Date of Report: 09/22/14

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: Slide Fire

B. Fire Number: ID-NCF-000838

C. State: ID

D. County: Idaho

E. Region: 01

F. Forest: Nez Perce-Clearwater

G. District: Moose Creek Ranger District

H. Fire Incident Job Code: P1J1XW

I. Date Fire Started: 08/13/2014

J. Date Fire Contained: estimated 30% as of 9/28

K. Suppression Cost: $8,000,000 (costs combined with Wash)

L. **Fire Suppression Damages Repaired with Suppression Funds**
1. Dozer Fireline repaired (miles): 3.9 as of 09/22/2015
2. Hand Fireline repaired (miles): .5 as of 09/22/2015

M. **Watershed Numbers** (as of 8/17/2014):

6th HUC	HUC Name	Acres Burned
170603020402	Glover Creek – Selway River	3562
170603020401	Gedney Creek	530
170603020405	Goddard Creek-Selway River	1065
170603020206	Pinchot Creek-Selway River	2014
170603020403	Rackliff Creek – Selway River	3153

N. **Total Acres Burned** (as of 09/17/2015): 10,325 acres
NFS: 10,280 acres **Private:** 20 acres **Other**: 25 acres

O. **Vegetation Types:** Habitat types consist of groups 5 and 6 from the Nez Perce-Clearwater National Forest Target Stand Groups. Group 5 habitat types (moderately cool and moist western red cedar) are characterized by mixed species stands of western red cedar, grand fir, and Douglas fir, with diverse shrub and forb understories. Cedar/Clintonia is the most frequently found habitat type within the group, while western white pine, larch and ponderosa pine are less frequently found. Group 6 habitat types (moderately cool and wet western red cedar) are characterized by stands of grand fir and western red cedar with diverse shrub and forb understories. Cedar/lady fern is the habitat type most frequently found in this group and is generally limited to riparian areas along streams and moist lower slopes in the western part of the subbasin.

P. **Dominant Soils:** Landtypes on the Slide Fire be characterized by four primary units. Landtypes 61E48, 61E38, 31D48, and 31C41. These map units all have soils formed on very steep dissected stream breaklands or dissected mountain slopes. Vegetation consists of moist mixed coniferous forest. The lower soil layers formed in material derived from granitic rocks

Q. **Geologic Types:** Geology across the Slide fire area is a mix of plutonic rock consisting essentially of quartz and intermediate plagioclase and metamorphosed siliciclastic sedimentary rocks. There are also some small areas of alluvium near the Selway River.

R. **Miles of Stream Channels by Order or Class**:

National Forest
1st order 18.1 miles, 2nd order 7.8 miles, 3rd order 3.6 miles, 6th order 0.5 miles

S. Transportation System

Trails: National Forest	16	miles	Other 0	miles
Roads: National Forest	6	miles	Other 0	miles

PART III - WATERSHED CONDITION

A. **Burn Severity** (acres): 6,410 (low) 1,241 (moderate) 1,815 (high)

B. **Water-Repellent Soil** (acres): (sum of moderate + high = 3,056)

C. **Soil Erosion Hazard Rating** (acres): 1.1 (low) 1,046 (moderate) 8,537 (high and very high)

D. **Erosion Potential:** 2.9 tons/acre in the areas with lower severity burns to 11.1 tons/acre in areas with higher burn severity

E. **Sediment Potential:** 1,773 yds^3/mi^2 to 7974 yds^3/mi^2 in the first two years

PART IV - HYDROLOGIC DESIGN FACTORS

A. **Estimated Vegetative Recovery Period**, (years): 1-3 grass, 5-10 shrubs, 10-50 conifers

B. **Design Chance of Success**, (percent): 90

C. **Equivalent Design Recurrence Interval**, (years): 25 year post-fire

D. **Design Storm Duration**, (hours): 6 hr and 1 hr

E. **Design Storm Magnitude**, (inches): 0.9 (6 hr), 0.7 (1hr)

F. **Design Flow**, (cubic feet / second/ square mile): variable by drainage area

G. **Estimated Reduction in Infiltration**, (percent): 0-80% depending on burn severity

H. **Adjusted Design Flow**, (cfs per square mile): variable by drainage area

PART V - SUMMARY OF ANALYSIS

The Slide fire on the Moose Creek Ranger Districts of the Nez Perce-Clearwater National Forest was ignited by lightning on August 10, 2015. At the time of BAER field assessment, the fire had burned roughly 10,325 acres, and will likely be fully contained only with the onset of winter conditions. The fire burned across portions of 5 sixth-hydrologic-unit-code (6th-HUC) watersheds, and covered primarily National Forest land as well as some private land.

A. Describe Critical Values/Resources and Threats (narrative):

Risks were assisgned based on Interim Directive No. 2520-2014-1. After examination of the fire area the BAER Team, in consultation with other specialists, identified the following values at risk:

Human Health and Safety: The Slide Fire consumed a wooden structure containing a single-seat toilet atop a 1,000 gallon concrete vault at the junction of Road 319 (Fog Mountain Road) and Road 223 (Selway Road), The vault remains, exposing a hole with two openings, which pose a threat to human health and safety. It is recommended that the vault be pumped and removed and exposed hole filled.

Risk Assessment: *Threats to human health and safety*
Probablity of Damage or Loss: *Likely – High potential of risk to public safety due to open toilet vault.*
Magnitude of Consequence: *Moderate– Risk to public safety*
Risk Level: *Very High*

Infrastructure: Due to fire effects, watersheds within the Slide Fire burn perimeter 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 erosion, entrainment and transport to stream channels. This combination of increased runoff and greater susceptibility to erosion threatens stream water quality as well as transportation infrastructure. Transportation infrastructure is a widespread value at risk of damage from post-fire erosion and elevated peak flows below the Slide Fire, including roads, trails and culverts.

Roads: There are 16 miles of roads within or immediately downslope of the burn perimeter. Forest Road 223 (Selway River road) provides access to private residences as well as Forest Service administrative sites and several heavily used FS campgrounds and trailheads. This road is the main access point to the 13 campgrounds, the Selway River boat take-out, and the Selway River trail (#4) within the Selway-Bitterroot Wilderness. Other trails accessed from the Selway Road are CCC (#734), Glover Creek (#704), East Boyd (#703), and Rackliff (#702) trails. Forest Road 319 (Fog Mountain road) provides access to the Big Fog Saddle Campground, the Big Fog Saddle Trail (#319) and the Gedney Creek trail (#708).

The BAER Team evaluated twelve road-stream crossings on open roads both within and immediately downslope from the burn perimeter with drainages that were affected by the fire. Most of these crossing structures have been replaced in recent years with large-capacity structures or are planned for upgrades during Fall 2015. These structures were determined to have sufficient capacity to accommodate anticipated elevated post-fire flows at the design magnitude.

Although the capacity of the major stream crossings was determined to be adequate in the post-fire environment (or will be following fall 2015 upgrades), most culverts at small, mostly ephemeral drainages, were judged to be at increased risk of clogging from debris/sediment slides. These culverts typically serve a dual purpose of passing episodic flow from the drainage and ditch storm flow from the road. Burned hillslopes will likely result in higher runoff to the road and to the small drainages. These steep drainages are also more susceptible to small debris torrents or slides. This type of occurrence often plugs the culvert inlet, resulting in flow across the road surface or down the ditch, eroding the road and delivering

considerable volumes of sediment to the stream below (in this case, the Selway River). These pipes are not set deeply, and are usually at the base of an over-steepened drainage bottom. Thus, a larger culvert is generally not feasible or effective in the post-fire setting. Vertical drop-structures installed at the inlet are effective at protecting the inlet from being plugged by small debris slides and thus increasing the probability that the culvert will function during runoff events. An armored rolling dip installed in the road in the downslope direction from the culvert inlet reduces the likelihood of runoff damaging a large segment of road in the event of a clogged culvert inlet. Furthermore, inadequate road drainage to accommodate anticipated increases in post-fire overland flow may also lead to erosion of the roadbed and subsequent damage to road segments below burned hillslopes.

The Fenn administrative site may be at increased risk from debris-laden flood flow in one or both of the drainages above the site. Culverts below the Selway River road for these two drainages (Fenn Creek and an unnamed stream) were not judged to be at risk because any debris torrent would be likely to drop most debris/rock along the length of the land with low-gradient, high channel/floodplain roughness between the toe of the slope and the road. The probability of the event that would exceed the capacity of the channel around this site was roughly estimated to have a 10% likelihood of occurance in the first year following fire.

Risk Assessment: *Threats to Forest Service roads and infrastructure*
Probablity of Damage or Loss: *Likely – High potential of failure of road drainage due to post-fire flows.*
Magnitude of Consequence: *Major – Risk to public safety, employee/contractor safety*
Risk Level: *Very High*

Trails/Recreation: BAER Team assessments indiciate seven Forest Service system trails have been impacted by the Slide Fire on the Moose Creek Ranger District. These include both motorized and non-motorized access trails, as well as designated Wilderness and non-Wilderness trails. Trail use ranges from light to heavy, and typically occurs between May and mid to late November. Trail users include outfitters, hikers, stock users, ATV and motorcycle riders, hunters, and fishermen. The Forest Service trail system also provides a crucial infrastructure to other agency programs (firefighting, botany, archeology, etc.), and Idaho County Search and Rescue. The area is normally heavily timbered and vegetated, and ranges from creek bottoms to ridge tops, with 40-70% slopes in between. Soils and trail tread is derived primarily from granitic parent material. These soils normally have a high erosion potential, however the erosion potential becomes severe when coupled with the effects of wildland fire. Pre-fire trail conditions within the Slide Fire perimeter ranged from fair to excellent, with annual maintenance occurring on all trails, and recent significant improvements on some. The following is a listing of the affected trails:

Trail	Burn Severity		Total Miles
	High	Moderate	
CCC TRAIL	0.5	0.9	1.4
EAST BOYD	0.5	0.3	0.8
GEDNEY-GLOVER	0.8	0.4	1.2
GLOVER TRAIL	1.3	0.2	1.5
RACKCLIFF	0.8	0.2	0.9
WEST BOYD	0.1	0.1	0.2
WEST GLOVER	0.5	0.3	0.8
Grand Total	**4.5**	**2.4**	**6.8**

Assessments of trails in burned areas revealed dry, burn exposed granitic soil on cut and fill slopes. Trails surveyed in moderate and high severity burn areas show extreme blowdown of burned trees. Holes are very likely to occur above the trail due to rootwads from fallen trees on cutslopes and below the trail due to burned out roots and stumps. Surveys revealed burned stump holes in fillslopes and under trail tread with loss of trail tread from soil sloughing. Many of the trails are already being covered with sediment from above and/or the trail tread is slipping from below (Figure 2). Continued precipitation will lead to increased trail tread loss due to water running down the trail,and the formation of rills and

gullies in low spots or burned trails due to water runoff on trails.

Risk Assessment: *Threats to Forest Service trails and associated structure.*
Probablity of Damage or Loss: *Likely – High potential of trail drainage failure due to post-fire flows.*
Magnitude of Consequence: *Moderate – Risk to public safety due to loss infastructure, Major - loss of FS infastructure*
Risk Level: *Very High*

Water quality: The streams in the burned area generally maintain good water quality. Erosion from steep burned hillslopes will 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. Despite this threat, the ability to mitigate these post fire effects to water quality is limited and thus no standalone treatments are proposed to mitigate potential post-fire impacts on the hillslopes. However, measurable effectiveness is possible by concentrating efforts to lower water quality impairments from post fire runoff from road and trail drainage.

Risk Assessment: *Threats to water quality.*
Probablity of Damage or Loss: *Likely – High potential sediment impacting water quality due to post-fire erosion and increased flows.*
Magnitude of Consequence: *Moderate – damage to critical natural or cultural resources resulting in considerable or long term effects*
Risk Level: *High*

Fisheries: The Selway River and its tributaties within the Slide Fire perimeter supports important critical habitat for threatened (summer steelhead, Chinook salmon, bull trout), sensitive (westslope cutthroat trout), and resident fish species (Pacific lamprey, rainbow trout, mountain whitefish, as well as dace, sculpin and suckers). Steelhead and bull trout designated Critical Habitat and salmon Essential Fish Habitat are located within the Slide fire.

Given the majority of the Slide Fire burned at low severity and with few acres of RHCA's that burned with moderate to high burn intensity, potential post-fire effects to many of the fish bearing tributaries to the Selway will be fairly isolated. However, post fire effects in these locations will include elevated peak flows and isolated channel scour along with surface erosion on burned hillslopes that deliver sediment, and debris flows. Downstream sediment delivery to the Selway River can be expected during these peak flow. These post-fire effects would have both short and long term impacts to fish habitat including detriment to egg production. Given existing habitat accessibility, depressed fish recruitment long-term in the mainstem Selway is not a primary concern.

Road treatments alone would not be effective at reducing the post-fire risk to critical fisheries values. However, road treatments were developed to protect other critical values and will have secondary, long-term benefits to the lower Selway watershed and to ESA-listed fish. Specific road treatments are highlighted in the BAER Engineering report and primarily include road improvements to the Selway River road 223.

Risk Assessment: *Threat to TES fisheries habitat.*
Probablity of Damage or Loss: *Likely – probability of increased fine sediment or post fire debris flows reaching fish bearing streams and adversely affecting habitat or directly impacting native fish*
Magnitude of Consequence: *Moderate – damage to critical fisheries resources resulting in considerable or long term effects*
Risk Level: *High*

Native vegetation: Inventories have found 4 noxious weed species (Spotted knapweed, Canada thistle, Yellow hawkweed, and Scotch thistle) within the Slide fire perimeter. Currently, the Moose Creek Ranger District conducts integrated weed management strategies that deal with weed infestations within the fire areas based on priorities outlined in the Annual Operating Plan for the Clearwater Basin Weed

Management Area, a community based cooperative (CBWMA). Idaho's noxious weeds are plant species that have been designated "Noxious" by law in the Idaho Code (title 22, chapter 24, "Noxious Weeds").

Susceptible habitats within the fire contain known infestations of Spotted knapweed, Scotch thistle, and Canada thistle. Small spot infestations of these noxious weeds, are scattered along forest roads 223 & 319 which run through the fire perimeter. Other discrete or small populations were identified within campgrounds and trailheads along the Selway River.

Fire intensities were generally Low to Moderate, with High intensity burns occurring in pockets on steep slopes and areas of diseased/dead trees. Most grasses and shrubs in or near infested sites should regenerate because roots and crowns remained intact. However, highly susceptible habitats, existing infestations and exposed mineral soils along roads, trails, and campgrounds greatly increase the risk of invasive weed spread as a result of fire disturbance. The risk of weed expansion has dramatically increased within the Slide fire due to the interaction of the weed expansion factors and poses a serious threat to ecosystem health.

Risk Assessment: *Threats to native plant communities due to the establishment or spread of noxious weeds.*
Probability of Damage or Loss: *Very Likely - Based on moderate and high burn severity and proximity to known weed infestations.*
Magnitude of Consequence: *Major – Loss of native plant communities and spread of noxious weeds.*
Risk Level: *Very High*

Soil Productivity: The Slide burn area consists primarily of a 6-10 inch volcanic ash mantle over soils derived from metasedimentary geology. Its a mix of plutonic rock consisting essentially of quartz and intermediate plagioclase and metamorphosed siliciclastic sedimentary rocks. There are also some small areas of alluvium near the Selway River. The following map shows the burn severity. We evaluated soil erosion hazard as part of assessing post fire impacts to soil resources. The Natural Resource Conservation Service's published soil data shows that the majority (89%) of the Slide Fire burned in areas with soils classified as having severe or very severe erosion hazards (NRCS 2009). While there is a high risk to soil productivity, no standalone treatments are proposed to mitigate potential post-fire impacts due to lack of a cost effective treatment option.

Risk Assessment: *Threat to Soil Productivity*
Probablity of Damage or Loss: *Likely – Increased erosion and loss of ash mantle*
Magnitude of Consequence: *Moderate – Loss of long-term soil productivity with high probability of immediate detrimental soil displacement*
Risk Level: *High*

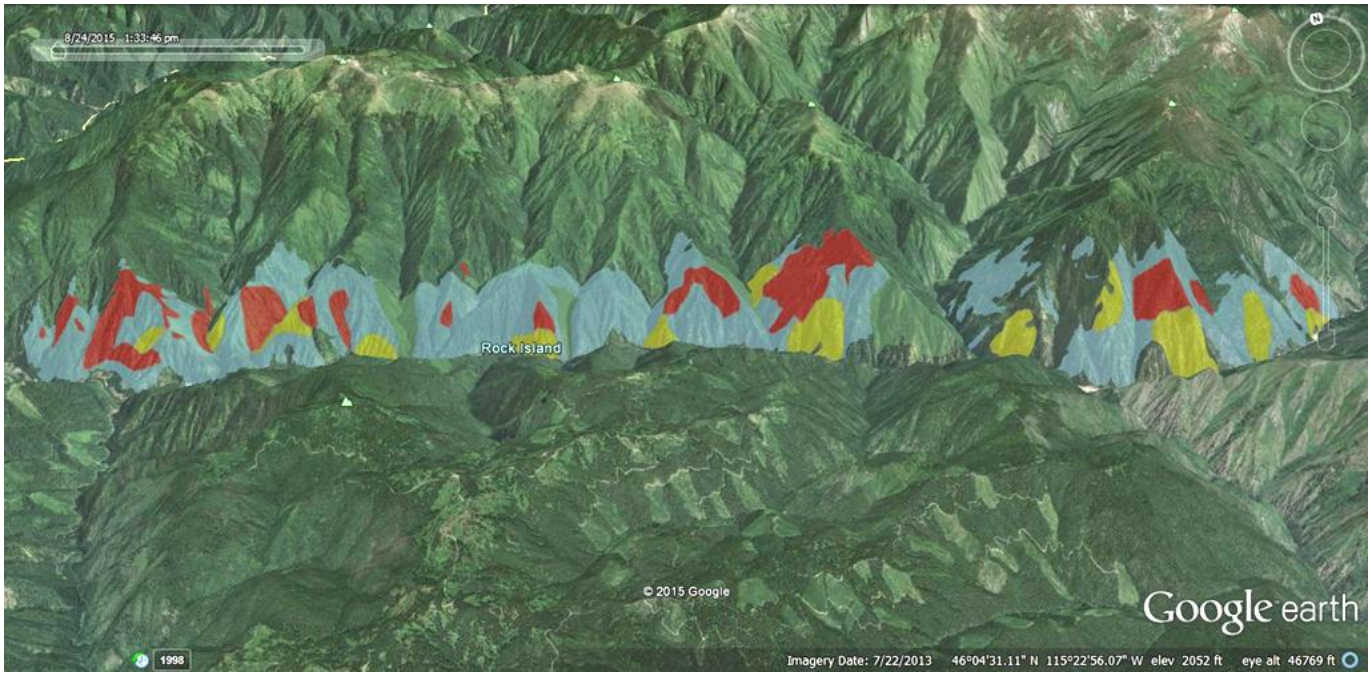

Figure 1: Google Earth Image of the fire area with the burn severity ratings shown

Heritage: After a review of the Nez Perce-Clearwater National Forest Heritage Resource Department files, it was determined that 18 previously recorded cultural resource sites eligible for, or potentially eligible for, the National Register of Historic Places are located within the APE of the Slide Fire and are classified as critical values. These site types range from flammable historic buildings and bridges to resources with moderate susceptibility to post-fire related damage as prehistoric lithic scatters. No fire supression impacts were observed at the sites within the fire area. Six sites were affected by the fire (two Lithic scatters, one guard station and three trails) but their integrity remains. Two of the trails (Remount and Glover Ridge) have an intermediate potential of being negatively impacted due to post-fire erosion, runoff and tree loss. No treatments are proposed to mitigate potential post-fire impacts due to intermediate risk level.

Risk Assessment: *Threat to heritage resources*
Probablity of Damage or Loss: *Possible – intermediate (10-49%) probability of damage or loss*
Magnitude of Consequence: *Moderate – damage to critical cultural resources resulting in considerable or long term effects*
Risk Level: *Internediate*

B. Emergency Treatment Objectives:
The emergency treatment objectives are to prevent exposure to human waste with the open vault toilet, prevent the expansion of noxious weeds in areas burned by the Slide Fire, and improve transportation infrastructure in order to accommodate the anticipated increased flows resulting from post-fire watershed response and greatly reduce the likelihood of road failure in the post-fire environment.

In accordance with the revised Forest Service manual, the risk matrix below, Exhibit 2 of Interim Directive No.: 2520-2014-1 was used to evaluate the Risk Level for each value identified during the Slide Fire BAER assessment. Only treatments directly addressing FS Values at Risk with a rating of High or above are being requested for BAER authorized treatments.

Probability of Damage or Loss	**Magnitude of Consequences**		
	Major	Moderate	Minor
	RISK		
Very Likely	**Very High - Native Veg**	**Very High**	**Low**
Likely	**Very High – Roads/Trails**	**High - Health and Safety**	**Low**
Possible	**High**	**Intermediate**	**Low**
Unlikely	**Intermediate**	**Low**	**Very Low**

Native Vegetation: Weed treatments will concentrate on the areas of known weed infestations in an attempt to counter fire-induced weed spread. Immediate weed treatment is needed to prevent known weed infestations from quickly flourishing after the fire and creating large sources of new weed seeds. These areas have high public use, which could exacerbate the spread of the existing populations.

Transportation Infrastructure (Roads/Trails): Mitigate effects of changed post-fire watershed response (runoff, erosion, and deposition) by adding road and trail drainage features in the vicinity of the fire-affected drainages.

Human Health and Safety: Mitgiate the effects of exposure to open toilet vault for human health and safety protection.

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**
Land	70%	*	*
Channel	NA	NA	NA
Roads/Trails	90%	90%	90%
Protection/Safety	90%	90%	90%

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 cost of no action would likely be substantially greater than the cost of proposed BAER treatments in road repair expenses alone, whereas the cost to public and personnel safety is more difficult to quantify.

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): ~ $153,557

Treatments	Costs
Land Treatments (Native Vegatation) **= $22,700.00**	Treatment costs = $300/acre x 73 acres = $21,900.00 Average treatment cost (including prep and pre-treatment flaggng of sites = $250.00/acre Average chemical/PPE cost = $50.00/acre Implementation Monitoring = $800.00 Two days @ $400.00/day
Transportation Infastructure **= $124,107.00**	Road drainage improvements = $54,325.00 Hazard tree removal = $1,600.00 Storm patrol (roads) = $2,800.00 Trail drainage improvements = $32,515.00 Hazard tree removal = $5,440.00 Effectiveness monitoring = $14,000.00
Roads **= $58,725.00**	
Trails **= $65,382.00**	
Protection/Safety **=$6,750.00**	Warning signs = $5,250.00 Secure vault toilet = $1,500.00

G. Skills Represented on Burned-Area Survey Team:

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

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John Warofka - Noxious Weeds
Katie Howisey - Noxious Weeds (t)
John Hutchison - GIS
Allison Johnson - Fisheries

H. Treatment Narrative:

Land Treatments:
Noxious weed control with herbicides is recommended for current and new invader infestations within the Slide Fire. Herbicide applications will follow the requirements and mitigation outlined under the latest NEPA and Biological Assessment for listed fish species. A weed management strategy within the Clearwater River Basin Weed Management Area, in interagency cooperative, is currently in place.

Inventory of roads, dozer and hand lines, drop points, camps, and any susceptible sites for both current and new invader weed populations, and monitoring of weed control methods should be initiated to determine *potential for weed spread and effectiveness of treatments.*

- *Treat satellite infestations of spotted knapweed along Forest Roads 223 & 319 within the burned area. The knapweed population along the road system is contributing a seed source and the road system is acting as a spread corridor for further expansion into the burned areas.*
- *Treat small infestations of spotted knapweed at trailheads and campgrounds within the burn.*
- *Treat Scotch thistle at Race Creek Campground which is the main trailhead to Selway River Trail #4.*
- *Monitor weed populations within and adjacent to the fire to determine if the combination of fire disturbance and susceptible habitat facilitates weed spread or increases weed densities, along with post treatment effective monitoring.*

Treatment Area	Acres	Season	Total Treatment (acres X # of treatments)
Spot treat spotted knapweed along Forest Service Roads 223 & 319 within the burn.	25 acres	Summer	25 acres
Spot treat spotted knapweed at campgrounds, trailheads, and Selway Falls Guard Station & corral along the Selway River.	22 acres	Spring and Fall	44 acres
Spot treat scotch thistle at Race Creek Campground & T.H.	2 acres	Spring and Fall	4 acres
Total	**acres**		**73 acres**

Channel Treatments: No channel treatment prescribed at this time.

Transportation Infrastructure Treatments:

Road Treatments:
Primary roads affected include the Selway River Road (FS223) and the Fog Mountain Road (FS319). 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 ditches, as well as replacement of burned drainage structures and cross drains. Armored rolling dips will be installed immediately downslope of most stream crossings in order to protect the road prism in the event of a flood event that overtops the road. Aggregate surfacing will be applied to sections of road 223 that are currently native surface. 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 water quality and aquatic habitat. District personnel should plan to be available for "storm patrol" of area roads during larger runoff events, and be prepared to unclog the inlets of culverts and other emergency road drainage work.

- **Culverts:** A hydrologic analysis was completed to determine areas of potentially increased flows from burned areas. After areas of concern were determined, an extensive analysis was completed on each of the main culverts on their respective roads. One culvert is recommended for upsizing on road 319 and 15 ditch relief culverts need replacement on road 223 due to fire damage.

- **Rolling Dips / Water Bars:** Rolling dips / Water bars are recommended to be constructed to effectively drain the effected road prisms. This temporary drainage structure will help to maintain the transportation system within the burn perimeter during increased flows.

Trail Treatments:
Trail work will treat portions of the trail systems which are at high risk to damage from additional runoff and erosion caused by post-fire conditions. Threats are from increased surface flow and upland slope erosion that will occur within the fire area. Treatments will consist of cleaning of drainage structures, replacement and installation of new drainage structures, replacement of burnt turnpikes, filling of burnt stump and root holes in and under tread surface, crib walls for stabilization of tread, and posting visitor warning signs at access points.

Hazard Tree Removal:
Selective hazard tree removal is recommended for health and safety of workers during BAER treatment implementation within the burn area. The hazard tree removal will occur at the treatment locations along road and trail prisms. This will only address immediate safety needs of BAER personnel. Additional hazard tree removal will be needed for long-term safety.

Protection/Safety Treatments
Warning signs will be posted along roads and at trailheads about entering burned area and associated hazards.

Pump human waste from the Fog Mountain toilet vault at the junction of road 319 and road 223 to address the hazard posed by the concrete vault and the potential for animals or humans falling into it.

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.)

Storm Inspection and Response:
Since increased runoff from burned slopes is not entirely predictable, continued storm monitoring along roads and trails within the burn perimeter has been prescribed. This will ensure that problems with the transportation system due to increased runoff are determined early, and solutions can be formed before a failure occurs.

Weed Treatment Effectiveness Monitoring:
In 2016 all of the known areas of infestation will be re-surveyed by NP-CNF Weeds staff. Any noxious weed populations not effectively treated during initial treatment efforts will be targeted for additional herbicide application.

Trail Treatment Effectiveness Monitoring:
See attached Level 3 RMRS trail monitoring proposal.

VI – Emergency Stabilization Treatments and Source of Funds

			NFS Lands		
Line Items	Units	Unit Cost	# of Units	BAER $	Other $
A. Land Treatments					
Weed treatment & assessment	*acre*	*300*	*73*	*$21,900*	
Subtotal Land Treatments				$21,900	$0
B. Channel Treatments					
Subtotal Channel Treat.				$0	$0
C. Road and Trails					
Install rolling dip	*each*	*200*	*1*	*$200*	
Replace drop inlet lids	*each*	*250*	*12*	*$3,000*	
Install drop inlets w/lids	*each*	*625*	*21*	*$13,125*	
Install new 18" CMP	*each*	*2,000*	*16*	*$32,000*	
Clean ditch,	*mile*	*500*	*12*	*$6,000*	
Spot hazard tree removal	*mile*	*800*	*2*	*$1,600*	
Road Storm Patrol	*day*	*280*	*10*	*$2,800*	
Trails					
Outsloping (Mod Severity)	*mile*	*600*	*2.4*	*$1,440*	
Clean Trail Drain Structures	*each*	*20*	*156*	*$3,120*	
Replace Drain Structures	*each*	*85*	*142*	*$12,070*	
Install Drainage Structures	*each*	*85*	*105*	*$8,925*	
Outsloping (High Severity)	*mile*	*1,300*	*4.5*	*$5,850*	
Replace Damaged Culverts	*each*	*370*	*3*	*$1,110*	
Spot hazard tree removal	*mile*	*800*	*6.8*	*$5,440*	
Subtotal Road & Trails				$96,680	$0
D. Protection/Safety					
Warning Signs	*each*	*150*	*35*	*$5,250*	
Burned Toilet Vault Cleanup	*each*	*1,500*	*1*	*$1,500*	
Subtotal Structures				$6,750	$0
E. BAER Evaluation					
Assessment					$12,894
Subtotal Evaluation					$12,894
F. Monitoring					
Weed treatment effectiveness	*day*	*400*	*2*	*$800*	
Level 3 Trail Treatment Effectiven	*day*	*27,427*	*1*	*$27,427*	
Subtotal Monitoring				$28,227	$0
G. Totals				$153,557	$12,894
Previously approved					
Total for this request				**$153,557**	

PART VII - APPROVALS

1. */s/ Cheryl F. Probert* 10/2/2015
Cheryl Probert, Nez Perce-Clearwater NF Forest Supervisor Date

2. /2015
Region 1 Regional Forester Date

Proposal
Post-fire Trail Stabilization Effectiveness Monitoring
2015 Slide and Wash Fires

Justification: Accelerated rates of erosion and runoff following wildfire, if left unmitigated, may cause irreparable damage and/or costly repairs to trail systems within burned areas. Trails are designed to be sustainable requiring low maintenance over time. Surface water control is critical to the long-term sustainability of trails. Overland sheet flow is often drained from trail tread using built-in grade reversals, knicks, rolling grade dips, wood and rock waterbars. In the absence of drainage controls, sheet flow concentrates along uninterrupted flow paths into rills that scour the tread into uneven gullied surfaces and contributes to perennial stream sediment.

Structural features draining water from tread, designed for and constructed in unburned forests, may be unable to accommodate elevated runoff and sediment that occur following a wildfire. In addition, partial or complete combustion of current stabilizing features (i.e. wooden waterbars) reduces the ability to break trail tread into sections and effectively direct post-fire runoff. Rebuilding waterbars, shortening the spacing of structural features and providing drainage at switchbacks before large post-fire storm events may prevent costlier repairs to an unstable tread.

Reconnaissance review was conducted on 24 September 2015 with Heather Berg, Wilderness Coordinator; Rebecca Lloyd, Soil Scientist; Cory B., Trails Specialist; Jim Gries, BAER Soil Scientist; Bob Brown, Hydrologist and Pete Robichaud, RMRS. We viewed two trail segments in high severity burned areas in the Side and Wash Fires. The trail is a well maintained single track, multi-use tread in a highly erodible soil type. Numerous water bars were burned completely with intermittent stream water crossings being unstable and will likely fail with high severity burned hillslopes above. These slopes can contribute ample runoff and sediment to the trail tread.

Objectives: The goal of effectiveness monitoring of post-fire trail stabilization efforts will quantify: 1) tread surface water damage with and without proper water bar replacement, repair and spacing and 2) effectiveness of hardening structure to prevent trail collapse at intermittent stream water crossings and swicthbacks.

Methods: This study will use the sediment fence monitoring methods to determine the effectiveness of trail stabilization treatments by comparison with untreated section of trail with treated sections (replace, repair and add water bars) for tread surface erosion rates. The basic design is to install 5-6 trail sediment fence plots (~200-400 ft^2, Robichaud and Brown 2002) in each treated and comparable untreated section of trail.

Hardening structure (logs or rocks) of intermittent stream water crossings will be monitoring with detailed survey, photo points and possible tripod-mounted Lidar to determine effectiveness of structure in preventing scour and failure of trail tread with and without treatment. Detailed GIS mapping of trail location, contributing area, and the frequency of trail use will also occur. Rainfall, ground cover, contributing area and soil characteristics will be also measured. Monitoring would continue for three years after the fire.

Outcome and Products: This monitoring will improve our understanding of effectiveness of common trail stabilization treatments. Our results will evaluate the ability of treatments to reduce runoff and erosion compared to untreated sections of trails as well as the efficacy of hardening structures on trail tread stabilization.

Monitoring Budget

Salary (installation and monitoring year 1, Fiscal Year 2016, fall 2015 and summer 2016)		
Hydrologist GS-9	*21 person-days @ $253/day*	$5,313
Field technicians field visits GS-5	*30 person-days @ $151/day*	$4,530
Data entry, analysis, writing GS-5	*16 person-days @ $151/day*	$2,416
Laboratory technician GS-4	*21 person-days @ $126/day*	$2,646
Supplies		
Rain gauges, silt fence fabric, stakes, fabric staples, 3d imaging.		$2,100
Travel		
GSA PU truck vehicle charges	*6 trips x $220 trip*	$1,320
Per diem and housing (installation)	*2 trip x 5 days x 5 people @ $123/day*	$6,150
Per diem and housing (monitoring)	*4 trips x 3 days x 2 people @ $123/day*	$2,952
Total Monitoring Cost (year 1)		**$27,427**
Monitoring Years 2 and 3 (each year, Fiscal Years 2017, 2018)		
Salary		
Hydrologist GS-9	*14 person-days @ $253/day*	$3,542
Field technician site visits GS-5	*25 person-days @ $151/day*	$3,775
Data entry, analysis, writing GS-5	*20 person-days @ $151/day*	$3,020
Laboratory technician GS-4	*18 person-days @ $126/day*	$2,268
Supplies		
Repairs silt fence fabric, misc.		$1,000
Travel		
GSA PU truck vehicle charges	*4 trips x $220 trip*	$880
Per diem and housing (monitoring)	*4 trips x 3 days x 2 people @ $123/day*	$2,952
Annual Monitoring Cost (year 2 and 3 each)		**$17,437**

Close collaboration will be needed with Forest personnel and monitoring crews to be successful. Some coordinated efforts for flagging treated and untreated sections of trails, monitoring trail use, etc. will be necessary.

Contact Information:

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