment proposals:

- **Road system:** The Moonshine Fire contains approximately six miles of system roads and administrative routes. Of those roads open to public access, approximately 1.5 miles (25%) fall within areas burned under moderate severity. This does not account for total area in moderate severity draining to roads within the burn perimeter. Forest Road 3124 is the lone access route to the north end of the Slim Buttes. This route provides access to an electronics site housing communications equipment for the following users:

  - NFS Slim Buttes Repeater
  - SD State Radio (includes SD DOT and Highway Patrol)
  - Butte County SD Emergency Management

These roads are vulnerable to accelerated erosion due to increased overland flow from burn areas, excessive ditch erosion, loss of road fill, and filling of drain structures. Road segments which have the greatest potential for post-fire road surface drainage problems were identified. Proposed treatments are for stormproofing roads to handle the post-wildfire storm flows.

- **Heritage/Cultural Resources:** 24 recorded cultural resources are located within or adjacent to the fire perimeter that could potentially be affected: six rock cairns; four lithic scatters; four prehistoric isolated finds; one lithic scatter with a cedar range water tank; six cedar range water tanks; the old Red Cross campground/ homestead; Ada Tyes grave; and an old roadbed. Of particular concern were the six stone features recorded. Many of these stone features (cairns) are considered by Plains Tribes to be sensitive locations that demand respectful treatment and protection. No new sites were found during BAER reconnaissance.

  Two cairn sites were identified where hazard trees should be removed before they uproot and damage these sites. Funding is requested for site monitoring and hazard tree removal.

- **Soil and Water Quality:** Localized increases in erosion and sedimentation may occur within watersheds that burned under moderate severity. Due to lack of downstream values likely to be adversely affected, no stand-alone treatments have been proposed to mitigate impacts.

- **Potential Loss of Native Vegetation and Ecological Integrity due to Weed Infestation and Spread:** Noxious weed spread is a threat and may affect values at risk such as soil productivity, vegetation, wildlife habitat and biodiversity, and land/property values in the vicinity of the Fire. Fire suppression equipment made dozer lines through known noxious weed infestations. Incident Wash Stations were not used during the fire. While equipment was inspected for cleanliness prior to their release for fire duty, dozer lines did cut through known infested sites which heighten the probability that dozer lines are suspect of new weed starts from transported weed seeds. Fire-related impacts of nonnative invasive plants may include changes in the species composition or structure of post fire plant communities, especially when these changes occur at the expense of native species and habitats.

  While noxious weeds are considered to be at risk of proliferation post-fire, no funding is being requested through BAER to address this risk. Given the existing funding availability through an agreement with Harding County SD and lack of internal or external (contracted) capacity for further weed treatment, county weed spraying efforts will be diverted to detection monitoring and treatment within the fire perimeter.

- **Potential Loss of Native Vegetation Recovery and Soil Stabilization without Livestock Deferment:** The Moonshine Fire burned roughly 50% of the South Bonniwell Allotment's East and West units. Deferment of grazing that includes time for plants to recover during the growing season is important to protect the soil and allow a desirable plant community to become re-established. While nutrient release post-fire is expected to increase production for several years post-fire, improper livestock grazing following a fire can offset those benefits obtained from fire. Livestock will be deferred from grazing in burned areas for at least one growing season until seed set near mid-July for 2015.

- **Erionite:** Much of the Moonshine Fire is underlain by the Arikaree and White River formations. Sampling conducted by the CGNF within this geologic formation has identified the presence of erionite, a naturally occurring asbestos form mineral in concentrations ranging from trace to 20%. Recent investigations have identified potential human health and safety concerns associated with inhalation of

erionite fibers, similar to concerns associated with asbestos. While presence has been established, extent to which individuals are inhaling erionite fibers when working in this area is unknown. Further, it is unknown how wildfire may affect erionite exposure risk to FS personnel working within the fire perimeter as well as potential for increased off-site travel. While no BAER treatments will be prescribed to address the elevated concern for eolian transport of erionite, it is a concern of note within and directly adjacent to the fire perimeter. Standard mitigations and precautions will be used for addressing elevated risk of erionite exposure within the burn perimeter, including wetting of work surfaces; use of air conditioning in vehicles/keeping windows rolled up while driving; and avoiding working in exceedingly windy conditions.

In accordance with the revised Forest Service manual, the risk matrix below, Exhibit 2 of Interim Directive No.: 2520-2010-1, was used to evaluate the Risk Level for each value identified during the Moonshine Fire BAER assessment. Only treatments directly addressing FS Values at Risk with a rating of Intermediate or above are recommended for BAER authorized treatments. While Risk Assessment was completed for the Non-FS Value at Risk (increased post-fire runoff response), it was not included in the risk matrix.

Probability of Damage or Loss	**Magnitude of Consequences**		
	Major	Moderate	Minor
	RISK		
Very Likely	**Very High- Heritage, Erionite**	**Very High**	**Low**
Likely	**Very High- Roads**	**High- Weeds/Livestock**	**Low**
Possible	**High**	**Intermediate**	**Low- Soil and Water Quality**
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.

Road System: With the fire having burned early season, the burn scar will be susceptible to high-intensity thunderstorm events that are common in northwest South Dakota for the entirety of the thunderstorm season; it is very likely that the burn scar will encounter at least one thunderstorm event this season. Should no road treatments be implemented, there is a substantially elevated likelihood of road washout and loss of accessibility to the north end of the Slim Buttes. Probability of damage or loss to the road system has been deemed ***Likely***. Should the electronics site be rendered inaccessible, in the event of the need for emergency communications there is potential for loss of life or injury. Accordingly, the magnitude of consequences would be ***Major***.

Heritage/Cultural Resources: It is near certain that trees killed by the fire would hit the cairns upon falling to the ground, making probability of damage ***Very Likely***. Damage to these sites would constitute irreversible damage to critical cultural resources, having ***Major*** consequences.

Soil and Water Quality: Probability of Damage or Loss ***Possible***, Magnitude of Consequences ***Low***

Potential Loss of Native Vegetation and Ecological Integrity due to Weed Infestation and Spread: It is ***Likely*** that weeds will proliferate throughout the burned area. Since weed infestation is not irreversible, magnitude of consequences has been deemed ***Moderate***.

Potential Loss of Native Vegetation Recovery and Soil Stabilization without Livestock Deferment: Multiple studies have shown that there are benefits of grazing deferment until after the first growing season after fire. Should grazing not be deferred, it is ***Likely*** that plant vigor may be affected and soil erosion may be exacerbated. While likely not irreversible, damage to critical natural resources would be incurred; magnitude of consequences is ***Moderate.***

Erionite: Given the loss of ground cover and overstory vegetation following the fire, it is ***Very Likely*** in the months immediately post-fire that there will be more soil entrained by wind and heightened exposure to erionite by FS and non-FS personnel. Magnitude of consequences from exposure to asbestos-form minerals is ***Very High***.

B. Emergency Treatment Objectives:

- Roads - Mitigate effects of changed post-fire watershed responses (runoff,erosion, and deposition) by stormproofing selected road areas and ensure continued access to critical emergency communications equipment and grazing allotments.
- Provide for safety and resource protection from hazard trees in concentrated work areas for BAER treatments.
- Weeds and native vegetation recovery - Reduce the risk of expansion of existing weed seed beds and infestations of noxious weeks and allow burned plant communities to recover more rapidly.
- Mitigate effects of changed post-fire watershed response on cultural resources.

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

Land **90** % Channel **na** % Roads/Trails **90** % Protection/Safety **na** %

D. Probability of Treatment Success

Years after Treatment

	1	3	5
Land (Heritage)	90	90	90
Channel	na	na	na
Roads/Trails	90	80	70
Protection/Safety	na	na	na

E. Cost of No-Action (Including Loss): $380,000

Cost of No-Action Alternative assumes that FR# 3124 would have to be completely rebuilt at the cost of approximately $100,000 per mile, which includes addition costs to work in and around erionite. Cost of No-Action does not include increased cost of noxious weeds management resulting from post-fire proliferation since no BAER funds are being requested for treatment. Cost of No-Action cannot be applied to cultural resources; damage to these resources is irreplaceable.

F. Cost of Selected Alternative: $129,888

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Andy Efta

Email: Andy Efta jefta@fs.fed.us Phone 406-255-1407 kreid@fs.fed.us Phone: 406-255-1413

Core Team Members:

- Andy Efta – Soils
- Dale White – Hydrology
- Bryce Hancock –Hydrology Technician
- Scott Barndt – Soils Field Technician
- Kim Reid – Range/Botany/Noxious Weeds
- Buck Buchanan – Range/Weeds
- Meghan Reedy–Range/Weeds
- Bobby Cordell – Fuels/Fire
- Dave Shimek – Engineering
- Andy Wilber – Engineering
- Halcyon LaPoint – Heritage
- Mike Bergstrom – Heritage
- Mary Gonzales/Tawni Cordell – GIS

H. Treatment Narrative:

Land Treatments

Road Treatments: BAER funds are appropriate for treatment of anticipated fire erosion events on roads but not to improve roads to standards over pre-fire conditions. Forest Road (FR) #3124 is a Maintenance Level 3 road open to all vehicles. It has both gravel and native surfacing on the road and has some maintenance needs along its 3.8 mile route. With the fire and estimated increase overland flow during precipitation events, the road is at risk for extreme rutting and washing out some sections of the road.

The objective of the proposed road treatments are to stormproof the road investment from accelerated erosion, sediment transport, and sediment deposition on travel routes and reduce the sediment transfer from the routes while maintaining access to the Forest for administrative, private lands access, and public use. Wildfire accelerated surface flows down roads are probable and if not treated will cause significant surface erosion and failure in localized areas.

Road treatment units and costs are listed in Attachment A. The treatments for the roads consist of a variety of storm proofing techniques including blading the roads and restoring drainage, constructing armored drainage dips and sags, and hazard tree removal to provide for safety during BAER contract administration. Armoring drainage dips and sags is essential due to the highly erodible nature of the soil in this area. Proposed treatments target FR # 3124 in areas where fire-related hillslope runoff may affect road infrastructure; no treatments have been recommended for ridgetop road segments.

Road system stormproofing costs are greater than normal as a result of the need to transport erionite-free gravel in from off-site as well as the critical need to wet down soil during construction so as to avoid excess liberation of erionite from soil.

Treatment of roadside hazard trees will provide for a safe working environment for the crews during contract administration and implementation. Hazard tree removal will be implemented along a portion of FR# 3124.

Weeds Treatments: The fire-caused emergency to resource recovery is of a high priority, especially in those areas, which have highly invasive species' concentrations prior to the burn (see Figure 3). The fire areas provide a seed bed where noxious weed seeds can continue to germinate, grow, and spread.

About 280 gross acres associated with the Fire are predominantly infested with Canada thistle, and less than 5 gross acres of Absinth wormwood. However, the density is low and is estimated to be less than 30 net acres. Most of the infestations are in areas where there is moderate soil burn severity.

Incident Wash Stations were not used during the fire. However, equipment was inspected for cleanliness prior to their release for fire duty. Dozer lines did cut through known infested sites which heighten the probability that dozer lines are suspect of new weed starts from transported weed seeds. Suppression dozer lines are considered prime weed beds, especially with a large infestation being in the area and suppression activities possibly moving seed source around suppression lines. The fire burned grassland and forest land and eliminated natural competition for invaders. The fire-caused disturbance creates perfect habitat for noxious weed invasion and expansion.

Results of uncontrolled weed spread are well documented. If emergency mitigation activities are not implemented the weed problem will expand exponentially and will require future extensive resources to manage. If left unmanaged the results could permanently alter plant communities, wildlife habitats, recreational experiences, and adjacent private land values.

Phase I monitoring will involve inspections, first along all roads and dozer lines, then outward from roadsides and other known noxious weed infestations and disturbed sites during the 2015 growing season. Phase II monitoring will continue throughout the Moonshine fire area. Documentation of weed locations, by species, and other observations regarding density and spread will be recorded following the guidelines in NRM corporate database. If the Forest Service determines more rigorous monitoring is then needed to track particular infestations through time, a new design can be implemented in appropriate areas

Weed treatment will concentrate on those areas of known weed infestations to treat fire-induced weed spread within fire perimeter and in the vicinity of the suppression lines outlined above under areas at risk. Immediate weed treatment is needed to prevent known weed infestations from quickly flourishing after the fire and creating large sources of weed seeds. These areas have high public use. People, vehicles, and wildlife serve as vectors of spread. It is critical that these areas be treated as soon as possible to prevent weed seed spread into newly burned and vulnerable areas.

A one-time herbicide treatment for noxious weeds will not be effective. Management and control efforts must be planned for several consecutive growing seasons in order to prevent new sprouting and seed formation/dispersal and at the same time deplete the associated seed banks that have built up in the soil. The Forest intends to use an existing funded Agreement that is in place with Harding County rather than request BAER funds for weed work in the Moonshine Fire area. This is due to capacity issues with current workforce and the workforce with the existing Agreement with Harding County. The District will have Harding County shift weed workload emphasis to detection monitoring and noxious weed treatment in the Moonshine Fire area. There will likely be additional non-BAER outyear funding requests for follow-up herbicide treatment needs.

See Attachment B for breakdown of weeds treatment monitoring and herbicide application.

Cultural Resource Treatments: All significant (NRHP eligible), potentially eligible and unevaluated sites or portions of sites within the burned area were carried forward for the consideration of effects in the recommended BAER treatments. As noted above under the Values at Risk discussion, hazard tree removal under archaeological supervision will be critical to protect two cultural sites that were burned over by the fire. Costs for treatment are itemized in Attachment B.

I. Monitoring Narrative:

Part VI – Emergency Stabilization Treatments and Source of Funds

A. Land Treatments	Units	Unit Cost	# of Units	BAER $	Other$
Weed detection, monitoring, and treatment[1]	EA	$6,800	1		
Livestock Deferment – Adm. Action - No Request	Job	0	0	$0	
Cultural Site Treatments[2]	EA	$2,656		$2,656	
Subtotal Land Treatments				$2,656	
B. Channel Treatments					
C. Roads and Trails					
Road stormproofing and drainage[3]	EA	$124,532		$124,532	
Road hazard trees	Faller Days	$300	9	$2,700	
Subtotal Roads and Trails				$127,232	
D. Protection and Safety					
Subtotal Protection and Safety					
E. BAER Evaluation					
Assessment (person days)	Days	$350	40		$ 14,000
Travel costs	LS	$			
Subtotal Evaluation					$ 14,000
F. Monitoring					
		$		$	
Subtotal Monitoring				$	
G. Totals					
Previously approved				$	
Total for this request				$129,888	

[1]See Attachment B for weeds monitoring, detection, and treament cost summary.
[2]See Attachment C for cultural resource stabilization cost summary.
[3]See Attachment A for engineer's estimate for road stormproofing and drainage.

PART VII - APPROVALS

1. _____ 5/11/2015
Forest Supervisor Date

2. _____ 5/11/2015
Regional Forester Date

Attachment A. Moonshine Fire Engineer's Estimate for FS Road #3124

Item #1 Road 3124						
Item Number	**Description**	**Method of Measure**	**Pay Unit**	**Estimated Quantity**	**Unit Price**	**Total**
15101	Mobilization	LSQ	LS	ALL	XXXXX	$ 8,500.00
15801	Watering for Dust Control (Erionite)	LSQ	LS	ALL	XXXXX	$ 10,000.00
21201	Road Reconditioning	CQ	STA	199	$ 75.00	$ 14,956.50
21202	Recondition Grade Sag	AQ	EA	15	$ 300.00	$ 4,500.00
21203	Recondition Rolling Dip	AQ	EA	3	$ 300.00	$ 900.00
30101	Armor Dips and Sags 6" Compacted Depth Compaction Method C (Erionite Non Detect)	CQ	CY	708	$ 90.00	$ 63,720.00
60201	Clean CMP Inlet/Outlet	AQ	EA	1	$ 350.00	$ 350.00
60202	Clean Cattleguard	AQ	EA	1	$ 850.00	$ 850.00
					TOTAL	**$ 103,776.50**

Contract Preparation 10%	$ 10,377.65
Contract Administration 10%	$ 10,377.65

GRAND TOTAL	**$ 124,531.80**

Attachment B. Weeds Monitoring, Detection, and Treatment Cost Summary

Table 1. Estimated Weed Detection and Monitoring Cost

Monitoring	Resources Needed	Estimated Unit Cost	Estimated Total Cost
Phase I	2 Person Days via Agreement with Harding County	$400/person/day & Equipment	$800
Phase II	4 Person Days force account (includes required reporting in corporate database)	$400/person/day & Equipment	$1600
Total Cost			**$2400**

Table 2. Estimated Cost For Treatment

	Cost/Ac	Est. Monitoring Ac	Estimated Wetted Ac	Total
Harding County Agreement	$125.00	302	30	**$3750**

Table 3. Summary of Herbicide Ground Application Weed Treatment Cost

NFS Weed Treatment Area	NFS Cost
Burn Area Infestation[1] (From Table 2 Total)	$3750
Detection Monitoring (From Table 1 Total)	$2400
Misc. Supplies	$50
Overhead[2]	$1000
NFS Total	**$6800**

[1]Cost per acre is based on the average cost of weed treatment for herbicide ground weed treatment by contract.
[2]Overhead based on 18% of treatment costs.

Attachment C. Moonshine Fire BAER Cultural Resource Stabilization Cost Summary.

Line Items	Units	Unit Cost	# of Units	BAER $
A. Cultural Site Treatments				
Cultural Resource Site Hazard Tree Removal – 2 site treatments	Tree	500.00	3	$1500
Archaeologist Monitor for tree removal – one day per site	Cultural site	578.00	2	$1156
Total for Cultural Resource BAER				**$2656**