

**File Code:** 2520; 5180; 6520**Date:** OCT 30 2018**Route To:****Subject:** Initial BAER Request Pole Creek Manti La Sal NF**To:** Forest Supervisor Manti La Sal NF

This letter is in reply to the initial request for Burned Area Emergency Response (BAER) funding for the Pole Creek Fire. The standards for approving emergency actions are found in FSM ID-2520-2018-1 and FSH 2509.13.

Our Regional BAER Program Manager has worked with your Forest BAER Team Leader to evaluate the request based upon the direction in FSM ID 2520-2018-1. Predicted post fire events justify emergency response measures to manage unacceptable risks to critical values.

The Initial BAER request for funding of \$372,605 is being approved as shown in Part VI of the enclosed 2500-8 and in the summary table below. The approved treatments are to reduce post fire risks to critical BAER values on National Forest lands. This authorization is for specified treatments rather than lump sum funding. Charges should be made to Pole Creek Fire BAER: H4L4NW19 0410. All approved initial treatments must be installed within 1 year of fire containment.

		Unit	# of	
Line Items	Units	Cost	Units	BAER \$
<b>Land Treatments</b>				
L-01 EDRR - Suppression	acre	81	200	\$16,232
Aerial Seeding	acre	85	936	\$79,398
<b>Road and Trails</b>				
RT-01 Trail Drainage	mile	2,301	15	\$34,520
RT-02 Lake Fork, Road Drainage Reconstruction and Prism Stabilization	job	\$46,420	1	\$46,420
RT-02 Dairy Fork, Road Drainage Reconstruction and Prism Stabilization	job	\$13,130	1	\$13,130
RT-02 Blind Canyon, Road Drainage Reconstruction and Prism Stabilization	job	\$7,500	1	\$7,500
RT-02 Ives Canyon, Road Drainage Reconstruction and Prism Stabilization	job	\$4,500	1	\$4,500
RT-02 Smiths Reservoir, Road Drainage Reconstruction and Prism Stabilization	job	\$6,000	1	\$6,000
Rip Rap for water bar armoring	ton	\$110	200	\$22,000
Rip Rap for bank protection in channels and ditches	ton	\$110	800	\$88,000
Seed for disturbed construction sites	each	\$1,000	1	\$1,000
48" Culvert, purchase and install	LF	\$105	60	\$6,300
36" Culvert, purchase and install	LF	\$84	100	\$8,400
<b>Protection/Safety</b>				
PS-01 BAER Warning Signs	sign	360	11	\$3,955
PS-02 Administrative Close & Gate Installation	order			
PS-02 Administrative Close & Gate Installation	gate	3,485	5	\$0




<b>Monitoring</b>				
RT-03 Road Storm Inspection & Response	day	\$1,198	25	\$29,950
Aerial Seeding Effectiveness		\$5,300	1	\$5,300
<b>Totals</b>				
Total - This Request				\$372,605

Funds are currently available for this project but could be restricted later, if the need arises, due to Agency apportionment limitations. If this occurs, you will be contacted by the regional Budget Officer regarding specific spending restrictions and procedures.

The Forest is responsible for providing financial oversight of this project. Any changes to this approved plan must be approved by the Regional Office. As a reminder, you are required to account for accomplishments in the appropriate databases of record and provide an accomplishment report after the project is completed.

A final accomplishment report is due within 60 days following completion of all treatments. The accomplishment report form can be found on the BAER website at: [http://fsweb.wo.fs.fed.us/wfw/baer/implementation/BAERFinalAccompReport\\_FormWithInstructions5.12.17.508.pdf](http://fsweb.wo.fs.fed.us/wfw/baer/implementation/BAERFinalAccompReport_FormWithInstructions5.12.17.508.pdf). Please contact Jeff Bruggink, Region 4 BAER Coordinator, at (801) 625-5357 or [jbruggink@fs.fed.us](mailto:jbruggink@fs.fed.us) if you have any questions.

  
for **NORA B. RASURE**  
Regional Forester

cc: Penny Luehring, Jeff Bruggink, Mat Meccariello, Darren Olsen, Kyle Beagley, Chris Stratton

**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:** Pole Creek**B. Fire Number:** UT-UWF-000971**C. State:** Utah**D. County:** Pole Creek – Juab**E. Region:** 04**F. Forest:** 0410 – Manti-La Sal**G. District:** Ferron-Price, Sanpete**H. Fire Incident Job Code:** P4L4NW**I. Date Fire Started:** September 6, 2018**J. Date Fire Contained:** October 7, 2018**K. Suppression Cost:** \$29,100,000 (from I209, October 7, 2018)**L. Fire Suppression Damages Repaired with Suppression Funds**

	Pole Creek Fire
1. Fireline waterbarred (miles):	107.1
2. Fireline seeded (miles):	Not Reported
3. Other (identify):	

**M. Watershed Name & Number:**

Subwatershed (HUC6)	HUC6 Area (acres)	Soil Burn Severity at the Subwatershed Scale									
		Unburned		Low		Moderate		High		Total Burned	
		acres	percent	acres	percent	acres	percent	acres	percent	acres	percent
Lwr Thistle Creek includes Bennie Ck (160202020205)	35,368	2,133	6	10,405	29	14,475	41	791	2	25,671	72
Lake Fork (160202020106)	29,356	1,095	4	3,999	14	8,487	29	617	2	131,103	45

Subwatersheds with 20% or less total burned area: Beer Creek (160202020603), Spring Creek (160202020602), Pole Creek-Salt Creek (160202010104), Middle Thistle Creek (160202020204), Lower Soldier Creek (160202020107), and Upper Spanish Fork Creek (160202020501).

**N. Total Acres Burned: 103,545**

NFS (70,618)    Other Federal (166)    State (8,998)    Private (23,763)

**O. Vegetation Types:** Forest cover types include spruce, fir, mixed-conifer, and aspen with mountain brush and snowberry understory. Vegetation at mid-elevations and drier slopes is primarily Oak brush and juniper. Non-forest vegetation is primarily rabbit brush and sagebrush with grass understory.

**P. Dominant Soils:** Soil subgroups at lower elevation warmer/drier portions are deep and very deep Typic Argixerolls and Typic Haploxerolls, with Aridic Calcixerolls on the warmest/driest slopes. Mountain soils at higher elevations are dominantly deep or very deep Pachic Argicryolls and Pachic Haplocryolls, and shallow to bedrock Lithic Haplocryolls subgroups. Soils are typically loamy-skeletal on steep slopes. Surface soil textures are primarily loam with varying amounts of rock fragments. The NRCS Digital General Soil Map of the United States or STATSGO2, was used to compile this summary.

**Q. Geologic Types:** The burn scar is underlain by a complex arrangement of thrust faulted Devonian-Silurian-Ordovician marine sediments, Early Tertiary, and Cretaceous geologic units. Dominant geomorphic features are steep mountain landscapes. Geologic types summarized from the Postcard Geologic Map of Utah (Utah Geologic Survey).

**R. Miles of Stream Channels by Order or Class:**

Perennial: 18.7    Intermittent: 0.0

**S. Transportation System (miles)**

Roads: 27.5    Trails: 25

**PART III - WATERSHED CONDITION****A. Burn Severity (acres):**

Pole Creek Fire						
Soil Burn Severity	NFS	Other Federal	State	Private	Total Acres	Percent
High	2,494		56	352	2,902	3%
Moderate	33,778	30	3,090	7,289	44,187	43%
Low	25,804	112	4,855	12,701	43,471	42%
Unburned/Very Low	8,542	25	997	3,420	12,984	12%
<b>Total</b>	<b>70,618</b>	<b>166</b>	<b>8,998</b>	<b>23,763</b>	<b>103,545</b>	<b>100%</b>

B. Water-Repellent Soil (acres): 47,089 (assumes all moderate + high SBS acres are WR)

C. Soil Erosion Hazard Rating (acres):  
57,463 (low)      13,366 (moderate)      32,716 (high)

D. Erosion Potential: 3.6 tons/acre

E. Sediment Potential: 1,394 cubic yards/square mile

#### **PART IV - HYDROLOGIC DESIGN FACTORS**

A. Estimated Vegetative Recovery Period (years): 5

B. Design Chance of Success (percent): 80

C. Equivalent Design Recurrence Interval (years): 10

D. Design Storm Duration (hours): 1

E. Design Storm Magnitude (inches): 1.02

F. Design Flow (cubic feet / second/ square mile): 3.2 csm

G. Estimated Reduction in Infiltration (percent): 37%

H. Adjusted Design Flow (cfs per square mile): 16.8 csm

#### **PART V - SUMMARY OF ANALYSIS**

Background: The lightning-caused Pole Creek Fire started on September 6, 2018, in the Nebo Loop area about 5 miles southeast of the Bald Mountain Fire point of ignition. The fire quickly spread and actively burned over 102,200 acres before being 100% contained on October 7, 2018. The Pole Creek Fire burned in the Thistle Creek, Lake Fork Creek, and Soldier Creek drainages on the Ferron-Price Ranger District, Manti-La Sal National Forest (NF). These drainages are tributary to the Spanish Fork River.

In addition to direct impacts from the Pole Creek fire, there is an extremely high level of concern for post-fire conditions to impact the health and safety of forest visitors and Forest Service employees, as well as severely damage the transportation and recreation infrastructure within and downstream from the burned area. Because of the high potential risk to these values, a Burned Area Emergency Response (BAER) team was established by the Manti-La Sal NF to assess threats from the post-fire environment to human life and safety, property, and critical natural and cultural resources.

On September 27, the BAER assessment team began field reconnaissance of the burned area with a team of soil scientists, hydrologists, and GIS specialists, using an initial BARC (burned area reflectance classification) satellite imagery generated map. This team finalized a soil burn

severity map on September 30. Beginning October 1, additional team members that included archeologists, road engineers, botanists and plant specialists, recreation specialists, and a public information officer were assigned to the BAER team to fully assess all National Forest resource values potentially affected by the fires.

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

(Incorporates 2523.1 – Exhibit 01 Critical Values and 2523.1 – Exhibit 02 Risk Assessment from WO ID 2520-2018-1, effective October 1, 2018.)

**1. Human Life and Safety:**

Potential threats to visitors/recreating public, agency personnel, and residents of private lands include flooding and debris flows, hazard trees, loss or damage to road prisms impacting ingress and egress, and rock fall along/at roads, trails, developed and improved dispersed recreation areas, and permitted uses downstream or downslope of burned slopes, especially those with a moderate-high burn severity. Risk is increased with higher probability in places having greater, more frequent concentrations of people. Locations with increased risk is primarily in the Lake Fork drainage because of the NFS road and trail infrastructure that provides easy access to developed and improved recreation opportunities for Forest visitors.

**Human Life and Safety (HLS) – NFS Trails and Recreation Facilities, NFS Travel Roads and Associated Infrastructure**

**Very high risk** (likely, major) to forest visitors and Forest Service employees within and adjacent to the burn area along NFS roads and trails and at developed recreation sites and dispersed recreation areas due to the increased threat of flash floods, debris flows, falling trees and rocks within the burned area. Specific locations include dispersed recreation areas in Lake Fork, Dairy Fork, Dipping Pin, and Blind Canyon drainages. **High risk** (possible, major) to motorists and trail users from lack of directional and object marker signage in the burned area. *(P1-02 Administrative Closure and Gate Installation, PS-02 Burned Area Warning Signs)*

**Very high** and high risk to forest visitors using travel routes within and downstream of burned areas in the Lake Fork, Dairy Fork, Blind Canyon, and Dipping Pen drainages due to increased threat of flooding and debris flows from contiguous areas of high and moderate burn severity in flood source areas. *(P1-02 Administrative Closure and Gate Installation, PS-02 Burned Area Warning Signs, RT-02 Road Drainage Reconstruction and Prism Stabilization, RT-04 Road Storm Inspection and Response)*

There are increased threats to life and safety of occupants at private residences and other private property within and downslope of the burned area. The potential for flash flooding, debris flows, falling rocks and trees poses a threat as well as loss of ingress and egress to landowners if road systems are impacted. Areas of concern include: Lake Fork Rd. 070; State Hwy 89 from the junction with State Hwy 6 through to 5 miles south of Birdseye, UT. Ives Canyon road leads directly into the Eagles Nest Subdivision and community. Blind Canyon Road leads directly into a personal residence. Coordination and information sharing, including sharing USGS hazard maps and USFS Soil Burn Severity maps, with cooperators, local emergency management services, and landowners is recommended.

**2. Property:**

**NFS Trails and Recreation Facilities**

**High risk** (likely, moderate) to NFS trails from increased overland flow and accelerated erosion concentrating on trail segments downslope from areas burned at moderate and high severity. Many of the trails affected by the fire are located on steep slopes or in the drainage bottoms. It is likely trails will become conduits for water to flow down trails, resulting in substantial damage or total loss of trail segments. Failure of trail segments constitute a loss of Forest Service infrastructure; in some locations trails lacking drainage features needed to divert post-fire increased overland flow become threats to water quality as they efficiently route mobilized sediment to adjacent streams. (*RT-01 Trail Drainage and Tread Stabilization*)

#### NFS Travel Roads and Associated Infrastructure

There are roughly 27.5 miles of NFS roads within the burned area. Using criteria that defines magnitude of potential damage and likelihood for damage to occur, approximately 22 miles on the Manti-La Sal NF have been identified as having unacceptable risk for damage from post-fire events.

**Very high risk** (likely, major) for damage to or loss of road and bridge infrastructure due to threats of flooding, debris flows, and erosion on FSRs: Lake Fork and a small upper portion of Dairy Fork. (*RT-02 Road Drainage Reconstruction and Prism Stabilization, RT-03 Road Storm Inspection and Response, PS-02 Administrative Closure and Gate Installation*)

**High risk** (likely, moderate) for damage to or loss of road and bridge infrastructure due to threats of flooding, debris flows, and erosion on FSRs: Blind Canyon, Smiths Reservoir and Ives Canyon. (*RT-02 Road Drainage Reconstruction and Prism Stabilization, RT-03 Road Storm Inspection and Response, PS-02 Administrative Closure and Gate Installation*)

### 3. Natural Resources:

#### Native Plant Communities

**High risk** (likely, moderate) to upland native plant communities due to damages or disturbances associated with fire suppression activities and the increased potential for introduction or expansion of invasive plants and noxious weeds. Weed infestations in moderate-to-high burn severity locations are expected to spread to suppression lines and other features. Susceptible plant communities are located in the Lake Fork drainage and other fire lines in the incident area. Invasive plant species inventoried in these areas include cheatgrass (*Bromus tectorum*). Noxious weed species include: Canada thistle (*Cirsium arvense*), diffuse knapweed (*Centaurea diffusa*), gypsyflower (*Cynoglossum officinale*), hardheads (*Acroptilon repens*), nodding plumeless thistle (*Carduus nutans*), Scotch cottonthistle (*Onopordum acanthium*), spotted knapweed (*Centaurea maculoas*), squarrose knapweed (*Centaurea virgata*), and whitetop (*Cardaria draba*). (*L-02 Early Detection and Rapid Response – Suppression*)

#### Water Quality

**High risk** (likely, moderate) to the quality of the drinking water supply at the Tinney Flat Campground. Threats from accelerated erosion, increased overland flow with entrained sediment from burned, steep slopes increase the probability for high stream flows and debris flows that can impact the water source area and damage the water transmission system, contaminating the drinking water. Post-fire effects to water supply source areas are difficult to

predict. Monitoring of domestic water quality will be needed to provide for human health and safety. *(PS-05 Recreation Infrastructure Protection)*

Low risk (likely, minor) for impacts to surface water quality in Lake Fork drainage. Threats from accelerated erosion, increased overland flow with entrained sediment from burned, steep slopes increase the probability for high stream flows and debris flows that can impact surface waters. However, the low risk is because the expected post-fire threats are distributed at a larger scale across the burned area, decreasing the magnitude of consequences. There is low risk for surface water quality impacts to human health and safety because there is low probability for direct consumption from surface waters and impacts to irrigation water would be temporary.

#### Soil Productivity and Hydrologic Function

Intermediate risk (possible, moderate) for loss of soil productivity, specifically in areas burned at high severity. In the short-term (<5 years), potentially large increases in detrimental erosion are expected in areas of high soil burn severity. However, where wildfire is a natural disturbance, erosion is expected to be within the range for long-term background rates for these fire-adapted landscapes.

**High risk** (likely, moderate) to soil-hydrologic function in high and moderate soil burn severity areas due to loss of ground cover, temporary water-repellent soil surface (<1 year), and damaged surface soil structure (high SBS). In the short term (<5 year), impairment of the natural hydrologic function from accelerated erosion, increased overland flow and hillslope sediment is expected to impact down-stream values-at-risk. *(Treatment L-01 Early Detection and Rapid Response – BAER and Treatment L-02 Early Detection and Rapid Response – Suppression)*

#### 4. Cultural and Heritage Resources:

Very low (unlikely, minor) risk to critical Cultural and Heritage Resources within the burn perimeter. Only one known potentially NRHP eligible site is located within the fire perimeter on MLNF lands. It is located at the peak of a steep grade formation within an area of low burn severity. Following the protocol for risk assessment, damage to the property from post-fire effects is not expected. Since the risk to the critical values is not high, no emergency response treatments are recommended. As no ground surface disturbing treatments on previously undisturbed ground have been recommended so far for other critical values on MLNF lands, no additional survey was needed. Therefore, there is no unacceptable risk to cultural resources as a result of the Pole Creek Fire on MLNF lands.

#### B. Emergency Treatment Objectives:

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

Land - 70      Channel - NA      Roads/Trails - 70 %      Protection/Safety 90 %



## D. Probability of Treatment Success

Treatment	Years after Treatment		
	1	3	5
Land	80	80	90
Channel	NA	NA	NA
Roads/Trails	80	80	80
Protection/Safety <sup>a</sup>	90	80	70
a. Initially, visitors will acknowledge the BAER warning signs. Complacency is expected after the initial year, unless there is a substantial damaging event.			

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

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

G. Skills Represented on Burned-Area Survey Team:

<input checked="" type="checkbox"/> Hydrology	<input checked="" type="checkbox"/> Soils	<input type="checkbox"/> Geology	<input checked="" type="checkbox"/> Range	<input checked="" type="checkbox"/> Recreation
<input type="checkbox"/> Forestry	<input checked="" type="checkbox"/> Wildlife	<input type="checkbox"/> Fire Mgmt.	<input checked="" type="checkbox"/> Engineering	<input type="checkbox"/>
<input type="checkbox"/> Contracting	<input type="checkbox"/> Ecology	<input checked="" type="checkbox"/> Botany	<input checked="" type="checkbox"/> Archaeology	<input type="checkbox"/>
<input type="checkbox"/> Fisheries	<input type="checkbox"/> Research	<input checked="" type="checkbox"/> GIS	<input type="checkbox"/> Landscape Arch	

Team Leader: Terry Hardy, Watershed Program Manager, Boise NF  
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H. Treatment Narrative: The following summarizes the response actions recommended to decrease risks to BAER Critical Values. Detailed specifications and maps identifying the spatial location for the treatments are located in the Bald Mountain-Pole Creek BAER Assessment documentation record. The documents can be obtained by contacting the Uinta-Wasatch-Cache National Forest BAER Coordinator.

(Describe the emergency treatments, where and how they will be applied, and what they are intended to do. This information helps to determine qualifying treatments for the appropriate funding authorities. For seeding treatments, include species, application rates and species selection rationale.)

Land Treatments:

**L-01 EDRR – Suppression:** Surveys and treatments for new or expanding invasive plant and noxious weed infestations, associated with fire suppression activities, will be conducted by Forest Service personnel during Spring/Summer 2019 in the Pole Creek Fire perimeter. EDRR efforts may be coordinated with other Federal, State, or Local agencies, and Cooperative Weed Management Area personnel. Suppression EDRR will be completed within one year of fire containment. EDRR activities that extend beyond the first year will be accomplished through non-BAER authorizations.

Suppression EDRR efforts will be focused on disturbed areas (e.g. dozer lines, hand lines, drop points, camps) with the highest likelihood for invasive plant infestation, particularly upland or riparian areas adjacent to existing infestations where invasive plants are currently absent or present in very minor amounts. Areas especially prone to weed invasion include moderate-to-high soil burn severity locations, fire suppression lines, and other suppression features (approximately 200 acres). Specific areas that have been identified for survey include: Lake Fork and all other fire lines and suppression features in the incident area (see attached treatment map).

EDRR activities will be conducted on foot, horseback, or vehicle (UTV/truck), as appropriate. Utilize the appropriate mechanical or chemical weed control methods depending on the weed species to be treated, location, timing, surrounding vegetation, and other factors. Any herbicide must be approved for use on the local unit, and be applied in accordance with all applicable laws and regulations. Weed treatments will be added to the appropriate database of record. EDRR may occur more than once during the growing season, depending on the life cycle of weed species that may be present. Follow-up treatments will be implemented as necessary.

#### EDRR

Item	UOM	Unit Cost	# of Units	Total Cost
L-01 EDRR – Suppression	acre	\$81	200	\$16,232

#### Aerial Seeding

The purpose of aerial seeding is to mitigate unacceptable risk to multiple critical BAER values at risk due to post-fire conditions. The primary values identified as having unacceptable risk associated with them and are being addressed with the proposed seeding treatment are maintenance of soil/site productivity, hydrologic function, effects to water quality and risk to native plant communities. The intent of seeding for soil productivity and hydrologic function is to reduce soil erosion rates that may otherwise impact proper functionality of vegetation communities and watersheds. The goal of seeding to address native plant communities is to reduce the potential spread of invasive / noxious weeds such as musk thistle and whitetop into areas that previously did not contain populations.

The location or placement of the proposed seeding areas were prioritized to maximize the potential for added benefits to other critical BAER values at risk that may already be addressed through other proposed BAER treatments.

The following criteria/rule set was developed and used in identifying seeding treatment areas. These treatment areas were identified as having the highest probability of success.

- Seeding areas that were previously high density mixed conifer stands with no aspen component (the forests mid-scale existing vegetation layer was used in GIS to determine this). Closed canopy, older growth mixed conifer without an aspen component generally has a relatively sparse herbaceous understory. Thus, it typically lacks a sufficient seedbank for natural vegetative recovery.
- Focusing on placement of treatment areas on north-facing slopes as it provides the best chance of success for germination and growth given the cooler, wetter climatic conditions present in these locations. Elevation ranges of 7500 ft to 8900 ft. Higher elevations tend to be increase seeding success.
- Based on discussion with forest personnel, late fall seeding of cool season perennial grasses prior to winter snowpack has been shown to be reasonably successful with

- germination and growth in the early spring months. So, there exists an adequate timing window to implement this treatment in the following months.
- The use of triticale, that has relatively quick germination and growth response after application will aid in adequate cover and basal area to mitigate against potential soil loss in the first year. It also has the benefit laying down and acting as a mulch in the second year to aid with erosion control. Triticale is the recommended cereal grain being proposed in the seed mix because it has the advantage of being around 90 percent sterile after the first year. This should help reduce competition for native, perennial grasses that should have a good opportunity to establish in the second year.
  - Prioritizing seeding those areas that are most at risk of potential soil loss by focusing on high soil burn severity locations within a 30 to 60 percent slope range which contain soils that produced the highest amount of modeled soil loss.

The following table shows the species in the mix and the pounds per acre application rate.

Species		Planting Rate (pls #/s/acre)
Sterile Triticale	Triticosecate	32
Snake River Wheatgrass Wawawaiensis	Elymus	1
Thickspike Wheatgrass	Elymus lanceolatus	1
Big Sandberg	Poa secunda	1
Total		35

Channel Treatments: none recommended

Road and Trail Treatments:

**RT-01 Trail Drainage and Tread Stabilization:** There are 25 miles of trails managed by the Manti-La Sal NF within or near the burned area. Drainage features are insufficient on approximately 15 miles of trails to handle the anticipated increase in post-fire runoff in areas burned at moderate to high severity. Predicted increased runoff due to water repellent soils and lack of effective ground cover will be intercepted and captured by trails, leading to severe trail tread erosion that will render the trails unusable and/or dangerous to use. Additional hazards caused by the fire such as hazard trees and rockfall will create unsafe conditions at trail access points and worksites along the trails to workers. Accelerated erosion that is channelized downslope and into streams may cause damage water quality.

Implementing this treatment will decrease the risk of unacceptable loss of trail prism, providing for continued recreation opportunities with reduced risk to human life and safety. Proper and adequate drainage will greatly reduce and prevent the trail prism and tread from eroding. Preventing the loss of trail prism is much more cost effective than rebuilding trail prisms.

The managed use for these systems are motorized and non-motorized. Priority trails to be worked on include those that are within or below moderate to high soil burn severity slopes and those with sustained steep grades that have inadequate drainage.

Trail work will be implemented according to USFS Trails Handbook 2309.18. Installation should be designed to last no more than 3 years. Permanent structures are not part of this treatment.

1. Install water-bars depending on steepness of trail (18 per mile) in areas of moderate or high severity.
  - a. Install waterbars in sections of trail that have continuous gradient for a length of greater than 50 feet and are either in-sloped (cupped) or show evidence of routing water (rills, gullies).
2. Construct tread retention structures where necessary and downslope, stabilizing vegetation has been consumed.
3. Remove rock and tree hazards within the trail route to facilitate safe work areas. If the area has too large a safety risk, work will be delayed until hazards are mitigated.
4. Clean existing water bars.

**RT-01 Trail Drainage & Tread Stabilization**

Item	UOM	Unit Cost	# of Units	Total Cost
Trail Tread Stabilization	miles	\$2,283	15	\$34,250

**RT-02 Road Drainage Reconstruction and Prism Stabilization:** Increased runoff resulting from burned slopes adjacent to roads have and will continue to cause damage to roadway surfaces, drainage structures, and debris flows and threats to Human Life and Safety unless treatments are implemented to handle or minimize the effects from the post fire runoff. Damage to streambanks alter stream function resulting in loss of the road fill increasing sediment loading to stream. These treatments are expected to mitigate the threat to road prisms, stream channels, water quality and user safety.

The BAER Assessment identified these roads as very high and high risk. These roads systems are routes critical for administrative use, recreation, and other uses and represent a significant financial investment. Implementation of the recommended treatments decrease the risk to human life and safety and protect the infrastructure investments. The potential monetary cost to repair roads that would be damaged by post-fire events if left untreated significantly exceeds the cost of the treatments.

1. Outsloping. Shape road templates disperse water and reduce erosion. Outsloping is useful in most locations, particularly for dispersing surface drainage on flat road grades. Outsloping is often combined with other road treatments, including rolling dips and armored crossings to control water.
2. Drain Dips (with or without armor). Roadway dips modify the road drainage by altering the template and allowing surface flows to run off the road to prevent any excessive erosion of the surface. The armor consisting of rip rap is placed where runoff could possibly cause erosion to the road surface and fillslope.
3. Culvert Installation. New culverts will be installed in ditch lines on in-sloped roads that have insufficient relief culverts to prevent scouring of the ditch bottoms and decrease sediment delivery to streams.
4. Culvert Cleaning. Increase capacity of drainage structures by removing debris and sediment from catchment basins, inlets and outlets.
5. Culvert Upsizing. Increase capacity of drainage structures by removing existing culvert and replacing with a properly sized culvert based on expected flows.
6. Ditch Cleaning. The cleanout of drainage ditches is required to remove any debris that may deflect the flow out of the ditch and also to ensure the flow reaches the outflow structure.
7. Road Template Reshaping. Road surfaces that channel water down the roadway need to be reshaped to shed the increased flows quickly before additional road surface erosion occurs.

This will be accomplished by a combination of outsloping and removal of the fill side berm allowing water to drain off the road surface.

8. Roadside Streambank Stabilization. Placement of riprap to stabilize streambank from increased watershed response. Damage to the streambank will lead to the loss of the road fill slope resulting in road damage and increasing the risk of delivering road fill to the stream.
9. Slope Stabilization. Removal of unstable cut slope material and placement of retaining rocks to protect the ditch and road. The burned condition will result in increased overland flow, increased ground water, loss of root integrity, and decreased slope stability.

The roads listed below were identified as having very high or high risk for road drainage issues and at a minimum will require all or part of the treatments listed above.

ROAD NUMBER	Treatments	Risk
Dairy Fork 50006	<ul style="list-style-type: none"> <li>• Install new relief culverts on in-sloped sections</li> <li>• Clean outlet ditches</li> <li>• Ditch Cleaning</li> </ul>	Very High
Lake Fork 50070	<ul style="list-style-type: none"> <li>• Roadside Streambank Stabilization</li> <li>• Slope Stabilization</li> <li>• Outsloping</li> <li>• Drain dips</li> <li>• Install new relief culverts on in-sloped sections</li> <li>• Culvert Cleaning</li> <li>• Culvert Upsizing</li> <li>• Ditch Cleaning</li> <li>• Road Template Reshaping</li> </ul>	Very High
Blind Canyon 50126	<ul style="list-style-type: none"> <li>• Outsloping</li> <li>• Drain dips</li> <li>• Ditch Cleaning</li> </ul>	High
Smiths Reservoir 50232	<ul style="list-style-type: none"> <li>• Outsloping</li> <li>• Drain dips</li> <li>• Ditch Cleaning</li> </ul>	High
Ives Canyon 50501	<ul style="list-style-type: none"> <li>• Outsloping</li> <li>• Drain dips</li> <li>• Ditch Cleaning</li> </ul>	High

#### RT-02 Road Drainage Reconstruction and Prism Stabilization

Item	UOM	Unit Cost	# of Units	Total Cost
Road Drainage Reconstruction	miles	\$9,752.27	22	\$214,550

\*See Road Drainage Reconstruction treatment specification form for complete cost description

**RT-03 Road Storm Inspection and Response:** Storm inspection and response keeps drainage features such as culverts, dips, lead-off ditches, water bars, and riprap armor-functional by cleaning sediment and debris between or during storm events. This treatment is in lieu of more expensive structural modifications or additions to existing road drainage structures. The top priorities for road drainage inspection and response treatments due to high burn

severities and/or high value at risk for potential loss are high volume, multiple-use roads: Lake Fork (50070), Dairy Fork (50006), Blind Canyon (50126), and Smiths Reservoir (50232).

#### Design/Construction Specifications:

1. Forest Service personnel will clearly communicate/coordinate expectations with county road crews and supervisors.
2. Following heavy rains and significant spring snowmelt the inspection will involve identification of drainage hazard conditions such as debris, sediment, and plugged culverts that are limiting functionality of road drainage systems.
3. The response will use equipment to remove obstructions from culvert inlets, catch basins, dips, lead-off ditches, water bars, riprap armor, and other drainage features. Excess material and debris removed from the drainage features will be placed where it cannot re-enter the stream. Problems will be corrected before they worsen or jeopardize the drainage systems.

Storm inspection and response ensures effectiveness of existing road drainage improvements. This treatment protects costly Forest Service property, the road drainage features and by extension the roads themselves, from damage during and after damaging storm events. The roads provide access to trailheads and NFS lands popular for dispersed recreation. The risk of drainage features being blocked or exceeding their maximum flow capacity is very high. The treatment is used in lieu of more costly structural upgrades.

In the first year after the fire, post-storm inspection and response, combined with maintenance of certain high-value drainage features such as culverts, dips, lead-off ditches, water bars, riprap armor, etc. (RT-02), are an appropriate BAER treatment in lieu of structural modification. The treatment as a response to damaging events reduces the risk of losing costly transportation infrastructure. The cost of the proposed treatment is reasonable considering that without treatment, drainage features and significant portions of the roads are very likely to be irreversibly damaged: Lake Fork (50070), Blind Canyon (50126), and Smiths Reservoir (50232). An average mile of road construction exceeds \$500,000.

#### RT-03 Road Storm Inspection and Response

Item	UOM	Unit Cost	# of Units	Total Cost
Storm Inspection and Response	days	\$1,198	25	\$29,950

\*See Storm Inspection and Response treatment specification form for complete cost description

#### Protection/Safety Treatments:

**PS-01 Burned Area Warning Signs:** The purpose of the Burned Area Warning signs or closed to overnight use is to reduce risks to human life and safety, to inform forest visitors of potential dangers and/or hazards when entering burned areas on NFS lands. Entering burned areas present very high risk to human and life and safety, with increased threats from post-fire effects such as falling trees, rolling rocks, and flash floods. It is necessary to inform the public of burned-area hazards that are a direct result of wildfire; hazards which are substantially different compared to undisturbed forest setting and with which many forest visitors may be unfamiliar.

Roadway burned area warning signs, closed signs for developed and dispersed camping, and trail closed signs will be installed to inform the public of the possible dangers associated with a burned area on major entry points into the burned area, trails and developed recreation sites and dispersed recreation areas. Signs shall contain language specifying items to be aware of when entering a burn area such as falling trees and limbs, rolling rocks, and flash floods.

Four locations have been identified for burned area warning signs or road closed to NFS lands at major entry points. Seven locations have been identified for burned area warning or closed signs at trailheads, developed recreations sites, and dispersed recreation areas. Refer to BAER Treatment Map for the spatial locations. Sign specifications include:

1. Traffic Warning and Road Closure Signs shall conform to the Manual on Uniform Traffic Control Devices (MUTCD) and shall be installed per Federal Highway Safety Standards.
2. Directional Signs shall match what was on the sign prior to the fire and shall be installed per Forest Service standards. These signs are to be placed on any roads and trails that are to remain open to use within the fire perimeter.
3. Burned Area Warning signs along the roads shall measure, at a minimum, 4 feet by 4 feet and consist of 0.08" aluminum, sheeted in high intensity orange with black letters. The BURNED AREA lettering shall be a minimum of 5 inches in height and all remaining lettering shall be a minimum of 3.5 inches in height.
4. Bridge and gate delineators shall conform to Type 3 object marker standards established by the MUTCD. Road delineators shall conform to MUTCD and the "Sign and Poster Guidelines for the Forest Service" (EM-7100-15).
5. Road route markers shall conform to EM-7100-15.

District or SO personnel will monitor or check signs after events and throughout the high use season to ensure signs have not been damaged, vandalized, or removed, to ensure signs remain effective (see Storm Inspection and Response).

#### **PS-01 Burned Area Warning Signs**

Item	UOM	Unit Cost	# of Units	Total Cost
Sign Purchase and Installation	sign	\$360	11	\$3,955

**PS-02 Administrative Closure and Gate Installation:** The funds needed to implement this treatment were requested in the Uinta-Wasatch-Cache NF 2500-8 BAER Report.

This treatment temporality restricts motorized public access to areas identified as having very high to intermediate risk to human life and safety when on NFS roads accessing the Manti-La Sal National Forests. This treatment includes initiating a signed travel route closure order, installing road gates at the primary ingress/egress points on routes accessing areas of concern, and patrolling the road and area to enforce the closure.

Forest visitors utilizing the roads identified below are at a very high risk of injury due to the increased threat of flash floods, debris flows, and falling rocks and trees. Segments of these routes have steep slopes and critical road/stream crossings that are at risk of failure during storm events. There is a very high potential for loss of motorized ingress and egress routes. The response action is consistent with the BAER manual direction by addressing the intermediate, high, and very high risk to Human Life & Safety (HLS) BAER Critical Value defined by the assessment team. The installation of gates and using existing gates in combination with a temporary closure order is designed reduce risk to human life and safety:

1. Enforce and make more effective the closure order.
2. Reduce exposure to emergency management personnel should there be a rescue response needed because someone violated the closure order.
3. Provides for efficient implementation of road drainage mitigations (drainage improvements); production and efficiency without having watch for public travel.
4. Provide for access to implement storm inspection and response, versus k-rail type barriers.

The administrative closure and gates could be a phased treatment, where the closures & gates would be implemented during the critical fall and spring seasons. While the HLS risk will not change, depending on snowmelt & spring/summer precipitation some routes with lower risk could be opened for public access. 'Entering Burned Area' signs will be needed where temporary closures change access; gates would still be in place to swing closed when conditions warrant.

Roads closed to the public must have a forest order that regulates and controls traffic. The closure order shall conform to Forest Service Handbook (FSH) 7709.59 and applicable language in the Code of Federal Regulations (CFRs). Traffic Warning and Road Closure Signs shall conform to the Manual on Uniform Traffic Control Devices (MUTCD), Sign and Poser Guidelines for the Forest Service (EM-7100-15) and shall be installed per Federal Highway Safety Standards and/or Forest Service Sign Installation Guide (7100-Engineering, March 2010, 1071-2812P-MTDC.) Each gate consists of two 14'x52" Powder River gates, mounted on a 10' railroad tie with associated hardware and signs. Install gates a minimum of 6" to a maximum of 12" from high point of road. Installation of gates, posts, signs, and associated hardware is needed at 9 locations (reference BAER Treatment Map for location):

#### Manti-La Sal NF.

1. Lake Fork FSR 070 entry from Hwy 89 near Thistle. Place gate near forest boundary to block Southeast traffic.
2. Lake Fork FSR 070. Place gate to block traffic from intersection with FSR 006.
3. Lake Fork FSR 070 entry from Hwy 89 near Indianola. Place gate near forest boundary to block Southeast traffic.
4. Dairy Fork FSR 006 entry off Hwy 6. Place gate to block southbound 006 traffic.
5. Dairy Fork FSR 006 entry from FSR 070. Place gate to block northbound traffic from FSR 070.

District or SO personnel will monitor or check gates and signs intermittently to ensure proper signing. Forest Protection Officers and/or Law Enforcement Officers will patrol the area intermittently to ensure the motorized restriction is enforced.

#### **PS-02 Administrative Closure and Gate Installation**

Item	UOM	Unit Cost	# of Units	Total Cost
Closure Orders (prepare & post)	order	\$2,025	4	\$0
Gate Installation	gate	\$3,485	5	\$0

#### **I. Monitoring Narrative:**

(Describe the monitoring needs, what treatments will be monitored, how they will be monitored, and when monitoring will occur. A detailed monitoring plan must be submitted as a separate document to the Regional BAER coordinator.) See separate monitoring plan for seeding treatment submitted with request.



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

Interim #\_\_

<b>A. Land Treatments</b>					
L-01 EDRR - Suppression	acre	81	200	\$16,232	\$0
Aerial Seeding	acre	85	936	\$79,398	\$0
<i>Insert new items above this line!</i>				\$0	\$0
<i>Subtotal Land Treatments</i>				\$95,630	\$0
<b>B. Channel Treatments</b>					
<i>Insert new items above this line!</i>				\$0	\$0
<i>Subtotal Channel Treatments</i>				\$0	\$0
<b>C. Road and Trails</b>					
RT-01 Trail Drainage	mile	2,301	15	\$34,520	\$0
RT-02 Lake Fork, Road Drainage	job	\$46,420	1	\$46,420	\$0
RT-02 Dairy Fork, Road Drainage	job	\$13,130	1	\$13,130	\$0
RT-02 Blind Canyon, Road Drainage	job	\$7,500	1	\$7,500	\$0
RT-02 Ives Canyon, Road Drainage	job	\$4,500	1	\$4,500	\$0
RT-02 Smiths Reservoir, Road Drainage	job	\$6,000	1	\$6,000	\$0
Rip Rap for water bar armor	ton	\$110	200	\$22,000	\$0
Rip Rap for bank protection	ton	\$110	800	\$88,000	\$0
Seed for disturbed construction	each	\$1,000	1	\$1,000	\$0
48" Culvert, purchase and install	LF	\$105	60	\$6,300	\$0
36" Culvert, purchase and install	LF	\$84	100	\$8,400	\$0
<i>Insert new items above this line!</i>				\$0	\$0
<i>Subtotal Road and Trails</i>				\$237,770	\$0
<b>D. Protection/Safety</b>					
PS-01 BAER Warning Signs	sign	360	11	\$3,955	\$0
PS-02 Administrative Closure Order	order				\$0
PS-02 Administrative Closure Gate	gate	3,485	5	\$0	\$0
<i>Subtotal Protection/Safety</i>				\$3,955	\$0
<b>E. BAER Evaluation</b>					
Initial Assessment	Report			---	\$0
<i>Insert new items above this line!</i>				---	\$0
<i>Subtotal Evaluation</i>				---	\$0
<b>F. Monitoring</b>					
RT-03 Road Storm Inspection	day	\$1,198	25	\$29,950	\$0
Aerial Seeding Effectiveness		\$5,300	1	\$5,300	
<i>Insert new items above this line!</i>				\$0	\$0
<i>Subtotal Monitoring</i>				\$35,250	\$0
<b>G. Totals</b>					
Total - This Request				\$372,605	\$0
Previously Approved					#REF!

**PART VII - APPROVALS**

1. /S/RYAN E. NEHL

Forest Supervisor (signature)

October 26, 2018

Date

2. 

Regional Forester (signature)

10/30/18  
Date