

Date of Report: 11/2/2012**BURNED-AREA REPORT**
(Reference FSH 2509.13)**PART I - TYPE OF REQUEST****A. Type of Report**

- ☒ 1. Funding request for estimated emergency stabilization funds
☐ 2. Accomplishment Report
☐ 3. No Treatment Recommendation

B. Type of Action

- ☒ 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:** Powell SBW Complex**B. Fire Number:** ID-CWF-000545**C. State:** Idaho**D. County:** Idaho**E. Region:** R1**F. Forest:** Clearwater**G. District:** Powell**H. Fire Incident Job Code:** P1G69S 0105**I. Date Fire Started:** 7/20/2012**J. Date Fire Contained:** Not contained as of 10/29/12**K. Suppression Cost:** \$5,023,686**L. Fire Suppression Damages Repaired with Suppression Funds**

1. Machine Fireline rehabilitated (miles): 5.5 miles
2. Machine Fireline waterbarred (miles): 0.14 miles
3. Other (identify): no seeding, native veg used for rehab

M. Watershed Number: (HUC6) total watershed area (area burned):

Fires	Watershed #	Watershed Acres	Acres of high severity	Acres of mod severity	Acres of low severity	Total Acres burned	% burned	% mod to high burn
Fern/Maud	170603030203	24754	0	6	1677	1683	7%	0%
	170603030205	16658	29	185	2573	2787	17%	1%
	170603030206	10810	372	606	8557	9535	88%	9%
	170603030207	32704	0	1090	8346	9436	29%	3%
	170603030208	21071	113	0	2359	2472	12%	1%
	Total		514	1887	23512	25913		
Freezeout-Queen, Pedro, Coop, Eagle-Robin	170603020106	19120	112	221	100	433	2%	2%
	170603030304	20737	0	140	1243	1383	7%	1%
	170603030401	13788	0	0	56	56	0%	0%
	170603030402	12561	0	72	379	451	4%	1%
	170603030403	19451	441	275	9024	9740	50%	4%
	170603030502	33315	0	2471	5182	7653	23%	7%
	170603030503	33221	2	123	3278	3403	10%	0%
	Total		555	3302	19262	23119		
Cedar, Bell Point	170603020101	21612	0	0	309	309	1%	0%
	170603020102	22456	0	124	7283	7407	33%	1%
	170603020103	16327	0	0	1171	1171	7%	0%
	170603020104	30768	0	0	880	880	3%	0%
	170603020110	29518	0	0	177	177	1%	0%
	170603030201	17368	0	127	3972	4099	24%	1%
	170603030202	10517	0	0	182	182	2%	0%
	170603030204	24497	0	149	4528	4677	19%	1%
	Total		0	400	18502	18902		
Powell SBW Complex			1069	5589	61276	67934		

N. Total Acres Burned:

[67934] NFS Acres [] Other Federal [] State [] Private

O. Vegetation Types: Lodgepole pine/beargrass, lodgepole pine/grouse whortleberry, sublpine fir/beargrass, subalpine fir/ grouse whortleberry, Douglas-fir/ninebark, Subalpine fir/ fools huckleberry, western redcedar and grand fir in lower, moister climates. Whitebark pine occurs at high elevations.

P. Dominant Soils: Silt loam Mazama volcanic ash ranging in thickness from absent to 10-12" overlying loamy sands to sandy loams derived from Idaho Batholith granitics. Rock outcrops common as are glacially influenced soils, including outwash plains, glacial troughs, compacted tills, etc.

Q. Geologic Types: Primarily granitics of the Idaho Batholith

R. Miles of Stream Channels by Order or Class: **Order 1:** 88.91 mi, **Order 2:** 30.53 mi, **Order 3:** 5.76 mi, **Order 4:** 15.87 mi, **Order 5:** 7.2 mi, **Order 6:** 0.58 mi
Class: **Non-fish-bearing:** 162 mi, **Fish-bearing:** 60 mi

S. Transportation System

Trails: 234.6 miles **Roads:** 8.5 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): unburned to low severity: 61,276 (90%), moderate: 5589 (8%) high: 1069 (2%)

B. Water-Repellent Soil (acres): 3397 (5%) (based on Bridge Fire, 2007)

C. Soil Erosion Hazard Rating (estimated acres): low: 55540 (82%), moderate 2529 acres (4%), high: 7010 (10%)

D. Erosion Potential¹: low: 3 tons/acre average, moderate 7 tons/acre average, high: 38 tons/acre average

E. Sediment Potential²: Overall 14.1 tons/acre (Based on Bridge Fire, 2007)

For specific sites:

Sub-Watershed (or specific values at risk to match peak flow modeling)	Watershed Acreage (sq.mi.)	Watershed with High and Moderate Soil Burn Severity ³ (sq.mi.)	Pre-Fire Background Sediment (tons/acre)	Post-Fire Yield ⁴ (tons/acre)
Alkire Creek/359 crossing	0.72	0.25	1.0	36
Storm Creek above Maud Creek	31.1	1.67	4.0	9.5
Horse Heaven Meadows/ Diablo Springs trail	3.1	0.75	0.02	14.4
Freezeout Creek	5.2	0.84	1	22

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (yrs): 2-4 grass/shrubs; 20-50 conifers

¹ ERMiT Erosion Model Outputs for the First Year Following the Fire (probability of sediment delivery rates exceeded = 10%)

² Results derived from ERMiT. Modeled high intensity fire, sandy loam soil, 30% rock, 40% slope, and Fenn RS modified climate. This is a worse case analysis.

³ Soil Burn Severity as described by the Burned Area Reflectance Classification Map

⁴ Based on Rock:Clime, ERMiT Erosion Risk Management Tool. Post-fire erosion is modeled as the amount of erosion produced by a 10-year storm event occurring within the first year following the fire. Background erosion is considered the amount of erosion produced by a 10-year storm event with full vegetation (Disturbed WEPP). Moderate and high burn severities are combined and modeled as high. Unburned and low burn severities are combined and modeled as low.

B. Design Chance of Success, (percent):	75%
C. Equivalent Design Recurrence Interval, (years):	10 years
D. Design Storm Duration, (hours):	0.25 hours
E. Design Storm Magnitude, (inches):	0.53 inches
F. Design Flow, (cubic feet / second/ square mile):	35-45 cfs/mi ²
G. Estimated Reduction in Infiltration, (percent):	25 %
H. Adjusted Design Flow, (cfs per square mile) ⁵:	110 cfs/m

PART V - SUMMARY OF ANALYSIS

- A. Describe Critical Values/Resources and Threats:** The primary values at risk resulting from the Powell SBW Fires are transportation infrastructure (predominately trails, and some roads and culverts), water quality, native fisheries for ESA-listed and sensitive species, native vegetation communities, and heritage sites.

Infrastructure: Due to fire effects, modest rain events are likely to cause extensive erosion and some 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.

Most of the fire burned within the Selway-Bitterroot Wilderness and adjacent roadless areas. Treatments proposed for wilderness must address imminent threats to downstream or downslope human life and property, or unacceptable degradation of critical natural or cultural resources. In the Powell SBW complex, 234.6 miles of trail were within or near the fire perimeter. Only 10.25 miles of the 234.6 miles were impacted by moderate to high fire burn severity. Another 54.9 miles of trail are in the low severity burn areas. It was determined that the damage to trails in the low severity burn did not constitute an emergency situation. Alternate funds will be sought for rehabilitation of these trails. Threats to the trail system were created by the moderate to high severity burn and treatments are needed to prevent significant soil runoff into wilderness streams as well as wildlife and fisheries habitat. Selected hazardous tree removal is also proposed along trails for the safety of BAER personnel implementing trail erosion control measures.

⁵ Use 110 cfs/m for watershed less than 2 mi²; Parret et al. 2003. Fire Hydrology. July 2003.

For watersheds 5-20 mi², the design storm should be approximately 23 cfs/m; Arkell Richard E, and Frank Richards, 1986. Short Duration Rainfall Relations for the Western United States. August 1986. Gerhard, N, 2003. Precipitation – Frequency Values for Lolo Pass, Idaho/Montana. Unpublished Paper. September 2003

There are portions of four roads within the fire perimeters: Roads 111, 359 and 369 in the Fern Fire and Road 360 in the Cedar Fire. These roads provide access for short-term BAER and other post-fire restoration work, as well as the long-term forest management. They also provide access to trailheads, recreation areas and lookouts, including the Elk Summit Recreation Area and Wilderness access. Some segments of these roads are currently poorly drained, and are at risk of severe post-fire erosion. Two stream crossings were found to be undersized for the post fire design (10-year precipitation) event, and are recommended for replacement. Additional culverts and waterbar/rolling dip construction are recommended on the bottom of Road 359 and on the end of Road 111 to effectively drain the prisms under post fire conditions. These improvements will improve the probability that road crossings will withstand a post-fire runoff event.

Water Quality: The streams in the burned area maintain good water quality. Erosion from steep burned hillslopes would compromise water quality through transport and deposition 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: Specific areas where adverse effects are mostly likely to occur are associated with pockets of high fire severity, particularly in the Storm Creek watershed where high severity fire occurred on landslide prone terrain. Storm Creek contains a strong bull trout population (ESA listed as threatened) as well as westslope cutthroat trout (Regional Forester sensitive species). Lower Colt Killed Creek also contains bull trout and ESA listed steelhead trout (threatened). Spring chinook salmon (not listed) are found in lower Colt Killed below Storm Creek. The fire burned portions of Colt, Dan, Fern and the upper portions of Colt Killed Creek which provide habitat primarily for western cutthroat trout.

To better protect the fishery resources within and downstream of the burned area, implementation of infrastructure treatments is recommended. Examples of infrastructure protection would include culvert replacement where increased water yield and increased streamflow could result in culvert failure, and construction of drivable dips at stream crossings that would accommodate debris flows, rather than result in loss of the road surface and fill.

Native Vegetation/Soil Productivity: Native vegetation communities and soil productivity are at risk from rapid expansion of noxious weeds from existing populations to adjacent areas within the burned area. Disturbance may increase the susceptibility of an otherwise intact plant community to weed invasion by increasing the availability of a limited resource (Hobbs 1989). Natural or human caused fires are broad scale disturbances that influence the amount of available habitat for weed establishment and may promote invasive weeds (D'Antonio, 2000; Belsky and Gelbard 2000; Pauchard et al. 2003).

Most of the previously identified weed infested sites within the fire were either burned or occur adjacent to burned areas. The susceptible habitats within the Powell Complex fires contain known infestations of Spotted knapweed and Canada thistle. Small spot infestations of spotted knapweed and Canada thistle are scattered along forest roads #360, 369, and 111 which run through the fire perimeter. Other discrete or small populations were identified this summer along forest trails #50, 44, and 49 leading into the burned area. Spotted knapweed, and Canada thistle are invasive weeds that can readily out-compete native plants and dominate disturbed sites. In addition, there are small patches of Spotted knapweed atop Elk Summit at the trailhead parking and stock areas, which are prime dispersal points that lead into the Selway-Bitterroot Wilderness. There is also an infested gravel pit/landing at the bottom of road #368.

Heritage: The area of potential effects (APE) associated with the Powell SBW Complex included the fire perimeter areas, locations of any treatment actions, and areas potentially impacted by indirect fire

effects (i.e., flooding, debris flows, etc.). Because of the inaccessible locations of the Powell SBW Complex and early snow fall which preceded the fires being classified as contained – no BAER related field assessment was performed for the fires in the fall of 2012. Rather, a Geographic Information Systems analysis was performed by intersecting known historic property locations with fire effects areas to ascertain potential impacts to critical values.

Three previously recorded sites eligible for, or potentially eligible for, the National Register of Historic Places are located within the APE of the Powell SBW Complex (Table 2) and are classified as critical values.

Table 2: Previously Recorded Sites in the Powell SBW Complex APE

Fire	Site #	Site Type	Potential Threats	Type of Damage Possible
Fern	10IH954	Savage Ridge Fire Lookout	Burned cultural material	Loss of data
Fern	10IH963	Dan Ridge Fire Lookout	Burned cultural material	Loss of data
Cedar	10IH2200	Historic Cabin	Burned feature	Loss of building

B. Emergency Treatment Objectives: Roughly 10 percent of the burned area was rated moderate to high severity. Most of the burned area is on hillslopes rated low for soil erosion; however 10% of the area has highly erosive soils and another 4% are rated moderately erosive. Even low severity slopes on steeper hillslopes devoid of canopy or ground cover are at risk of increased erosion and runoff. Landslide prone areas within the fire with high and moderate burn severity are at risk for post-fire erosion and runoff risk. Much of the Wilderness area has not been mapped for landtypes, however of the 42% of the burn that has been mapped, nearly half is rated moderate to very high for mass wasting.

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.

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. Using the 10 year post fire exceedance probability assumes watershed recovery within a few years and represents much larger flows than the existing culvert can pass. Culverts with significant fish habitat upstream will be sized to simulate the stream to allow for passage of fish and other aquatic organisms. Weed populations adjacent to burn areas where there is a spread of threat of expansion 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 roads in the burned area, severe erosion damage on several public roads needed for FS and public access, entrainment and deposition of road/trail sediment in important fishery streams, and erosion damage and failure of trails. The cost of repairing roads, trails, and stream crossings, if they fail post-fire, would exceed the cost of the protection measures. The value of critical habitat for two 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 intrinsic value of Wilderness, though not affected by the natural behavior of fire, would be impacted by failure of the trail infrastructure. Water quality in the area would also be affected by infrastructure failure. The value of protecting the ecological integrity and soil productivity of the burned area from noxious weed infestation likely far exceeds the cost of weed treatment and monitoring. Non-market resource values also include loss of hunting/fuelwood gathering/recreating income to area (see VAR table).

F. Cost of Selected Alternative (Including Loss): \$218,413

In accordance with the revised Forest Service manual, the risk matrix below, Exhibit 2 of Interim Directive No. 2520-2010-, was used to evaluate the Risk Level for each value identified during the Powell SBW fire BAER assessment. Only treatments that had a risk of Intermediate or above are recommended for BAER authorized treatments.

BAER Risk Assessment

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	RISK		
Very Likely	Very High	Very High	Low
Likely	Very High	High	Low
Possible (10 year storm event)	High	Intermediate	Low
	Roads and Trails	Roads and Trails	
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 one to three years (depending on the resource):

Very likely- nearly certain occurrence (>90%)

Likely- likely occurrence (>50% to < 90%)

Possible- possible occurrence (>10% to <50%)

Unlikely- unlikely occurrence (<10%)

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 natural or cultural resources resulting in minimal, recoverable or localized effects.

Loss of Water Control

The Powell SBW Complex Fires occurred within multiple watersheds. Additional unofficial 7th field and 8th field HUCs were modeled to show fire effects to specific areas of concern, such as the water quality below high soil burn severities, road infrastructure, springs and campgrounds, and trails. The use of these smaller local subwatersheds provides a more pronounced and indicative increase in water yields by watershed because there is less averaging across unburned areas.

Peak discharge increases for the design storm (Q10) range from 30 to 400 percent for subwatersheds within the area of the fire (water quality), 300 to 500 percent for the Forest infrastructure just downstream of the fire (369 road, trails), and 30 to 50 percent for the unburned recreational areas within the Cedar fire. The variability in the modeling is due to the amount of area in the moderate to high soil burn severity classification relative to the size of the watershed modeled.

The post fire 10-year return interval design storm has a 19% chance to occur at least once in the first two years following the fire. This constitutes a “possible” probability of occurrence even with proposed culvert replacement. Without treatment, major property damage (and associated impacts to water quality) would be highly likely.

This increase in peak flows constitutes a “High” risk emergency.

Increase in sediment potential

Sediment yield potential for the same categories, models ranges from 107 to 440 percent for subwatersheds within the area of the fire, 1300 percent for the Forest infrastructure just downstream of the fire, and 1730 percent for the unburned recreational areas within the Cedar fire (Table 5).

The 10-year return interval design storm has a 19% chance to occur at least once in the first two years following the fire. This constitutes a “possible” probability of occurrence. Without treatment, this level of storm could cause major inputs of sediment into important fisheries with listed species.

These increases constitute a “High” risk emergency for values at risk within and immediately downstream of the fire area where increased sediment loading with the potential of road induced debris torrents.

Forest Service Roads and Trails

Peak flow and sediment yield potential increases indicate that there is much Forest infrastructure within and near the fire area that is potentially in an “Intermediate” to “High” risk emergency condition, depending on classifying the property loss as moderate to major.

Water Quality of TES carrying streams

The streams with moderate to high burn severities above them include Storm Creek, Alkire Creek, Colt Creek, Don Creek, Fern Creek, Warm Springs Creek, and Freezeout Creek. Increased flow and decreased water quality from the entrainment of additional sediment comes with increased woody debris and tend to pulse through the system (Forest fisheries specialist), resulting in minor consequences.

Water quality changes to TES carrying streams constitutes a “Low” risk situation as long as there is no major failures of infrastructure.

Forest Service Look-outs

During the helicopter flight, it was observed that most of the lookouts were outside the fire area, and also on high ridges with little contributing watershed area above. The ground cover and vegetation in the area should not show an increase in watershed effects in these areas.

There is an “unlikely” probability of damage due to the fire with “moderate” consequences to the infrastructure and cultural aspects of the lookout. Therefore, the look-outs are in a “low” risk category.

Water developments

No water development locations were identified within the fire area. Numerous recreational areas outside the fire area could have water developments.

There is an “unlikely” probability of damage due to the fire with “moderate” consequences to human health and property. Therefore, water developments are in a “low” risk category.

Cultural Resource Sites

Table 3: Risk Assessment Matrix for Cultural Resource Sites Located Within the APE of the Powell SBW Complex

Site #	Site Type	Probability of Damage or Loss*	Risk Indicator	Magnitude of Consequences*
10IH9 54	Savage Ridge Fire Lookout	Possible	Very Low	Minor
10IH9 63	Dan Ridge Fire Lookout	Possible	Low	Minor

10IH2 200	Historic Cabin	Possible	Intermediate	Minor
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*Reference FSM 2523.1 – Exhibit 02 for definitions of Damage or Loss, and Consequences

G. Skills Represented on Burned-Area Survey Team:

<input checked="" type="checkbox"/> Hydrology	<input checked="" type="checkbox"/> Soils	<input type="checkbox"/> Range	<input checked="" type="checkbox"/> Weeds
<input type="checkbox"/> Forestry	<input type="checkbox"/> Wildlife	<input type="checkbox"/> Fire Mgmt.	<input checked="" 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 checked="" type="checkbox"/> Recreation	<input checked="" type="checkbox"/> GIS

Team Leader: Anne Connor

Email: aconnor@fs.fed.us Phone: 208-476-8235 FAX: 208-476-8329

H. Treatment Narrative:

Land Treatments: Areas with new infestation of 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, new weed populations within the fire perimeter 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 fire, 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 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 Lochsa Weeds EA and the Selway-Bitterroot Weeds EIS.

For the cultural resource sites, no risk indicator scored higher than “Intermediate” in the risk assessment matrix (Table 3), therefore no treatments or associated funding needs are being requested for the three sites located within the Powell SBW Complex.

Channel Treatments: No channel treatment prescribed at this time.

Roads Treatments: Road treatments will be targeted at effectively draining anticipated increased runoff in the first year following the fire. The primary identified work will include:

- Replacing culverts that are downstream of severely burned areas to ensure proper conveyance for post-fire design flows (10-year return internal precipitation event) and for passage of fish and other aquatic organisms where appropriate. Clearing culvert inlets to prevent clogging during increased flows
- Constructing waterbars / culverts along roads within and near the burn perimeter in order to protect the road prism and prevent major erosion
- Installing warning signage to warn the public of hazardous conditions
- Storm monitoring along the roads to inspect and ensure drainage is functioning properly

Trail Treatments: In the Powell SBW complex 234.6 miles of trail were affected by fire. Of these, 10.25 miles were impacted by high to moderate fire burn severity. Treatments include the cleaning of existing

drainage structures, replacement of damaged drainage structures (waterbars, dips), spot stabilization and outsloping of trail tread, replacement of damaged retaining walls and post of visitor warning signs.

Protection/Safety Treatments: To provide for worker safety during implementation of trail drainage improvements, selected 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 early 2013 to ensure that treatment objectives are met. Road and trail treatments will be monitored again during the summer, especially after thunderstorms, to evaluate effectiveness.

In 2013 all treatment areas of infestation will be re-surveyed. Any noxious weed populations not effectively treated during initial treatment efforts will be targeted for additional herbicide application using appropriate funding sources after one year from fire containment.

VI – Emergency Stabilization Treatments and Source of Funds

			NFS Lands				Other Lands			All	
		Unit	# of		Other		# of	Fed	# of	NonFed	Total
Line Items	Units	Cost	Units	BAER \$	\$		units	\$	Units	\$	\$
A. Land Treatments											
Heritage Treatments				\$0	\$0			\$0		\$0	\$0
Weed Spraying	acres	300	25	\$7,500	\$0			\$0		\$0	\$7500
Assessment	day	400	6	\$4,400	\$0			\$0		\$0	\$2400
Subtotal Land Treatments				\$11,900	\$0			\$0		\$0	\$9900
B. Channel Treatments											
Subtotal Channel Treat.				\$0	\$0			\$0		\$0	\$0
C. Road and Trails											
*Trail erosion control – minor (shown to document the need for additional trail work)	miles	\$1,725	54.9		\$94,703			\$0		\$0	unfunded
Trail erosion control - mod	miles	\$3,450	10.25	\$35,363	\$0			\$0		\$0	\$28,980
Rd 359 MP 0.6 AOP culvert replace	Each	\$90,000	1	\$90,000	\$0			\$0		\$0	\$90,000
Rd 359 MP 0.6 AOP culvert design	Each	\$15,000	1	\$15,000	\$0			\$0		\$0	\$15,000
Alkire Cr Culvert replace	Each	\$35000	1	\$35,000							\$35,000
Engineering	day	\$350	25	\$8,750	\$0			\$0		\$0	\$8,750
Rehab on road 359	LS	\$15,350	1	\$15,350	\$0			\$0		\$0	\$15,350
Rehab on Road 111	LS	\$1,050	1	\$1,050	\$0			\$0		\$0	\$1,050
Subtotal Road & Trails				\$200,513	\$0			\$0		\$0	\$200,513
D. Protection/Safety											
Hazard Tree treatment for worker protection	mile	\$500	12	\$6,000	\$0			\$0		\$0	\$6,000
Subtotal Structures				\$6,000	\$0			\$0		\$0	\$6,000
E. BAER Evaluation											
Team Costs					\$10,200			\$0		\$0	\$0
Subtotal Evaluation					\$10,200			\$0		\$0	\$0
F. Monitoring											
Storm Monitoring Road/Trail	day	\$500	5	\$2,500	\$0			\$0		\$0	\$2,500
Subtotal Monitoring				\$2,500	\$0			\$0		\$0	\$2,000
G. Totals				\$220,913	\$0			\$0		\$0	\$218,413
Previously approved											
Total for this request				\$220,913	\$10,200						

*It was determined that the damage to trails in the low severity burn did not constitute an emergency situation. Alternate funds will be sought for rehabilitation of these trails.

PART VII - APPROVALS

1. <u>/s/ Ralph E. Rau "for"</u>	<u>11/02/2012</u>
Nez Perce-Clearwater NF Forest Supervisor	Date
2. _____	<u>11/ /2012</u>
Region 1 Regional Forester	

Appendix A. Cost Details and Photos

Road 359 MP 0.6 Culvert.

- Existing crossing is 2 24" culverts in a 9' BFW fisheries stream
- 1.5 miles of fish habitat above road.
- Watershed area = 1.19 square miles
- Apx ½ of watershed burned; apx 10% of watershed had mod severity
- Adjusted Design Flow = $110 \text{ cfsm}^6 = 130 \text{ cfs}$
- Predicted Q100 = 81 cfs (from StreamStats)
- Sizes to minimum of 6' culvert
- Fisheries stream, size for stream simulation.
- Bankfull width of stream is 9'. Use 11' wide low rise pipe-arch.
- Estimate \$15,000 for A & E design
- Estimate \$90,000 for installation
- Estimate 10 days of engineer time @ \$350/ day = \$ 3500 (contract prep and admin)



24" pipes in 9' stream. Picture taken prior to burn

Road 359 MP 1.6 Culvert (Alkire Creek).

- Existing crossing is 48" culvert in a 9' stream
- Potentially fish-bearing-0.15 miles of marginal fish habitat
- Watershed area = 0.72 square miles
- 33% of watershed burned; apx 5% of watershed high severity
- Adjusted Design Flow = $110 \text{ cfsm}^4 = 79 \text{ cfs}$
- Predicted Q10 = 36 cfs; Q100 = 52 cfs (from StreamStats)
- Sizes to minimum of 6' culvert
- The rust line on the culvert takes up half the volume. There is about a 300 foot unburned buffer above the culvert, but the slope leading into the culvert averages at greater than 15%. . There is high soil burn severity to the northwest. Peak discharge modeled to increase 3-5 times and to deliver up to 13 times the sediment to the area of the culvert (PRISM modeling in FS WEPP and RAWS station data from the Fenn Ranger Station)
- Use 8' culvert; stream simulation not necessary.
- Estimate \$35,000
- Estimate 10 days of engineer time @ \$350/ day = \$ 3500 (design, contract prep and admin)



⁶ Use 110 cfsm for watershed less than 2 mi²; Parret et al. 2003. Fire Hydrology. July 2003.

For watersheds 5-20 mi², the design storm should be approximately 23 cfsm; Arkell Richard E, and Frank Richards, 1986. Short Duration Rainfall Relations for the Western United States. August 1986. Gerhardt, N, 2003. Precipitation – Frequency Values for Lolo Pass, Idaho/Montana. Unpublished Paper. September 2003

Road 359 MP 3.13 to MP 5.57

- Road accesses popular trailhead at confluence of Colt and Colt Killed Creeks
- Road grade varies from -5% to -15% +; 1 miles of over -8%
- Contributing area is 100% within the burn; nearly all low severity
- 0.2 miles burned moderate severity
- Literature suggests a 200' cross drain spacing on these grades
- Only three existing culverts (12" cross drains); upgrade to minimum of 18"
- Add 10 18" cmps and 20+ dips
- Estimate \$1000 per culvert (13 * \$1000 = \$13,000)
- Estimate 1 day with grader for dips (10 hours @ \$130/hr = \$1300)
- Estimate 4 days of engineer time @ \$350/ day = \$ 1050 (contract prep and admin)
- Total = \$15,350



Bottom of Road 359, where it switchbacks down to the confluence of Colt and Colt Killed Creeks to a popular portal to the Selway Bitterroot Wilderness.

Road 111 MP 10.00 to MP 11.54

- Very low use, open road
- Fairly flat road grade
- Mostly high severity burn over the road and within the contributing area
- Apx 30 18"- 24" culverts, mostly in good shape
- Estimate 1 day with backhoe to clean culvert inlets (10 hours @ \$70/hr = \$700)
- Estimate 1 day of engineer time @ \$350/ day = \$ 350 (contract prep and admin)
- Total = \$1,050

End of Road 111 in high burn severity
(Fern Fire, Powell SBW Complex,
2012)



Weed Treatment Costs

Treatment Area	Acres	Season	Total Treatment (acres X # of treatments)
Spot treat Spotted knapweed and Canada thistle along Roads: 360, 369, and 111.	5 acres	Summer	5 acres
Treat Spotted knapweed and Canada Thistle along Trails: 50, 44, and 49.	13 acres	Summer	13 acres
Treat Spotted knapweed at Elk Summit Trailhead, parking lot, Campground, and stock areas.	3 acres	Summer	3 acres
Treat new invaders around trailheads and ATV access points.	1 acre	Spring and Fall	2 acres
Treat gravel pit/landing at the bottom of Road 368	1 acre	Spring and Fall	2 acres
Total	23 acres		25 acres

DIRECT COSTS

Average Treatment Cost (includes prep and pre-treatment flagging of sites): Labor \$250.00 per acre

Average Chemical/Personal Protection Equipment Cost: \$50.00 per acre

Implementation Monitoring of Treatment: at \$400 per day (two person crew).

TOTAL Estimated Costs

Estimated Treatment cost: \$300.00/acre X 25 acres = \$7,500.00

Weed Monitoring 6 days X \$400/day = \$2,400.00

Total \$9,900.00

Trail Costs



In the Powell SBW complex 234.6 miles of trail were affected by fire. There are 10.25 miles that were impacted between moderate to high fire burn severity that are proposed for treatment to stabilize fire -affected trail tread at risk to damage from the additional runoff and erosion from the post fire conditions.

Utilize traditional tools to clean of drainage structures, replace damaged drainage structures (waterbars, dips), stabilize damaged areas, outslope trail tread, replace damaged retaining walls and post visitor warning signs.

- Moderate Tread/Erosion control (water bars, check dams, drainage dips, minor restoration) on 10.25 miles @ \$3450/ mi = \$35,636

Trail 213 in high severity burn near Bear Mtn Lookout.