

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: Bald Mountain
Pole Creek

B. Fire Number: UT-UWF-000892
UT-UWF-000971

C. State: Utah

D. County: Bald Mountain – Utah
Pole Creek – Juab

E. Region: 04

F. Forest: 0410 – Manti-La Sal
0419 – Uinta-Wasatch-Cache

G. District:
Spanish Fork (UWC NF)
Ferron-Price (MLS NF)

H. Fire Incident Job Code:
Bald Mountain: P4L4Z8 (0419)
Pole Creek: P4L4NW (0419)

I. Date Fire Started:
Bald Mountain: August 24, 2018
Pole Creek: September 6, 2018

J. Date Fire Contained:
Bald Mountain: October 3, 2018
Pole Creek: October 7, 2018

K. Suppression Cost:
Bald Mountain: \$11,200,000 (from I209, October 5, 2018)
Pole Creek: \$29,100,000 (from I209, October 7, 2018)

L. Fire Suppression Damages Repaired with Suppression Funds

	Bald Mountain	Pole Creek
1. Fireline waterbarred (miles):	38.9	107.1
2. Fireline seeded (miles):	Not reported	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
Peteetneet Creek (160202020603)	18,624	5,292	28	3,835	21	3,797	20	899	5	8,531	46
Summit Creek (Santaquin Cyn) (160202010301)	20,660	1,940	9	3,705	18	1,950	9	175	1	5,830	28
Nebo Creek (160202020203)	34,278	1,670	5	10,140	30	14,675	43	1,327	4	26,143	77
Lwr Thistle Creek includes Bennie Ck (160202020205)	35,368	2,133	6	10,405	29	14,475	41	791	2	25,671	72
Lwr Diamond Fk (160202020307)	16,305	1,823	11	6,651	41	2,020	12	40	0.0	8,711	53
Wanrhodes Cyn (160202020305)	11,609	1,473	13	2,887	25	1,388	12	74	1	4,349	38
Middle Diamond Fk (160202020306)	12,880	232	2	2,884	22	973	8	1	0.0	3,858	30
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: 124,763 (Bald Mountain: 21,218; Pole Creek: 103,545)
 NFS (90,583) Other Federal (166) State (9,740) Private (24,274)

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 on the Manti-La Sal NF. 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: 136.7 (UWC NF: 114.7; MLS NF: 22.0)
 Trails: 116 (UWC NF: 91 miles; MLS NF: 25 miles)

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 51,570 low (41%) 51,087 moderate (41%) 4,387 high (4%) 17,718 unburned (14%)

Bald Mountain Fire					
Soil Burn Severity	NFS	State	Private	Total Acres	Percent
High	1,380	56	49	1,485	7%
Moderate	6,349	407	145	6,900	33%
Low	7,641	228	231	8,099	38%
Unburned/Very Low	4,595	52	88	4,734	22%
Total	19,964	742	512	21,218	

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%
Total	70,618	166	8,998	23,763	103,545	100%

B. Water-Repellent Soil (acres): 55,530 (assumes all moderate + high SBS acres are WR)

C. Soil Erosion Hazard Rating (acres):
 69,233 (low) 16,104 (moderate) 39,426 (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): 25
- D. Design Storm Duration (hours): 1
- E. Design Storm Magnitude (inches): see table below
- F. Design Flow (cubic feet / second/ square mile): see table below
- G. Estimated Reduction in Infiltration (percent): 45%
- H. Adjusted Design Flow (cfs per square mile): see table below

Pre- & Post-Fire Discharge for the 25-yr/1-hr Design Storm.

Drainage Area (HUC6)	Area (mi ²)	Design Storm (in)	Pre-Fire		Post-Fire	
			Peak Flow (cfs)	Peak Flow (csm)	Peak Flow (cfs)	Peak Flow (csm)
Loafer and Box Canyons	3.75	1.29	97	26	912	242
Crooked Canyon (10/2/18 debris flow drainage)	0.48	1.18	3	7	57	118
Levi Hollow, Santaquin Cyn (Summit Creek HUC6)	0.27	1.28	11	41	139	506
Beaver Dam Ck (Nebo Creek HUC6)	4.03	1.30	105	26	1121	278
Deer Hollow	1.77	1.29	55	31	571	322
Taylor Fork, Santaquin Cyn (Summit Creek HUC6)	2.37	1.28	63	27	222	93
Upper Summit Ck, Santaquin Cyn (Summit Creek HUC6)	9.09	1.28	203	22	578	64

Compared to Stream Stats, the WILDCAT5 model design storm produced varying values for the 25-year flood event in pre-fire conditions. Post burn, the design storm is now expected to produce greater than a 100 year storm event. In areas of great concern the expected post-fire runoff flows are expected to increase by an order of magnitude.

PART V - SUMMARY OF ANALYSIS

Background: The Bald Mountain Fire was started by lightning on August 24, 2018, in the Mt. Nebo Wilderness, near the top of Bald Mountain which is about 50 miles south of Salt Lake City, Utah. On the afternoon of September 12, the fire became very active due to low relative humidity (RH) and high winds. The fire quickly spread and actively burned over 18,600 acres before being 100% contained on October 3, 2018.

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. The fire quickly spread and actively burned over 102,200 acres before being 100% contained on October 7, 2018.

The Bald Mountain Fire burned in the Upper Summit Creek, Upper Peteetneet Creek, and Loafer Creek drainages on the Spanish Fork Ranger District, Uinta-Wasatch-Cache National Forest. The Pole Creek Fire burned on the Nebo Creek, Bennie Creek, Thistle Creek, Lake Fork Creek, Diamond Fork Creek, Little Diamond Creek, Wanrhodes Creek, and Soldier Creek drainages on the Ferron-Price Ranger District, Manti-La Sal National Forest (NF) and the Spanish Fork Ranger District, Uinta-Wasatch-Cache National Forest (NF). These drainages are tributary to the Spanish Fork River.

The Uinta-Wasatch-Cache National Forest is immediately adjacent to the largest population center within the State of Utah, defined as the Wasatch Front. The Forest is heavily influenced and impacted by over a million people living in close-proximity; more than 85% of visitors to the forest live within 100 miles. Because of the abundance of recreation opportunities and the large urban population along the Wasatch Front, the Uinta-Wasatch-Cache National Forest is the most heavily visited in the entire National Forest System.

In addition to direct impacts from the Bald Mountain and Pole Creek fires, 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 Uinta-

Wasatch-Cache NF and 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 include: Santaquin Canyon, Payson Canyon, and the Nebo Creek, Bennie Creek, Diamond Fork, and Lake Fork drainages 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

Very high risk (likely, major) to forest visitors and Forest Service employees within and adjacent to the burn area along NFS 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 motorized/non-motorized trails in the Nebo Unit (Blackhawk, Nebo Ck, Bennie Ck trails); Santaquin Canyon, Blackhawk and Tinney Flats campgrounds, and Trumbolt picnic area; and dispersed recreation areas in Nebo, Bennie, and Wanrhodes drainages. **High risk** (possible, major) to motorists and trail users from lack of directional and object marker signage in the burned area. *(PS-02 Administrative Closure and Gate Installation, PS-03 Burned Area Warning Signs)*

Very high risk to forest visitors using travel routes within and downstream of the drainages Payson Canyon, Santaquin Canyon, Bennie Creek, Nebo Creek and Page Fork due to increased threat of flooding and debris flows from contiguous areas of high and moderate burn severity in flood source areas. **High risk** to occupants and forest visitors using the Diamond Fork and Koholowo Camp roads due to the increased threat of flooding and debris flows from contiguous areas of high and moderate burn severity in source areas. **Intermediate risk** to residents and forest visitors traveling Maple Lake, Wanrhodes, and Little Diamond roads due to the increased threat of flooding and debris flows originating from areas of high and moderate burn severity. *(PS-02 Administrative Closure and Gate Installation, PS-03 Burned Area Warning Signs, RT-03 Road Drainage Reconstruction and Prism Stabilization, RT-04 Road Storm Inspection and Response)*

Low and very low risk to forest visitors and Forest Service employees traveling 16 additional forest roads, to the threat of increased flooding and debris flows. (See Bald Mountain-Pole Creek BAER Engineering Assessment)

There are increased threats to life and safety of occupants at private residences, private camps, 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 Diamond Fork drainage along Diamond Fork Rd. 029, Little Diamond Rd. 338, Wanrhodes Cyn Rd. 031; State Hwy 6 from Sterling Hollow Rd. 620 (near Covered Bridge community) through Long Hollow Rd. 383; Lake Fork Rd. 070; State Hwy 89 from the junction with State Hwy 6 through to 5 miles south of Birdseye, UT, along Bennie Creek, Nebo Creek and Spencer Canyon Roads; Santaquin Canyon; and the Wasatch front range drainages from Crooked Creek near Spring Lake, UT northeast around through Payson Canyon Rd. 015 continuing through Loafer Canyon north to Maple Canyon. 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*)

High risk (likely, moderate) for fire-killed or damaged trees to substantially damage stationary developed recreation infrastructure at Blackhawk Campground, recreation facilities, and trailheads. The fires burned in and around the campgrounds and trailheads resulting in pockets of tree mortality. Fire weakened trees pose a threat to buildings and infrastructure at these developed recreation sites. (*Treatment PS-04 Recreation Facility Hazard Removal*)

High risk (likely, moderate) to the water transmission system at Tinney Flat campground. There is increased probability for debris flows and flooding to expose and damage the water line and contaminate the spring source. (*PS-05 Recreation Infrastructure Protection, PS-06 Recreation Facility Storm Inspection and Response, RT-01 Trail Drainage Reconstruction*)

NFS Travel Roads and Associated Infrastructure

There are roughly 137 miles of NFS roads within the burned area. Using criteria that defines magnitude of potential damage and likelihood for damage to occur, approximately 49 miles on the Uinta-Wasatch-Cache NF have been identified as having unacceptable risk for damage from post-fire events.

Very high risk (very likely, moderate) for damage to or loss of road and bridge infrastructure due to threats of flooding, debris flows, and erosion on the following roads: Santaquin Canyon

(FSR 014), Mt. Nebo Scenic Byway (FSR 015), Nebo Creek (FSR 045), Page Fork (FSR 152), & Bennie Creek (FSR 406). (*RT-03 Road Drainage Reconstruction and Prism Stabilization, RT-04 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 the following roads: Diamond Fork (FSR 029) and Koholowo Camp (FSR 033). (*RT-03 Road Drainage Reconstruction and Prism Stabilization, RT-04 Road Storm Inspection and Response, PS-02 Administrative Closure and Gate Installation*)

Intermediate risk for damage to road infrastructure from threats such as flooding, debris flows, and erosion (Maple Lake – FSR 020, Wanrhodes – FSR 031, and Little Diamond – FSR 338). Low risk for damage to road infrastructure (11 FSRs) from flooding or debris flows. Very low risk to road infrastructure (6 FSRs) due to increased threat of damage from flooding or debris flows.

3. Natural Resources:

Native Plant Communities

High risk (likely, moderate) for invasive and state listed noxious weeds to impact suitable habitat of the ESA-listed threatened plant species Ute ladies'-tresses. The suitable habitat currently has areas where invasive and noxious weed species are absent or present in minor amounts. The suitable habitat was observed to have low and moderate soil burn severity during BAER field review, with Canada thistle seedlings sprouting within the burned habitat. Weed infestations are a serious threat to Ute ladies'-tresses. This species has a very low reproductive rate, which makes it highly vulnerable to noxious and invasive weed invasions. Numerous other noxious and invasive weeds located within the Diamond Fork drainage that also threaten the ULT habitat include: Broadleaved pepperweed (*Lepidium latifolium*), noxious; Dalmatian toadflax (*Linaria dalmatica ssp. dalmatica*), noxious; Field bindweed (*Convolvulus arvensis*), noxious; Houndstongue (*Cynoglossum officinale*), noxious; Musk thistle (*Carduus nutans*), noxious; Saltcedar (*Tamarix ramosissima*), noxious; Scotch thistle (*Onopordum acanthium*), noxious; Squarrose knapweed (*Centaurea virgate ssp. squarrosa*), noxious; Whitetop (*Cardaria draba*), noxious; Bull thistle (*Cirsium vulgare*), invasive; Cheatgrass (*Bromus tectorum*), invasive; Common mullein (*Verbascum thapsus*), invasive; Lesser burdock (*Arctium minus*), invasive; and Yellow sweetclover (*Melilotus officinalis*), invasive. (*L-01 Early Detection and Rapid Response – BAER*)

Very high risk (very likely, moderate) to upland and riparian native plant communities due to ecological disturbance associated with fire and the increased potential for introduction or expansion of invasive plants and noxious weeds. Weed infestations in moderate-to-high soil burn severity locations, particularly along travel corridors, are expected to spread to adjacent areas where invasive plants are currently absent or present in minor amounts. Susceptible plant communities are located in Diamond Fork, Little Diamond Creek, Wanrhodes Creek, Red Hollow, Billies Mountain, Nebo Creek, Bennie Creek, Nebo Loop Scenic Byway, and Santaquin Canyon Road. Invasive plant species inventoried in these areas include bull thistle (*Cirsium vulgare*), cheatgrass (*Bromus tectorum*), common mullein (*Verbascum Thapsus*), corn chamomile (*Anthemis arvensis*), Johnsongrass (*Sorghum halapense*), lesser burdock (*Arctium minus*), and sweetclover (*Melilotus officinalis*). Noxious weed species include broadleaved pepperweed (*Lepidium latifolium*), Canada thistle (*Cirsium arvense*), Dalmatian toadflax (*Linaria dalmatica*), diffuse knapweed (*Centaurea diffusa*), field bindweed (*Convolvulus arvensis*), gypsyflower (*Cynoglossum officinale*), hardheads (*Acroptilon repens*), nodding plumeless thistle

(*Carduus nutans*), poison hemlock (*Conium maculatum*), saltcedar (*Tamarix ramosissima*), Scotch cottonthistle (*Onopordum acanthium*), spotted knapweed (*Centaurea stoebe*), squarrose knapweed (*Centaurea virgata*), and whitetop (*Cardaria draba*). **High risk** (likely, moderate) to upland native plant communities from ecological disturbance associated with fire and the increased potential for introduction or expansion of invasive plants and noxious weeds. Weed infestations in moderate-to-high soil burn severity locations, particularly along trails and high-use areas, are expected to spread to adjacent areas where invasive plants are currently absent or present in minor amounts. Susceptible plant communities are located in the Mt. Nebo Wilderness, in the vicinity of White Pine Hollow Trail and Tinney Flat Campground. Invasive plant and noxious weed species inventoried in these areas are included in the list above. Threats to native vegetation communities can be compounded if there is a long term decrease in soil quality, possible where known populations of invasive species or noxious weeds are in close proximity to high soil burn severity areas. Potential decreases in soil quality is an accumulated threat to existing native plant communities. (L-01 Early Detection and Rapid Response – BAER, L-02 Early Detection and Rapid Response –Suppression) (*L-01 Early Detection and Rapid Response – BAER*)

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 Mt. Nebo Wilderness along Mona Pole Road, and other fire lines in the incident area. Invasive plant and noxious weed species that have been inventoried in these areas are included in the list above. (*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) risk for impacts to surface water quality in Loafer Canyon and Santaquin Canyon; and the Peteetneet Creek, Summit Creek, Bennie Creek, Nebo Creek, Diamond Fork drainages. The threats described above for Tinney Flat campground apply to these drainages, however the risk is decreased 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:

High risk (likely, moderate) to critical Cultural and Heritage Resources within the burn perimeter. There is increased potential for looting as burned vegetative is no longer providing effective screens that previously concealed artifacts and features; loss of vegetation also increases public accessibility. Increased overland flow, subsequent flash flooding and erosion from post-fire storm events is likely result in loss of sites and/or site integrity. (*Treatment PS-01 Cultural Resource Protection Patrols*)

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 ^a	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:

- Hydrology Soils Geology Range Recreation
- Forestry Wildlife Fire Mgmt. Engineering
- Contracting Ecology Botany Archaeology
- Fisheries Research GIS Landscape Arch

Team Leader: Terry Hardy, Watershed Program Manager, Boise NF
Brendan Waterman, Forest Hydrologist, Uinta-Wasatch-Cache NF

H. Treatment Narrative: The following narratives summarize 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 – BAER: Survey and treatment for new or expanding invasive plant/noxious weed infestations, associated with fire disturbance, will be conducted by Forest Service personnel during Spring/Summer 2019 in the Pole Creek and Bald Mountain Fire perimeters. EDRR efforts may be coordinated with other Federal, State, or Local agencies, and Cooperative Weed Management Area personnel. EDRR implementation will be completed within one year of fire containment. EDRR activities that extend beyond the first year will be accomplished through non-BAER authorizations.

Detection and treatment efforts will be focused on disturbed areas 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, travel corridors, trails, or other high-use areas (approximately 1,026 acres). Specific areas that have been identified for survey include: White Pine Hollow Trail and Tinney Flat Campground (both adjacent to Mt. Nebo Wilderness), Diamond Fork, Little Diamond Creek, Wanrhodes Creek, Red Hollow, Billies Mountain, Nebo Creek, Bennie Creek, Nebo Loop Scenic Byway, and Santaquin Canyon Road (see attached treatment map).

Surveys will be conducted at all locations identified above, at an intensity/frequency necessary to identify the occurrence/spread of weed infestations, with a focus on species that are listed under the Utah Noxious Weed Act. Subsequent treatments use 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. EDRR activities will be conducted on foot, horseback, or vehicle (UTV/truck), as appropriate. Specific information (e.g. species, location, size, photos) regarding identified infestations and subsequent treatments will be added to the appropriate database of record. Special consideration should be given to survey activities in the Diamond Fork drainage. This area contains suitable habitat for Ute Ladies Tresses (Threatened), and consultation with USFWS is required prior to any treatment. Approved methods may include chemical application to individual plants (e.g. brush swiping) or hand pulling, as appropriate.

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.

L-02 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 and Bald Mountain Fire perimeters. 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 115 acres). Specific areas that have been identified for survey include: Mona Pole Road (adjacent to Mt. Nebo Wilderness), 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.

Channel Treatments: none recommended

Road and Trail Treatments:

RT-01 Trail Drainage and Tread Stabilization: There are 91 miles of trails managed by the Uinta-Wasatch-Cache NF within or near the burned area. Drainage features are insufficient on approximately 24 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-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.

Before opening the roads to public travel, inspection and repair will be conducted to implement the minimum treatments required to remedy hazards to user safety and property:

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. Cleaning includes the removing debris and sediment from catchment basins, inlets and outlets.
5. 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.
6. 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.
7. 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.

8. 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.

NFSR #045 Nebo Creek (3.16 miles to be treated)
 Outslope road
 Construct drain dips
 Culvert Cleaning: 2 Each

NFSR #152 Page Fork (1.1 miles to be treated)
 Outslope road
 Construct drain dips

NFSR #406 Bennie Creek (1.58 miles to be treated)
 Outslope road
 Construct drain dips
 Road template reshaping/ditch cleaning

NFSR #029 Diamond Fork (7.5 miles to be treated)
 Culvert cleaning

NFSR #014 (10 miles to be treated)
 Culvert Installation: 10 Each
 Ditch Cleaning: 4.5 Miles

NFSR #033 (.12 miles to be treated)
 Culvert Installation: 2 Each

NFSR #015 Nebo Loop Road (Peteetneet Ck between Forest Boundary & Wimmer Ranch Ck)
 Armor stream bank with riprap, 2 places: 100 cubic yards total

NFSR #015 Nebo Loop Road (between Shram Creek and Frank Young Canyon)
 Fill slope excavation and removal: 130 cubic yards
 Retaining rock placement: 100 cubic yards

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. Road drainage inspection and response treatments are proposed for: Santaquin Canyon Road (FSR 014), Mount Nebo Scenic Byway (FSR 015), and Diamond Fork Road (FSR 029) are the top priorities due to high burn severities and/or high value at risk, high potential loss and high multiple use roads.

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 important infrastructure on NFS lands including popular developed and dispersed recreation area, Winward Reservoir, grazing allotments, the Diamond Fork water system (101,900 acre feet per year), Forest Service Guard Stations, trailheads, and a Girl Scout camp. 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. For example, Santaquin Canyon and Payson Canyon are paved. An average mile of road construction exceeds \$500,000. Some paving projects exceed \$1,000,000 per mile for a two lane road.

Protection/Safety Treatments:

PS-01 Cultural Resource Protection Patrols

The values protected by this treatment are: 1) site integrity of cultural resources listed, eligible, or potentially eligible for inclusion in the National Register of Historic Places; and 2) site integrity of cultural resources important to potentially affected Indian tribes, regardless of National Register eligibility. Monthly to bi-monthly patrols of 2 sites will reduce the potential for looting by establishing a regular presence in the area. The patrols will document changes to the site in terms of artifact and feature composition that indicate if archeological looting or erosion is occurring that could affect site integrity. The results of the patrols will be used to determine if additional management action is required to protect these sites.

Forest Service Manual (2523.02, 2523.1 Exhibit 01) identifies cultural resources as a critical value for the purposes of BAER. This treatment is consistent with FS Heritage Program direction for the monitoring of cultural resources (Indicator 4: Condition Assessments, and Indicator 5: PHA Stewardship). Cultural resources are scattered throughout the fire area, making area closures difficult. Administrative closures can draw attention to specific site locations. Patrols are less expensive than other measures such as fences to help protect sites. It is also a treatment acceptable to the Tribes.

PS-02 Administrative Closure and Gate Installation: This treatment temporarily restricts motorized public access to areas identified as having very high to intermediate risk to human life and safety when on NFS roads and trails accessing the Uinta-Wasatch-Cache and Manti-La Sal

National Forests. Actions include preparing a signed travel route closure order, installing road gates, and signs at the primary ingress/egress points on roads and trails accessing areas of concern, and patrolling the roads and trails to enforce the closure.

Forest visitors utilizing the identified roads and trails 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 objective for installing gates in combination with a temporary closure order is to 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 and trail 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 when retracting the temporary route closures; gates would still be in place to close when conditions warrant.

Roads and trails 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 road gate consists of two 14'x52" Powder River gates, mounted on a 10'x10"x10" treated timber beam with associated hardware and signs. Install gates a minimum of 6" to a maximum of 12" from high point of road. Installation of road gates, signs, and posting of closure order is needed at 9 locations (reference BAER Treatment Map for location):

Uinta-Wasatch-Cache NF

1. Springville crossings at intersection of FSR's 029, 051 & 058. Place gate to block southbound FSR 029 traffic.
2. Bennie Creek FSR 406. Place gate near Forest Boundary.
3. Nebo Creek FSR 045. Place gate near Forest Boundary.
4. Mona/Pole FSR 160. Place gate near Forest Boundary.

Manti-La Sal NF.

1. Lake Fork FSR 070 entry from Hwy 89. Place gate near forest boundary to block Southeast traffic prior to FSR 037 intersection.
2. Lake Fork FSR 070. Place gate to block traffic from intersection with FSR 232.
3. Dairy Fork FSR 006 entry off Hwy 6. Place gate to block southbound 006 traffic.
4. Dairy Fork FSR 006 entry from FSR 070. Place gate to block northbound traffic from FSR 070.
5. Blind Canyon FSR 126 entry from Hwy 89.

Administrative Closures on Motorized/Non-Motorized Trails

- | | |
|---------------------------|------------------------------|
| 1. 1.Bennie Creek Trail | 7. 7.Black Canyon Trail |
| 2. 2.Blackhawk Trail | 8. 8.Bear Trap Ridge Trail |
| 3. 3.Page Fork Trail | 9. 9.Deer Hollow Trail |
| 4. 4.Blackhawk Loop Trail | 10. 10.Summit Trail |
| 5. 5.Beaver Dam Trail | 11. Sawmill Nebo Creek Trail |
| 6. 6.Holman Canyon Trail | |

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-03 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.

Twelve locations have been identified for burned area warning signs or road closed to NFS lands at major entry points. Twenty-four 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-04 Recreation Facility Hazard Removal: Hazard trees pose a risk to recreation infrastructure located within the burn area. Much of the infrastructure was not damaged directly by the fire or is salvageable. Fire weakened trees within or near the Blackhawk Campground, sewer lagoons, and trailheads within the Nebo unit will fall and further damage or destroy recreation infrastructure such as restrooms, site furniture, fences, signs etc. The fence surrounding the sewer lagoons is at risk to damage from falling trees. Damage to the fence at the sewer lagoons also poses a potential risk to public safety via unauthorized public access to the site. It is less expensive to fall the trees away from recreation infrastructure than to replace the usable infrastructure after it is destroyed by the falling trees.

A dead tree is considered a hazard tree in a developed area setting. Falling fire-killed trees will reduce risk of damage to campground structures (undamaged by the fire) and also prevent unnecessary injury to the public, their property or vehicles, and provide for safe work settings for Forest Service employees. The treatment design is to fall and remove hazard trees in the areas where stationary recreation infrastructure exists, to one and one half tree lengths from objects. Crews will fall and remove trees from trailheads and other recreation sites. A contract for a feller-buncher or chipper will be used at Blackhawk Campground due to the high volume of larger trees. Using a feller-buncher will mitigate the risk to campground infrastructure; using equipment will decrease the risk of exposure of fallers to the hazard trees.

Protecting recreation infrastructure will reduce cost in the long term versus buying new tables, fire rings, comfort stations, etc. after they are damaged by fallen hazard trees. Use of the feller-buncher in Blackhawk campground will cost less money than having the fallers cut the large number of trees at Blackhawk. The fallers are more mobile to move from location to location to remove smaller numbers of trees at locations such as trailheads to prevent damage to signs, information boards, fences, etc.

PS-05 Recreation Infrastructure Protection: There is high risk for damage to Tinney Flat Campground water system from post-fire flooding and debris flows. Treatments are needed to reduce the risk to protect this sizeable investment. Substantial increases in stream flows have already been observed adjacent to the White Pine Hollow Trail where the water line is buried; debris flows have occurred in the Summit Creek drainage. There is a likely probability for increased flows to recur in Summit Creek.

The Tinney Flat Campground water system is adjacent to Summit Creek for long approximately ½ mile, upstream from the developed campground. The water line runs from the spring collection area parallel to Summit Creek and crosses over the creek into the campground. The existing ditch on the uphill side of the water collection area will be cleaned and deepened by a hand crew in order to divert flows from the burned sloped above away from the collection area and prevent contamination of the spring source. Mechanized equipment will be used to construct water drainage structures on the trail/access road to direct flow across the trail. Where the water pipe is suspended across Summit Creek it will be cut on each side of the creek and capped to prevent debris flows in the creek from hitting the line and pulling and breaking it on either side of the creek.

PS-06 Recreation Facility Storm Response and Inspection: The purpose of this treatment is to protect the investment in PS-05, which decreases risk to the Tinney Flat Campground water system from floods and debris flows. Storm Inspection and Response is needed to evaluate post-flood event conditions to determine if PS-05 treatment activities remain effective. Treatment PS-05 is intended to prevent unacceptable damage to the Tinney Flat Campground water system, located in lower Santaquin Canyon.

Depending on condition and potential level of risk after a storm event, employees will evaluate if damage resulting from the storm jeopardized the effectiveness of the preventative treatment (PS-05). Inspections will identify:

1. Maintenance needs to ensure ditching is diverting overland flow and debris away from the source water collection area.
2. Maintenance needs to ensure trail drainage improvements are effective in preventing surface tread erosion.
3. Need for channel debris removal that threaten the pipe structure crossing Summit Creek.

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.)