Date of Report: 9/16/2019

Cherry Fire – Humboldt-Toiyabe National Forest

BURNED-AREA REPORT

PART I - TYPE OF REQUEST

A. Type of Report

☒ 1. Funding request for estimated emergency stabilization funds
☐ 2. No Treatment Recommendation

B. Type of Action

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

☐ 2. Interim Request #___
☐ Updating the initial funding request based on more accurate site data or design analysis

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Cherry Fire

B. Fire Number: NV-HTF-010291

C. State: Nevada

D. County: White Pine & Elko

A. Fire Name: Cherry Fire

B. Fire Number: NV-HTF-010291

E. Region: 04 - Intermountain

F. Forest: 17 – Humboldt-Toiyabe National Forest

G. District: Ruby Mountain-Mountain City - Jarbidge

H. Fire Incident Job Code: P4MQL4

I. Date Fire Started: 09/02/2019

J. Date Fire Contained: 09/09/2019

K. Suppression Cost: 1.9 million +

L. Fire Suppression Damages Repaired with Suppression Funds (estimates):

1. **Fireline repaired (miles): 7.1 miles of dozerline and 1.5 mile of handline**
2. **Other (identify): Cut fences repaired. Fire line seed and herbicide application to dozerlines have been approved but work is not complete (S#'s are approved)**

M. Watershed Numbers:

Table 1: Acres Burned by Watershed

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
160401030202	Sestanovich Creek	9911	1509	15
160401030204	Walker Canyon-Huntington Creek	39650	1876	5
160401030301	Sherman Creek-Huntington Creek	35339	126	<1

N. Total Acres Burned: 3,499 acres

Table 2: Total Acres Burned by Ownership

OWNERSHIP	ACRES
NFS	3,449
OTHER FEDERAL (LIST AGENCY AND ACRES)	0
STATE	0
PRIVATE	50
TOTAL	3,499

O. Vegetation Types: Mountain brush including PJ and aspen, willow dominated aspen, sage steppe

P. Dominant Soils:

Map Unit Symbol	Map Unit Name	Rating	Acres in Fire	Percent of Fire
1212	Bobs-Xine association	Very gravelly loam	1527	44%
1370	Wardbay-Haunchee-Lorgana association	Very gravelly loam	1117	32%
851	Grink-Onkeyo-Xine association	Stony loam	483	14%
763	Segura-Douhide-McIvey association	Very cobbly loam	325	9%

844	Hackwood-Bendastik-Bullump complex	Slightly decomposed plant material	25	1%
690	Chug-Welch association	Ashy loam	22	1%

Q. Geologic Types: Mixed minerology colluvium and fine grained carbonaceous bedrocks

R. Miles of Stream Channels by Order or Class:

Table 3: Miles of Stream Channels by Order or Class

STREAM TYPE	MILES OF STREAM
PERENNIAL	7.0
INTERMITTENT	
EPHEMERAL	
OTHER (DEFINE)	

S. **Transportation System:**
Trails: *National Forest (miles):* 0 *Other (miles):*
Roads: *National Forest: 19.50 – This includes motorized trails that are full width*

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Table 4: Burn Severity Acres by Ownership

Soil Burn Severity	NFS	Other Federal (List Agency)	State	Private	Total	% within the Fire Perimeter
Unburned	170	---	---	10	180	5
Low	990	---	---	24	1,014	29
Moderate	2,167	---	---	16	2,183	62
High	122	---	---	0	122	4
Total	3,449	---	---	50	3,499	

B. Water-Repellent Soil (acres): 122

C. Soil Erosion Hazard Rating: Moderate

D. Erosion Potential: Moderate**Sediment Potential:** Moderate

F. Estimated Vegetative Recovery Period (years): 1-3 years for hillslope grass components, 5-10 years for shrub components

G. Estimated Hydrologic Response (brief description): The fire burned across mid-catchment positions and did not spot into upper portions of the watersheds. Burned hillslopes are not overly steep. There are no extensive areas of high soil burn severity. Accordingly, watershed mass and energy response is expected to be limited. Channel sediment and ash deliveries should be expected. Damaging mud and debris flows are possible assuming a 5-yr return interval storm occurrence prior to soil cover recovery.

PART V - SUMMARY OF ANALYSIS

Introduction/Background

The Cherry Fire burned 3,499 acres of the low frontal Ruby Mountains. The fire burned in a mid-catchment location and did not spot into upper portions of the watersheds. Burned hillslopes are not overly steep. There are no extensive areas of high soil burn severity, consisting mostly of low to moderate. Accordingly, watershed mass and energy response is expected to be limited. Channel sediment and ash deliveries should be expected. Damaging mud and debris flows are possible but dependent on a high intensity rainfall prior to soil cover recovery. The soil mantle in the burned area is continous. Soil development is moderately weak but subsidized in thickness and texture by longterm additions of periglacial dust. In prefire condition, littering zones beneath trees had complete O horizon sequences while the interspaces between trees were generally devoid of litter and vegetation. This surface litter pattern provided soil stability and rapid infiltration directly under tree canopies. In addition, a portion of the fire burned into a fuels treatment unit prepped with standing burn piles of cured pinyon and juniper. The Cherry Fire burned these piles relatively completely leaving distinct circles of black and white ash. This level of consumption is higher and more extensive than would be achieved in a prescribed fire action, and exhibits a repeating pattern of moderate and high soil burn severity patches. Given the vulnerability of the area to invasive annuals, the area warrants special protections. This is a heavily recreated area and the roads and trails provide range management access as well as hunting and recreation opportunities. Additionally, this area is classified by the Nevada Department of Wildlife (NDOW) as an important winter mule deer migration corridor and as critical winter habitat. Furthermore, within the fire perimeter is located a large sage-grouse management area (SGMA) and priority sage-grouse habitat.

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

Table 5: Critical Value Matrix

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	**High**	**Intermediate**	**Low**
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 too few investments; damage to critical natural or cultural resources resulting in minimal, recoverable or localized effects.

Several critical values were identified as being at risk. They include a road and motorized trail network and the native plant community. The threats to these resources are discussed below in the table. Only those threats that have a high or very high risk level associated with them were brought forward for treatment proposals.

Based on the Risk assessment exihibit 2 in FSM 2500-2017-1 (copied above) the following value at risk table was developed.

Color Scheme Legend	
	Risk Level

	Very High
	High
	Intermediate (Where Treatments Are Recommended)

Value At Risk	Relevant Allotments	Value Life (L), Property, (P), Resources (R)	Probability of Damage or Loss	Magnitude of Consequences	Risk	Discussion
A. Native plant community where invasive species or noxious weeds are absent or present in only minor amounts	Sherman Creek C&H Cherry Spring C&H	R	Very Likely	Moderate	Very High	*These allotments had pre-existing populations of leafy spurge and Canada thistle within the fire perimeter, primarily located in creek drainages. The majority of the fire exhibited moderate soil burn severities (Appendix A), causing moderate to high ground disturbance opening up soil resources for the expansion of opportunistic weeds in the fire scar. *Cheatgrass and field brome within the fire perimeter, though minimal in acreage, were distributed along the roadsides throughout the burned area. Abundant vectors exist within each of these allotments within the fire perimeter. These include large numbers of roads through each area that experience high traffic each fall during hunting season. Vectors also include mule deer for whom this area represents and integral part of their migration route. The abundance of vectors through which invasive annual seeds can be dispersed throughout the fire area result in high current vulnerability to their expansion in the fire scar. This risk is further increased due to the large proportion of moderate burn severities, leaving soil exposed and vulnerable to expansion of invasive plant species. *The habitat vulnerability of the native plant community was determined to be high pre-fire in phase 3 juniper woodlands and moderate in phase 1 and 2 juniper woodlands do to the decrease in herbaceous understory of juniper woodlands as canopy cover increases (Miller et. Al. 2015). When moderate to high intensity fire causes juniper mortality the understory is opened up for plant establishment, and due to low ground cover of native perennial grasses and forbs pre-fire, particularly in phase 3 juniper, these areas are very susceptible to the establishment of opportunistic invasive annual grasses (Miller et. Al. 2015). *Approximately 7 miles of dozer line were constructed during suppression activities. These dozer lines passed through areas along roadsides with existing infestations of cheatgrass and field brome into un-infested portions of the Forest and fire scar. This event is

						very likely to have spread invasive annual seed throughout the fire scar which in turn creates high potential for this invasive annual grass to expand its range. Furthermore, no mitigation measures were implemented during fire suppression to decrease the spread of noxious weeds. A weed wash station was used only as part of demobilization. *High traffic on all roads throughout the fire area during suppression activities is very likely to have further contributed to the spread invasive annual grass seeds throughout the fire scar due to existing infestations of cheatgrass and field brome along the roadsides. This dispersal of seed greatly increases the risk of expansion post fire.
B. Spread of weeds and invasive species from adjacent private, BLM, and state owned lands	Non FS Land	R	Likely	Moderate	High	*Meetings were held with each of the affected grazing permittees who also own the land adjacent to the fire perimeter. They expressed that their largest concern is the potential for expansion of cheatgrass and Canada thistle populations both on FS land and within their private land. In the portions of the private land that burned the potential for weed expansion appears to be likely but not large in scale do to the low acreage of private land that burned (50 acres).
rd381		P	Likely	Major	Very High	The road is as low in the meadow bottom as the stream. This is causing it to capture flows from the adjacent areas and act as a creek. Due to the fine soil texture wet soil condition use of the road has damaged the majority of the cross-drainage features in the road. The road prism has the potential to become a gully for the length through the fire area and continue downstream for again as far. The fire suppression personnel rerouted a small section of the road which the district desires to keep and abandon the bad section- they propose to pay for this portion of the work to be done while the stabilization is being implemented.
rd382		P	Likely	Moderate	High	Due to the fine soil texture the cross-drainage structures in the road surface are being driven out

Cattle Guard in 382	L	Possible	Major	High	Due to the missing rail pieces in the cattle guard deck there is a likely hood that a motorbike or similar vehicle could have an accident causing injury or death to the driver. Due to the irregular spacing in the gaps caused by the missing rails it is also hazardous for people to walk across the cattle guard due to the gaps being large enough to trap a foot. It is also a safety risk to implementation personnel to be changing tires on the heavy equipment in the field. The distance for response vehicles and to the area hospital compounds the risk. There is no gate present in the fence to allow for closure of the crossing and a temporary reroute until the district can replace the deck. Likewise, the deck cannot just be removed due to the void under the deck that would need to be filled with road base in order to not leave a tank trap in the road. The haul distance for road base increases the cost of this alternative and increases the cost of removal once the district is ready to replace the deck. Due to the fire being accessed by this road the attractive nuisance of the fire area will cause increased visitorship and increased risk to the public.
	P	Likely	Moderate	High	Due to the missing rails in the deck and where they are broken/cut there is a likely- hood of slashing sidewalls of implementation vehicles and heavy equipment. Heavy equipment tires are at minimum $1000 each to replace. Travel time to get new tire(s) coupled with the down time of the equipment would add to the cost of implementation. It is also a safety risk to implementation personnel to be changing tires on the heavy equipment in the field.
rd388	P	Likely	Moderate	High	Due to the fine soil texture the cross-drainage structures in the road surface are being driven out
rd816	P	Likely	Moderate	High	Due to the fine soil texture the cross-drainage structures in the road surface are being driven out
rd850	P	Likely	Moderate	High	Due to the fine soil texture the cross-drainage structures in the road surface are being driven out

rd735	P	Likely	Moderate	High	Due to the fine soil texture the cross-drainage structures in the road surface are being driven out
Fire Area Visitor Safety	L	Possible	Moderate	Intermediate	Rock roll out, increased flood flows and increased debris flows are all potential hazards to the fire area visitor.

B. Emergency Treatment Objectives:

- Fire Area Visitors: advise them of changing conditions and that caution is needed while in the burned area.
- Authorized Motorized Routes: ensure proper drainage function on the roads to ensure that they are storm stable thereby preventing unacceptable sediment discharge and loss of the property that are the roads.
- Native Plant Community: treat new infestations and expanding areas of infestations to prevent the loss of the highly valued native plant community and to prevent establishment of new infestations.

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

Land 90 **Channel** N/A
Roads/Trails 90 **Protection/Safety** 100

D. Probability of Treatment Success

Table 6: Probability of Treatment Success

	1 year after treatment	***3 years after treatment***	***5 years after treatment***
Land	90	80	80
Channel	N/A	N/A	N/A
Roads/Trails	85	75	70
Protection/Safety	100	100	100

E. Cost of No-Action (Including Loss):

Land Treatments:
It is difficult to place monitary value on the loss of 3,449 acres of high value mule deer and sage grouse crucial habitat, 1,829 acres of Horse Management Area, in addition to valuable rangelands. If the proposed BAER treatment is not funded, it is expected that non-native invasive annual grasses and noxious weeds will expand throughout the burned area. The expected consequences include: diminishing the quality of crucial wildlife and wild horse habitat and decreasing the value of forage production for both livestock and wildlife.

A conservative prediction would be that if the fire scar is left to recover naturally with no chemical treatment intervention or seeding efforts that the amount of new acres infested would triple. This would consequently triple the cost in subsequent years to treat the new infestations if small pilot populations are not controlled in year one. In Mesa Verde National Park researchers tracked the response of noxious weeds following six different wildfires and found that if weeds went untreated they persisted in the plant communities for at least 13 years (Floyd et al.) Furthermore, on one fire only six years after the burn Canada thistle and cheatgrass had expanded their area by 260 percent (Floyd et. Al, 1993). Failure to address the potential spread of noxious weeds found within the Cherry Fire perimeter could lead to a tripling of these populations within six years.

Unmeasurable items: loss of soil productivity, loss of mycorrhizae in the soil due to cheatgrass expansion (FEIS), and decrease in forage production due to lost soil productivity for wildlife and livestock.

The Cost of No-Action including loss would be $244,551 if left to treat in subsequent years post fire after populations have expanded.

Road and Trail Treatments:

Rd#	Treatment Need	Cost of no action
381	Repair drainage whole length and stabilize abandoned bed section (less than .1 mile) (suppression made a new route) so that it does not turn into a gully.	$225,000
382	Repair/touch up 40 cross drainages.	$47,000
	Replace hazardous cattle guard deck and wings	Several broken rails that could flat equipment tires at $1000 per tire plus hours to get repaired or cause a motorcycle to crash with significant injury potential plus $10,200 to fix. No gate present to use as alternative.
388	Was visited but no treatments are recommended at this time	--
816	Repair/touch up 6 cross drainages	$20,000
363	Repair/touch up 4 cross drainages	$20,000
850 and 735	Repair/touch up 35 cross drainages.	$45,000
		$357,000

F. Cost of Selected Alternative (Including Loss): $294,277 for the herbicide treatment, seeding, biochar, roads implementation, and implementation overhead proposal, as opposed to $605,331 if left to treat in subsequent years post fire after populations have expanded and roads have deteriorated.

G. Skills Represented on Burned-Area Survey Team:

☒ Soils ☒ Hydrology ☒ Engineering ☒ GIS A Archaeology
☒ Weeds ☒ Recreation A Fisheries A Wildlife
☐ Other:

Team Leader: Robin Wignall
Email: robin.wignal@usda.gov **Phone(s) 775-778-6122**

Forest BAER Coordinator: John McCann
Email: john.mccann@usda.gov **Phone(s): 775-355-5339**

Team Members: Table 7: BAER Team Members by Skill

Skill	Team Member Name
Team Lead(s)	Robin Wignall, Brian Hansen (T)
Soils	Sam Prentice
Hydrology	Robin Wignall
Engineering	Doug Nesbit
GIS	Allison Bruner (consulted)
Archaeology	Chimalis Kuehn (consulted)
Weeds	Cecily Fitch, Matt Makison (T)
Recreation	Brian Hansen
Wildlife	Kyra Ried (consulted)

H. Treatment Narrative:Land Treatments:

Proposed Action: 1) To treat 25 acres of noxious weeds that are predicted, based on current population sizes, to expand within the fire scar. 2) To treat 60 acres within the lop, scatter, and pile juniper treatment area for cheatgrass expansion. 3) To reseed the 60 acres within the lop, scatter, and pile juniper treatment area to help the naturalized plant community re-establish; also, to seed 230 acres along target roadsides within the fire perimeter to reduce the potential spread of cheatgrass and field brome into the fire scar. 4) To establish a study plot using bio char on the lop, scatter, and pile juniper treatment area within the fire to help determine if bio char may be a valuable too to mitigate the expansion of invasive annual grasses on future fires. These alternatives were selected because early treatment of smaller acreages prove to be more economically efficient than trying to rehabiliate the landscape once these populations have expanded. All references to appendices refer to the specialsit report.

A) Noxious Weed Herbicide Treatment (Early Detection and Rapid Response): BAER

A fall and a spring treatment are proposed in order to target expanding populations of the noxious weeds leafy spurge and Canada thistle. Treatments will focus on the new pilot populations and expansion surrounding their current known infestation locations (Appendix B), in order to mitigate the spread of these two weed species within the fire scar. Two treatments are necessary in order to reduce the invasive plant establishment risk to an acceptable level within the first year following the fire; “repeated treatments over the course of many years are required to eradicate weed populations,” (“Noxious Weed Treatment Project” USDA). The cost estimates for the proposed treatments are found in the table below. Cost per acre for a contractor was estimated by calling several local vendors and getting an average cost. These costs were in align with bids received for an herbicide contract for the South Sugarloaf Fire (2018) scar. Herbicide cost estimates were determined through calling a local herbicide distributor and getting quotes on the appropriate quantities and kinds of herbicides. Treatments will be centered in downwind and downstream areas from existing infestations because of the higher seed dispersal potential. These recommended species treatments and estimates were put together by Brett Glover, former Forest Service H-T Weed Management Specialist who worked on the District managing noxious weeds for over 15 years.

Furthermore, a fall or spring herbicide treatment is proposed to target the establishment and expansion of the invasive annual grass cheatgrass into the lop, scatter, and pile units of Juniper that were treated on the Forest pre-fire. This area began as a project to improve sage grouse habitat and transitioned into a fuels reduction project, and focused on manually cutting down all juniper within the treatment area. In large portions of the project area the felled trees were stacked into piles by a crew. The treatment area focused on juniper woodlands that had entered phase 3.

The decision to request funding for contracted herbicide treatments on the Forest are based on the lack of capacity to complete these treatments through Forest personnel and due to hiring and retention issues. Putting EDRR funds into a contracted treatment will better ensure that the emergency stabilization work is completed on the Cherry Fire in order to protect the values at risk.

Spring and Fall of 2020 Noxious Weed Treatment

Contract Price	**Acres to be Treated**	**Season of Treatment**	**Treatment Method**	**Unit Cost**	**Total**
$100/acre	5	Spring	atv/utv	$100/acre	$500
$150/acre	10	Spring	backpack	$150/acre	$1,500
$100/acre	5	Fall	atv/utv	$100/acre	$500
$150/acre	5	Fall	backpack	$150/acre	$750
Herbicide Price	**Acres to be Treated**	**Season of Treatment**	**Treatment Method**	**Unit Cost**	**Total**
Multiple herbicides*	25	Fall/Spring	truck/atv/utv/backpack	$400	$400

Line Item	Unit Cost	Total
COTR	$410 per day x 3 days	$1,230
Inspectors/Contract Pre-tour/Close-out**	(2) $242 & (1) $364 @ 4 days	$3,392
Vehicle mileage***	$0.60 per mile x 1,440 miles	$864
FACTS Data Input	$450 per day x 2 days	$900
	Grand Total:	**$10,036**

*Dependent on timing of the year when treatment occurs.
**Represents 2 GS 9 level inspectors and 1 GS 11 level inspector each with 4 days for a total of 12 days.
***50 miles out to site, 100 miles round trip. 20 miles around sites totals 120 miles total per day. 12 days (4 for each inspector) totals 1,440 miles travelled for inspections.

Fall of 2019 or Spring 2020 Lop, Scatter, and Pile Unit Treatment

Contract Price	Acres to be Treated	Season of Treatment	Treatment Method	Unit Cost	Total
$100/acre	50	Fall or Spring	atv/utv	$100/acre	$5,000
$150/acre	10	Fall or Spring	backpack	$150/acre	$1,500
Herbicide Price	**Acres to be Treated**	**Season of Treatment**	**Treatment Method**	**Unit Cost**	**Total**
Multiple herbicides*	60	Fall/Spring	truck/atv/utv/backpack	$1,440	$1,440

Line Item	Unit Cost	Total
COTR	$410 per day x 3 days	$1,230
Inspectors/Contract Pre-tour/Close-out**	(2) $242 & (1) $364 @ 4 days	$3,392
Vehicle mileage***	$0.60 per mile x 1,440 miles	$864
Facts Data Input	$450 per day x 3 days	$1,350
	Grand Total:	**$14,776**

*Dependent on timing of the year when the contract is implemented.
**Represents 2 GS 9 level inspectors and 1 GS 11 level inspector each with 4 days for a total of 12 days.
***50 miles out to site, 100 miles round trip. 20 miles around sites totals 120 miles total per day. 12 days (4 for each inspector) totals 1,440 miles travelled for inspections.

B) Noxious Weed Herbicide Treatment (Early Detection and Rapid Response): SUPPRESSION

A request has been approved for an S number to fund a fall herbicide treatment of all roadsides and dozer lines within the Cherry fire perimeter. A follow up treatment request is found below to treat one fourth of what will be treated in the fall of 2019 to ensure that the unacceptable risk to the naturalized plant community is sufficiently reduced in year one post-fire. This treatment would total 75 acres of spot treatments along all roadsides in the fire area. The cost per acre was acquired by averaging the price of four vendors who bid on a similar herbicide contract on the District in 2019.

Spring 2020

Line Item	Unit Cost	Total
Herbicide Contract	Labor + Herbicide: $130/acre @ 75 acres	$9,750
COTR	$410 per day x 3 days	$1,230
Inspectors/Contract Pre-tour/Close-out*	(1) $242 & (1) $364 @ 4 days	$2,424
Vehicle mileage**	$0.60 per mile x 960 miles	$576
FACTS Data Input	$450 per day x 3 days	$1,350
	Total:	**$15,330**

* Represents 1 GS 9 level inspectors and 1 GS 11 level inspector each with 4 days for a total of 8 days.
**50 miles out to site, 100 miles round trip. 20 miles around sites totals 120 miles total per day. 8 days (4 for each inspector) totals 960 miles travelled for inspections.

C) Seeding Proposal: BAER

It is recommended that 60 acres within the lop, scatter, and pile juniper treatment unit be seeded along with 230 acres of targeted roadside within the fire perimeter for a total of 290 acres. In the 60 acre unit the soil is now sterile due to higher burn severities causing native and naturalized plant mortality due to the fire. This is why relying solely upon chemical treatment will not be sufficient to mitigate the risk to the naturalized plant community. While crested wheatgrass, Great Basin wildrye, and other species found in the area pre-fire typically exhibit good resilience to fire (FEIS), the higher severity of the fire in certain areas caused the mortality of the naturalized vegetation resulting in the loss of sufficient seedbank and remnant plants to re-establish (USDA Plants Database). Invasion is predicted to occur across the area where the juniper treatment occurred (Appendix C) and burned before the surviving naturalized plant community in the interspaces will be able to re-establish and re-colonize these areas. Thus it was determined necessary to re-introduce seed within the native and naturalized species previously recorded in the area into these portions of higher severity burns to reintroduce desired seed in the area and to compete with the annual grass expansion in year one. The 230 acres of roadside were chosen for treatment once the determination was made that although the majority of the area within the fire are at moderate to high risk to cheatgrass invasion, attempts to chemically treat and seed the 3,499 acres of FS land within the fire scar would not prove economically justifiable. We could not accurately predict where exactly invasive grasses would outcompete native and naturalized vegetation and establish nor the size of the expansion. The determination was made that treating the vectors most likely to contribute to non-desirable species seed distribution within the fire scar would be the most effective way to decrease the likelihood of their expansion, thus lowering the level to the value at risk to "moderate." The vectors most likely to contribute to the spread of invasive species seed were the roadsides along the major access roads in the fire area. Prices for the seed were determined by calling two local vendors and averaging the prices. Labor and equipment costs were based on using equipment that the District has available and putting together a one person team consisting of a GS 10 worker to broadcast and harrow the seed. The exact areas for the seeding proposal can be found in Appendix C.

Line Item	Unit Cost	Total
Seed	$63/acre @ 290 acres	$18,270
Shipping	$900 for the 2 pallets of seed	$900
Implementation	Labor + Equipment + Supplies for full implementation: $6,700	$6,700
Vehicle mileage Implementation*	$0.60 per mile x 480 miles	$288
Inspectors/Contract Pre-tour/Close-out **	(2) $242 & (1) $364 X 4	$3,392
Vehicle mileage Inspection***	$0.60 per mile x 1,440 miles	$864
Data Input	$450 per day x 3 day	$1,350
	Total:	**$31,764**

*50 miles out to site, 100 miles round trip. 20 miles around sites totals 120 miles total per day. 4 days (for crew to implement) totals 480 miles travelled for implementation.

** Represents 2 GS 9 level inspectors and 1 GS 11 level inspector each with 4 days for a total of 12 days.

***50 miles out to site, 100 miles round trip. 20 miles around sites totals 120 miles total per day. 12 days (4 for each inspector) totals 1,440 miles travelled for inspections.

Species	lbs PLS/Acre	Acres	Total lbs PLS needed	Raineir Cost lb. of PLS Seed	Total Cost Seed	Raineir Seed Co. Cost/acre
Crested Wheatgrass (Agropyron cristatum)	7	290	2030	$4.00	$8,120.00	$28.00

Great Basin Wildrye (Leymus cinereus) v. Magnar	0.5	290	145	$11.83	$1,715.35	$5.92
Bluebunch Wheatgrass (Pseudoroegneria spicata)	2	290	580	$7.00	$4,060.00	$14.00
Lewis Flax (Linum lewisii)	0.5	290	145	$30.00	$4,350.00	$15.00
Total	10	290	2900	$52.83	$18,245.35	$62.92

D) Bio Char: BAER

Application of two tons of bio char on one third of an acre within the lop, scatter, and pile juniper treatment unit is proposed as a test plot to improve management outcomes. It is already known to increase soil carbon content, restore determine the efficiency of bio char in inhibiting the growth and expansion of invasive annual grasses. A second on third of an acre plot utilizing wood chips will also be studied to see if it has similar effects to those predicted for bio char. Bio char is a naturally occurring forest product that can be added as a soil amendment soil pH, improve the soil's capacity absorb and retain water, and in some cases aid in the reduction of invasive species growth (Bamesburger, 2019). This test plot would work towards answering the question if bio char is a viable tool for emergency stabilization of native plant communities and soils on rangelands. Bio char is available free of charge from the Stanislaus National Forest, and the proposal takes into account the recommended rates of bio char application. Implementation costs were determined using a team of one GS 7 and one GS 9 personnel to distribute the bio char across the plot. The exact area for the bio char proposal can be found in Appendix C.

Line Item	**Unit Cost**	**Total**
Bio Char	2 tons at $0.00 per ton	$0
Transport	Wage for driver: (1) $242 per day @ 2 days	$484
	Per diem for driver $55.00 x 2 days	$110
	Hotel for driver $95.00 x 1 night	$95
Vehicle mileage*	$0.60 per mile x 480 miles x 2 days	$576
Inspectors**	(1) $242 & (1) $364 @ 3 days	$1,818
Vehicle mileage***	$0.60 per mile x 720 miles	$432
Implementation team leader	$410 per day x 3 day	$1,230
Implementation	Equipment + Labor $630/day @ 4 days	$2,520
Monitoring/data input****	(1) $242 & (1) $364 @ 4 days	$3,030
Vehicle mileage*****	$0.60 per mile x 960 miles	$576
	Total:	**$10,871**

*From the Stanislaus National Forest to the Cherry Fire is 480 miles. This trip will be made twice to pick up the bio char and then to take it out to the implementation site.

** Represents 1 GS 9 level inspectors and 1 GS 11 level inspector each with 3 days for a total of 6 days.

***50 miles out to site, 100 miles round trip. 20 miles around sites totals 120 miles total per day. 6 days (3 for each inspector) totals 720 miles travelled for inspections.

**** Represents 1 GS 9 level inspectors and 1 GS 11 level inspector each with 4 days for a total of 8 days.\

*****50 miles out to site, 100 miles round trip. 20 miles around sites totals 120 miles total per day. 8 days (4 for each monitor) totals 960 miles travelled for inspections.

How we got to the proposal: The 2015 Miller et al 2015 worksheet process was completed and individual meetings were held with each grazing permittee during the BAER assessment period; each permittee was asked what their biggest concern was post-fire and each one answered that they were most concerned about the spread of the weeds, primarily the cheatgrass and thistles. A meeting was also held with NDOW personnel who expressed the same major concern: the spread of invasive annual grasses and noxious weeds from existing populations into the fire scar. Such spread would result in a degradation of the value at risk, diminishing the lands value as both crucial wildlife habitat and as important rangeland. This area also supports a Wildhorse population.

In post fire areas, invasive plants and noxious weeds have reduced competition from native and naturalized plants which experience higher mortality in moderate to high burn severities re-establish and grow more slowly. Invasive plants are able to capitalize on the increased release of nitrogen in the soil post-fire augmenting the expansion of their population, whereas the native vegetation does not experience dramatic increased growth with the released nitrogen post-fire (USDA Plant Database, Chambers et. Al. 2007). Furthermore, cheatgrass and field brome in particular are able to grow despite mycorrhizal mortality in moderate to high soil burn severities, giving them another competitive advantage (USDA Plant Database). This reduced competition in the early stages of regrowth post fire allows a window in which non-native plants will be able to expand their existing populations more quickly than in pre-fire conditions (FEIS). Their expansion is of particular concern when it inhibits the re-establishment of native and naturalized plant communities. Robertson and Pearse (1945), and Harris (1967) both concluded “that cheatgrass forms ‘closed communities,’ preventing the establishment of seeded species unless the cheatgrass competition is eliminated first.” The critical value of the naturalized plant community in the Cherry Fire is at very high risk to non-native plant expansion based on the biotic and abiotic factors of the area (see the discussion in the BAER Risk Assessment Matrix above). Should the invasive plant species, particularly cheatgrass, establish post fire this would present an unacceptable risk to our critical value as it will greatly reduce the naturalized plant community’s ability to re-establish.

In order to address and best mitigate this unacceptable risk to the critical value, a combination of herbicide treatments followed by reseeding treatments has been proposed. According to the Fire Effects Information System: “In general, early detection and treatment is critical for preventing establishment of large populations of invasive plants.” This reasoning was echoed by Rew and Johnson in their study on the role of wildfire on the spread of invasive plant species in the west. They stated: “Many managers consider rapid detection and control of new, nonnative plant populations after wildfire one of the most effective management activities… particularly if the nonnative propagule pressure is high and the anthropogenic disturbances are frequent.” Due to the pre-existing noxious weed populations and more importantly their distribution, the overall moderate fire severity, and the high recreational use in the area it was determined that substantial efforts to detect and treat any expansion of invasive plants early will be necessary to protect the values at risk in addition to the necessity of seeding efforts to help re-establish the desirable plant community post herbicide treatment. These treatments will work together to contain the existing populations of weeds in the fire scar and prevent the spread of new populations into the area in year one, sufficiently reducing the risk to the critical value highlighted in BAER Risk Assessment Matrix.

The team completed the worksheet found in “A Field Guide for Rapid Assessment of Post-Wildfire Recovery Potential in Sagebrush and Piñon-Juniper Ecosystems in the Great Basin: Evaluating Resilience to Disturbance and Resistance to Invasive Annual Grasses and Predicting Vegetation Response” from 2015 and determined that due to the moderate to high soil burn severity in the fire area and characteristics of the site the naturalized plant community is likely to have a low to moderate resistance and resilience to the invasion of non-native annual grasses throughout the majority of the fire (Appendix G). The manual recommends for low resiliency, with moderate to high burn severities that reseeding will be necessary, and for moderate resiliency with the same burn severities that seeding recommendations be based off of past experience in the area (Miller et. Al. 2015). A fire studied in southern Idaho showed a fire in phase 3 juniper year one and two post fire in the same

Major Land Resource Area (MLRA) (Appendix E) as the Cherry Fire. Photos of the regeneration in years one and two (Appendix F), showed that regrowth of the understory was slow, with large patches of bare soil even in year two ("Fire Ecology of Juniper" 2009). This response in phase 3, and even phase 2 juniper stands is common, and the Cherry Fire is likely to exhibit similar responses in these vegetation types, leaving disturbed soil open to the expansion of invasive species. Furthermore, a field inspection on the Echo Fire that burned in 2018 also on the Ruby Mountain District in phase 1 juniper stands was conducted on September 11, 2019 in order to determine year one revegetation in the fire scar. The Forest weed coordinator, Meagan Carter, found that noxious weeds were spreading from known population centers out into the fire scar and that cheatgrass was following the road vector up into the fire from the BLM where the source population is found (a photo from the inspection can be found in Appendix I). Results from this proximal fire in the same ecotype and mountain range as the Cherry Fire support the concern that cheatgrass will expand via road vectors and that noxious weed populations will spread outward from existing populations. Through utilizing the Morrel et. Al. 2015 process and assessing the post-fire response of proximal fire examples, the majority of the area within the Cherry Fire was established to be at moderate to high risk to cheatgrass invasion. However, it was determined that attempts to chemically treat and seed the 3,449 acres of FS land within the fire scar would not prove economically justifiable. We could not accurately predict where exactly invasive grasses would outcompete native and naturalized vegetation and establish nor the size of the expansion. The determination was made that treating the vectors most likely to contribute to non-desirable species seed distribution within the fire scar is the most effective and efficient way to decrease the likelihood of their expansion, thus lowering the level to the value at risk to "moderate." The vectors most likely to contribute to the spread of invasive species seed were the roadsides along the major access roads in the fire area. This treatment should be able to mitigate the expansion invasive seed species in year one giving the desired naturalized plant community time to re-establish.

One area in particular was determined to be at higher risk for annual grass expansion and small enough to justify specific treatments. This was the lop, scatter, and pile juniper treatment area that burned in the Cherry Fire. Pretreatment of this area had been phase 3 juniper, and the trees had been cut in the two years prior to the fire. Chambers et al. in 2007 explained that cheatgrass biomass and seed production can increase 2–3-fold after herbaceous species removal, 2–6-fold after fire, but 10–30-fold after removal plus fire in big sagebrush ecosystems. This puts this area at a particularly high risk due to the removal of the juniper coupled with the fire. Due to the competitive advantages of cheatgrass discussed above, this invasive annual grass will be able to establish in the pockets of high intensity fire where downed juniper burned and the soil is now sterile and native and naturalized plants have experienced mortality due to the fire. This is why relying solely upon chemical treatment will not be sufficient to mitigate the risk to the naturalized plant community. While crested wheatgrass, Great Basin wildrye, and other species found in the area pre-fire typically exhibit good resilience to fire (FEIS), the higher severity of the fire in certain areas caused the mortality of the naturalized vegetation resulting in the loss of sufficient seedbank and remnant plants to re-establish (USDA Plants Database). Invasion is predicted to occur across the unit (Appendix C) before the surviving naturalized plant community in the interspaces will be able to re-establish and re-colonize these areas. Thus it was determined necessary to re-introduce seed of the native and naturalized species previously recorded in the area into these portions of higher severity burns to compete with the annual grass expansion in year one.

For both seeding proposals, a recommended herbicide treatment has been submitted to take place prior to seeding. Roadsides will be treated with approved funding from the P code and the 60 acre lop and scatter area is proposed to be treated using BAER funds. According to Monsen, considerable success has been achieved by planting either native or introduced species after cheatgrass has been eliminated or controlled by mechanical tillage or selected herbicides (1994). Furthermore, proper precipitation rates for successful planting in the area have been verified (Appendix D). Species chosen for the seed mix were selected for their competitive nature and their ability to mitigate the risk to the critical value in year one ("BAER Guidance Paper" 2018); they are also hardy, drought tolerant species that stay green longer into the season (USDA Plant Database). Crested wheatgrass was already a naturalized, dominant grass in the area due to seeding in the past (Cheri Howell). Plantings of crested

wheatgrass in particular have been proven effective in controlling annual weeds (Asay and Johnson 1983). These findings were echoed by M.G. Francis in 1996, who found that crested wheatgrass was the most effective in competing with cheatgrass specifically. In addition to effectively mitigating the threat to the value at risk, the species selected for the seed mix will also help to lower threats to the naturalized plant community by establishing green strips, particularly in the seedings along the roadsides. Plants used in green strips must be adapted to the site, able to compete with annual weeds, easily establish, have low flammability, produce an open canopy and have resilience and regrowth capabilities, and crested wheatgrass is one of the most common plants used in green stripping along with Lewis flax (St. John and Ogle, 2009).

Canada thistle, cheatgrass, and field brome also threaten the natural fire regimes of western plant communities (FEIS). Due to the thistles abundant, flammable aboveground biomass and the annual grasses' readily ignited litter, these species have the potential to increase fire frequency in an area where native plants would otherwise remain fire resistant later into the season (FEIS). Increased frequencies of fires in the area due to expanded populations of these harmful non-native species could alter the natural succession of the plant community making it difficult for native grasses, forbs, and shrubs to re-establish in these areas (Devon Snyder). This would lead to an unacceptable risk to the naturalized plant community which provides important habitat to mule deer and sage grouse as well as important rangelands for livestock.

Predicting the spread of invasive plants and noxious weeds in the west in post-fire scenarios is difficult and is affected by a myriad of variables. A review of all the available literature on post-fire weed expansion conducted by the Rocky Mountain Research Station in collaboration with Montana State University showed that climatic, plant characteristic, and site-specific variables all work to determine to what extent invasive plants will expand and persist post fire. They continued to explain that one of the surest methods for predicting post-fire weed behavior is pulling from any available examples of similar ecosystems that burned and their response to the fire. Field observations from recent fires on the Ruby Mountain, Mountain City, Jarbidge Ranger District, where the Cherry Fire occurred, have shown that each fire scar exhibits an expansion of pre-existing weed populations as well as the establishment of new infestations. Furthermore, the Ecologist on the District of over 30 years (Cheri Howell) predicts the expansion of cheatgrass into the fire scar in this area as well as Devon Snyder, a researcher from UNR who has worked in the area. From local examples, the conclusion can be drawn that it is very likely for invasive annual plant and noxious weed species to expand their areas within the Cherry Fire scar, threatening the native and naturalized plant community.

Bio char is a naturally occurring forest product that can be added as a soil amendment to improve management outcomes. Adding this bio product to the soil works to increase soil carbon content and restore soil pH, thus increasing soil productivity, in addition to improving the soils capacity to absorb and retain water (Bamesburger, 2019). It has been found to help in reducing invasive species growth and helping native species expand their range on forestlands throughout the west; it does this by tying up nitrogen in the soil which invasive species thrive on (Bamesburger, 2019). The proposed study treatment with bio char will be used to determine if this method has economic and result based efficiency and potential for invasive annual grass suppression and native plant community emergency stabilization. Finding more tools to treat and mitigate threats to values at risk will help improve the efficiency and success of future BAER efforts. A second plot utilizing wood chips will also be studied to see if it has similar effects to those predicted for bio char.

The assessment team considered several alternatives to the proposed action including:

- A reseeding alternative for the mid elevational band of the fire where the juniper woodland was predominatly in phase 3, totaling 1,000 acres was considered but ultimately eliminated. The moderate to high soil burn severity led to a lower resistance and resilience determination for these areas to the invasion of non-native annual grasses. However, herbicide and seeding treatments for this many acres would be costly and difficult to implement effectively in year one not knowing exactly where the expansion of the invasive annual grasses into the burned juniper woodlands will

occur. Thus it was determined that treating roadsides, where existing populations will expand outward into the interior of the fire scar, in order to reduce propogule pressure and availability of invasive seed would be more economical and effective to mitigate the risk to the naturalized plant community in year one.

- A reseeding alternative for the lop, scatter, and pile juniper treatment area was considered to treat the entire area within the fire perimeter due to the moderate and high burn severities exhibited. This would have totaled 140 acres of herbicide and seeding treatments; it was determined that the most likely areas to experience adverse annual grass expansion would be the southern facing slopes (Chambers et al. 2007), thus the treatment area was narrowed down to 60 acres. It was also discussed to aerially apply the seed, bringing the seeding cost to $130 dollars per acre. The determination was made that having the seed applied by atv would be more cost effective, bringing the treatment cost down to $89 dollars per acre.

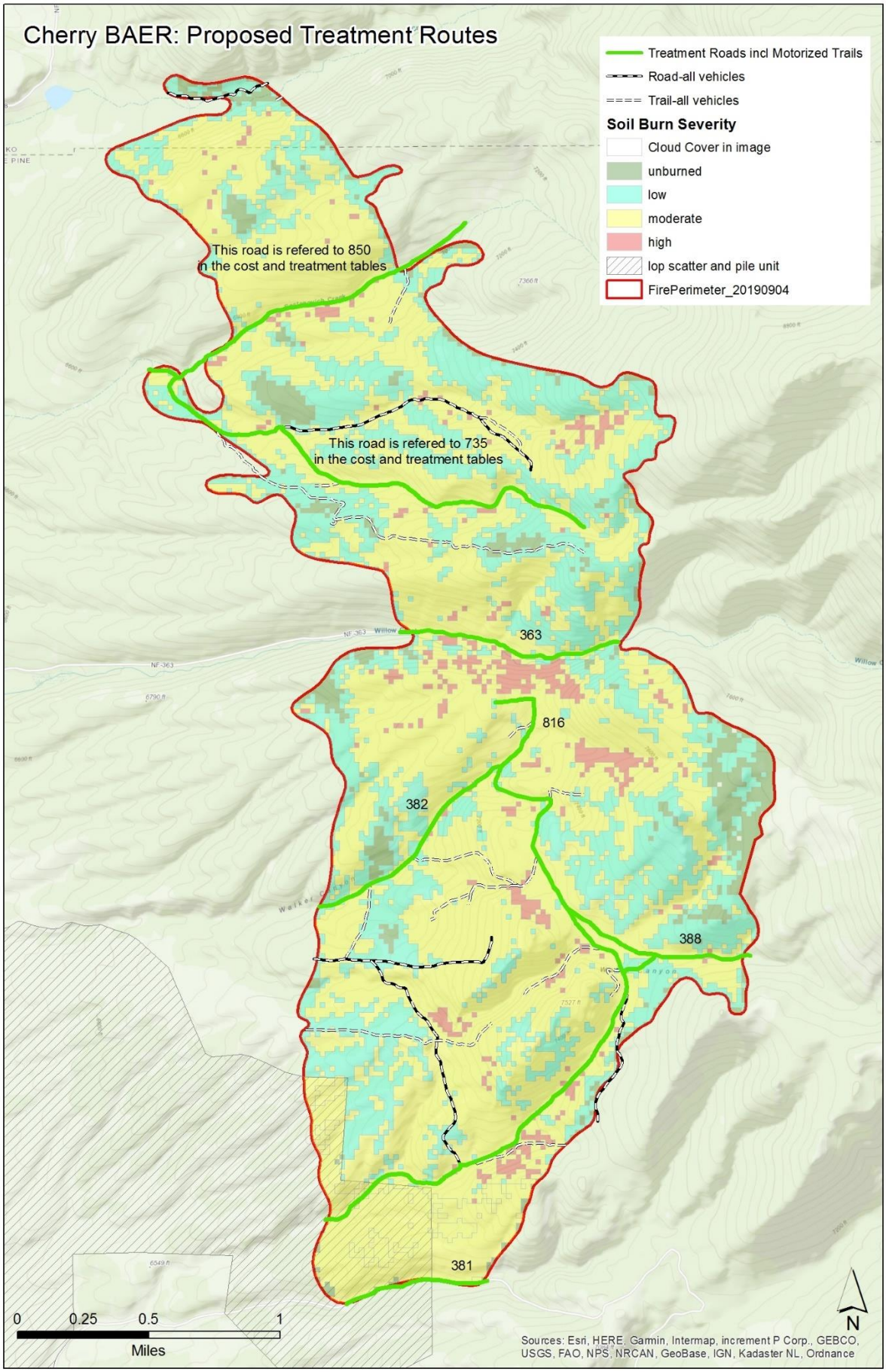
- A No Action alternative was considered for all of the allotments affected by the fire. It was determined that allotments in the *Critical Value Matrix Table* listed as risks "A" have too high a potential risk of invasive annual grass and noxious weed invasion to be left to recover naturally.

Channel Treatments: None proposed

Roads and Trail Treatments:

Based on the condition surveys the Forest is requesting to treat 9.8 miles of roads and full width motorized trails within and directly adjacent to the fire area. This is less than half of the route miles in the fire area. Below is a more detailed description of the routes and the treatment needs identified by the Road Crew Workleader and his assistant.

Rd#	Treatment Need	Proposed treatment cost
381	Repair drainage whole length and stabilize abandoned bed section (less than .1 mile) (suppression made a new route) so that it does not turn into a gully.	**$72,000 BAER** $19,000 District Match
382	Repair/touch up 40 cross drainages.	$20,400
	Replace hazardous cattle guard deck and wings	$10,200
388	Was visited but no treatments are recommended at this time	--
816	Repair/touch up 6 cross drainages	$3,200
363	Repair/touch up 4 cross drainages	$3,200
850 and 735	Repair/touch up 35 cross drainages.	$20,400
	Mobilization and unforeseen salary costs due to unavailability of preferred operators contingency	$10,000
		$139,400 BAER $19,000 District Match



Roads and motorized trails alternatives considered but not brought forward:

cattle guard: remove deck and fill the hole. Would need to construct a gate and haul in soil to fill the hole. Due to haul costs, equipment time for placing the material and lifting the deck the personnel time is a push and the material costs are slightly lower however gates get left open and actually adds to the cost for the district when they go to replace the deck In the future because the material will need to be dug back out and hauled off or wasted on site.

-build a gate in the fence and go around the cattle guard in question- this doesn't address the safety hazard to the public who wouldn't know that the gate is the safer route unless the cattle guard was blocked which would present a collision hazard in the main travel out. Also, a new section of road through the gate would need to be built. Gates get left open thus defeating the purpose of the cattle guard and keeping livestock off of the mine access road and in their designated pastures.

-place a metal utility plate across the cattle guard in question during project implementation. This requires the same equipment and laborers to place the plate, at the end of project implementation the plate would need to go back to town and would not provide safety mitigation to fire area visitors or monitoring staff. The plate does not block livestock access so a gate would be needed.

-only replace the deck and wings of the cattle guard and reuse the footers from the existing crossing. Assumes that the footers are in good condition. They would be too short on both ends and not hold up to heavy traffic but would hold up to average traffic (tilting of the deck from left to right lengthwise or vice versa).

Storm patrol: was considered but dismissed due to the soft soil conditions when wet and the risk of causing more damage to the roads then is prevented.

Protection/Safety Treatments: Purchase and install 3 entering burned area warning signs at each portal to the fire area. Inclusive cost (labor, miles and supplies): $2,500

I. Monitoring Narrative:

No monitoring is proposed

PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS

			NFS Lands				Other L
		Unit	# of		Other	# of	Fed
Line Items	Units	Cost	Units	BAER $	$	units	$
A. Land Treatments							
EDRR BAER				$24,812	$0		$0
EDRR Supression				$15,330	$0		
Seeding				$31,764	$0		$0
Biochar				$0	$0		
Insert new items above this line!				$0	$0		$0
Subtotal Land Treatments				$71,906	$0		$0
B. Channel Treatments							
None proposed				$0	$0		$0
				$0	$0		$0
Insert new items above this line!				$0	$0		$0
Subtotal Channel Treatments				$0	$0		$0
C. Road and Trails							
Initial Roads Package				$139,400	$19,000		$0
				$0	$0		$0
Insert new items above this line!				$0	$0		$0
Subtotal Road and Trails				$139,400	$19,000		$0
D. Protection/Safety							
Warning Signs				$2,500	$0		$0
				$0	$0		$0
Insert new items above this line!				$0	$0		$0
Subtotal Protection/Safety				$2,500	$0		$0
E. BAER Evaluation							
Initial Assessment	Report			---	$0		$0
Imp. Overhead Cost				$72,100	$0		$0
Insert new items above this line!				---	$0		$0
Subtotal Evaluation				$72,100	$0		$0
F. Monitoring							
				$0	$0		$0
				$0	$0		$0
Insert new items above this line!				$0	$0		$0
Subtotal Monitoring				$0	$0		$0
G. Totals				$285,906	$19,000		**$0**

PART VII - APPROVALS

1._____

Forest Supervisor Date