Date of Report: 11/13/2012

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: Isabella Complex (Wash, Jug, Crimper Fires)

B. Fire Number: ID-CWF-000625

C. State: Idaho

D. County: Clearwater

E. Region: R1

F. Forest: Clearwater

G. District: North Fork

H. Fire Incident Job Code: P1G8E1

I. Date Fire Started: 09/09/12

J. Date Fire Contained: 10/15/2012

K. Suppression Cost: $26,000

L. Fire Suppression Damages Repaired with Suppression Funds
1. **Machine Fireline rehabilitated (miles)**: 0
2. **Machine Fireline waterbarred (miles):** 0
3. **Other (identify):** No rehab. No machines used. No seeding

M. Watershed Number:

Watershed #	Watershed Acres	Acres of high severity	Acres of mod severity	Acres of low severity	Total Acres burned	% burned	% mod to high burn
170603080103 (Isabella HUC 6)	17635	10	80	2039	2130	12	0.5

N. Total Acres Burned:
[2130] NFS Acres [ ] Other Federal [ ] State [ ] Private

O. Vegetation Types: Grand Fir (30%); Western Redcedar (30%); Douglas-Fir (20%); Lodgepole Pine (5%); Engelmann Spruce (5%); Western White Pine, Ponderosa Pine, and Western Larch (<5%), Non-Forest (<5%).

P. Dominant Soils: Soils in the fire area are generally deep (+60 in.), with shallow (20 in. deep soils) adjacent to bedrock outcrops, particularly on southerly aspects where erosional losses are greater. Surface soil textures are generally silt loams in the with many soils being loamy-skeletal due to frost-churning weathering processes, colluvial mixing, and shallow depths. Dominant parent materials are Border Zone micaceous schists. The Mazama volcanic ash layer ranges from absent on and adjacent to rock outcrops to depths up to 24 in. Temperature regimes are overall frigid. Moisture regimes range from xeric on drier, breakland landforms to udic on gentler landforms with deeper soils. Mineralogy is mixed. Dominant subgroups are Typic Vitrandepts and Andic Dystrochrepts. Soil erosional hazards range from low to high, dependent primarily on geology and landform. Steep landforms, unstable micaceous parent material and abundant moisture (+ 50 in. mean annual precip.) result in high to very high mass wasting potential and sediment delivery efficiencies across much of the watershed and burned area.

Q. Geologic Types: Primarily Border Zone micaceous schists. The ash layer varies in thickness from 24" to absent or mixed in areas with colluvial rocky soils.

R. Miles of Stream Channels by Order or Class: **Order 1:** 5.5 mi, **Order 2:** 1.5 mi, **Order 3**: 2.4 mi, **Order 4:** 0.3mi, **Order 5:** 0 mi **, Order 6:** 0 mi
Class: Non-fish-bearing: 8.6 mi, **Fish-bearing:** 3.2 mi

S. Transportation System

Trails: 2.7 **miles** **Roads:** 1.0 **miles on burn perimeter (additional 1.1 miles downslope)**

PART III - WATERSHED CONDITION

A. Burn Severity (acres (% of burn perimeter)): **unburned to low severity:** 2039 (96%), **moderate:** 80 (3.5%) **high:** 10 (0.5%)

B. Water-Repellent Soil (acres (% of burn perimeter)): 50 (2%)

C. Soil Erosion Hazard Rating[1]:

Mass Wasting Potential (rating: % of burn area): low: 18% moderate: 0% high: 41% very high: 41%

Burn Severity (%) by Mass Wasting Potential Class

Mass Wasting Class	Low Burn Severity %	Mod. Burn Severity %	High Burn Severity %
Low (18% of area)	100	0	0
Moderate (0% of area)	0	0	0
High (41% of area)	94	0	1
Very High (41% of area)	92	7	1

Surface Erosion Potential (rating: % of burn area): low: 85% moderate: 5% high: 10%

Burn Severity (%) by Surface Erosion Potential Class

Surface Erosion Potential Class	Low Burn Severity %	Mod. Burn Severity %	High Burn Severity %
Low (85% of area)	94	5	1
Moderate (5% of area)	97	3	0
High (10% of area)	100	0	0

Sediment Delivery Efficiency (rating: % of burn area): low: 0% moderate: 9% high: 60% very high: 31%

Burn Severity (%) by Sediment Delivery Efficiency Class

Sediment Delivery Efficiency Class	Low Burn Severity %	Mod. Burn Severity %	High Burn Severity %
Low (0% of area)	0	0	0
Moderate (9% of area)	100	0	0
High (60% of area)	92	7	1
Very High (31% of area)	97	2	1

D. Erosion Potential[2]: **low severity burn areas:** 4 tons/acre average, **moderate severity:** 12 tons/acre average**, high severity:** 20 tons/acre average

E. Sediment Potential:

Watershed	Watershed Acres	Pre-fire sediment delivery rate (tons/acre)[3]	Total Post-fire sediment delivery rate (tons/acre)[4]
170603080103 (Isabella HUC6)	17635	**2.0**	**2.3**

[1] Erosion hazard ratings from landtypes in Clearwater NF Land System Inventory, 1983.
[2] ERMiT Erosion Model Outputs for the First Year Following the Fire (probability of sediment delivery rates exceeded = 10%);
[3] background sediment delivery rate is 2 t/ac as modeled by DisturbedWEPP, mature forest cover
[4] ERMiT Erosion Model Outputs for the First Year Following the Fire (probability of sediment delivery rates exceeded = 10%); unburned background sediment delivery rate is 2 t/ac as modeled by DisturbedWEPP, mature forest cover

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (yrs):

The effects of the 2012 Isabella Complex Fires on recovery of vegetation within its boundaries will vary primarily by the severity of the burning that took place and the available seed sources. In undisturbed soil areas, the native seedbank for shrubs, forbs, and grasses will likely respond favorably to the burn since they have evolved with such natural disturbances. Where the soil has been altered, primarily by road or trail construction, spread of noxious weeds is a concern that should be monitored over time. Slope, aspect, fuel loadings, and the type of vegetative cover present when the fire burned influenced the severity of the burn.

Vegetative Recovery Period on NFS Lands - Years

Burn Severity	Total Acres	Reforestation Period	Vegetative Recovery Period [6]
None to Low	2039	0-5 years	**0-5 years**
Moderate	80	1-5 years	**1-15 years**
High	10	3-5 years	**3-20 years**
Total	2130		

[6]Vegetative Recovery is considered be any vegetation which provide >80% cover which effectively intercept rainfall and provides an extensive root mass.

Unburned to Low Severity Burn Areas: In areas where the burn severity was unburned to low, recovery would generally be expected to occur within one growing season. Vegetative recovery is considered to be any vegetation which providing more than 80% cover which effectively intercepts rainfall and provides an extensive root mass as defined on page II-26 of the Clearwater National Forest Plan. These unburned to low severity burn areas are expected to maintain adequate live tree stocking levels and associated understory vegetation in most cases. Tree mortality is expected to average less than 30% in these areas, ranging from 0% to 50%. Perennial grasses, forbs, and shrubs generally will re-sprout after low severity burns and a duff/litter layer will reform within several years. Vegetative recovery will vary from 0 to 5 years.

Moderate Severity Burn Areas: In areas where the burn severity was moderate, the majority of the trees are expected to die as a direct result of the fire, with mortality ranging from 50% to 100%. Most of the needles remain on the trees, but have turned red as a result of the burn effects. Vegetative recovery will vary from 1-15 years. Some of the larger areas that burned at moderate severity are a greater distance from surviving seed sources. This will slow the recovery time. Pockets of high severity burn within moderate severity areas will also likely display impaired vegetative and soil recovery. Existing seed from shrubs, forbs, and grasses stored deeper in the soil, will provide some vegetative recovery in these areas

High Severity Burn Areas: In areas where the burn severity was high, nearly all of the trees were killed or are expected to die as a direct result of the fire, with mortality ranging from 80% to 100%. Vegetative recovery will vary from 3-20 years. The largest areas that burned at high severity are surrounded by moderate severity burn areas and thus are at a greater distance from seed sources. This will slow the vegetative recovery time. The heat produced in the high severity burning in these areas has destroyed much of the existing seed stored in the soil, so shrub, forb, and grass recovery will occur at a slower pace. Many of the high severity burn areas are on sites with thin rocky soils and dry, hot aspects, thus will likely have vegetative recovery periods that exceed 20 years. Encroachment by noxious weeds may be a concern on high burn severity areas adjacent to road corridors where weeds already exist.

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, (cfs per square mile): 50-65 cfs/mi^2

G. Estimated Reduction in Infiltration, (percent): 30 %

H. Adjusted Design Flow, (cfs per square mile) [1]: 110 cfs/mi^2

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats: The primary values at risk resulting from the Isabella Complex Fires are transportation infrastructure (Road 705), water quality, native fisheries for ESA-listed bull trout and other aquatic species, and native vegetation and soils. Trails 95 and 96 were directly affected by the fire through increased downfall of trees, burning of stumps and cribbing in trail fill and burning/scorching of foot bridges. The mostly low severity nature of the burn upslope of these trails is not expected to result in an elevated risk of runoff or erosion that would detrimentally affect these trails or the drainage infrastructure.

Infrastructure: Due to fire effects, modest 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 are in part 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.

A stacked 2.1 mile segment of Forest Road 705 is located along the western burn perimeter of the Wash Fire and upslope of Isabella Cr. This road provides access to the trailhead for FS trail 95, Isabella trail. Seventeen culverts exist on this segment of road, including 11 in perennial streams and 6 ditch relief culverts. Most of these culverts are undersized by modern Forest standards (design to pass 100-yr discharge). Approximately 1300 feet of road downslope and adjacent to the Wash fire has blocked ditches and segments of gullying and rilling on road surface due to poor surface drainage and ditch condition. Recent (Sept-Oct 2012) deposits of rock and burned wood in ditches and culvert inlets were observed, indicating instability in the burned area upslope of the road. If culverts and/or ditch lines

[1] Use 110 cfsmi^2 for watershed less than 2 mi^2; Parret et al. 2003. Fire Hydrology. July 2003.
For watersheds 5-20 mi^2, 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

overtop and the road fill fails, there would be potential impacts to water quality and aquatic organisms in Isabella Creek.

The burn area upslope of the road is primarily low severity; however, 10% of the burn was a moderate to high severity, presenting a risk of increased runoff and erosion that may exceed the capacity of the road drainage system in its current condition. Most of Rd 705 is on land types with a road suitability class of 1 or 2 defined as “having high to extremely high risk of landslides and/or erosion and high probability of sediment and debris reaching streams due to a high sediment delivery efficiency. Mistakes have severe consequences and are often impossible or difficult to correct.” One recent (winter 2011-2012) 130 ft. long by 4 ft. wide fill failure has occurred where road surface drainage is inadequate. Response to the fire will exacerbate these conditions.

We recommend improving the drainage on this road by cleaning culverts, ditch lines and surface shaping/grading. These actions would decrease risk of road failures and erosion and potential damage to the road and sediment delivery to streams, thus protecting water quality, soils, native fisheries for ESA-listed and sensitive species, and native vegetation communities.

The road-stream crossings in particular are quite undersized by today’s standard: the culvert at Milepost (MP) 3.3 and MP 2.8 (Wash Creek). Over 80% of the basins draining to these two crossings are on landypes with high to very high mass wasting potential and sediment delivery efficiency. The unnamed stream above MP 3.3 is at an elevated risk of failure due to post-fire increase in runoff and erosion. Most of the high to moderate severity burn within the Isabella Complex is in this one watershed. We recommend replacement of the culvert at MP 3.3 with a larger capacity culvert to minimize the risk of culvert failure due to watershed response to the burn. We also recommend replacing the culvert at MP 2.8 in Wash Creek as it is undersized, but recognize that the low severity burn in this watershed will probably not cause a significant increase in risk of failure at this culvert. See Appendix A for more details.

Water Quality: The streams in the burned area maintain good water qualitiy. Erosion from steep burned hillslopes would compromise water quality through transport and depostition of fine sediment in important fishery streams. The elevated erosion and potential failures from roads also compromise water quality. Treatments to restore hillslope drainage along road 705 to withstand post-fire events will provide protection for water quality as well.

Fisheries: Fish-bearing streams within the perimeters of Jug-Crimper and Wash Creek fires include Isabella Creek and its tributaries, Jug Creek, Elmer Creek, John Creek, and Crimper Creek. Several non-fishbearing tributaries of Isabella Creek, including Wash Creek, are also within the fire perimeters.

Westslope cutthroat trout are ubiquitous in all fish-bearing streams, while redband trout are present in the lower mainstem. Bull trout were detected in the lower mainstem of Isabella Creek in the 1990 survey, but this species is also known to occur and spawn in the upper mainstem (Kenney, personal observation; IDFG 2006); the Isabella mainstem has also been designated as bull trout Critical Habitat from the mouth up through the northeast edge of the Jug fire perimeter.

Kokanee salmon spawn in lower Isabella Creek most years (Kenney, personal observation), and Coeur d’Alene salamanders are known to occur in an unnamed tributary of Isabella Creek that drains the Wash Creek fire area and in Dog Creek and Fern Creek just downstream of the Wash Creek fire area (IDFG ACD 2012; not many surveys have been performed for this species—they are likely more widespread and abundant than documented). Western pearlshell mussel are not known to occur in Isabella Creek, but are likely present in the mainstem of the North Fork Clearwater River (Kenney,

personal observation). Western toad presence on the Forest is not well documented, but the species is relatively common in low to mid-elevation forest in North Central Idaho (Kenney, personal observation), so individuals are likely present in the Isabella Creek subwatershed.

Native Vegetation/Soil Productivity: Following moderate and high severity burns, the frequency and magnitude of surface erosion (e.g. sheet, rill, gully erosion) and the risk of mass wasting erosion events (e.g. landslides) are expected to increase. Soil erosion through sheet, rill, gully and mass wasting processes can result in decreased soil productivity at a site due to the loss of surface soils. Surface soils in the burn area contain higher organic matter and volcanic ash-derived mineral content compared to the subsurface soils. Ash-derived surface soil is fundamental in supporting site productivity due to much greater water infiltration rates and moisture- and nutrient-holding capacities than underlying soil horizons.

The consumption of vegetation, ground cover and soil organic matter and increased soil water-repellency contribute to increased surface erosion following fire. Tree and large shrub mortality following fire can substantially increase the risk of mass wasting events and landslides, particularly on areas with high to very high landslide/mass wasting risk such as those in the Elizabeth Fire area. Tree roots (and those of shrubs, forbs, and grasses to a lesser extent) help stabilize soil on steep slopes by forming a fibrous structure throughout the soil horizon. Trees also act as pumps, removing excess water from the soil profile through evapotranspiration. This decreases the extent of saturated conditions during periods of high precipitation or snowmelt. After a tree dies, roots decay and landslide hazard increases. The greatest landslide hazard associated with lost root strength occurs 5 to 20 years after tree death. The hazard remains elevated until a new stand becomes established on the site.

The most notable losses of soil productivity occur during mass wasting/landslide events where several hundred to thousands of tons of surface soil can be displaced and often leaving the land scoured to bedrock and unproductive subsoils. Unstable road fills and inadequate or poorly maintained road drainage systems in areas with high landslide hazards increase the risk of substantial and impaired productivity due to landslide/mass wasting erosional events. Landslides and an fill failures associated with roads (including road 720) and natural causes have occurred adjacent to the burned area.

In addition, 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 board 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). Road 705, in particular, is infested with spotted knapweed, St. Johnswort, oxeye daisy, and meadow hawkweed.

Heritage: Research has shown wildfires have the potential to damage or destroy cultural resources through: (1) direct effects of the fire; (2) fire suppression or rehabilitation activities; and/or (3) erosive soil movement caused by subsequent weather events. These impacts have the potential to adversely affect both built-environmental and archaeological resources. Additionally, wildfires may have an indirect effect to historic properties by increasing the accessibility and visibility of archaeological site locations, making them more susceptible to vandalism/artifact looting, and facilitating unauthorized recreational activity.

The area of potential effects (APE) associated with the North Fork District Fires included fire perimeter areas, locations of treatment actions, and areas potentially impacted by indirect fire effects (i.e., flooding, debris flows, etc.). Because of the accessible locations of the Fires and early rain and 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.

One previously recorded site eligible for the National Register of Historic Places is located within the APE of the Isabella Fire Complex and is classified as moderate cultural resource values.

Fire	Site #	Site Type	Potential Threats	Type of Damage Possible
Wash	None	NA	NA	NA
Jug Crimper	CW350	Cabin	NA	Alter Historic Landform

B. Emergency Treatment Objectives: Roughly 56% of the burned area was rated moderate to high severity. A total of 83 acres (4%) burned at high intensity. These areas generally had high to extreme hydrophobic conditions. Moderate intensity burn covered 1071 acres (52%). These burned areas generally developed minor hydrophobic conditions on approximately 50% of the moderate severity burn area. Low intensity burn areas covered 894 acres (44%) of the fire area.

The average slope of the burned area exceeds 50%, and many areas have slopes in excess of 60%. Increased post-fire surface erosion, runoff, or mass wasting events (landslides) have a high probability to impact streams since 50% of the burned area is on landtypes with very high sediment delivery efficiency, and an additional 14% of the area with high sediment delivery efficiency. Within the areas of very high sediment delivery efficiency, 51% burned at moderate to high intensity Landslide prone (mass wasting) areas within the fire with high and moderate burn severity are at risk for post-fire erosion and runoff risk. High to very high mass wasting potential exists on 32% of the burned area, with another 32% rated as moderate. Moderate to high severity fire burned on 62% of the area having high mass wasting potential. Most (63%) of the burned area is on hillslopes rated low for soil erosivity; however 31% of the area has highly erosive soils and another 6% 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.

The primary emergency treatment objective is to protect resources by improving the drainage system on road 705 and to prevent the expansion of noxious weeds. Water quality, native fisheries, soil productivity and native vegetation communities are all resources that are susceptible to damage from expected erosion and potential mass wasting associated with road 705 within and downslope of the burned area.

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

Land 50**%** **Channel** N/A **Roads/Trails** 60% **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	60	80	90
Protection/Safety	90	90	80

E. Cost of No-Action (Including Loss): **>$300,000**

The potential cost of no action includes the failure of culverts/stream crossings, erosion damage, and mass wasting on road 705 needed for FS and public access, the cost of entrainment and deposition of road/trail sediment in important fishery streams, and erosion damage and mass failure damage to native vegetation and soils. The cost of repairing roads and stream crossings, if they fail post-fire, would exceed the cost of the protection measures. The value of habitat for bull trout and westslope cutthroat, as well as other aquatic species of concern, cannot easily be quantified, but would likely far exceed the cost of sediment-mitigation measures proposed here. 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): $29,060

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**
	Road 705 Weeds		
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 Isabella Complex fires occurred in the Isabella Creek HUC 6. Smaller subwatersheds (150-300 acre) that burned at moderate to high severity were analyzed to assess fire effects in these smaller basins, particularly those located upslope of road 705. Potential increases in runoff, erosion and sediment delivery were higher in smaller subwatersheds by watershed because there is less averaging across unburned or low severity burned areas. These results were used to support the recommendation to improve the drainage system on road 705.

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 property damage, in particular due to mass wasting and erosion associated with Road 705.

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

Increase in sediment potential

The estimated increase in sediment yield is 115 percent for the Isabella HUC 6 watershed, which had a 96% low severity burn. Smaller subwatersheds (150-300) with higher percentages of moderate to high severity burn (10%) had increase in sediment yield of 200-250 (see PART III, Watershed Condition; Section E, Sediment Potential).

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 property damage.

These increases constitute a “High” risk emergency for values at risk within and immediately downstream of the fire area where increased sediment loading with increased peak flows could cause damage, particulary if mass wasting and large erosion events associated with road 705 occur.

Weeds

Increased weed expansion as a result of wild fire is greatly influenced by habitat susceptibility, seed availability, seed or propagule dispersal, and habitat disturbance history. The probability that weeds will expand in the area depends on the interaction of these four factors. The risk of spread greatly increases as fire opens new sites along spread corridors such as trails and where weed populations already exist.

Land use practices and resource conditions may be important factors that encourage the initial invasion of exotic plants (Hobbs 2000). In mountainous habitats, roads and trails are the primary means by which people and their equipment interact with the environment and therefore may be an important spread pathway. These linear corridors act as dispersal conduits for invasive plants (Gelbard and Belnap 2003, Marcus et al. 1998). In addition, trails and firelines create soil disturbance that promotes establishment of invasive weeds there by increasing seed or propagules for ongoing dispersal.

Most of this fire burned with low intensity and severity. However, weed species including spotted knapweed, St. Johnswort, oxeye daisy, and meadow hawkweed can be found along road 705, serving as a seed source specifically to the Wash Fire area. Thus, the risk of weed spread has increased to a “high risk” due to the interaction of the weed expansion factors.

Water Quality of TES carrying streams

The streams with moderate to high burn severities in their basins are small first order streams that drain into Isabella 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, such as road 705.

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Anne Connor
Email: aconnor@fs.fed.us Phone: 208-476-8235 FAX: 208-476-8329

H. Treatment Narrative:

Land Treatments: The area within and along the burn perimeter, especially along road 705, will be assessed for weed spread and treated in 2013 as needed. This travel route receives moderate recreational use, with moderate to high seasonal stock use. Recently burned areas may provide an opportunity for weed infestation to expand from travel corridoors into adjacent areas.

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 .

Channel Treatments: No channel treatment prescribed at this time.

Road Treatments: Road 705 in the areas burned at moderate and severe levels will receive drainage improvement to prevent future mass wasting and landslides and minimize potential increase in surface erosion due to increased runoff and erosion in the first years following the fire. The primary identified work will include:

- Replacing the undersized culvert that is downstream of most of the high to moderate severity burn areas to ensure proper conveyance for post-fire design flows (10-year post fire return internal precipitation event).
- Install additional cross-drain culverts and drainage dips and clean existing ditches and culvert inlets along Road 705 within and near the burn perimeter in order to prevent major erosion and mass wasting.
- Storm monitoring along the road to inspect and ensure drainage is functioning properly

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 of the known 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.

VI – Emergency Stabilization Treatments and Source of Funds

			NFS Lands			Other Lands				All
Line Items	Units	Unit Cost	# of Units	BAER $	Other $	# of units	Fed $	# of Units	Non Fed $	Total $
A. Land Treatments										
Heritage Treatments				$0	$0		$0		$0	$0
Weed Treatments	acres	$450	8	$3,600	$0		$0		$0	$3,600
Subtotal Land Treatments				$3,600	$0		$0		$0	$3,600
B. Channel Treatments										
				$0	$0		$0		$0	$0
Subtotal Channel Treat.				$0	$0		$0		$0	$0
C. Road and Trails										
Road 705 Drainage Improvement	mile	$12,730	2	$25,460	*$17,000*[2]		$0		$0	$25,460
Subtotal Road & Trails				$25,460	$0		$0		$0	$25,460
D. Protection/Safety										
Hazard Tree treatment for worker protection	mile			$0	$0		$0		$0	$0
Subtotal Structures				$0	$0		$0		$0	$0
E. BAER Evaluation										
Team Costs					$4,870		$0		$0	$0
				---	$0		$0		$0	$0
Subtotal Evaluation					$4,870		$0		$0	$0
F. Monitoring										
				$0	$0		$0		$0	$0
Subtotal Monitoring				$0	$0		$0		$0	$0
G. Totals				$29,060	$4,870		**$0**		**$0**	**$29,060**
Previously approved										
Total for this request				**$29,060**						

[2] Funding undetermined

PART VII - APPROVALS

1. _____
Nez Perce-Clearwater NF Forest Supervisor Date

2._____
Region 1 Regional Forester Date

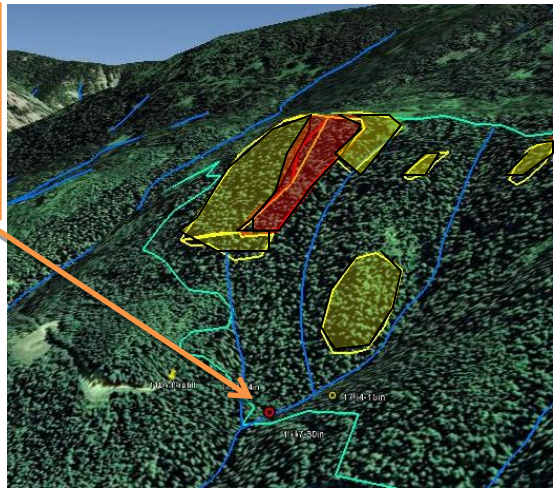
Appendix A. Cost Details and Photos

Road 705 stream crossing, MP 3.3, unnamed trib.

Runoff from moderate burn high in watershed

30 in. culvert on Rd 705 draining 43% burned basin. Approximately 1/3 of this burned at a mod-high severity (yellow-red).

Existing 30" culvert



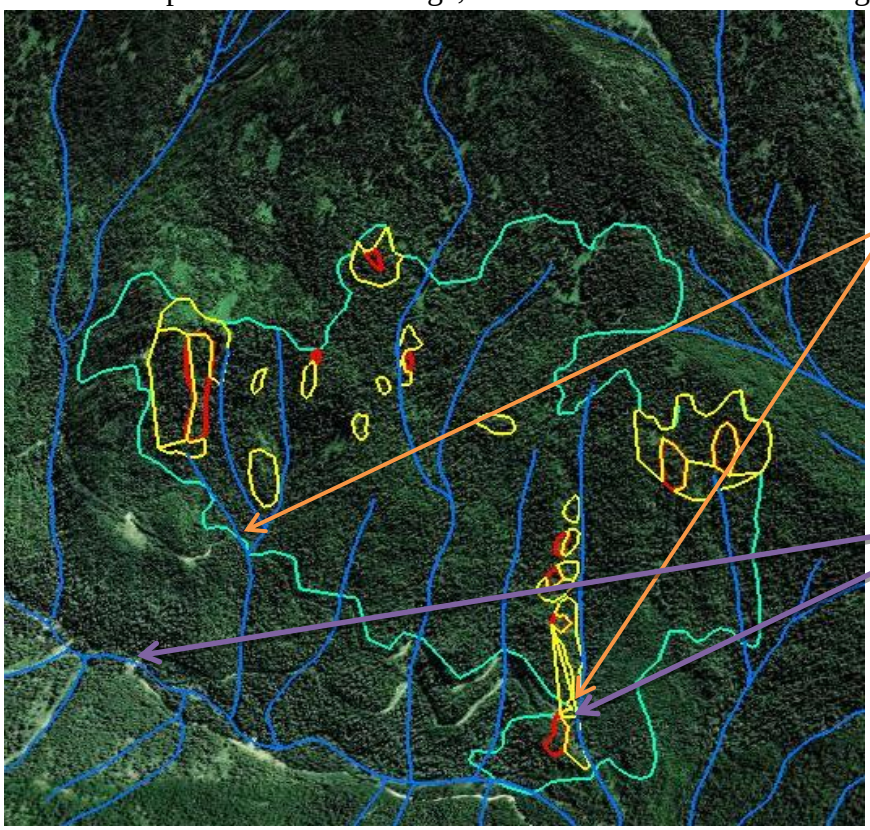
- Existing crossing is 30" culvert in a 48" BFW stream
- Additional undersized indicators: prominent rust line at 50% diameter, aggradation of sediment/rock/debris at inlet, modeled Q100 = 33 cfs (from StreamStats), sizes to minimum of 42" diameter
- Watershed area upstream of culvert = 153 acres (0.24mi^2); 80% of watershed has high to very high mass wasting and sediment delivery potential;
- Approx. 45% of upstream watershed burned; approx 1/3 of burn had mod to high severity; average slope of burned area >50%; Sed delivery rate modeled to increase from 2 t/ac to 5t/ac post-burn in watershed upstream of culvert.
- Design flow: 60 cfs/mi^2 (unburned)
- Adjusted Design Flow[1] = 110 cfs/mi^3 for burned area (burned area=12 cfs, unburned 8 cfs, total = 20 cfs post-burn 10-yr flow)
- 20 cfs post-burn 10-yr flow sizes to mimimum 36" culvert; modeled Q100 = 33 cfs (from StreamStats), sizes to minimum of 42" diameter
- Replace with 48" CMP

Typical moderate to high burn within watershed above MP3.3

[1] Use 110 cfsm for watershed less than 2 mi^2; Parret et al. 2003. Fire Hydrology. July 2003. For watersheds 5-20 mi^2, 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 705 MP 2.4 to MP 3.4

- Road accesses trailhead to popular trail 95 (Isabella Cr., acceses Mallard-Larkins Pioneer Area) and dispersed campsite at trailhead
- Road grade averages 8%
- Contributing area is 60% within the burn; Overall 92% low severity, 8% moderate and high severity
- Suggested 200-300' cross drain spacing for 8% grade; 10 existing culverts, existing drainage problems on road, plugged ditches and inlets, rilling and gullying on road, one recent and one older fill failure associated with poor surface drainage
- Recommend: installing three new cmps (18" minimum): one in swale at MP 3.34 and two in segment of poor drainage and fill failures (approx. MP 3.0-3.2); installing +12 rolling dips to improve surface drainage; ditch and culvert inlet cleaning



Road 705 MP 1.4 to MP 2.4

- Road accesses trailhead to popular trail 95 (Isabella Cr., acceses Mallard-Larkins Pioneer Area) and dispersed campsite at trailhead
- Average 4% road grade, overall road surface drainage in fair condition, segments with ditches blocked by sediment and debris and rilling on road
- Road segment located 150 to 1500 ft. downslope of burn and upper segment of rd 705 described above; culverts on this segment in same drainages as those in upper segment, some of which expected to have increased flow and sediment
- Seven existing culverts, most in need of inlet cleaning
- One ditch relief culvert at MP 1.46 is 90% plugged; pipe cracked and road fill fallen into pipe blocking flow

- Recommend cleaning ditches and culvert inlets, replacing culvert at MP 1.46, adding approximately 5 additional drainage dips.

Road 705 Costs

- Estimate $15,000 for 42" culvert and installation at MP 3.3
- Estimate $1000 per cross drain culvert (4 * $1000 = $4,000)
- Estimate 1 day with grader for dips and surface blading (8 hours @$130/hr = $1040)
- Estimate 1 day with excavator for cleaning inlets (8 hours @ $120/hr = $960)
- Mobilization @ 6% (6% of $21,000) = $1260
- Estimate 8 days of engineer time @ $400/ day = $ 3200 (survey, design, contract prep and admin)
- Total = $25,460
- Note: The North Fork District will try to find funding (apx $17,000) to replace the undersized Wash Creek culvert under the same contract as the BAER work.

Weed Treatment Costs

DIRECT COSTS

- Treat weeds along 2 miles of road 705
- Use 4 acres of treatment per mile = 8 acres
- Assessment Cost = 1 days @ $400/day = $400
- Average Treatment Cost (includes prep and pre-treatment flagging of sites): Labor $300.00 per acre
- Average Chemical/Personal Protection Equipment Cost: $50.00 per acre
- Implementation Monitoring of Treatment: at $400 per day for 1 days

TOTAL Estimated Costs

- Estimated Treatment cost: $350.00/acre X 8 acres = $2,800.00
- Assessment and Monitoring 2 days X $400/day = $800.00

Total $3600