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

Date of Report: September 23, 2013

**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: Hardluck

B. Fire Number: WY-SNF- 251

C. State: Wyoming

D. County: Park

E. Region: 2

F. Forest: Shoshone

G. District: Wapiti

H. Fire Incident Job Code: P2HR4Q

I. Date Fire Started: 07/17/2013

J. Date Fire Contained: 09/16/2013

K. Suppression Cost ~$723,981on 9/12/2013

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

M. Watershed Numbers: East Fork Shoshone River (100800130103), Saddle Ck C (100800130104), Upper South Fork Shoshone C (100800130102), Upper South Fork Shoshone River (100800130101)

N. Total Acres Burned: 24,648 total acres
NFS Acres(24,648) Other Federal 0 State 0 Private 0

O. Vegetation Types:
Misc. alpine types; Whitebark Pine / Idaho fescue; Whitebark Pine / Grouse whortleberry; Subalpine fire / Grouse whortleberry; Subalpine fir / Heart leafed arnica; Subalpine fir / common juniper; 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, Talus slopes, and Rock outcrop. Soil survey report for Hardluck Fire is in project files.

Q. Geologic types: Andesitic Absaroka Volcanics of the Wiggins and Wapiti Formations; glacial moraine; landslide deposits.

R. Miles of Stream Channels by Order or Class:

| | **Sum of Miles** | | | | |
|---|---|---|---|---|---|
| **Watershed & Stream Class** | **Unburned/Very Low** | **Low** | **Moderate** | **High** | **Grand Total** |
| **East Fork Shoshone River** | **99** | **140** | **87** | **27** | **353** |
| Intermittent | 26 | 35 | 24 | 5 | 89 |
| Perennial | 41 | 66 | 29 | 8 | 143 |
| Ephemeral | 33 | 39 | 35 | 14 | 121 |
| **Saddle Ck C** | **33** | **39** | **15** | **2** | **88** |
| Intermittent | 7 | 9 | 6 | 1 | 23 |
| Perennial | 19 | 22 | 7 | | 48 |
| Ephemeral | 7 | 8 | 2 | 1 | 18 |
| **Upper South Fork Shoshone C** | **118** | **208** | **104** | **36** | **467** |
| Intermittent | 32 | 66 | 38 | 16 | 152 |
| Perennial | 58 | 104 | 45 | 10 | 217 |
| Ephemeral | 28 | 38 | 21 | 10 | 97 |
| **Upper South Fork Shoshone River** | **59** | **74** | **60** | **29** | **221** |
| Intermittent | 19 | 24 | 27 | 15 | 85 |
| Perennial | 19 | 25 | 14 | 6 | 64 |
| Ephemeral | 21 | 25 | 18 | 8 | 72 |
| **Grand Total** | **309** | **461** | **266** | **93** | **1129** |

S. Transportation System

Trails: 24.5 miles Roads: 0 miles

## PART III - WATERSHED CONDITION

A. Burn Severity (acres): 7,336 (unburned); 3,405 (low); 10,898 (moderate); 1,938 (high)

B. Water-Repellent Soil (acres): 12,836 acres)

C. Soil Erosion Hazard Rating (acres):
3,303 (low) 9,340 (moderate) 10,934 (high)

D. Erosion Potential: .15 tons/acre (under estimated because of highly active debris flow processes)

E. Sediment Potential: 24.1 tons / sq mile (under estimated because of highly active debris flow processes)

## PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 5

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

C. Equivalent Design Recurrence Interval, (years): 25

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

E. Design Storm Magnitude, (inches): 1.2 inches

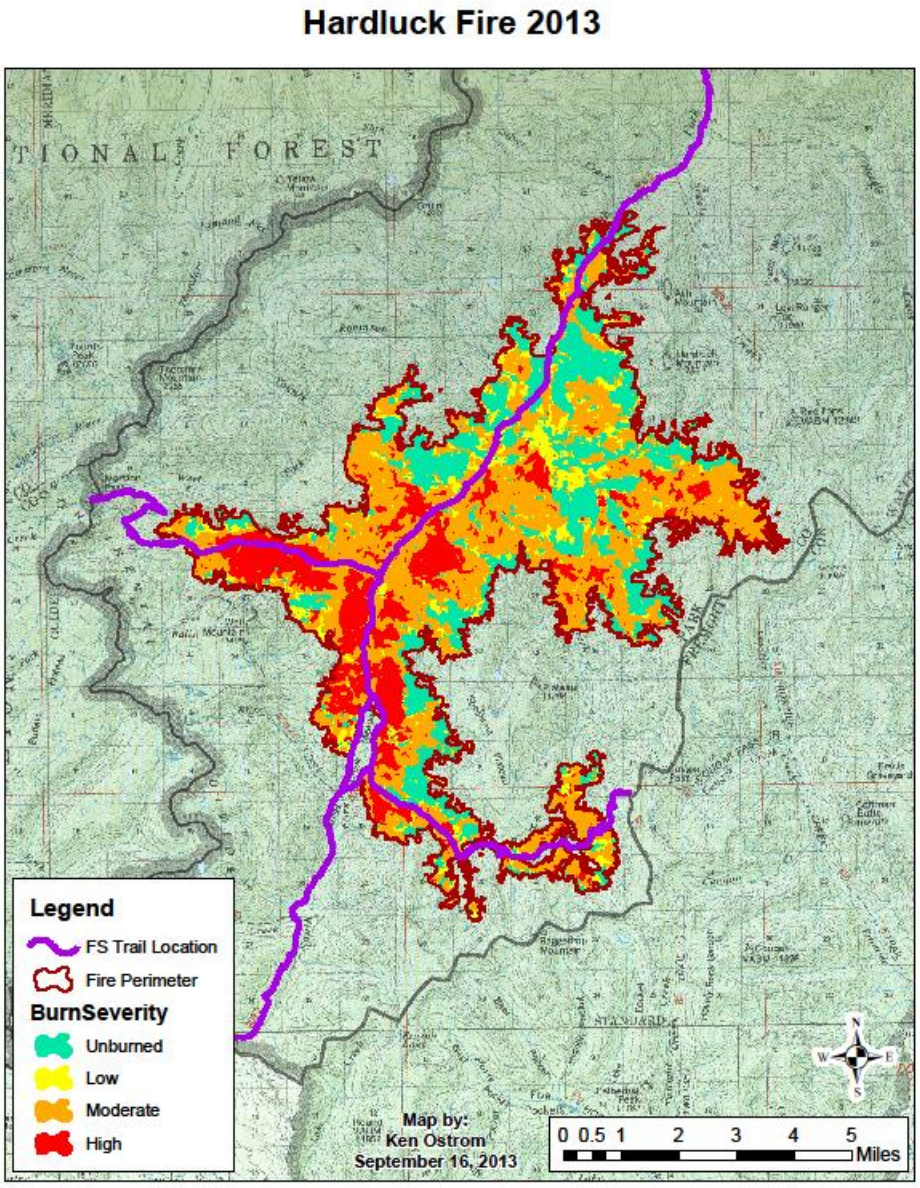
F. Design Flow, (cubic feet / second/ square mile): 182 cfs/$mi^2$ (3.8 cfsm)

G. Estimated Reduction in Infiltration, (percent): 18

H. Adjusted Design Flow, (cfs per square mile): 360 cfs/$mi^2$ (7.6 cfsm)

## PART V - SUMMARY OF ANALYSIS

# A. Describe Critical Values/Resources and Threats




### Threats to Life and Property

The watershed is part of the municipal water supply for the City of Cody; however due to the proximity of the fire to the municipal water supply intake, no issues are expected.

The most prominent threats to health and human safety is the potential for debris flow activity related to backcountry dispersed camp sites, assigned outfitter camp locations, and trails. Trail systems may also be washed-out during storm events limiting access to recreationists traveling either into or out of the South Fork of the Shoshone. An option for addressing these concerns is to post warnings at trailheads alerting entities to be cognicent of camping locations in the fire perimeter and that debris flow activity with rain events is probable and could impact campsites as well as trail conditions.

The nearest water diversion is located approximately eight miles downstream of the burned area. It is possible but unlikely that a storm event could mobilize enough bed or debris material that points of diversion and

adjacent ditches could be affected. Models do not predict mobilization distances well.

### *Summary of Watershed Response*

Hydrologic Response*:* The Hardluck fire had periods of fast moving wind driven fire. Extensive areas of moderate to high burn intensity are found in the burn perimeter. Debris flows are common in this landscape and the resulting sediment yield increase could be much larger depending upon summer thunderstorm activity. Actual water quality values at risk are minimal because of wilderness and subsequent lack of development. Yellowstone Cutthroat exists in the drainage but is adapted to fires such as this and values at risk are minimal.

The East Fork Shoshone River, Saddle, and South Fork Shoshone Watersheds are affected by the Hardluck Fire. The fire is in highly dissected terrain which has 4000 feet of relief. The coarse textured Absaroka volcanic soils are quite vulnerable to debris flow processes. Post fire erosion processes pose extensive potential to damage Forest trails. This is the Marston Creek drainage.

High severity burn area is common in the in the upper Shoshone River watersheds. Forest trails 809.2, 772.5, 812.3, and 772 traverse much of this heavily burned area. They are subject to erosion damage. The arrow shows the trail crossing a high burn severity area.

Erosion response: Loss to soil erosion is estimated with Disturbed WEPP 2.0 at 0.15 tons per acre during the first year after the fire. WEPP under estimates erosion from debris flow processes. High soil 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 fifth growing season.

Soils loss can be expected on hill slopes. This photo illustrates soil *movement after* a small rain event during September.

Geologic Response: Debris flows during summer thunder storm activity will 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.

The arrow shows where a September rain event and subsequent debris flow occurred in a high burn severity area in Marston Creek.

Debris flows are a frequent and common occurrence in Absaroka Volcanic landscapes. This event occurred during one of the slow periods of fire growth in September. Note amount of soil movement from a small rain event.

## Values at Risk:

In accordance with the revised Forest Service manual, the risk matrix below, Exhibit 2 of Interim Directive No.: 2520-2013-1 was used to evaluate the Risk Level for each value identified during Hardluck Fire 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 |

The Hardluck Fire risk levels by resource include trails, cultural resources, and noxious weeds. Cultural resources evaluation and protection information will continue into FY2014 due to safety and logistic concerns. Trails, noxious weeds, and cultural resources that have risk levels of intermediate or greater are the recommended for BAER funded treatments.

| Probability of Damage or Loss | Magnitude of Consequences | | |
|---|---|---|---|
| | Major | Moderate | Minor |
| | RISK | | |
| Very Likely | Very High Trails | Very High | Low |
| Likely | Very High cultural resources | High Weeds | Low Fisheries |
| Possible | High Grizzly Bear | Intermediate Whitebark pine | Low |
| Unlikely | Intermediate | Low | Very Low |

### Trails

The Hardluck Fire perimeter is entirely within the Washakie Wilderness. Four National Forest system trails are located in the interior of the Hardluck fire perimeter; South Fork (809.2), Marston Creek (772), Marston Creek Cutoff (772.5), and Clark Creek / Hidden Basin (812.3). Historically these trails were used by sheep herders, ranchers, and a spectrum of recreationists. Currently the trail system serves non-motorized users (hikers, horse riders, and fall hunters). It is approximately 12 miles to the northern fire perimeter from the two trail heads and almost 40 miles to the Hidden Basin part of the fire. Over 2,500 hazard tree and trail blocking downfall trees were removed within the burned area by suppression crews. The exception was the Clark Creek / Hidden basin trail. Suppression crews were not able to complete this trail. Areas where hazard tree removal occurred will still need to be assessed prior to the initiation of 2014 trail work. Hazard trees and poor post fire trail conditions constitute the greatest threat to human life.

Approximately 24.5 miles of system trails within the Hardluck perimeter are expected to be at risk of deterioration from additional runoff and sediment from post-fire conditions. Trail burn severity was rated using the BARC map. Of the 24.5 miles, 2.9 were unburned, 4.5 low, 11.1 moderate, and 5.9 were rated high.

Threats to life and property are present from upland slope erosion and debris flows being deposited on the trail. The trails were not designed for the increased flow that may occur. 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 rill and gully soil erosion.

Debris flows create unsafe conditions requiring tread re-establishment and hazard tree removal in debris flow-deposition and down cut areas.

In localized sections of trail on high ridges and steep slopes the trail tread is indiscernible from sloughing in high burn intensity segments. With tread loss and blazed trees burned, there is a high potential for trails to become braided. If the system trail is not apparent, visitors will venture off the main tread with associated safety concerns and creating more erosion from developing trail braids and reroutes. Safety concerns are relevant regarding 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 Hardluck fire. Warning signs are needed at trail access points at the South Fork / Boulder Creek Trail head and the Cabin Creek Trail head.

Forest Service or contract labor crews will remove hazard trees, install erosion control devices, localized reconstruction of tread for better surface drainage and slough removal and replace signs at trail junctions.

## Noxious Weeds

Concern exists regarding the potential spread of noxious weeds in the Hardluck Fire area. Weed infestations include Dalmatian toadflax and its associated seed banks. Suppression personnel traveled through known populations to access the fire area. This situation requires treatment of known populations along the trails accessing the Hardluck fire and monitoring for the spread of new infestations.

Approximately 1000 gross acres of a known Dalmatian toadflax infestation occur adjacent to the fire area. New infestations can easily start in nearby burn areas.

Burned sites can have altered soil structure and reduced organic matter content creating a more favorable germination substrate for weed seeds. Disturbed sites and montane vegetation types are at the greatest at risk from invasion and spread. Disturbed trails, dispersed recreation sites, game trails and areas where ground disturbing debris flows have occurred need to be checked for new infestations.

Weed sprayers treating Dalmatian toadflax along the South Fork trail on the approach to the Hardluck Fire.

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. Results of uncontrolled weed spread are well documented. Without treatment, weeds will increase.

## Fisheries

Wyoming Game and Fish databases show that Cutthroat trout occur in the South Fork of the Shoshone River drainage. 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.

There are no BAER emergency rehabilitation actions recommended for fisheries. This is due to that these stream systems rapidly recover from fire effects. Further, the drainages that have been affected by fire do not connect to any waters of concern.

## Cultural Resources

Heritage resource sites are being located and monitored for 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 or until vegetative cover has been re-established. Increased site monitoring is recommended for sites as well as site 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 by WYSHPO. Work after the adjacent 2011 Norton Point fire revealed over 100 new sites. The Hardluck fire has a greater potential. Involvement of the Crow, Eastern Shoshone, and Northern Arapaho tribal councils essential at all stages of BAER implementation work should these activities have an effect on the sites identified above.

## Sensitive Plants

Whitebark pine has been recently listed as a Region 2 sensitive plant. Approximately 1275 acres have been affected. Whitebark pine occurs at elevations generally greater than 8500 feet in the Hardluck Fire. Stand replacement fire will assist in the establishment of new whitebark pine seedlings by Clark's Nutcracker seed cashing. At this time no treatments are planned. Monitoring of whitebark pine re-establishment should be a priority over the next 5 years.

Note the stand replacing fire in whitebark and scattered trees above that will become seed source for Clark's Nutcrackers to cashe in Hidden Basin.

**Threatened and Endangered Species**

The Grizzly bear is listed as a threatened species. One of the main methods of reducing human contact and conflict in the backcountry is through proper food storage. Within the burn area 6 of the 24 “Bear poles” that are used to keep food unavailbe to grizzly bears in outfitter and dispersed sites were burned. Replacement of these poles is esstential to maintain safe working conditions for trail crews and the general public.

Proper food storage is essential to reduce the potential of life threantening Grizzly bear - human interaction.

## 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 Hardluck 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 50 % Channel **NA** % Roads/Trails 50 % Protection/Safety 80 %

## D. Probability of Treatment Success

| | Years after Treatment | | |
|---|---|---|---|
| | 1 | 3 | 5 |
| Trails | 80 | 85 | 95 |
| Weeds | 80 | 80 | 80 |
| Cultural site | 50 | 80 | 80 |

## E. Cost of No-Action (Including Loss): $1,083,500

## F. Cost of Selected Alternative (Including Loss): $270,875

## G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Kent E. Houston Email: khouston@fs.fed.us Phone: 307-578-5142

**Team Members:** Kent Houston– Soil Scientist, Botany, Ecology, and Weeds

- Crosby Davidson - Trails
- Ken Ostrom – GIS, Forester
- Karri Cary – Hydrology
- Kyle Wright - Heritage

## H. Treatment Narratives

### <u>Land Treatments</u>:

### Trails: $219,875

The Hardluck Fire burn areas system trails will require emergency assistance to reduce erosion, protect trail prism and provide for safe travel. Proposed BAER trail treatments consist of 5 primary activities.

**1)** Hazard tree need to be removed for the safety of the implementation crew as well as for public using the trails.

The tree in the center left was missed by suppression crews. Hazard trees along the Clark Creek have yet to be removed.

2-3) Installation of drainage structures such as check dams, water bars, retainer logs, and drain dips help 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.

Replacement of burned retaining logs structures is needed (Marston Creek trail).


Waterbar
Replacement


An area on Marston Creek trail where a September debris flow captured and down cut the trail.

4) In localized areas tread stabilization for surface drainage, tread erosion and upslope slough removal provide for safe travel. Removal of 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

Tread needs to be reestablished in debris flow -deposition areas and on side slopes experiencing sloughing

5) Log out (clear downfall) is essential for safe passage in burned tree windfall areas.

Logging out (clearing out downfall) was accomplished by suppression crews. Some works still remains.

## Specific Hardluck Trail BAER work includes:

Treatments to reduce erosion, runoff and sediment delivery are being recommended at varying levels. Several factors are taken into consideration including burn intensity, burn severity, soil type, soil structure, trail grade, side slope, alluvium, topography, vegetative cover, current trail use, expected use, and future travel planning.

### South Fork Trail #809.2 (Mainline, 11.5 miles)

- Cottonwood Corrals to Confluence with East Fork (3.5 miles)
  - 6 wash-outs in need of re-tread. Approx. 2,820 feet of slide/washout
  - 1 gully wash 10 ft. deep and 40 feet wide, needs a retained crossing
  - 20 waterbars/mile to prevent further tread loss (70 waterbars total)
  - 500 feet of retainer log in areas where tread crosses side slope greater than 30% All hazard tree removal and log-out complete
- East Fork to Moose Bog (2.5 miles)
  - 20 waterbars/mile (50 waterbars total)
  - Trail tread in fairly good condition
  - All hazard tree removal and log-out complete
- Moose Bog to Marston Creek (3.0 miles)
  - Tread in good condition
  - All hazard tree removal and log-out complete
- Marston Creek to Bliss Creek Meadows (2.5 miles)
  - 0.5 miles in need of retread. Approximately 2,640 ft. (slough and berm removal)
  - 20 waterbars/mile (50 waterbars total)
  - 600 feet deeply entrenched due to poor drainage. Fill and re-tread
  - 300 feet of retainer log
  - All hazard tree removal and log-out complete

| Feature | Water-bars | Re-tread Slough & Berm | Debris flow Washout | Retainer Logs | Hazard Tree 200/mile | Log-out (clear downfall) | Mobilization |
|---|---|---|---|---|---|---|---|
| Needed Work | 170 | 0.5 miles | 3,460 ft. | 800 ft. | 0 miles | 0 miles | N/A |
| Contract Price | $85 each | $300/mile | $10.00/ft. | $7.00/ ft. | $60 each | $500/mile | N/A |
| Item Total | $14,450 | $150 | $34,600 | $5,600 | $0 | $0 | N/A |
| **Total Cost** | **$54,800** | | | | | | |

### Marston Creek Trail #772 (secondary, 4.3 Miles)

- Junction with Trail # 809.2 to Snowtel Site (3.8 miles)
  - 1.5 miles in need of re-tread. Approximately 7,920 feet
  - 750 feet of washout needing slide/washout work
  - 600 feet deeply entrenched due to poor drainage. Fill and re-tread
  - 25-30 waterbars/mile (114 waterbars total)
  - 1,760 feet of retainer log
  - Hazard tree removal and log-out complete
- Snowtel Site to edge of burned area (.5 miles)

20 waterbars/mile (10 waterbars total)
Hazard tree removal and log-out **not complete**

| Feature | Water-bars | Re-tread Slough & Berm | Debris flow Washout | Retainer Logs | Hazard Tree 200/mile | Log-out (clear downfall) | Mobilization |
|---|---|---|---|---|---|---|---|
| Needed Work | 124 | 1.5 miles | 1,350 ft. | 1,760 ft. | 0.5 miles | 0.5 miles | N/A |
| Contract Price | $85 each | $300/mile | $10.00/ft. | $7.00/ ft. | $60 each | $500/mile | N/A |
| Item Total | $10,540 | $450 | $13,500 | $12,320 | $6,000 | $250 | N/A |
| **Total Cost** | **$43,060** | | | | | | |

### Marston Creek Cut-Across Trail #772.5 (Secondary, 1/2 mile)

- Junction of Trail #809.2 to junction of Trail #772 (0.5 miles)
  10 waterbars/mile (5 waterbars total)

| Feature | Water-bars | Re-tread Slough & Berm | Debris flow Washout Maintenance | Retainer Log | Hazard Tree 200/mile | Log-out (clear downfall) | Mobilization |
|---|---|---|---|---|---|---|---|
| Needed Work | 5 | 0 miles | 0 ft. | 0 ft. | 0 miles | 0 miles | N/A |
| Contract Price | $85 each | $300/mile | $10.00/ft. | $7.00/ ft. | $60 each | $500/mile | N/A |
| Item Total | $425 | $0 | $0 | $0 | $0 | $0 | N/A |
| **Total Cost** | **$425** | | | | | | |

### Clark Creek / Hidden Basin Trail #812.3 (Mainline, 8.2 miles)

The remote, highly dissected Clark Creek trail was not cleared of hazard trees or logged out by suppression crews. Subsequently, costs are high.

- Northern edge Bliss Creek Meadows to Clark Creek Cut-Across (1.6 miles)
  - ¾ mile sustained severe tread loss: in need of tread resurfacing/waterbars
  - 30 waterbars/mile (23 waterbars)
  - 3,960 feet tread work
  - Hazard tree removal and log-out complete

- Clark Creek Cut-Across to Pierpont Pass (4.0 miles) **not yet surveyed**
  - Estimated 2.0 miles of tread resurfacing (slough and berm removal)
  - Estimated 20 waterbars/mile (80 waterbars total)
  - Estimated 1,000 feet of retainer log
  - Hazard tree and log-out **not complete**
- Pierpont Pass to Cougar Pass (2.6 miles) **not yet surveyed**
  - Estimated 1.0 miles of tread resurfacing (slough and berm removal)
  - Estimated 10 waterbars/mile (26 waterbars total)
  - Hazard tree and log-out **not complete**

| Feature | Water-bars | Re-tread Slough & Berm | Debris flow Washout | Retainer Log | Hazard Tree 200/mile | Log-out (clear downfall) | Mobilization |
|---|---|---|---|---|---|---|---|
| Needed Work | 129 | 3.75 miles | 0 ft. | 1,000 ft. | 6.6 miles | 6.6 miles | N/A |
| Contract Price | $85 each | $300/mile | $10.00/ft. | $7.00/ ft. | $60 each | $500/mile | N/A |
| Item Total | $10,965 | $1,125 | $0 | $7,000 | $79,200 | $3,300 | N/A |
| **Total Cost** | **$101,590** | | | | | | |

**Summary Estimated Trail Costs**

| Feature | Water-bars | Re-tread Slough & Berm | Debris flow Washout | Retainer Logs | Hazard Tree 200/mile | Log-out (clear downfall) | Mobilization |
|---|---|---|---|---|---|---|---|
| Needed Work | 428 | 5.75 miles | 4,810 ft. | 3560 ft. | 7.1 miles | 7.1 miles | |
| Contract Price | $85 each | $300/mile | $10.00/ft. | $7.00/ ft. | $60 each | $500/mile | $20,000 each |
| Item Total | $36,380 | $1,725 | $48,100 | $24,920 | $85,200 | $3,550 | $20,000 |
| **Grand Total** | **$219,875** | | | | | | |

Note: Estimates are based on 2012 and 2013 contract prices. Contract prices are generally slightly higher than the cost of equivalent work done by Forest Service crews. However, the Shoshone NF North Zone trails program may not have the capacity to complete all work in a timely manner. Contractors will have to be used. A new IDIQ contract for trail work will be in place in the spring of 2014.

Mobilization is the cost to get crews to the work site. This includes livestock and packing in work camps.

All native materials will be used for water-bars and retainer logs. These materials will be cut to fit on site.

All trail work shall be according to EM-7720-102, Standard Specification for Construction of Trails.

### Land treatment - Cultural Site location and protection: $30,000

Site location and protection for numerous prehistoric sites that are found within the burn area consists of seeding native grasses to protect sites from erosion and susceptibility to looting. Costs include using horse packers to drop camp archeologists in remote locations to assess sites and to seed or camouflage. An estimated 30 sites will need treatment.

### Land treatment- Warning signs $1,500

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

### Land Treatment - Weed Monitoring Strategy $13,500

Hardluck BAER weed treatments include implementing an early detection rapid response strategy. Proposed treatments and monitoring follow Forest Service regulatory requirements and protocols in accordance with existing 1999 Shoshone NF Noxious Weed EA.

BAER team vegetation experts assessed areas at risk from invasion and potential seed sources into these areas. The primary area of concern is the north end of the fire along the south fork of the Shoshone River. This area has a large infestation of Dalmatian toadflax that the Forest has been actively treating. BAER funds will be used to increase EDRR activity on this area of the burn perimeter.

**Weed Early Detection and Rapid Response Cost**

| Monitoring | Resources Needed | Estimated Unit Cost | Estimated Total Cost |
|---|---|---|---|
| EDRR | 3 member Horse pack sprayer weed crew from Park County Wyoming Weed and Pest. Participating Agreement in place. | $450/person/day 30 days | $13,500 |
| **Total Cost** | | | **$13,500** |

### Land treatment – Replace Bear poles: $6,000

6 of the 24 existing bear poles within the burned area were damaged by the fire. An existing IDIQ contract is in place with unit replacement costs at $1,000 each.

## I. Monitoring Narrative:

Weed monitoring is considered as part of weed treatments activities.

Trail condition monitoring will be ongoing as work commences in the summer of 2014.

Cultural site monitoring will be ongoing as work commences in the summer of 2014.

## Part VI – Emergency Stabilization Treatments and Source of Funds

| Line Items | Units | Unit Cost | # of Units | BAER $ | Other $ |
|---|---|---|---|---|---|
| **A. Land Treatments** | | | | | |
| Weed herbicide treatment / EDRR | days | $450 | 30 | $13,500 | |
| Cultural site location and protection | Sites | $1000 | 30 | $30,000 | |
| *Subtotal Land Treatments* | | | | $43,500 | |
| **C. Roads and Trails** | | | | | |
| Hazard tree removal | each | 60 | 1420 | $85,200 | |
| Retainer logs replacement | feet | $7 | 3560 | $24,920 | |
| Install waterbars and replace | each | 85 | 428 | $36,380 | |
| Re-tread Sough & berm | miles | $300 | 5.75 | $1,725 | |
| Logging out downfall | miles | $500 | 7.1 | $3,550 | |
| Debris flow washout clearing | feet | $10 | 4,810 | $48,100 | |
| Mobilization of trail work crews | trips | $4,000 | 5 | $20,000 | |
| Trail hazard signs | each | 750 | 2 | $1,500 | |
| Bear poles for food storage safety | each | $1,000 | 6 | $6,000 | |
| *Subtotal Roads and Trails* | | | | $227,375 | |
| **E. BAER Evaluation** | | | | | |
| **Assessment (person days)** | DAYS | AVG $335 | 21 | | $6626 |
| **Travel costs** | NA | 0 | 0 | | $0 |
| *Subtotal Evaluation* | | | | | $6,626 |
| **F. Monitoring** | | | | | |
| Weed monitoring | | | | | |
| Included with treatment / EDRR | | | | | |
| *Subtotal Monitoring* | | | | | |
| Total for this request | | | | **$270,875** | **$6,626** |

## PART VII - APPROVALS

1. */s/ Joe Alexander* — **09/23/2013**
   **Forest Supervisor** — **Date**

2. _____ — _____
   Regional Forester — Date