USDA-FOREST SERVICE FS-2500-8

Date of Report: 10/15/12

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: Sheep

B. Fire Number: ID-NPF-000604

C. State: ID

D. County: Idaho

E. Region: 01

F. Forest: Nez Perce

G. District: Salmon River Ranger District

H. Fire Incident Job Code: P1G7VJ

I. Date Fire Started: 09/06/2012

J. Date Fire Contained: estimated 12/1/12

K. Suppression Cost: $15,900,000 as of 10/06/2012

L. Fire Suppression Damages Repaired with Suppression Funds
1. Dozer Fireline repaired (miles): 30.7 as of 10/08/12
2. Hand Fireline repaired (miles): 8.1 as of 10/08/12

M. Watershed Numbers:
National Forest Land
170602090204 (5630 acres), 170602090301 (2279 acres), 170602090302 (856 acres), 170602090304 (13941 acres), 170602090402 (4554 acres), 170602090403 (134 acres), 170602090404 (6667 acres)

N. Total Acres Burned (as of 10/2/2012):
NFS: 33,929 Other Federal (BLM): 4858 State: 1651 Private: 7559

O. Vegetation Types: Common forest types include open ponderosa pine and Douglas-fir forests, mixed conifer stands of grand fir, Douglas-fir, and Western Larch, and interspersed lodgepole pine stands. Lower elevation, non-forest vegetation includes Idaho fescue, bluebunch wheatgrass, hackberry, hawthorn, and more mesic shrubs. Whitebark pine occurs at high elevations.

P. Dominant Soils: Dystric Cryochrepts, Andic Cryochrepts, and Ultic Argixerolls on dissected stream breakland, dissected mountain slope and breakland drainage-head landforms.

Breaklands consist of steep slopes adjacent to rivers and their tributaries. The slopes are oversteepened as a result of streams downcutting faster than the adjoining slopes could retreat. Slopes are long and straight to concave in shape. Gradients exceed 60%. Bedrock is moderately to weakly weathered. Rock outcrop is common. Soils are colluvial, weakly developed, and vary widely in properties. Soils on northerly aspects tend to be deep and skeletal with a mixed ashcap. On southerly slopes, soil depths vary from deep to less than 20 inches in depth. Ash caps are thin or missing on shallow soils and are mixed on others. *These lands are the most unstable on the Forest.* Productivity varies from high on the northerly aspects to low or noncommercial for shallow droughty soils on southerly aspects.

Dissected mountain slopes are complexes of narrow ridges about 500- to 1,000-feet high. Slopes are nearly straight with gradients from 25 to 60 percent. The drainageway pattern is parallel, though some branching of lower-order drainageways occurs. Dissected mountain slopes deliver sediment to streams efficiently due to moderately steep to steep straight slopes and channels that are relatively close together.

Breakland drainageway heads are triangular-shaped features with the narrow end downslope at the heads of drainageways on stream breaklands. Slope gradients range from 40 to more than 60 percent. The drainageway pattern is pinnate, with the confluence of drainageways near the lower, narrow end of the landform. Breakland drainageway heads deliver sediment to streams very efficiently due to steep slopes and closely spaced drainageways. *The point where drainageways converge at the lower apex of the landform tends to accumulate sediment. This convergence may be a source of debris avalanches and flash floods.*

Q. Geologic Types: Dominant rock types include Cretaceous granitic rocks of the Idaho Batholith, Permian micaceous schist, and Miocene basalt. Soils formed on the Permian micaceous schist are highly susceptible to mass wasting events.

R. Miles of Stream Channels by Order or Class:

National Forest
1st order 74.8 miles, 2nd order 14.4 miles, 3rd order 5.4 miles, 4th order 1.9 miles, 5th order 4.8 miles

S. Transportation System

Trails: National Forest	40.0	miles	Other	3.5 miles
Roads: National Forest	92.9	miles	Other	70.2 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 17,721 (low) 6631 (moderate) 1917 (high)

B. Water-Repellent Soil (acres): 7000

C. Soil Erosion Hazard Rating (acres): 3500 (low) 30,585 (moderate) 14,082 (high)

D. Erosion Potential[1]: 24.4 tons/acre

E. Sediment Potential[1]: 4358 yd^3/mi^2

[1] Results derived from Disturbed WEPP. Modeled high intensity fire in the uplands and riparian, sandy loam soil, 50% slope, 20% ground cover, 15% rock, and PRISM modified climate. This is a worst-case analysis.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years):	2-4 grass/shrubs 20-50 conifers
B. Design Chance of Success, (percent):	70
C. Equivalent Design Recurrence Interval, (years):	10
D. Design Storm Duration, (hours):	6 and 1 hr
E. Design Storm Magnitude, (inches):	0.9 (6hr), 0.7 (1hr)
F. Design Flow, (cubic feet / second/ square mile):	30-100
G. Estimated Reduction in Infiltration, (percent):	60
H. Adjusted Design Flow, (cfs per square mile):	60-400

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

The primary values at risk resulting from the Sheep Fire are transportation infrastructure (roads, trails and culverts), water quality, native fisheries for ESA-listed species, native vegetation communities, and heritage sites.

Infrastructure: Due to fire effects, modest snowmelt and rain events are likely to cause extensive erosion and mass movement on steep hillslopes throughout the burned area. Additionally, reduced canopy interception, combined with lack of groundcover and hydrophobicity will cause increased runoff response compared to pre-fire conditions. Thus, streams in and downstream of the burned area are likely to generate higher stormflows in the first few years following the fire. Larger flow events in part are a function of increased surface runoff from bare hillslopes. Furthermore, burned and exposed soils are more susceptible to entrainment and transport to stream channels. This combination of increased runoff and greater susceptibility to erosion threatens transportation infrastructure. Poorly drained roads and undersized culverts are more likely to fail in the post-fire hydrologic setting. Within the fire perimeter, three maintenane level 3 roads cross Forest Service and private land. The main roads are important for access by FS personnel for short-term BAER and other post-fire restoration work, as well as long-term management. These roads are also important public access routes for large areas of the national forest, as well as some private land. Additionally, within the burn perimeter, several miles of level 2 and 1 roads are likely to convey greater runoff volume than in pre-fire conditions during snowmelt and rain events over the next few years. Some segments of these roads are currently poorly drained, and are at risk of severe post-fire erosion. One culvert was found to be undersized for the post-fire design (10-year precipitation) event, and is recommended for replacement. At other sites, although the culverts were judged to be adequate to convey the design post-fire runoff event, armored dips or sags are recommended in the event that debris torrents occur. These improvements will improve the probability that road crossings will withstand a post-fire debris torrent or bulked runoff event. In addition to the road infrastructure, there are 33 miles of trail within the burned area that are at risk of elevated damage from accelerated erosion and runoff. Many of the trails are located on steep slopes ranging from 40 to 70%.

Water quality: The streams in the burned area generally maintain good water quality. Erosion from steep burned hillslopes would compromise water quality through transport and depostion of fine sediment in important fishery streams. The elevated erosion and potential failures from roads and trails also compromise water quality. Treatments to improve road and trail drainage to withstand post-fire events will provide protection for water quality as well.

Fisheries: Three significant fisheries are within and immediately downstream of the burn perimeter on NFS land: the Slate Creek drainage (including Little Slate Creek), Allison Creek and John Day Creek. Three Endangered Species Act (ESA) listed species reside in these waters: bull trout, steelhead and spring/summer Chinook salmon. In addition to these three species, westslope cutthroat trout and redband trout, which are forest sensitive species, also reside in these streams. Elevated sediment delivery to these streams fills interstitial spaces between cobble and gravel, clogging redds and eliminating important spawning gravels, as well as impacting summer and winter rearing habitats, particularly winter range for young-of-the-year and juvenile fish. Elevated post-fire slope instability in landslide-prone land types could result in debris torrents or hillslope failures, which would cause major damage to aquatic habitats, stream channels, and riparian habitats. Accelerated erosion and sediment transport from roads to stream channels is also a threat to aquatic habitat. Treatments to improve road and trail drainage to withstand post-fire events will provide protection for aquatic habitat as well.

Native vegetation/Soil Productivity: Native vegetation communities and soil productivity are at risk from rapid expansion of noxious weeds from existing populations in the burned area. There are approximately 4,627 acres of known noxious weed sites within the Sheep Fire perimeter on Forest Services lands. The majority of the acres are Crupina and yellow star thistle on dry grassland types north of Slate Creek. Current inventories identified Spotted knapweed (Centaurea maculosa), Scotch thistle (Onopordum acanthium), Canadian thistle (Cirsium arvense), Crupina (Crupina vulgaris), Yellow starthistle (Centaurea solstitalis), Yellow and Dalmatian Toadflax (Linaria sp), Orange Hawkweed (Hieracium aurantiacum), and Rush skeletonweed (Chondrilla juncea).

The Weed Risk Assessment for the Sheep Fire on National Forest classified approximately 1020 acres (3%) as high risk for infestation, 12,090 acres (35%) as moderate risk, and 24,500 acres (62%) as low or no risk. Most of the previously identified weed-infested sites within the fire were either burned or occur adjacent to burned areas. TThese species are invasive weeds that can readily compete with native plants and dominate disturbed sites.

Heritage: After a review of the Nez Perce National Forest Heritage Resource Department files, it was determined that 38 previously documented cultural resource sites were located within the Sheep Fire perimeter and within area of potential effect on the NPNF. Three new cultural resource sites were located during post fire BAER inventory within the fire area perimeter. Adding these three resources into the total, there are now 41 cultural resource sites within the fire activity area. From site visits and reviewing the GIS fire severity burned area reflectance classification (BARC) map, 21 sites within the fire area were burned over while 16 sites were not burned. Fire severity at the 21 burned sites include: 17 in low/unburned, three in moderate, and one in high severity, generally involving grass, brush, and forested landscapes.

High severity burn in the East Fork of John Day Creek watershed.

B. Emergency Treatment Objectives:

Roughly one-third of the burned area was of moderate to high severity. However, much more the burned area is on steep hillslopes with highly erosive soils. Thus, even low burn severity slopes devoid of overstory canopy or ground cover are at heightened risk of severe erosion and greatly increased runoff. Furthermore, most of the burned area on NFS land is characterized as landslide prone. In this landscape, burn severity alone is an inadequate indicator of post-fire erosion and runoff risk.

Emergency treatment objectives are to protect roads, trails and culverts susceptible to damage from erosion and elevated runoff within and immediately downstream of the burned area, and to prevent the expansion of noxious weeds in areas burned in the fire, while providing for BAER implementation worker safety.

Drainage on roads and trails will be improved to allow for discharge of elevated runoff in a manner that protects both the travel surface and stream water quality and aquatic habitat. Undersized culverts identified on open roads will be upgraded to pass the post-fire 10-year (10% exceedance probability) event. Known populations of noxious weeds will be treated in the first growing season following the fire, allowing for a more robust native vegetation recovery.

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

Land 70**%** **Channel** N/A **Roads/Trails** 70% **Protection/Safety** 90%

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Heritage	na	na	na
Weed treatment	50	50	50
Channel	na	na	na
Roads/Trails	70	80	90
Protection/Safety*	90	90	80

E. Cost of No-Action (Including Loss): >$500,000

The potential cost of no action includes the failure of culverts/stream crossings on major roads in the burned area, severe erosion damage on several public roads needed for FS and public access, entrainment and deposition of road sediment in important fishery streams, and erosion damage and failure of trails. The cost of repairing roads, trails, and stream crossings would most likely exceed the cost of the selected alternative. The value of critical habitat for three separate ESA-listed fish species, as well as species of concern, cannot easily be quantified, but would likely far exceed the cost of sediment-mitigation measures proposed here. The value of protecting the ecological integrity and soil productivity of the burned area from noxious weed infestation likely exceeds the cost of weed treatment and monitoring, although this too was not quantified.

F. Cost of Selected Alternative (Including Loss): ~$214,000

In accordance with the revised Forest Service manual, the risk matrix below, Exhibit 2 of Interim Directive No.: 2520-2012-1, was used to evaluate the Risk Level for each value identified during the Sheep fire BAER assessment. Only treatments that had a risk of Intermediate or above are recommended for BAER authorized treatments.

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	RISK		
Very Likely	Very High **roads, trails**	Very High **weeds**	Low
Likely	Very High **fisheries**	High **heritage**	Low
Possible	High	Intermediate **soil productivity**	Low
Unlikely	Intermediate	Low	Very Low

G. Skills Represented on Burned-Area Survey Team:

[x] Hydrology [x] Soils [x] Range [x]Weeds
[ ] Forestry [ ] Wildlife [ ] Fire Mgmt. [x] Engineering
[ ] Contracting [ ] Ecology [ ] Botany [x] Archaeology
[x] GIS [ ] Air Quality [ ] Research [x] Fisheries
[x] Recreation

Team Leader: David Callery
Email: dcallery@fs.fed.us Phone: 406-495-3710 FAX: 406-449-5436

Team Leader Trainee: Cara Farr
Email: clfarr@fs.fed.us Phone: 208-983-4045 FAX: 208-983-4099

H. Treatment Narrative:

Land Treatments:
Areas infested with noxious weeds will be treated within the burn perimeter to reduce the probability of spread into uninfested burned areas. BAER funding is only available for the first year of the treatments (2013). In 2013, existing weed populations will be treated. If subsequent monitoring identifies weeds populations not effectively removed with initial treatment, additional treatment will be planned, and funds requested in an interim request. Many of the weeds are difficult to find the first year after a fires, so the acres of known populations within the burn perimeter will be covered twice in 2013 to ensure that all weeds are located and treated effectively. Other funding sources will be sought in out-years to treat any expansions of noxious weeds identified in subsequent monitoring. All of this work will be accomplished using ground-based equipment. Treatment will include the following:

- Mix of backpack spraying and hand-pulling, as appropriate, in spring/early summer 2013 before weeds begin to seed
- Using approved herbicides and application techniques based on weed species, topography and environmental factors, in compliance with NPNF Weeds EIS.

Hillslope treatments (e.g. mulching) were considered in order to protect critical fishery habitat in coordination with the BLM, which manages parts of the burn along these streams. Fisheries personnel from both agencies made an initial determination that such treatment may not be cost-effective. However, the BLM plans to further evaluate potential treatments in the John Day drainage.

At least one Heritage site is at risk of damage from looting due to increased ground visibility and erosion potential within the fire. The team will document the site as part of the BAER assessment prior to rescinding the closure order for this portion of the Sheep Fire.

Channel Treatments: No channel treatment prescribed at this time.

Roads and Trail Treatments:
Road treatments will be targeted at effectively draining anticipated increased runoff in the first several

years following the fire. Efforts will include clearing of clogged ditches and cross drain inlets and outlets, re-establishment of damaged/non-functional ditch, as well as replacement of burned drainage structures and cross drains. Armored dips or sags will be installed at most stream crossings in order to protect the road prism in the event of a flood event that overtops the road. Work will be done on open roads within the burned area that were judged to be at high risk of elevated post-fire runoff. Without proposed treatments, overland flow and erosion will likely damage the roads as well as transport sediment to streams, impacting aquatic habitat. In the steep terrain and granitic soils of the burned area, roads would likely be heavily eroded in the first year following the fire in their current condition.

One 18" stream culvert on road 9303 is undersized and is proposed for replacement with a 36" culvert sufficient to convey the post-fire design runoff event (10-year return interval—10% exceedance probability—precipitation event).

Trail work will treat the segments of the trail system within the burned area that are at high risk of damage from elevated post-fire runoff and erosion. Treatments will consist of replacement of burned drainage structures, installation of new drainage structures for additional drainage in anticipation of greater runoff and erosion, cleaning of existing intact drainage structures, and spot stabilization/outsloping of eroding trail segments, especially on steep slopes and near streams. Visitor warning signs will also be posted at trailheads.

Protection/Safety Treatments:
To provide for worker safety during implementation of trail drainage improvements, hazard trees along the trails mentioned above will be removed. Roads have generally been snagged as part of suppression efforts.

I. Monitoring Narrative:
(Describe the monitoring needs, what treatments will be monitored, how they will be monitored, and when monitoring will occur. A detailed monitoring plan must be submitted as a separate document to the Regional BAER coordinator.)

Monitoring of road and trail treatments will occur during and after implementation in 2012-13 to ensure that treatment objectives are met. Hillslope and road treatments will be monitored again after snowmelt and during the summer to evaluate effectiveness. In October 2012, one or more tipping-bucket rain gauges will be installed to monitor precipitation in the drainage. The precipitation data will provide useful information when compared to assessments of treatment effectiveness following subsequent precipitation and runoff events.

In 2013 all of the known areas of infestation will be re-surveyed by HNF Weeds staff. Any noxious weed populations not effectively treated during initial treatment efforts will be targeted for additional herbicide application.

Similarly, heritage sites mitigated in the initial BAER implementation will be monitored in 2013 to ensure effectiveness of treatments.

VI – Emergency Stabilization Treatments and Source of Funds

B. Channel Treatments											
Subtotal Channel Treat.				$0	$0			$0		$0	$0
C. Road and Trails											
Road armoring and drainage (details in Appendix A.)				***$118,152***							
Trail drainage structures	***each***	***115***	***20***	***$2,300***							
Trail drainage clean out	***each***	***30***	***65***	***$1,950***							
Trail repair drainage structures	***each***	***115***	***35***	***$4,025***							
Trail spot stabilization	***mile***	***120***	***21***	***$2,520***							
Trail tread outslope/drainage	***mile***	***1,300***	***4***	***$5,200***							
Culvert upgrade, road 9303	***each***	***22,500***	***1***	***$22,500***							
Subtotal Road & Trails				$156,647	$0			$0		$0	$0
D. Protection/Safety											
Hazard tree removal	***mile***	***800***	***21***	***$16,800***							
Trail warning signs	***each***	***460***	***14***	***$6,440***							
Subtotal Structures				$23,240	$0			$0		$0	$0
E. BAER Evaluation											
Assessment					$15,000			$0		$0	$0
Subtotal Evaluation					$15,000			$0		$0	$0
F. Monitoring											
				$0				$0		$0	$0
Trail treatment effectiveness	***day***	***250***	***5***	***$1,250***							
Road treatment effectiveness	***day***	***280***	***10***	***$2,800***							
Subtotal Monitoring				$4,050	$0			$0		$0	$0
G. Totals				$215,937	$15,000			**$0**		**$0**	**$0**
Previously approved											
Total for this request				**$215,937**							

PART VII - APPROVALS

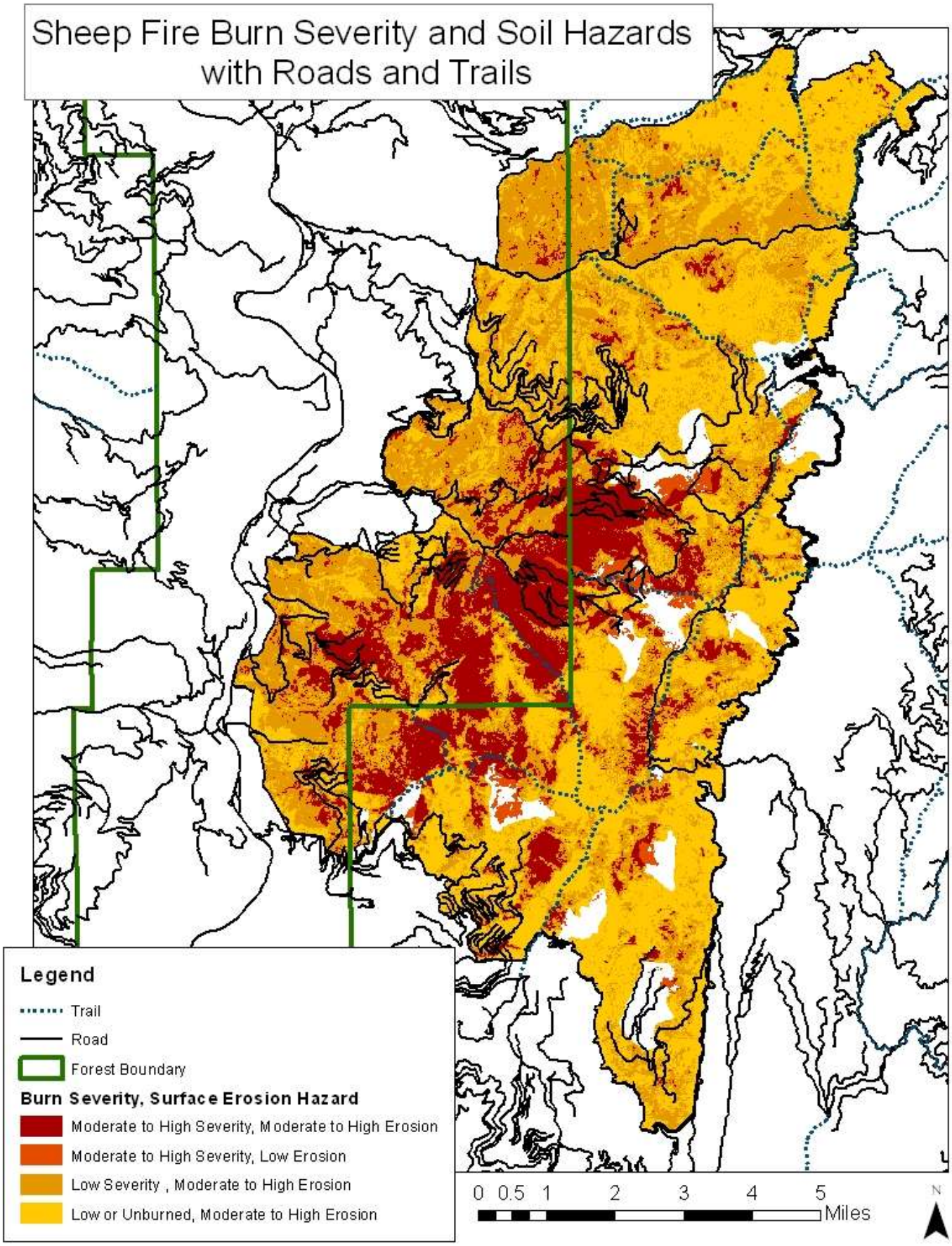
1. _____ 10/15/2012
Rick Brazell, Nez Perce-Clearwater NF Forest Supervisor Date

2. _____ 10/ /2012
Region 1 Regional Forester

Appendix A. Sheep Fire BAER Road Treatment Costs

Road Treatment	Unit	Quantity	Unit Price	Total
Mobilization	LS	1	$8,000.00	$8,000.00
Install drivable drain dip	EA	65	$250.00	$16,250.00
Aggregate surfacing (associated with new dip install)	LS	1	$10,000.00	$10,000.00
Install armored drivable drain dip	EA	35	$790.00	$27,650.00
Install open-top cross drain	EA	30	$1,000.00	$30,000.00
Clean grated open-top cross drain	EA	40	$190.00	$7,600.00
Replace grated open-top cross drain	EA	3	$1,000.00	$3,000.00
Clean culvert/catch basin	EA	30	$185.00	$5,550.00
Clean ditch, grade road surface	MI	13	$270.00	$3,510.00
Install new 18" CMP	LF	46	$51.00	$2,346.00
Reestablish ditch (to new culvert)	LF	200	$1.37	$274.00
Brush ditch/catch basins	MI	6.62	$600.00	$3,972.00
			TOTAL	**$118,152.00**

Appendix B.


Sheep Fire Burn Severity and Soil Hazards with Roads and Trails
Legend
Trail
Road
Forest Boundary
Burn Severity, Surface Erosion Hazard
Moderate to High Severity, Moderate to High Erosion
Moderate to High Severity, Low Erosion
Low Severity , Moderate to High Erosion
Low or Unburned, Moderate to High Erosion
0 0.5 1 2 3 4 5
Miles
N