USDA-FOREST SERVICE FS-2500-8 (6/06)

Date of Report: September 12, 2011

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: Hole in the Wall

B. Fire Number: WY-SNF-000317

C. State: Wyoming/Montana

D. County: Park/Carbon

E. Region: 2/1

F. Forest: Shoshone/Custer

G. District: Wapiti/Beartooth

H. Fire Incident Job Code: P2GBW6

I. Date Fire Started: 08/21/2011

J. Date Fire Contained: 95% on 9/12/2011

K. Suppression Cost $4,100,000 on 9/12

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): Handline - ; Dozerline -7.0
2. Fireline rehabilitated (miles): 7.0
3. Other (identify): 0

M. Watershed Numbers: Line Creek 100700060511, Upper Bennett Creek 100700060509

N. Total Acres Burned: 6,200 total acres, including fire use acreage on 09/11/2011
NFS Acres(6200) Other Federal 0 State 0 Private 0

O. Vegetation Types:
Geum Turf; Idaho Fescue / Tufted hairgrass; Whitebark Pine / Idaho fescue; Whitebark Pine / Grouse whortleberry; Subalpine fire / Grouse whortleberry; Subalpine fir / Heart leafed arnica; Douglas fir/ Bluebunch wheatgrass; Douglas Fir / Common juniper; Limber pine / King fescue; Aspen CT's; Misc riparian CT's; and Mountain Big Sage / Idaho fescue.

P. Dominant Soils: Typic Cyrolls, Typic Cryochrepts, Eutric Dystrocryrepts, Typic Dystrocryrepts, Eutric Humicryepts, and Rock outcrop.

Q. Geologic types: Precambrian granite; glacial moraine; landslide deposits, and Sedimentary rocks undivided.

R. Miles of Stream Channels by Order or Class:

Stream miles by order within Hole in Wall Fire Perimeter.

Stream Order	Length (Miles)
1	19.5
2	8.3
3	2.2
Grand Total	30

S. Transportation System

Trails: 8 miles Roads: 2.3 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 93 (unburned); 457 (low); 3114 (moderate); 2114 high)

B. Water-Repellent Soil (acres): 2114 acres)

C. Soil Erosion Hazard Rating (acres):
310 (low) 1550 (moderate) 4340 (high)

D. Erosion Potential: 0.11 tons/acre (estimate)

E. Sediment Potential: 24.1 tons / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 3

B. Design Chance of Success, (percent): 80

C. Equivalent Design Recurrence Interval, (years): 5

D. Design Storm Duration, (hours): 1 hour

E. Design Storm Magnitude, (inches): 0.92 inches

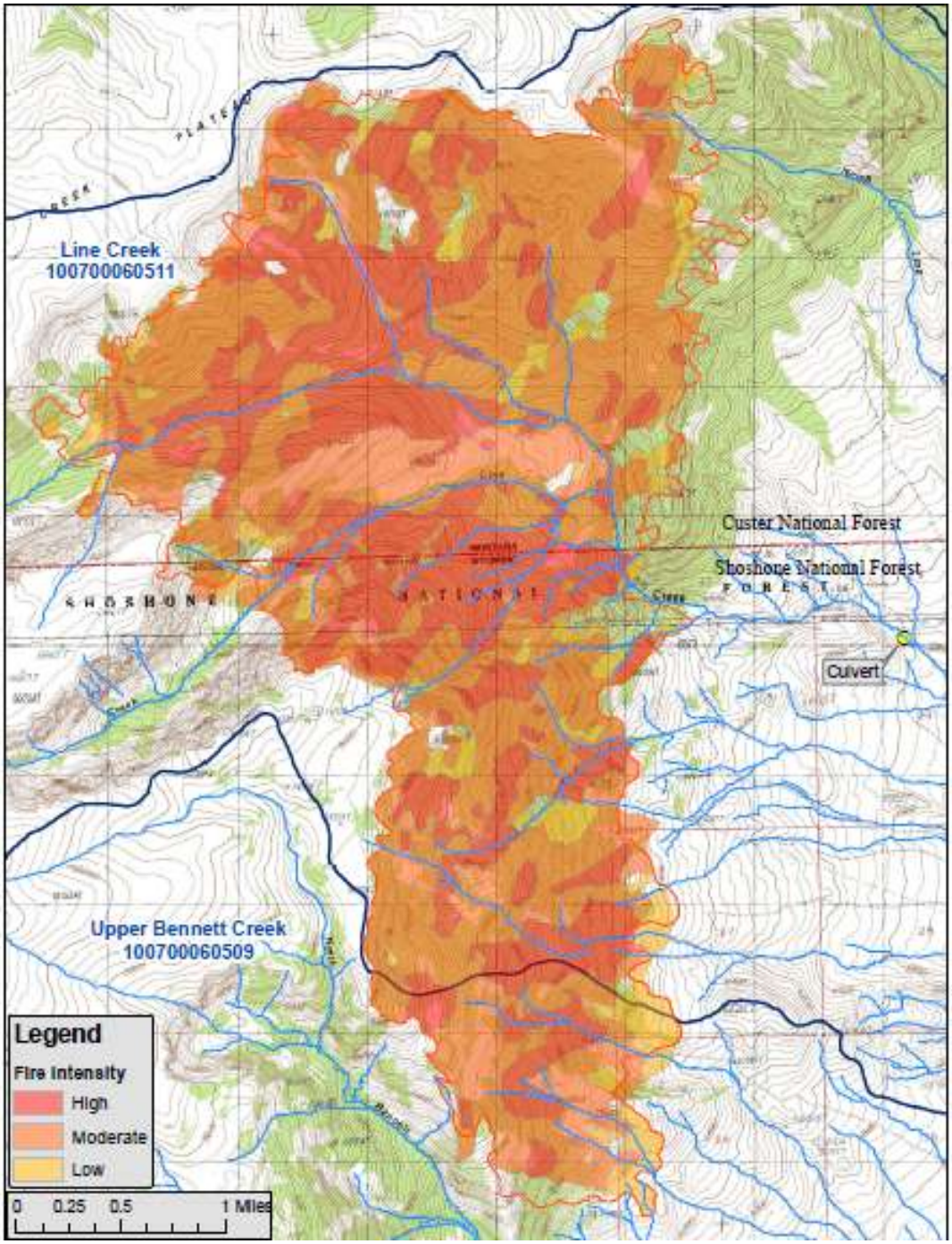
F. Design Flow, (cubic feet / second/ square mile): 10.5 cfs/mi^2

G. Estimated Reduction in Infiltration, (percent): 24

H. Adjusted Design Flow, (cfs per square mile): 13.8 cfs/mi^2 (estimates at Forest Boundary ~ 2 miles downstream from the fire)

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:



Hole in the Wall Fire Intensity Map

Summary of Watershed Response

Hydrologic Response*:* The Hole in the Wall Fire was fast moving with extensive areas of moderate to high burn intensity with very limited un-burned or lightly burned mosaic.

The Line Creek Watershed includes most of the Hole in the Wall Fire on the Custer NF. The fire is in very heavily dissected terrain and has 4000 feet of relief . The coarse textured soils are quite vulnerable to debris flow processes. Post fire erosion processes pose extensive potential damage to Forest trails.

High severity burn area is commmon in the north end of the Hole in the Wall fire. The Line Creek Basin trail #7B, which traverses much of this heavily burned area, is very subject to erosion damage from the fire.

Sediment levels in Line Creek are projected to increase from pre-fire 291 tons/year to 616 tons/year during the first year, an increase of 115% (R1R4 model). If debris flows are triggered (as per the proximate Cascade fire in 2008) the resulting sediment yield increase could be much larger. Actual water quality values at risk are minimal since no municipal or high fisheries values occur in Lime Creek or any of the Hole in the Wall Fire drainages on the Shoshone NF. Stormflow modeling in Line Creek (USGS regression techniques for un-gaged watersheds) indicates a stormflow increase potential of about 40%. A culvert on the Line Creek access road

#123 (T58N R102W S23) on the Shoshone NF (7' arch pipe) could be slightly overtopped by a 10 year recurrence interval storm event (FishXing and MSU culvert capacity template).

The Line Creek culvert at the Shoshone NF boundary at T58N R103W S23 is an arch pipe 6.2' by 7.8 feet which both the MSU culvert spreadsheet and the Fish Crossing program estimated at 280 cfs capacity. The culvert was judged to be adequate for the 5 year recurrence interval design storm but the FishXing program estimated 10 year event of 290 cfs would overtop the road deck by about 2". Since the road material over the culvert has extensive large rocks, the culvert was judged to be adequate and no upgrading of the culvert or road modification is recommended for BAER treatments.

Erosion response: Loss to soil erosion is estimated with Disturbed WEPP 2.0 at 0.11 tons per acre during the first year after the fire. This loss will be primarily during the first 3 years post fire and until hydrophobic conditions subside. Forest understory species should provide critical ground cover by the third growing season.

Geologic response: Debris flows during summer thunder storm activity could be the major cause of soil loss and sedimentation to water courses. Steep slopes, hydrophobic conditions, shallow soils, and sandy loam soil textures throughout the burn area accelerate the debris flow process.

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 Hole in the Wall BAER Assessment. Only treatments that had a risk of Intermediate or above are 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	Low
Possible	High	Intermediate	Low
Unlikely	Intermediate	Low	Very Low

For the Hole in the Wall Fire risk levels by resource included trails, weeds/sensitive plants, fisheries, and cultural resources. Only trails and weeds/sensitive plants had risk levels of intermediate or greater and therefore are the only resources recommended for BAER funded treatments.

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	RISK		
Very Likely	Very High	Very High Trails	Low
Likely	Very High	High Weeds/Sensitive Plants	Low Fisheries
Possible	High	Intermediate	Low
Unlikely	Intermediate	Low Cultural Resources	Very Low

Trails

The Hole-in-the-Wall Fire perimeter currently lies on the Shoshone and Custer National Forests. Three national forest system trails are located in the interior of the Hole-in-the-Wall Fire perimeter on the Custer NF: The Line Creek Basin #7B, Face of the Mountain #7 and North Line Creek Basin #7A trails. Historically these trails were used by sheep herders, miners, ranchers, and a spectrum of recreationists. Currently the trail system serves non-motorized users (hikers, mountain bikes, horses, and fall hunters).

Approximately 8 miles of Custer National Forest trails are expected to be at risk of deterioration from additional runoff and sediment from post-fire conditions. Three miles of trail are considered a safety risk to BAER rehab crews conducting needed emergency trail drainage and stabilization work. The trails were not designed for the increased flow that may occur from the fire. This may cause soil erosion on the trail surface and fill-slope. Failure of drainage dips and water bars may cause stream capture onto trail surface area, causing soil erosion, including loss of the trail by rilling and gullying.

In areas of high severity there is a high potential for trails to become unstable. In several locations stabilization of the trail will be necessary to protect both employee and user safety. Safety concerns are relevant regarding hazard trees and/or tread failure. Warning signs also need to be installed at trailheads and trail portals. Signs at portals will provide information for recreational users about the hazards of the Hole in the Wall fire. Warning signs are needed at trail access points for the Line Creek Basin #,7B Face of the Mountain #7 and North Line Creek Basin #7A trails.

BAER crews will remove hazard trees, install warning signs, install erosion control structures, stabilize some trail segments, and improve surface drainage,.

Weeds/Sensitive Plants

Concern exists regarding the potential spread of noxious weeds in the Hole in the Wall Fire area. Weed infestations and associated seed banks include spotted knapweed and leafy spurge with isolated pockets of Canada thistle, houndstongue, field bindweed, and black henbane. Suppression equipment made dozer lines through known spotted knapweed populations. This situation demands close monitoring for new infestations and spread.

After assessing those species recognized as noxious by the counties, the State of Montana, and the U.S. Forest Service, the following Table lists the species of greatest concern with regards to impacts on ecosystem integrity for the Hole In The Wall Fire area.

Weed Species that Pose the Greatest Threat in the Hole in the Wall Fire Area

Scientific Name[1]	Common Name
Euphorbia esula	leafy spurge
Centaurea biebersteinii (C. maculosa)	spotted knapweed
Cirsium arvense	Canada thistle
Cynoglossum officinale	houndstongue
Convolvulus arvensis	field bindweed
Hyoscyamus niger	black henbane

Pre-burn Invasive Plant and Noxious Weed Condition

[1] Nomenclature follows the USDA Plants Database: USDA, NRCS 1999. The PLANTS database (http://plants.usda.gov/plants). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Approximately 20 net acres of known noxious spotted knapweed infestations and seed bank occur in the fire area. Leafy spurge, Canada thistle and houndstongue are known to occur only sporadically in the area, with spotted knapweed known in adjacent areas. New infestations can easily in nearby suppression activity areas (dozer and hand lines - approximately 1.4 net acres. These areas can be vectors for weed spread. The new seedbed the fire created is another vector for weed spread.

For most noxious weed species identified in the Hole In the Wall Fire, disturbed sites and dry potential vegetation types are the most at risk from invasion and spread. Disturbed areas include roads, recreation trails, dispersed recreation sites, game trails and where ground disturbing fire suppression actions occurred (i.e. dozer lines, hand lines, helispots, and drop points). Burned sites can have altered soil structure and reduced organic matter content creating a more favorable germination substrate for weed seeds. Undisturbed areas in drier vegetation types of the fire area are also at risk.

Research by Rice and Toney (1997) and a weed risk assessment project conducted in the Northern Region of the USFS (Mantas and Jones 2001) have identified potential vegetation types most at risk from invasion by a number of invasive exotics. The following table displays potential vegetation types in the burn perimeter and nearby suppressions lines and have been determined to be vulnerable to the listed weed species when there is site disturbance, such as wildfire.

Vulnerable Vegetation Types in the Hole in the Wall Fire

Species	Vulnerable Vegetation Types Within the Burn Perimeter
leafy spurge	Any disturbed site
spotted knapweed	Graminoid parks, Ponderosa pine, riparian forests
houndstongue	Any disturbed site
Canada thistle	Riparian, uplands, shrublands and meadows
field bindweed	Grasslands
black henbane	Roadsides, grasslands

It is important not to overlook potential seed sources within the burn area as well. Although these sites (such as game trails, roads and recreation trails, and fence-lines) are converted areas where ecosystem integrity has already been altered, they are the main sources of weed seeds that can facilitate and greatly exacerbate the spread of weeds into more pristine areas. It is critical that these areas are treated as well to protect currently unaffected but vulnerable areas within the fire.

Potential Loss of Known Sensitive Plant Populations from Weed Establishment and Competition
Beartooth goldenweed is a regional endemic, formerly a candidate for listing under the Endangered Species Act. Its overall range is restricted to the foothills of Bighorn Basin in Montana and Wyoming. This species is ranked vulnerable at both global and state levels by the Natural Heritage Network and is recognized as a Sensitive Species by the Forest Service Northern Region Office. Beartooth goldenweed had previously been documented from 14 locations in Wyoming and 30 locations in Montana. Five of these 42 locations are nearby the Hole in the Wall Fire perimeter. There is potential for invasive weed competition since the majority of fire suppression equipment and activity occurred in three and near two other populations.

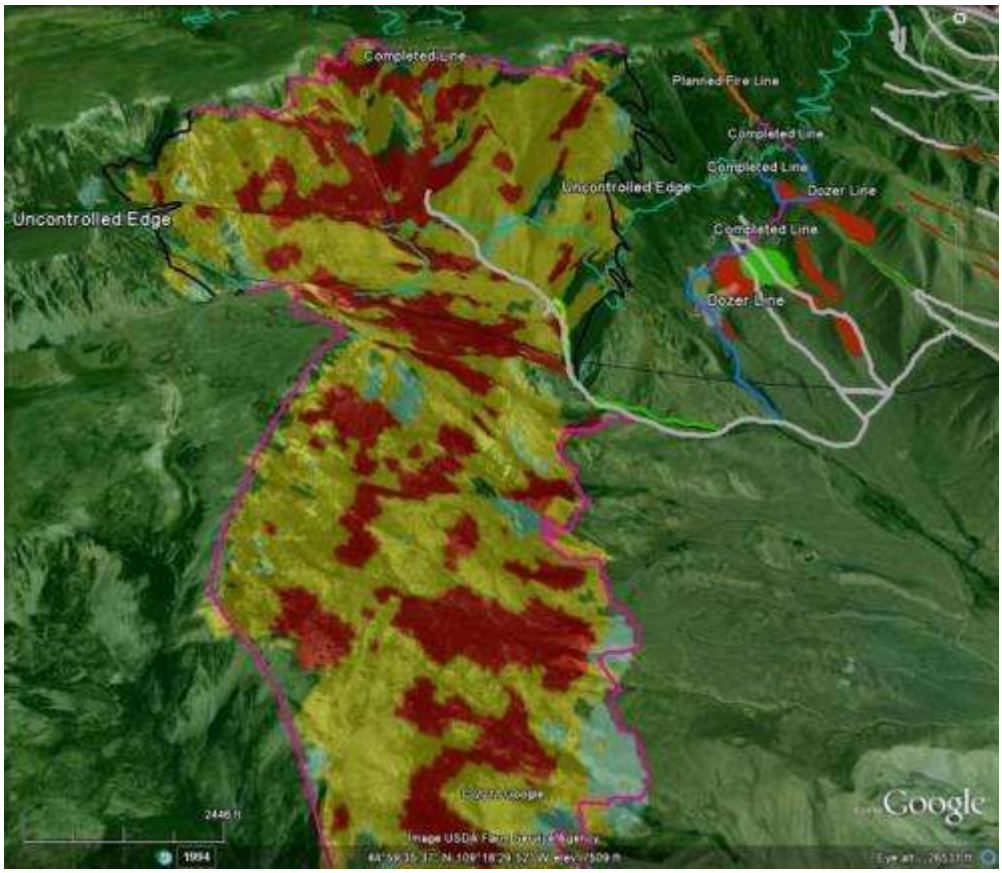
Hole in the Wall Fire Weeds Emergency Determination
The fire-caused weed emergency to resource recovery is of a high priority, especially in those areas, which have highly invasive species' concentrations prior to the burn and in or near sensitive plant populations. About 69 gross acres within the fire perimeter were know to be infested with spotted knapweed. The gross area provides a seed bank where spotted knapweed seeds can continue to germinate, grow, and spread. Spotted knapweed seeds can remain viable in the soil for up to 12 years. Areas of leafy spurge can spread, regenerate, and reproduce prolifically from the root crown, root buds, and root pieces. Very young and repeatedly damaged leafy spurge plants can regenerate. Small, deeply buried leafy spurge root pieces can develop into new plants. Through root growth and sprouting, leafy spurge can occupy a large area in a short time. Radial vegetative spread of a leafy spurge patch can be up to 11 feet annually and seeds can disperse up to 15 feet from the seed head.

Dozers were washed at Incident Wash Stations prior to entering the fire area. However, dozer lines did cut through known infested sites which heightens the probability that all dozer lines are suspect of new weed starts from transported weed seeds.

Suppression dozer lines for the Hole In the Wall Fire (2.8 miles total) 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 Hole In the Wall Fire burned grassland and forest land, and eliminated natural competition for invaders. The fire-caused disturbance creates perfect habitat for noxious weed invasion and expansion. If emergency mitigation activities are not implemented this problem will expand exponentially and will require future extensive resources to manage. If left unmanaged the results could permanently alter plant communities and habitat, and adjacent private land values. Results of uncontrolled weed spread are well documented. Without treatment, weeds increase about 14% a year under natural conditions (USDA, Forest Service 2006). These studies show that spotted knapweed and its distribution will continue to increase if not aggressively treated.

Sensitive Plants: It is unlikely that threats from post-fire storm events (direct physical uprooting, movement of seed banks out of habitats, plant suffocation, or habitat alteration from overland flow of debris and ash) would occur in this setting due to the high position in the watershed on a ridge rather than in a drainage and low to moderate burn severity. However, there is potential for invasive weed competition since fire suppression equipment and activity occurred through both sensitive plant populations and nearby weed populations. Therefore, there is potential for new weed seed sources to come in on the suppression lines. The proposed land treatment would be to monitor the population site for weed establishment and implement the recommended weed treatment proposals outlined under the Treatment Narrative section of this 2500-8.

On the east side of the fire dozer (royal blue) and hand lines (pink) coincide with noxious weed (bright green) and sensitive plant populations (orange/red) in the foothills outside main fire perimeter.



Noxious weeds found on the Shoshone NF in the Hole in the Wall Fire are the same as on the Custer NF portion. Weeds occur in small (less than 1/10 acre) patches. It is estimated there are less than 20 acres currently infested.

Fisheries

The M-Fish database (Montana Fish, Wildlife, and Parks) shows that brook trout occur in North Line Creek. However, the downstream mainstem of Line Creek does not contain fish. This could be due to channel morphology features at the mouth of the Line Creek canyon where bedrock is present at the surface creating vertical barrier drops in the channel for approximately 1/8 of a mile. Future spring runoff and summer precipitation events will cause erosional processes beginning on burned slopes of the uplands. This will collect and carry saturated soil material, wood debris, and the associated hydrologic energy downhill to stream channels. First and second order streams will have some morphologic changes due to depositional depositing and scouring processes. The introduction of large woody material into these stream systems may cause further changes in channel features. The loss of stream-side vegetation will increase surface water temperatures in the short-term. However, riparian plant species should rapidly recover next year.

There are no BAER emergency rehabilitation actions recommended for fisheries. This is due to the fact that there are no fish species of concern within or downstream of the Hole in the Wall Fire area. Further, the drainages that have been affected by fire do not connect to any waters of concern.

Cultural Resources

Eleven recorded cultural resources are located on the Custer National Forest within or adjacent to the fire perimeters that could potentially be affected: one prehistoric lithic scatter; an historic sawmill; two historic mining claim sites; the Line Creek Guard Station; one historic irrigation ditch (still in use); and five stone features. Detailed information regarding these 11 sites is available in the Hole in the Wall Fire Cultural Resources Abstract and Damage Assessment (9/9/2011).

Of particular concern was the high number of stone features in the Robertson Draw and North Line Creek drainages that suggest the area is used for traditional cultural activities. These activities may be associated with the Crow and Shoshone who have aboriginal ties to the area. The number and type of sites further suggest the area may be considered a traditional cultural landscape. Today, the Crow and Shoshone use both Forests for traditional cultural practices such as fasting and plant collection. Many of these stone features are considered by the Crow to be sensitive locations that demand respectful treatment and protection (see Deaver and Kooistra-Manning 1995). Effects from fire suppression and subsequent BAER treatments on these cultural resources would require consultation with these Tribes.

None of the heritage resource sites monitored warrant immediate BAER treatment. However, there is a high risk for illegal collecting, looting and vandalism in areas where high fire severity has exposed heritage resource sites. This unacceptable degradation of heritage resources is highly likely to occur within one year, until vegetative cover has been re-established. Increased site monitoring is recommended for one site as mitigation, with follow-up law enforcement investigation where necessary.

Heritage compliance level inventory and evaluation are required for all ground disturbing projects associated with BAER treatments and will follow procedures already established in the MTSHPO PA for sites located on Forest Service administered lands. Involvement of the Crow and the Shoshone Cultural Committees is essential at all stages of BAER implementation work should these activities have an effect on the sites identified above.

B. Emergency Treatment Objectives:

As noted above, theats to natural and cultural resources, public safety, from loss of water control, increased sediment delivery, increased debris flow potential, establishment of noxious weeds, and habitat degredation as a result of the Hole in the Wall Fire. For these reasons the primary treatment objectives are:

- Mitigate effects changed post-fire watershed response on BAER implementation crews and trail users safety.
- Mitigate effects of changed post-fire watershed response on Forest Service trails.
- Moniter effects of changed post-fire watershed response on the historic properties and cultural resources.
- Minimize the increased potential for the spread of invasive and noxious weeds.

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

Land 80 % Channel **N** % Roads/Trails 80 % Protection/Safety 80 %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Trails	80	85	95
Weeds	80	80	80

E. Cost of No-Action (Including Loss): $225,000

F. Cost of Selected Alternative (Including Loss): $75,059

G. Skills Represented on Burned-Area Survey Team:

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

Team Leaders: Mark Story and Kent Houston

Email: mstory@fs.fed.us / khouston@fs.fed.us Phone: 406.587.6735 / 307.578.5142

Team Members:

- Kent Houston– Soil Scientist
- Mark Story– Hydrologist
- Kari Cary– Hydrologist Trainee
- Allie Wood - Trails
- Joe Vacirca - Fisheries
- Dale White– Road/Hydraulic Engineer
- Mike Bergstrom– Heritage
- Halycyon LaPointe– Heritage
- Kyle Wright- Heritage
- Sean Monahan– Weeds
- Kim Reid – Weeds/Range/Sensitive Plants
- Luke Fossness – Fuels/Fire

H. Treatment Narrative:

Note: The treatment descriptions below are summarized. Treatment specification sheets are included as part of the project file.

Land Treatments:

Trails

Within the Hole-in-the-Wall Fire burn area, some National Forest trails will require immediate emergency assistance to reduce erosion, protect trail prism and provide for safe travel for BAER rehab crews. Trail BAER treatments consist of 4 primary activities.

Hazard tree removal for BAER rehab crew safety.

Installation of drainage structures such as check dams, water bars and drain dips.

In localized areas tread stabilization for surface drainage, tread erosion and upslope slough removal provide for safe travel for BAER rehab crews.

Warning signs being installed at trailheads or portals that inform the public about entering a burned landscape and the associated hazards.

These treatments to reduce erosion, runoff and sediment delivery are being recommended at varying levels for each trail, with a number of factors taken into consideration. These factors are burn intensity, burn severity, soil type and structure, trail grade, side slope, alluviums, topography, vegetative cover, watersheds, proximity to critical fish habitat, current trail use, expected use, and future travel planning being consideration in the near future.

Specific Hole in the Wall Fire trail BAER work includes:

Drainage structures on trails $28,241

1. General Description: Install drainage structures (water bars, check dams, and/or drain dips) on trails to prevent erosion from the expected increase in runoff from the fire along and above trails.

2. Location (Suitable) Sites:

   a. 5.0 miles - #7B – Line Creek Basin
   b. 2.0 miles - #7 – Face of the Mountain.
   c. 1.0 miles - #7A– North Line Creek

3. Design/Construction Specification(s):CNF:

   1. Install a total of 344 drainage structures: Line Creek Basin Trail install 198 drains; Face of the Mountain Trail install 80 drains; and North Line Creek install 66 drains. Drainage structures should be spaced as staked on the ground. All work shall be according to EM-7720-102, Standard Specification for Construction of Trails, as amended for this project.

Purpose: The drainage structures are intended to prevent accelerated erosion by diverting, discharging, and dissipating

runoff flowing down trail tread. This protects watersheds by lessening the force and concentration of water flowing downslope.

Hazard Trees $5,786

1. General Description: Cut and remove standing, leaning, and fallen hazard trees that were weakened as a result of the fires to insure the safety of BAER rehab crews.

2. Design/Construction Specification(s) CNF:
   2. Remove approximately 2,000 hazard trees identified along the trails listed below.

   3. All work shall be according to EM-7720-102, Standard Specification for Construction of Trails, as amended for this project.

3. Purpose**:** Clearing will permit reasonable safe passage for BAER rehab crews.

4. Location (Suitable) Sites:
   a. Line Creek Basin - 4.0 miles
   b. Face of the Mountain - 1 mile
   c. North Line Creek - .25 miles

Tread Stabilization $5,060

1. General Description: Some trails within the Hole in the Wall Fire burned area on National Forest lands require re-treading and trail prism stabilization to remove material sloughing from post fire runoff, adequately reduce the risk of further erosion and degradation of trail prism and provide for safe access for BAER rehab crews.

2Location: approximately 10% of the trail distance below needs treat stabilization.
   a. Line Creek Basin - 13,200 ft
   b. Face of the Mountain - 10,560 ft
   c. North Line Creek - 1,320 ft

3. Purpose: To remove material sloughing from post fire runoff, adequately reduce the risk of further erosion and degradation of trail prism and provide for safe access for BAER rehab crews.

Weeds

Land Treatments
Hole in the Wall BAER weed treatments on the Custer NF include weed monitoring, herbicide and biological weed treatment, livestock deferment from burned areas during recovery of native vegetation. Proposed treatments and monitoring 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. Figures 8-9 displays various features related to land treatment areas and related infrastructure.

Land Treatment - Weed Monitoring Strategy and Estimated Cost
BAER team vegetation experts assessed areas at risk from invasion and potential seed sources into these areas. These areas are identified for monitoring to determine where treatment will be needed to protect vulnerable vegetation resources and biological diversity. These areas will be the first priority for monitoring (and potential future noxious weed treatment). The second priority for monitoring will be the remainder of the burned area.

Phase I monitoring will involve inspections, first along all roads and dozer lines, then outward from roadsides and other known noxious weed infestations and disturbed sites beginning with 2011 fall regrowth and during the 2012 growing season. Phase II monitoring will continue throughout the fire area. Documentation of weed locations, by species, and other observations regarding density and spread will be recorded following the guidelines in NRM NRIS corporate database. If the Forest Service determines more rigorous monitoring is then needed to track particular infestations through time, a new design can be implemented in appropriate areas. The estimated cost for initial weed monitoring is found in the following Table.

Weed Detection and Monitoring Cost

Monitoring Phase	Resources Needed	Estimated Unit Cost	Estimated Total Cost
Phase I	2 Person Days 4-wheel Drive Pickup and 2 ATVs (200 miles)	$300/person/day .60/mile* $300 FOR	$600 $120 $30
Phase II	4 Person Days 4-wheel Drive Pickup and 2 ATVs (400miles)	$300/person/day .60/mile* $300 FOR^	$1200 $240 $60
Total Cost			**$2,250**
Cost / Unit	Unit: 6 persons days + fleet	**$375**	**$2,250**

Land Treatment - Immediate Weed Control Treatments and Estimated Cost

The following Table summarizes the estimated funding needed for herbicide weed control during the fall regrowth in 2011 and the 2012 growing period. Weed treatment will concentrate on those areas of known weed infestations 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. These areas are high use public and administrative sites where people, vehicles and wildlife would serve as vectors of spread. It is critical that these areas be treated as soon as possible to prevent weed seed spread into newly burned and vulnerable areas. Nearby vulnerable areas include populations of sensitive plant Beartooth goldenweed. See Appendix A for Weed Treatment Protection Measures that need to be followed when controlling weeds in or near sensitive plant populations.

In order to address the noxious weed threat, the following treatments are recommended; 1) monitoring and herbicide treatment, and 2) monitoring and herbicide treatment on all suppression lines inside and outside the fire perimeter. The table below displays the total low elevation fire-lines, the Line Creek Road and the proposed treatment area and costs for each.

Immediate Weed Treatment Cost

Suppression Line Length in Miles[2]	Suppression Line Average Width in Feet	Gross Acres	Net Acres Using 15% Density of Gross Acres	Cost Weed Treatment Per Acre[3]	Cost Weed Treatment
MT Dozer South 1.7 miles	15	3.1	0.5	$125.00	$65
MT Dozer North 1.1 miles	15	2.0	0.3	$125.00	$40
MT Handline High Elev. 4.2 miles - Site conditions make it unlikely for Infestations	3.0	1.5	0.2	$0.00	$0
MT Handline Low Elev. 1.0 miles	3.0	0.4	0.1	$125.00	$15
SuppressionLine In/Near Sensitive Plant Populations 1 mile	15	1.8	0.3	$333.00	$100
Line Creek Road within Burn Area Length in Miles	**Line Creek Road 100 Feet from each side of road**	**Gross Acres**	**Net Acres Using 35% Density of Gross Acres**	**Estimated Cost Weed Treatment Per Acre**	**Estimated Cost Weed Treatment**
2.3	200	56	20.0	$125.00	$2,500
Total		**68.7**	**21.4**		**$2,720**

Due to the high elevation and short growing season it was determined that the risk of spotted knapweed or other weed seed germination and plant growth is very low along the handline established at treeline in alpine settings.

The key for effective long-term control is to implement a plan that consistently prevents the formation and dispersal of weed seed during each year's growing season. Therefore, a one-time herbicide treatment for noxious weeds will not be effective. Management and control efforts must be planned for several consecutive growing seasons in order to prevent new sprouting and seed formation/dispersal and at the same time deplete the associated seed banks that have built up in the soil.

A total of $4,970 will be needed for monitoring detection and treatment of 21.4 net acres during fall regrowth period of 2011 (if conditions warrant) and the growing season of 2012. It is estimated that there will likely be additional outyear funding requests for follow-up herbicide treatment needs.

[2] Suppression line data is from the August, 2011 Rocky Mountain Incident Management Team GIS fire-line inventory. 8.3 miles of handline was completed on the Shoshone NF portion of the burn and using same formula above equates to 0.5 net acres @ $63

[3] Cost per acre is based on the average cost of weed treatment for the Custer National Forest Invasive Plant Program of Work.

The Shoshone Weed program emphasis is Early Detection Rapid Response (EDRR). Work includes both treatment and monitoring undertaken at the same time. UTV crews will treat along road corridors and known populations. In back burn areas south of Line creek and other areas not appropriate for UTV's, EDRR work will be performed by backpack crews. A summer and fall EDRR visit is planned in 2012.

I. Monitoring Narrative: Weed monitoring is listed previously with weed treatments.

Land Treatment – Sensitive Plant Population Monitoring
The Beartooth goldenweed population is identified for monitoring to determine if noxious weeds are becoming established, if nearby weed treatment is effective, and if potential future noxious weed treatment is needed. The monitoring would begin in 2011 during any fall regrowth period and during the 2012 growing season.

Beartooth Goldenweed Population Weed Monitoring Cost

Monitoring Location	Resources Needed	Estimated Unit Cost	Estimated Total Cost
Beartooth goldenweed population	2 Person Days 4-wheel Drive Pickup (200 miles)	$350/person/day .60/mile* $300 FOR	$700 $120 $30
Total Cost			**$750**
Cost / Unit	Unit: 2 persons days + fleet	**$375.00**	**$750**

Part VI – Emergency Stabilization Treatments and Source of Funds

Line Items	Units	Unit Cost	# of Units	BAER $	Other $
Custer National Forest					
A. Land Treatments					
Weed herbicide treatment	AC	$125	21	$2,620	
Weed herbicide wicking or hand pull treatment in Sensitive Plant Populations	AC	$333	0.3	$100	
Subtotal Land Treatments				$2,720	
C. Roads and Trails					
Hazard tree removal	each	2.74	2000	$5,786	
Install drainage structures	each	82	344	$28,241	
Tread Stabilization	feet	2.02	2508	$5,060	
Trail signs	each	1000	10	$2,000	
Trail re-establish trail realignment	feet	2.44	5280		$12,877
Subtotal Roads and Trails				$41,087	
E. BAER Evaluation					
Assessment (person days)	DAYS	350	36		$12,600
Travel costs	LS	120	9		$1,080
Subtotal Evaluation					$13,680
F. Monitoring					
Weed monitoring	DAYS	375	6	$2,250	
Sens. Plant Population Weed Monitoring	DAYS	375	2	$750	
Subtotal Monitoring				$3,000	
G. Custer NF Totals				$46,807	$26,557
Shoshone National Forest					
A. Land Treatments					
Weed herbicide treatment Park County Weed and Pest UTV crew	DAYS	$600	2	$1,200	$0
Weed herbicide treatment Park County Weed and Pest 4 person backpack crew	DAYS	$750	5	$3,750	$0
Subtotal Land Treatments				$4,950	
E. BAER Evaluation					
Assessment (person days)	DAYS	350	10		$3,500
Travel costs	LS	120	2		$240
G. Shoshone NF Totals				$4.950	$3.840
Custer and Shoshone NF's Total for this request				**$51,757**	**$30,397**

PART VII - APPROVALS

1. _____ 9/12/2011
Forest Supervisor Date

2. _____ _____
Regional Forester Date