Date of Report: 5/11/2015

WEST FORK ROAD FIRE
BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[X] 1. Funding request for estimated emergency stabilization funds
[ ] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

[X] 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)

[ ] 2. Interim Report
[ ] Updating the initial funding request based on more accurate site data or design analysis
[ ] Status of accomplishments to date

[ ] 3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: West Fork Road

B. Fire Number: MT-GNF-010002

C. State: Montana

D. County: Carbon

E. Region: Northern (1)

F. Forest: Custer Gallatin

G. District: Beartooth

H. Fire Incident Job Code: P1JK2Y

I. Date Fire Started: 03/28/2015

J. Date Fire Contained: 04/06/2015

K. Suppression Cost: TOTAL: $225,000

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): approx. 1100 feet
2. Fireline seeded (miles): 0.0
3. Other (identify):

M. Watershed Numbers:

HUC NUMBER	HUC_NAME
100700060905	Lower West Fork Rock Creek
100700060906	Rock Creek-Stanley Draw

N. Burned Acres by Ownership:

OWNERSHIP	ACRES
PRIVATE	47.5
USDA FOREST SERVICE	204.2
TOTAL	251.7

O. Vegetation Types: Lodgepole pine overstory with inclusions of Douglas-fir, limber pine, and whitebark pine across the upper elevations of the fire. Mixed bunchgrass and herbaceous communities with xeric shrubs dominate the south-facing slopes across the lower fire elevations.

P. Dominant Soils: Primarily loamy-skeletal to sandy-skeletal sandy loam to loamy sand surface textures.

Q. Geologic Types: Vertically upturned Devonian and Ordovician sedimentary rock strata adjacent to predominantly granitic basement rocks comprising the majority of the eastern Beartooth Range.

R. Miles of Stream Channels by flow regime:

STREAM TYPE	MILES
Perennial	0.52
Intermittent/Ephemeral	0.76
TOTAL	1.28

S. Transportation System: Approximately 1.9 miles of NFS administered roads fall within the West Fork Fire's burn perimeter: FR# 2071 (West Fork Rock Creek)- 1.1 miles, FR# 2071A1 (Rock Creek Bone Yard)- .1 miles, FR 2478 (Nichols Creek)- .37 miles, FR 24782 (Nichols Creek Spur)- .36 miles.

PART III - WATERSHED CONDITION

A. Burn Severity (Acres):

	Burn Severity				
Ownership	Low	Moderate	Moderate w/ high inclusions	Unburned with spots	Grand Total
PRIVATE	47.5				47.5
USDA FOREST SERVICE	85.8	36.6	27.5	54.3	204.2
Grand Total	133.3	36.6	27.5	54.3	251.7

B. **Water-Repellent Soil (acres):** 27.5 FS acres (assuming acreage burned under moderate severity with high inclusions all displays moderate hydrophobicity)

C. Soil Erosion Hazard Rating (acres) *

EROSION HAZARD	ACRES
moderate	0.0
high	64.2
severe	0.0
TOTAL	64.2

* No soil survey data exists for the Beartooth District, so systematic assignment of erosion hazard using NRCS/NASIS protocols was not feasible. Erosion hazard ratings were assigned assuming that erosion susceptibility will not change in soils burned under low severity. A high erosion rating was assigned to those areas burned under moderate severity or moderate severity with high inclusions.

D. Erosion Potential: 6.35 tons/ac/yr (ERMiT results for a forested hillslope burned under moderate severity 1 year post-fire, 20% probability of occurrence)

E. Sediment Potential: 3344 cubic yards / square mile (assume 1.2 tons/cubic yard of soil)

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years):	1-3 grass, 20-25 shrubs, 20-50 conifers
B. Design Chance of Success, (percent):	90
C. Equivalent Design Recurrence Interval, (years):	10 (25 year pre-fire)
D. Design Storm Duration, (hours):	6 hr. and 24 hr.
E. Design Storm Magnitude, (inches):	2.4 in and 4.2 in
F. Design Flow, (cubic feet / second/ square mile):	96
G. Estimated Reduction in Infiltration, (percent):	5
H. Adjusted Design Flow, (cfs per square mile):	101

PART V - SUMMARY OF ANALYSIS

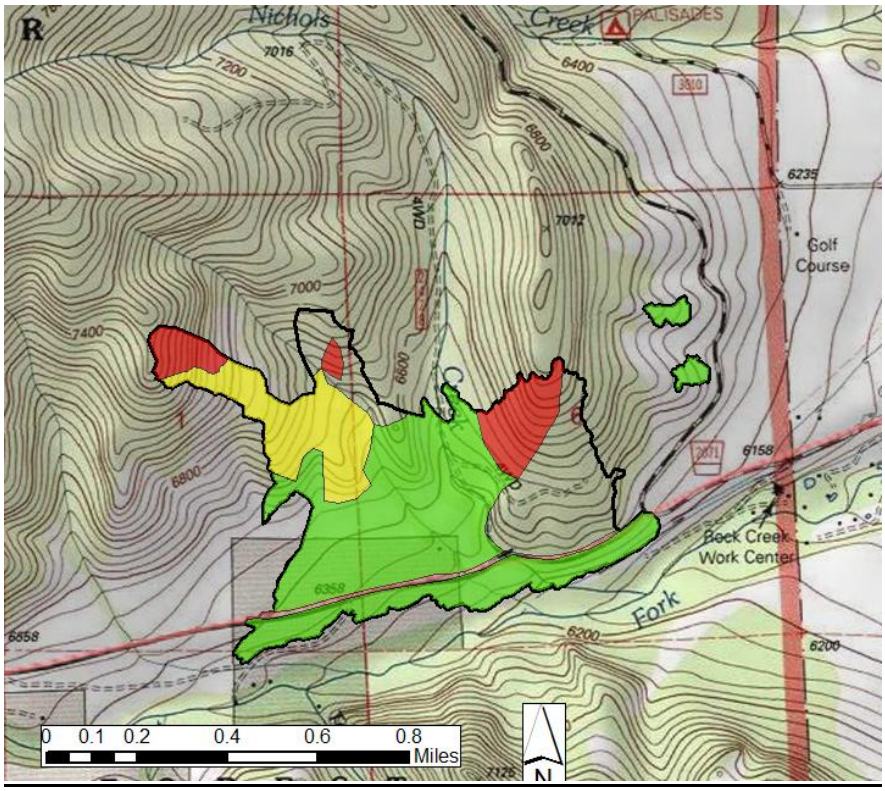
A. Critical Values/Resources and Threats:

The West Fork Fire started on March 28th in the Lamb Estates subdivision in the lower part of the West Fork Rock Creek drainage. Rapid fire spread occurred as a result of high winds (wind speeds in excess of 75 miles per hour were measured at Red Lodge Mountain Ski Area on the day of ignition) and as a result of lack of low-elevation snow in the area. Steep terrain and lack of available firefighting resources given the time of year challenged initial suppression efforts. Abatement of wind and a drop in temperatures, coupled with prolific soil moisture, facilitated suppression following the fire's initial run.

The fire's trajectory was generally upslope and down-canyon following ignition. As the fire moved upslope, the transition in fuel type from predominantly grass and sagebrush to forest resulted in an increase in burn intensity and severity (Photo 1). Pockets of high intensity burn were observed on steep slopes on both the west and east flanks of the fire perimeter. Prolific soil and litter moisture and minimal fire residence time were conducive to minimizing burn severity effects; while isolated pockets of high severity burn conditions were

observed, areas burned under moderate and high intensity largely correlated with moderate soil effects with inclusions tending toward high severity).

Photo 1. Example of moderate tending high burn severity within the West Fork Fire perimeter. Photo was taken on the west end of the fire near its highest elevation extent.



Map 1. Final severity map for the West Fork Fire. Red = Moderate Severity with High Severity Inclusions, Yellow = Moderate, Green = Low Severity, Clear = Unburned to Low Severity.

The physiography of the burned area is characterized by steep, south-facing hillsides north of and above the West Fork Road (FR# 2071) drained by Nichols Creek and an ephemeral/intermittent tributary. As noted above, lower elevations of the burned area (approximately 6200 to 6800 feet) are mostly open areas vegetated by grass and sagebrush with sparse coniferous tree presence. Higher elevation are mostly coniferous forest. Areas adjacent to streams are vegetated by primarily deciduous as well as coniferous tree species and shrubs. The burned area is composed of approximately 25% forested and 75% open areas.

Values at Risk:
Risks were assigned 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. The following post-fire effects and identified values at risk were identified and addressed where possible and appropriate with BAER treatment proposals:

- **Potential Loss of Native Vegetation and Ecological Integrity due to Fire-induced Weed Spread:** There are known aggressive noxious weed infestations in and adjacent to the burn area that will likely spread due to burned area conditions. Spotted knapweed has a large, perennial taproot and generally survives and sprouts after fire. It also produces large quantities of durable, heat-tolerant seed that can probably survive most grassland fires. This species colonizes after fire from seeds buried in soil or from off-site sources. Its seeds can remain viable in the soil for up to 12 years. Spotted knapweed can increase 14% in a year in undisturbed conditions. Leafy spurge has a large, deep, and highly regenerative root system which makes postfire sprouting of established plants nearly certain. Root systems of well-established older plants can regenerate from fragments even if roots are removed to a depth of three feet. Leafy spurge seeds are viable up to 8 years. Each flowering stem produces an average of 140 seeds. When the plant matures, the seed capsule explodes and launches the seeds up to 15 feet. Seedlings have capacity for vegetative reproduction and can develop root buds within 7 to 10 days of emergence. Burned sites have altered soil structure and reduced organic matter content creating a very favorable germination substrate for noxious weed seeds to establish and spread. Undisturbed areas in adjacent drier vegetation types are also at risk because the noxious weed species evolved in dry Mediterranean climates and are highly competitive under these similar site conditions.

  One of the most environmentally and economically damaging impact of wildfires is the post-fire invasion and aggressive spread of noxious weeds, which compete with desired native species for space and nutrients. Noxious weed spread changes species composition or structure of post fire plant communities, at the expense of native species and habitats. Soil productivity, native vegetation, wildlife habitat and forage, overall ecological integrity and land/property values in the vicinity of the Fire are values at risk from the threat of fire-induced noxious weed spread. Existing noxious weeds within and adjacent to the burned area and dozer lines that were constructed through weed infestations are factors that contribute to the risk of the situation.

  The West Fork Fire reduced or eliminated crown canopy, shrub, and forb cover in 64.2 acres of moderate severity burned areas of National Forest System Lands. These disturbed areas are highly vulnerable to weed invasion or weed spread from existing infestation or adjacent sources. If emergency mitigation activities are not implemented the weed problem will expand exponentially and will require future extensive resources to manage. If left unmanaged the results could alter plant communities, wildlife habitats, recreational experiences, and adjacent private land values.

- **Water Quality:** An ephemeral/intermittent draw to the west of the Nichols Creek drainage is tributary to the main stem of Nichols Creek. Approximately 50% of the drainage burned. Of the drainage area that burned, approximately 18% of that burned under moderate to high severity. The existing conveyance structure is an 18" diameter culvert under approximately 15 feet of road fill. The culvert is almost completely plugged both upstream and downstream of the West Fork Road.

  The majority of the fire area fell within the Lower West Fork Rock Creek 6th HUC, which serves as the municipal watershed for the City of Red Lodge. Projected increases in post-fire runoff elevate the risk of crossing failure and with it the potential for water quality impairment in Rock Creek.

- **Heritage/Cultural Resources:** The lower part of the West Fork Rock Creek drainage has numerous heritage resources, in part attributable to its close proximity to Red Lodge. Of chief concern among those as they pertain to the fire is the West Fork Rock Creek Road, which is eligible for the National Register of Historic Places. As noted above, one crossing along the West Fork Rock Creek Road is at elevated risk of failure due to the potential for increased runoff post-fire, potentially affecting the historic character of this road.

Non-FS Values at Risk:

- **Egress from Private Inholdings:** The West Fork Rock Creek Road is the sole access road to many private residences on inholdings in the lower part of the West Fork Rock Creek drainage. Should the road wash out as a result of post-fire runoff, vehicle access for residents would be cut off. While the increased risk for road washout poses a hazard to private residents, BAER authority is not designed to address non-FS Values at Risk; proposed BAER treatments for the road-draw crossing of concern have been prescribed with the explicit intent of addressing only NFS values at risk.

In accordance with the revised Forest Service manual, the risk matrix below (Exhibit 2 of Interim Directive No.: 2520-2010-1), was used to evaluate the Risk Level for each value identified during the Rock Creek fire BAER assessment. Only treatments that had a risk of Intermediate or above have been recommended for BAER authorized treatments.

Probability of Damage or Loss	**Magnitude of Consequences**		
	Major	Moderate	Minor
	RISK		
Very Likely	**Very High**	**Very High**	**Low**
Likely	**Very High**	**High- Weeds**	**Low**
Possible	**High- Road Crossing**	**Intermediate**	**Low- Soil and Water Quality**
Unlikely	**Intermediate**	**Low**	**Very Low**

Probability of Damage or Loss: The following descriptions provide a framework to estimate the relative probability that damage or loss would occur within 1 to 3 years (depending on the resource):

- Very likely. Nearly certain occurrence (90% - 100%)
- Likely. Likely occurrence (50% - 89%)
- Possible. Possible occurrence (10% - 49%)
- Unlikely. Unlikely occurrence (0% - 9%)

Magnitude of Consequences:

- Major. Loss of life or injury to humans; substantial property damage; irreversible damage to critical natural or cultural

resources.

- Moderate. Injury or illness to humans; moderate property damage; damage to critical natural or cultural resources resulting in considerable or long term effects.
- Minor. Property damage is limited in economic value and/or to few investments; damage to critical natural or cultural resources resulting in minimal, recoverable or localized effects.

Potential Loss of Native Vegetation and Ecological Integrity due to Fire-induced Weed Spread: Without action, it is "***Likely"*** that there will be new weed infestations within the burned area in the next year. This infestation will result in a loss of native vegetation and ecological integrity as weeds proliferate throughout the burned area due to weed seed/propagule sources from the weed infestions found in and adjacent to the burned area. The magnitude of consequences is considered "***Moderate***" since weed establishment and spread is not irreversible with treatment. However, as infestation's density increases, significant financial input will be required to attempt reversing the invasion over a long-term due to the aggressive nature of the species.

Water Quality/Heritage Resources (Road Crossing): Past experience in this area has shown that a 10-year (i.e. 1 in 10) recurrence interval short duration precipitation event may be large enough to produce substantial post- and pre-fire runoff events; i.e. Probability of Damage or loss is ***Possible***. Road washout could result in loss of life or injury, damage to an important heritage resource, and potential municipal water quality degradation; such an occurrence would have ***Major*** consequences.

B. Emergency Treatment Objectives:

- Weeds and native vegetation recovery - Reduce the risk of expansion of existing infestations of noxious weeks and allow burned plant communities to recover more rapidly.
- Road crossing - Mitigate effects of changed post-fire watershed response (runoff, erosion, and deposition) by stormproofing one crossing along the West Fork Rock Creek Road.

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

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

D. Probability of Treatment Success

	Years after Treatment		
	1	**3**	**5**
Land (weeds)	70	70	90
Roads/Trails	95	85	75

E. Cost of No-Action (Including Loss): Approx. $66,000

Cost of No-Action relative to weed spread: Wildfire effects include loss of vegetative cover and changes to soil properties that may lead to secondary effects of vulnerability to aggressive noxious weeds. These secondary effects may threaten native plant communities, forage resources, and overall ecological integrity. An Implied Minimum Value (IMV) approach (Calkin et.al. 2007) was used to avert loss of these non-market resources. IMV equals the treatment cost divided by the reduction in likelihood of experiencing a negative outcome: The IMV value of the non-market loss without mitigation is $5342[1].

Cost of No-Action further assumes that the West Fork Rock Creek road would require an increased culvert size, paving, and slope armoring. Contracting and mobilization costs would also be incurred.

[1] $3190 treatment cost
IMV $5342= (90% Probability that loss occurs with no treatment minus 30% Probability that loss occurs with treatment)

F. Cost of Selected Alternative: $ 24,375

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Andy Efta

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

Core Team Members:

- Andy Efta - Hydrology/Soils
- Kim Reid – Range/Botany/Noxious Weeds
- Terry Jones – Range/Noxious Weeds
- Mary Gonzales – GIS
- Dave Shimek - Engineering
- Halcyon LaPoint – Heritage
- Mike Bergstrom – Heritage

H. Treatment Narrative:

Land Treatments

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

About 95 NFS acres of the 150 burned NFS acres are predominantly infested with spotted knapweed and leafy spurge which are the most aggressive weed species in the area. Eight acres of infestations are in areas where there is moderate soil burn severity with high severity inclusions, while the remainder occurs within predominantly low to moderate burn severities.

No incident weed wash stations were used during the fire. Due to the emergency situation, a local county-owned dozer was used. It was inspected for weeds and cleanliness previous to entry on the fire. Dozer lines did cut through known infested sites, however, heightening the probability of weed spread to areas not previously infested.

Suppression dozer lines (0.28 NFS total miles or less than 1 acre) are considered prime weed beds, especially with a large infestation being in the area and suppression activities possibly moving seed source around suppression lines. The fire burned both grassland and forest land and eliminated natural competition for invaders, creating perfect habitat for noxious weed invasion and expansion.

Recommended land treatments to mitigate the unacceptable risks are weed detection and herbicide ground application treatments. Areas at risk from invasion were identified for early detection monitoring to determine where treatment will be needed to protect vulnerable vegetation resources and ecological integrity. One of the most important steps of prevention is early detection. Weeds are far easier to control in the early stages of development. If the weeds do get a strong foothold it makes it very hard to control and/or eradicate. Weed treatment will concentrate on those areas of known weed infestations to treat fire-induced weed spread within fire perimeter and in the vicinity of the suppression lines outlined above under areas at risk. Immediate weed treatment is needed to prevent known weed infestations from quickly flourishing after the fire and creating large

sources of weed seeds. Proposed treatments will follow Forest Service regulatory requirements and protocols in accordance with existing 1986 Custer Forest Plan and 2006 Custer National Forest Weed Management EIS NEPA decisions.

Road Treatments: As noted above, both the inlet and outlet of the Nichols Creek unnamed tributary crossing of concern are nearly 100% blocked (Photos 2 and 3), further exacerbating the potential for crossing failure in the event of a large post-fire runoff or debris flow event.

Post-fire storm flow runoff was estimated using the unit hydrograph method (SCS, 1973). Runoff curve numbers for modeled watersheds were derived from NRCS reference, discussion with other R1 hydrologists, and previous BAER reports. A composite curve number was established via weighted average based on drainage area burned under each constituent severity class. Further details can be found in Efta (2015).

The ephemeral draw crossing was evaluated for flow capacity in order to determine its adequacy to convey post-fire design storm flow events. Following field data acquisition, culvert capacity was estimated using culvert hydraulic capacity values from Robison et al. 1999. As a supplement to Robison and others, culvert capacity was estimated using HY-8 Culvert Hydraulic Analysis Program (FHWA, 2010). Although a design culvert headwater/depth (HW: D) ratio should generally be less than 1.5, the culvert was modeled using the entire depth of fill above the culvert (i.e. assuming a headwater elevation at the top of the road fill. Though a 10 year post-fire design event was evaluated and used for making BAER treatment recommendations, crossing capacity with respect to the 25 year post-fire design flows was also evaluated. Past experience on the Custer side of the Custer Gallatin National Forest has shown that 25 year precipitation events post-fire have yielded post-fire storm flows well in excess of a 25-year recurrence interval.

A modest increase in runoff response is projected as a result of the West Fork Fire (Table 1). The hydraulic capacity of an 18” diameter culvert is approximately 5 cfs. The 10 year post-fire discharge is projected to change by approximately the entire hydraulic capacity of the culvert.

HY-8 analysis suggests that the West Fork Rock Creek Road would overtop at approximately 23 cfs, well below that of the projected 10 year post-fire discharge event. Of note is that the roadside ditch to the east of the crossing would accommodate some storm flow and convey it to Nichols Creek.

Table 1. Modeled discharge in cubic feet per section at the West Fork Rock Creek Road intersection with the intermittent/ephemeral draw west of Nichols Creek.

	Return period (years)					
Modeled condition	2	5	10	25	50	100
pre-fire	5.8	18.7	32.1	66.1	85.5	106.3
post-fire	7.2	21.8	36.5	72.0	92.0	113.7

Acknowledging the inherent uncertainty in runoff modeling both pre- and post-fire, model estimates nonetheless suggest that there is an elevated risk of crossing overtopping and failure should a 10-25 year post-fire runoff event occur. To address this elevated risk, a combination of stormproofing and cleanout measures has been recommended. These measures would include armoring the upstream fill slope and hydraulic flushing of the culvert to remove sediment blockage. Storm inspection and response will also be done after annual higher flows and within one year to ensure this culvert remains clear and able to pass flows.

Photos 2 and 3. Culvert outlet (left) and inlet (right, near rock at base of fill slope) where the West Fork Rock Creek Road crosses the unnamed tributary to Nichols Creek.

Runoff modeling suggests that the existing culvert is not adequately sized to accommodate anticipated post-fire runoff. While crossing replacement would be ideal, this would require tunnel boring under a paved road and would risk damaging the road surface through settling; implementation would be quite expensive and potentially incur peripheral damage to infrastructure during implementation. Given the modest projected increase in post-fire runoff, ponding capacity upstream of the culvert, and overflow capacity provided by the roadside ditch draining to the main Nichols Creek drainage, the more cost effective approach for addressing the elevated risk of crossing failure was chosen as the most viable treatment alternative.

References:

Efta, J.A. 2015. West Fork Fire BAER Hydrology/Soils Report. 9 p.

FHWA, 2010. Culvert Hydraulic Analysis Program, Version 7.2. Federal Highway Administration. http://www.fhwa.dot.gov/engineering/hydraulics/software/hy8/

Robison, E. George; Mirati, Albert; Allen, Marganne. 1999. Oregon road/stream crossing restoration guide: spring 1999. Salem, OR: Oregon Department of Forestry. 79 p. Available on USDA Forest Service Burned Area Emergency Response Tools website (Flow capacity for circular and pipe-arch culverts. http://forest.moscowfsl.wsu.edu/BAERTOOLS/ROADTRT/Treatments/supplement.html#Robison1999.

SCS, 1973. Engineer Field Manual for Conservation Practices. Chapter 2: Peak Rates of Discharge for Small Watersheds. US Department of Agriculture, Soil Conservation Service.

I. Monitoring Narrative:

Part VI – Emergency Stabilization Treatments and Source of Funds

Line Items	Units	Unit Cost	# of Units	BAER $	Other$
A. Land Treatments					
Weed detection, monitoring, and treatment[1]	Ac	$42.53	75	$3,190	$0
Subtotal Land Treatments				$3,190	$0
B. Channel Treatments					
C. Roads and Trails					
Crossing stabilization	EA[2]	$21,151	1	$20, 391	$0
Post-storm crossing inspection	EA[3]	$794	1	$794	
Subtotal Roads and Trails				$21,185	$0
D. Protection and Safety					
E. BAER Evaluation					
Assessment (person days)	Days	$350	15		$5,250
Travel costs					
Subtotal Evaluation					$5,250
F. Monitoring					
G. Totals					
Previously approved				$0	
Total for this request				$24,375	

[1]See Attachment A for full breakdown of weeds treatment cost.
[2]See Attachment B1 for full breakdown of crossing stabilization cost.
[3]See Attachment B2 for full breakdown of post-storm crossing inspection cost.

PART VII - APPROVALS

1. _____ 05/11/2015
Forest Supervisor Date

2. _____ 05/11/2015
Regional Forester Date

Attachment A. Weed Detection, Monitoring, and Treatment Cost Schedule

Table 1. Estimated Weed Detection Cost

Monitoring Phase	Resources Needed	Estimated Unit Cost	Estimated Total Cost
55 Ac	2 Person Days 4-wheel Drive Pickup and 2 ATVs (20 miles)	$300/person/day .60/mile*	$600 $15
Total Cost			**$615**

Table 2. Estimated Cost for Treatment

Activity	Cost/Ac[2]	Estimated Wetted Ac	Total
Ground Herbicide Treatment by ATV/UTV	$90.00	15	$1350
Ground Herbicide Treatment by Backpack	$245.00	5	$1225
Total		**20**	**$2575**

Table 3. Summary of Herbicide Ground Application Weed Treatment and Monitoring Cost

NFS Weed Treatment Area	Treated Acres	Detection Acres	NFS Cost
Burn Area Infestation (From Table 2 Total)	20		$2575
Detection Monitoring (From Table 1 Total)		55	$615
NFS Total	**20**	**55**	**$3190**

[2] Based on current Weed Treatment IDIQ Contract Costs

Attachment B1. Crossing Stabilization Schedule

	Item Number	Pay Item	Measurement	Pay Unit	Estimated Quantity	Unit Price	Total
BASE BID	15101	Mobilization	LSQ	LS	All	XXXXXX	$ 1,300.00
	60201	Clean 18"x100' CMP	AQ	Each	2	$ 3,400.00	$ 6,800.00
	60202	Clean culvert inlet and outlet with leadoff ditch to daylight. Grade to drain.	AQ	Each	1	$ 2,500.00	$ 2,500.00
	251	Rirap collection and placement. Collection along West Fork Rock Creek Road	DQ	SY	80	$ 52.00	$ 4160.00
	63501	Temporary traffic control	LSQ	LS	All	XXXXXX	$ 750.00
						TOTAL	**$ 15,510.00**

Contract Preparation 15%	**$ 2,440.50**
Contract Administration 15%	**$ 2,440.50**
GRAND TOTAL	**$ 20,391.00**

Attachment B2. Estimated Post-Storm Crossing Inspection Cost

Resources Needed	Estimated Unit Cost	Estimated Total Cost
2 Person Days	$350/person/day	$700
4-wheel Drive Pickup (240 miles)	.39/mile	$94
TOTAL COST		**$794**