

Date of Report: 9/27/12

BURNED-AREA REPORT

(Reference FSH 2509.13)

PART I - TYPE OF REQUEST**A. Type of Report**

- ☒ 1. Funding request for estimated emergency stabilization funds
☐ 2. Accomplishment Report
☐ 3. No Treatment Recommendation

B. Type of Action

- ☒ 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:** Pine Creek**B. Fire Number:** MT-GNF-162**C. State:** MT**D. County:** Park**E. Region:** 01**F. Forest:** Gallatin**G. District:** 04**H. Fire Incident Job Code:** P1G7W4**I. Date Fire Started:** 08/29/2012**J. Date Fire Contained:** estimated 11/1/12**K. Suppression Cost:** \$5,211,000 as of 09/24/2012**L. Fire Suppression Damages Repaired with Suppression Funds**

1. Fireline waterbarred (miles): 7
2. Fireline seeded (miles): 0 as of 9/24/12
3. Other (identify):

M. Watershed Numbers: 100700020403 and 100700020405**N. Total Acres Burned:** 8,509 as of 09/28/12

NFS Acres (5210) Other Federal (0) State (0) Private (3362) some unburned private acres are within the fire perimeter

O. Vegetation Types: Engelmann spruce/subalpine fir (20%) lodgepole pine and Douglas fir (20%), Whitebark Pine (20%), grassland (30%)

P. Dominant Soils: Soils are primarily sandy-skeletal Entisols and Inceptisols containing abundant rock fragments throughout forested areas of the Pine Creek Fire. They reflect the predominance of very hard, coarse grained parent materials and limited soil formation in a young, unstable landscape. Primary parent materials present are metamorphic gneiss and darker colored but similar amphibolite. The major drainages, including the South Fork of Deep Creek and Pine Creek, are filled with local glacial till. Abundant, extremely hard stones and boulders in the glacial till are of local origin.

Abundant hard rock fragments are common throughout nearly all soils in this area. Soil textures of the non-rock fraction are predominantly loamy sands and sands although a thin veneer of sandy loam texture may be present at the mineral soil surface on stable (non-eroding) slope positions. Soil productivity is generally low on south facing mountain slopes and moderate on north facing slopes and drainage bottoms. Soils are very deep in glacial till areas and tend to be extremely bouldery. Extensive areas of shallow soils and rock outcrop are present on south aspects and convex, mountain slope positions. The predominance sandy textures makes soils in this area highly susceptible to water erosion if they are underlain by shallow (<20"), non-porous bedrock. Wind erosion can also be a problem where the mineral soil surface has been exposed, as evidenced by field observations along the trail up the South Fork on Deep Creek. Primary landscape forming processes are soil erosion, rock slides

Q. Geologic Types: Geologic materials on Gallatin National Forest lands within the Pine Creek Fire area are dominated by ancient, Early Precambrian bedrock exposed along a large anticline. Bedrock is composed of primarily of gneiss and amphibolite with lesser amounts of quartzite and marble. All of the above are highly resistant to erosion. The net result is extremely steep, mountain slopes. Mountain drainages within the burn perimeter are filled with glacial till of local origin. They contain abundant, large rock fragments of the same types as the surrounding mountain slopes. Areas of local alluvium and colluvium may be mixed with the glacial till in some areas. Rock slides are extensive on extremely steep slopes but debris flows appear to be relatively rare due to the porosity of colluvial and glacial rock deposits.

R. Miles of Stream Channels by Order or Class: 1st order 12 miles, 2nd order 5 miles, 3rd order 3 miles

S. Transportation System

Trails: 8.5 miles Roads: 0.5 miles (National Forest)

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 1159 (low) 2191 (moderate) 853 (high)

B. Water-Repellent Soil (acres): 3044

C. Soil Erosion Hazard Rating (acres):
623 (low) 1159 (moderate) 3044 (high)

D. Erosion Potential: 9 tons/acre (ERMit, 10% exceedance value)

E. Sediment Potential: 25.2 tons/square mile (assuming no debris flows)

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 2 grass/shrubs 20-50 conifers

B. Design Chance of Success, (percent): 70

C. Equivalent Design Recurrence Interval, (years): 10

D. Design Storm Duration, (hours):	<u>6 and 1 hr</u>
E. Design Storm Magnitude, (inches):	<u>1.9 (6hr), 1.2 (1hr)</u>
F. Design Flow, (cubic feet / second/ square mile):	<u>18.3 (SF Deep Ck, 10 yr event)</u>
G. Estimated Reduction in Infiltration, (percent):	<u>87</u>
H. Adjusted Design Flow, (cfs per square mile):	<u>61.9 (SF Deep Ck, 10 yr event)</u>

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

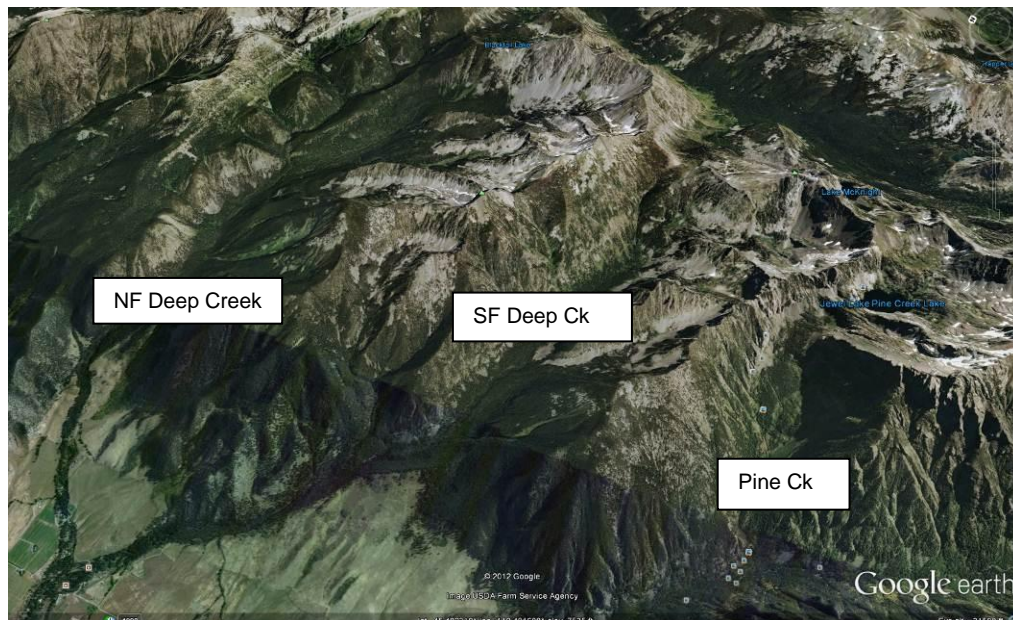
The 8,509 acre Pine Creek fire started from man-made causes (under investigation) on August 30, 2012 and quickly burned over private land into the Gallatin NF and has stabilized at 8,509 acres. Most of the fire values at risk on National Forest are in the Pine Creek and South Fork Deep Creek. The Pine Creek fire suppression efforts have required public closure of all National Forest lands within the fire perimeter due to expansion potential, hazard trees, and burned trail structures. Trails are the main values at risk on the National Forest portion of the fire. Approximately 8.5 miles of Gallatin National Forest trails at risk of deterioration from additional runoff and sediment from post-fire conditions. Due to post-fire hazard trees, 8.5 miles of GNF trails are considered a safety risk to BAER rehab crews and public. The South Fork Deep Creek trail #388 and parts of the #Pine Creek trail #47 are not safe for public travel due to hazard trees, burned and sloughing segments of trail, and in-sufficient trail drainage. Debris flow potential is high in the SF Deep Creek and parts of Pine Creek below high burn severity areas where talus and landslide deposits and high drainage density are common in very steep to extremely steep areas. The Pine Creek Fire burned through high elevation lodgepole pine and-Douglas-fir uplands, generally leaving a mosaic pattern in Pine Creek and SF Deep Creek. South Fork Deep Creek had very limited mosaic as the burn on NF was primarily moderate and high burn severity. The table below displays burn acres calculated for Pine Creek watershed at the Forest boundary and the North Fork and South Fork Deep Creek watersheds at their confluence which are the critical sections for stormflow analysis. The remaining 3683 fire acres are on private land and a mixture predominantly low and moderate burn severity. Burn intensity was not specifically mapped but the acreage of high burn intensity is much greater than the acres of high burn severity. Most of the sites examined displayed hydrophobic soil conditions in burned areas.

Soil burn severity area estimates (acres)

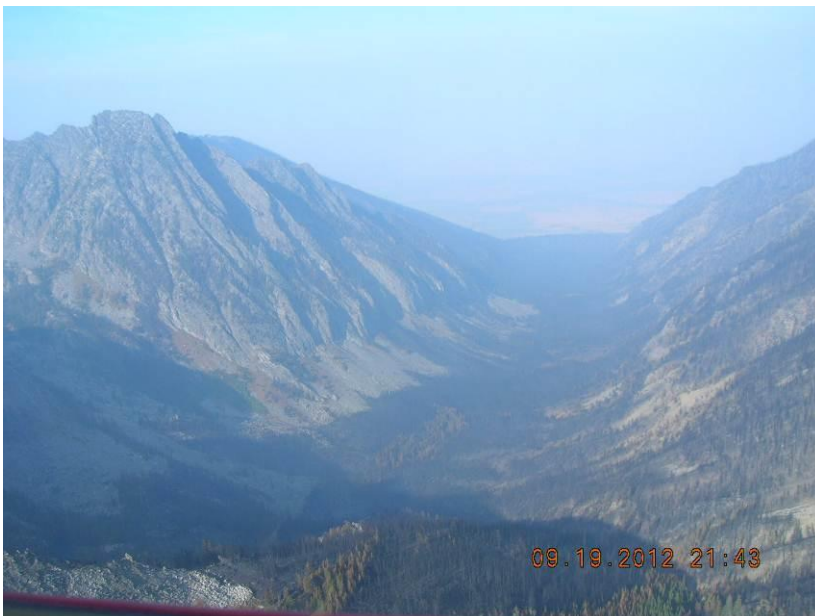
6th-HUC drainage	Unburned	Low Severity	Moderate Severity	High Severity	Total
North Fork Deep Creek, at mouth	106	176	104	122	508
South Fork Deep Creek, at mouth	292	518	1611	333	2754
Pine Creek, at Forest Boundary	225	465	476	398	1564
Total	623	1159	2191	853	4826



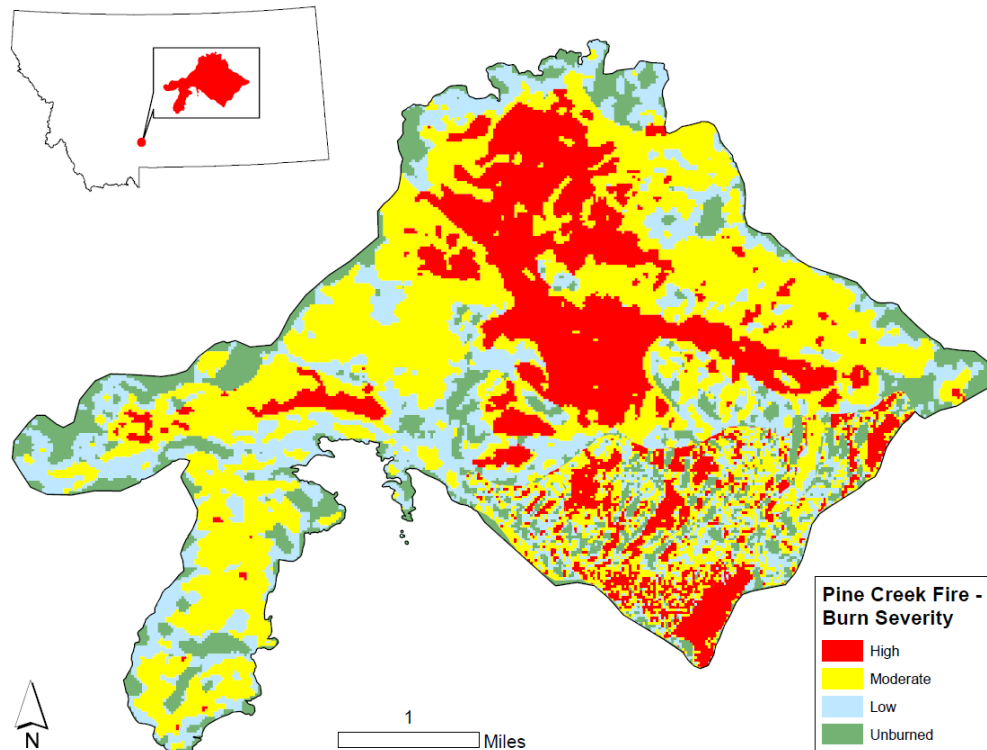
North side of South Fork Deep Creek from Trail 388. The fire burned most of the valley bottom of the drainage then to the top of the ridge into North Fork of Deep Creek. The South Fork of Deep Creek watershed has a high runoff, erosion, and debris flow potential.



Google Earth screen view of the primary drainages of the Pine Creek Fire



BAER helicopter reconnaissance photo of South Fork of Deep Creek on 9/19/12. Most of the valley bottom burned with high severity and valley sides to both the south and north side to the top with polygons of moderate and high severity. As a result the trail #388 is highly exposed to post fire runoff events and the drainage subject to accelerated erosion, debris flow, and down stormflow responses of stream discharge increases.



Pine Creek Fire Burn Severity

The South Fork of Deep Creek drainage has the greatest percentage of moderate and high burn severity with 70% of the total burn area rated in the moderate and high category. Approximately 80% of the burned area in this catchment had high intensity burning. Sediment increases were modeled in Pine Creek and South Fork of Deep Creek (R1R4 and WEPP models) with an estimated pre-fire sediment yield of 0.6% and 2.1% above natural and increasing to 51% and 178% during 2013. Peak flows were calculated for SF Deep Creek using the NRCS (TR-20) Fire Hydrology (2002) spreadsheet (RCN method) and for SF and NF Deep Creek, entire Deep Creek at SF/NF confluence, and Pine Creek via adjustments to Parrott (2004) USGS regression equations. Results are summarized in Part IV above. The main BAER concern focused on trail damage from hillslope erosion and localized debris flows in 1-2nd order tributaries during locally intensive rain events.

Road System: The Pine Creek Fire perimeter contains an estimated 0.5 miles of open roads on National Forest, all in or near the Pine Creek campground. None of these roads are exposed to post fire runoff and will require no BAER funded treatments.

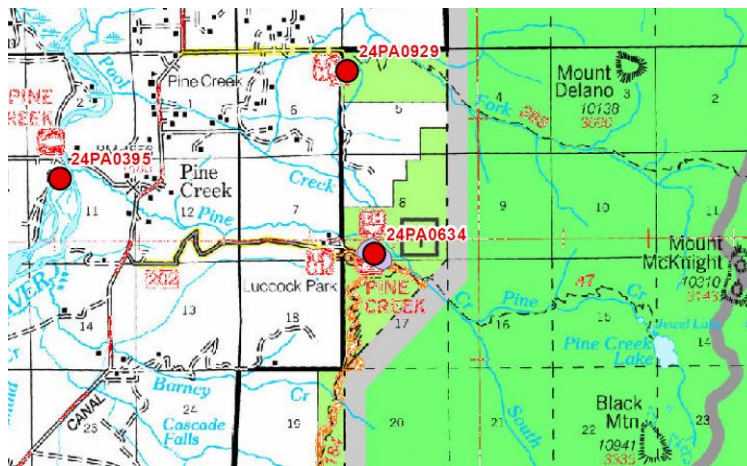
Trails: Approximately 8.5 miles of Gallatin National Forest system trails within the Pine Creek Fire perimeter are at risk of erosion and sediment delivery, as well as a safety concern with existing and potential hazard trees immediately adjacent to the trail. Three national forest system trails are located in the interior of the Pine Creek Fire perimeter including #388 – South Fork Deep Creek 5.4 miles, #47 – Pine Creek 2.6 miles, and Davis Creek 0.5 miles.

The critical trail resource threat is from upland slope erosion and runoff being deposited on or entering the trail. The trails were not designed for the increased overland flow that may occur from the Pine Creek fire. This may cause severe soil erosion on the trail surface and fill-slopes. 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 gullyng. Safety concerns for BAER crews working to improve trail drainage in the Pine Creek Fire are relevant regarding hazard trees and/or tread failure. In a few sections of the SF Deep Creek trail the tread is indiscernible due to the intensity of the burn. Warning signs also need to be installed at trailheads or trail

portals. Signs at portals will provide information for recreational users about the hazards of a burned over landscape. Warning signs are needed at trail access points for the - South Fork Deep Creek (2), Pine Creek (1), Davis Creek (1), George Leo Tie (1), and George Lake (1).

Heritage Resources: Two sites were located within the Pine Creek fire area. Site 24PA0929 is the Deep Creek Administrative Site and 24PA0634 the Historic Pine Creek Campground site built by the CCC in 1939. The Pine Creek Campground site is unburned. A portion of the Deep Creek Administrative Site was on the edge of the fire, including the loading ramp located on the east side of the existing road into the site. The loading ramp is north of the buildings and is built into a slope on the east side of the access road into the site. The ramp consists of low walls built of railroad ties and is filled in with dirt. Fire intensity was low on this grassland site with no known damage to the ramp.

Few known cultural sites have been documented within the Wilderness part of the fire due to limited field investigations. Fire burning in the Absaroka Beartooth Wilderness area provides an opportunity to survey the burned locations to determine if there are heritage resources within this locale.



Weeds Existing known sites of likely weed spread in the Pine Creek Fire includes approximately 232 acres of known noxious weed infestations within and adjacent to the fire area such as spotted knapweed, Canada thistle, musk thistle, yellow toadflax, etc. Many of these known infestations occur along roads, trails, and old logging units near Pine Creek Campground, which can be vectors for weed spread. Access Road 202 to Pine Creek Campground is under Forest Service jurisdiction and a likely source of weed vectors into the fire. The need for weed treatments is substantially accelerated by the Pine Creek Fire. Known weed treatment areas are shown in the treatment map.

B. Emergency Treatment Objectives:

Trail treatments - Permit reasonably safe passage for BAER rehab crews and reduce or prevent accelerated trail erosion by diverting, discharging, and dissipating runoff down the trail tread.

Weed treatments - Immediate control of new and known weed infestations to reduce the risk of expansion of infestations and allow burned plant communities to recover more rapidly.

Heritage resources – no treatments necessary

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

Land 80 % Channel na % Roads/Trails 70 % Protection/Safety na %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land (heritage)	na	na	na
Weed treatment)	50	70	90
Channel	na	na	na
Trails	70	80	90
Protection/Safety*	na	na	na

E. Cost of No-Action (Including Loss): \$297,000

F. Cost of Selected Alternative (Including Loss): \$105,104

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 Pine Creek 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

For the Pine Creek Fire fire the risk levels by resource included trails, heritage resources, water quality, soil productivity, and fisheries. Only trails and weeds had treatable 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, water quality, soil productivity, fisheries	Low
Possible	High	Intermediate	Low heritage resources
Unlikely	Intermediate	Low	Very Low

G. Skills Represented on Burned-Area Survey Team:

<input checked="" type="checkbox"/> Hydrology	<input checked="" type="checkbox"/> Soils	<input checked="" type="checkbox"/> Range	<input checked="" type="checkbox"/> Weeds
<input type="checkbox"/> Forestry	<input type="checkbox"/> Wildlife	<input checked="" type="checkbox"/> Fire Mgmt.	<input checked="" type="checkbox"/> Engineering
<input type="checkbox"/> Contracting	<input type="checkbox"/> Ecology	<input checked="" type="checkbox"/> Botany	<input checked="" type="checkbox"/> Archaeology
<input checked="" type="checkbox"/> Fisheries	<input type="checkbox"/> Research	<input checked="" type="checkbox"/> Air Quality	<input checked="" type="checkbox"/> GIS

Team Leader: Mark T. Story

Email: mark@story2.name Phone: 406-586-3176 FAX: 406-587-6758

Assistant Team Leader: Dale White

Email: dalewhite@fs.fed.us Phone: 406-587-6752 FAX: 406-587-6758

H. Treatment Narrative:

Trail Treatments

Nine miles of Gallatin National Forest system, including parts of 5 trails, are within or close to the Pine Creek Fire perimeter. A total of 8.5 miles are at risk of erosion and sediment delivery, as well as a safety concern with existing and potential hazard trees immediately adjacent to the trail. Trail treatments to reduce erosion, runoff and sediment delivery, are planned at varying levels for each trail, with a number of factors taken into consideration. These factors are burn severity, soil type and structure, trail grade, side slope, proximity to critical fish habitat, and current trail use.

Safety concerns are relevant regarding hazard trees and/or tread failure. In a few sections of the SF Deep Creek trail the tread is indiscernible due to the intensity of the burn. Warning signs are needed at trail access points for the South Fork Deep Creek, Pine Creek, Davis Creek, George Lake and George Leo Tie trails.

To ensure BAER rehab crew safety up front, a number of post-fire hazard trees will need to be removed during rehabilitation of system trails leading into the burned area. The Safety Handbook and the Fire Suppression Manual, clearly state that when hazards to these workers are recognized, they should be immediately dealt with and paid with fire suppression or BAER funds.

BAER rehab crews will also need to access these trails to remove hazard trees, install erosion control devices, remark the trail route where blazes have burned, replace signs at trail junctions, and in limited segments reconstruct tread for better surface drainage and slough removal for the safety of the BAER workers.

Selected hazard trees will be removed on the 8.5 miles of trails within the Pine Creek fire burn perimeter in accordance with EM-7720-102 standard specification for construction of trails. This will allow reasonably safe access for BAER trail rehab crews. Approximately 280 trail drainage structures will be installed. Trail work will consist of:

1. Removal selected hazard trees and clearing of down trees where pack string access is blocked.
2. Install adequate drainage structures and subsequent cleaning out of these structures to prevent erosion of trail prism from upslope runoff likely to occur over the coming months of rain and snowfall.
3. Stabilize trail prism to provide safe travel routes for BAER rehab crews.
4. Install warning signs at all trail portals to inform BAER rehab crews of associated hazards within a burned landscape.

The Trail BAER work will be done at 8.5 miles of trails within the Pine Creek Fire perimeter. Specific trails include:

#388 – South Fork Deep Creek

The trail begins at the end of a county road off East River Road and ends at the divide between South Fork Deep and Davis Creek drainages. Of the total 5.4 miles, approximately 5.4 miles of the trail is within the burn area. Approximately 5.4 miles warrant immediate removal of hazards trees for the safety of BAER rehab crews. Approximately 5.4 miles warrant immediate erosion control and drainage features to prevent sediment delivery, trail channeling and erosion, and trail prism deterioration.

#47 – Pine Creek

The trail begins at the end of Forest Road #202 at Pine Creek campground and ends at the Pine Lake. Approximately 2.6 miles of the total 5.2 miles is within the burn area. The 2.6 miles warrant erosion control and drainage features to prevent sediment delivery, trail channeling and erosion, and trail prism deterioration. Two switch backed sections of the trail will need particularly heavy waterbar installation. The 2.6 miles warrant immediate removal of hazards trees for the safety of BAER rehab crews. This trail is heavily used by the public.

#38 - Davis Creek

The trail begins at the junction with trails # 388 at the Davis and Deep Creek divide, and ends at the West Boulder trailhead. Approximately 0.5 miles warrant erosion control and drainage features to prevent sediment delivery, trail channeling and erosion, and trail prism deterioration. Some removal of hazard trees is needed for the safety of BAER rehab crews.

#184 - George Lake

The trail begins at the end of Forest Road #202 at Pine Creek campground and ends at the George Lake. Approximately 0.3 miles of the total 5.2 miles is on the edge of the burn perimeter but is not sufficiently burned to warrant BAER treatments except for a warning sign.

#684 – George Leo Tie

The trail begins at the end of Forest Road #202 at Pine Creek campground and ends at the junction with trail #184. Approximately 0.6 miles is on the edge of the fire perimeter but is not sufficiently burned to warrant BAER treatments except for a warning sign.

Trail work is planned to start in October 2012 with 2 additional drainage structure cleanings during the summer of 2013. Trail Treatments that are being recommended for many trail sections are shown in photos from the Pine Creek Fire.

Hazard tree removal for BAER rehab crew safety and public.



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



Tread stabilization for surface drainage



Replacement bridge for SF Deep Creek



Heritage Resources

The 2 sites located within the Pine Creek fire area, site 24PA0929 (Deep Creek Administrative Site) and 24PA0634 (Historic Pine Creek Campground site built by the CCC in 1939) do not require BAER treatments. No BAER related treatments or monitoring is proposed.

Weeds Existing sites and new infestations of the approximately 232 acres of known noxious weed infestations within and adjacent to the fire area such as spotted knapweed, Canada thistle, musk thistle, yellow toadflax, etc will be hand pulled or treated with herbicides for up to 3 years. Known weed treatment areas are shown in the treatment map. Many of the weeds are difficult to find the first year after a fire, so the acres will be covered twice to ensure that all weeds are located and treated effectively. Since BAER funds for weed control are only available for 1 year (2013 up to a year after the 2012 authorization initiation) other sources of funding will be pursued for subsequent years.

I. Monitoring Narrative: No BAER monitoring is proposed for the Pine Creek fire.

VI – Emergency Stabilization Treatments and Source of Funds

A. Land Treatments	Units	Unit Cost	# of Units	BAER \$	Other\$
Weed detection & herbicide treatment	AC	\$77	250	\$19,110	
<i>Subtotal Land Treatments</i>				\$19,110	
B. Channel Treatments	0	0	0	0	
C. Roads and Trails					
Trail drainage structures	each	\$155	100	\$15,500	
Trail clean out/repair drainage structures	each	\$50	200	\$10,000	
Trail hazard Trees	each	\$75	150	\$11,250	
SF Deep Creek Trail Bridge replacement	each	\$8,570	1	\$8,570	
Warning signs	each	\$1,095	6	\$6,570	
<i>Subtotal Roads and Trails</i>				\$51,890	
<i>Trails</i>					
D. Protection and Safety	0	0	0	0	
E. BAER Evaluation					
Assessment (person days)	DAYS	\$325	140		\$16,250
Travel costs	LS	0	0	0	0
<i>Subtotal Evaluation</i>					\$16,250
F. Monitoring					
<i>Subtotal Monitoring</i>				0	
G. Totals				\$71,000	
Previously approved				\$0	
Total for this request				\$71,000	

PART VII - APPROVALS

1. /Mary Erickson/ 9/27/2012
 Gallatin NF Forest Supervisor Date

2. 9/ /2012
 Region 1 Regional Forester