Date of Report: 08/09/2016

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[X] 1. Funding request for estimated emergency stabilization funds
[ ] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

[X] 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)

[ ] 2. Interim Report #____.
[ ] Updating the initial funding request based on more accurate site data or design analysis
[ ] Status of accomplishments to date

[ ] 3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Lower Ebbs

B. Fire Number: UT-FIF-006146

C. State: Utah

D. County: Millard

E. Region: 4

F. Forest: Fishlake National Forest

G. District: Fillmore

H. Fire Incident Job Code: P4KHP716 (0408)

I. Date Fire Started: July 23,2016

J. Date Fire Contained: 100% contained 8/1/16

K. Suppression Cost: $3,100,000 as of August 07, 2016 which was the last cost update.

L. Fire Suppression Damages Repaired with Suppression Funds
1. **Fireline waterbarred (miles)**: 25 miles
2. **Fireline seeded (miles):** 19 miles scheduled for seeding this fall.
3. **Other (identify):**

M. Watershed Number: 160300050103 Round Valley Creek, 160300050104 Scipio Valley-Devils Canyon, 160300051407 Ebbs Canyon (HUC6)

N. Total Acres Burned: 5,629
NFS (5,476Acres), State Parks, Recreation and Wildlife (153 acres), BLM (0 acres), Private (0 acres)

O. Vegetation Types: Curlleaf Mountain Mahogany (924 acres), Mixed Conifer (483 acres), Mixed Conifer/Aspen (284 acres), Pinyon-Juniper (754 acres), Pinyon-Juniper/Mountain Big Sagebrush

(643 acres), Pinyon-Juniper/Gambel Oak (449 acres), Aspen/Perennial Grasses (225 acres), Gambel Oak/Mountain Big Sagebrush (1,174 acres), Gambel Oak/Curlleaf Mountain Mahogany (693 acres).

P. Dominant Soils: Soils dervied from Flagstaff Limestone geologic type include; map symbol (MS) 155 (454 acres) Forsey/Agassiz families; 158 (69 acres) Foresty/Woodhurt/Namon families; 160 (915 acres) Genoa/Irigul/Forsey families; 172 (227 acres) Irigul family; 177 (195 acres) Namon/Forsey families; 178 (280 acres) Namon/Forsey families; 181 (454 acres) Pernty, Agassiz families; 182 (246 acres) Pernty/Agassiz families; 183 (645 acres) Pernty family; 201 (628 acres) Spager family; 216 (226 acres) Woodhurst/Idmon/Passar families; 221 (760 acres) Yates Hollow/ Ostler families; 222 (401 acres) Yeates Hollow family.

Q. Geologic Types: C2 - Maxfield Limestone (330 acres), C3 - Ajax Dolomite (634 acres), K3 - Price River Sandstone (1,206 acres), O – Ordovician Dolomite (1,159 acres), Qa – Alluvium and Colluvium (1,189 acres), S – Bluebell Dolomite (565 acres), T4 = Salt Lake Sediments (546 acres).

R. Miles of Stream Channels by Order or Class: 1st order – 11.93 miles; 2nd order – 0.85 miles; 3rd order – 3.49 miles

S. Transportation System

Trails: 10.26 total (1.67 motorized, 8.59 non-motorized) miles **Roads:** 6.92 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): U**nburned** - 120 acres (2%) **low** - 1,211 (21%) **moderate –** 1,944 acres (35%) **high –** 2,354 acres (42%)

B. Water-Repellent Soil (acres): 3,900

C. Soil Erosion Hazard Rating (acres): 1,171 **(low)** 1,211 **(moderate)** 3,247 **(high)**

D. Erosion Potential: 8.0 tons/acre

E. Sediment Potential: 6,000 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years):	5
B. Design Chance of Success, (percent):	70%
C. Equivalent Design Recurrence Interval, (years):	10
D. Design Storm Duration, (hours):	0.5
E. Design Storm Magnitude, (inches):	0.75
F. Design Flow, (cubic feet / second/ square mile):	31.0
G. Estimated Reduction in Infiltration, (percent):	40%

H. Adjusted Design Flow, (cfs per square mile): 57.0

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

LOWER EBBS WILDFIRE

BAER / CRITICAL VALUES-AT-RISK SUMMARY TABLE

The Lower Ebbs fire was discovered July 29, 2016. The cause was a suspected lightning holdover. For 3 days the fire demonstrated extreme fire behaviour with significant crown fire runs through pinyon juniper, Gamble oak, mahogany, and mixed confier cover types. Air temperatures were in the high 90's to low 100's with relative humidity values in the single digits and 10 hour fuel moistures ranged from 2.9 to 4.5 durning the peak burning days. Due to the severity of the fire, hydrophobic soils cover a large portion of the burn areas which are prone to very high flooding hazards. The majority (96%) of the fire is contained within the Ebbs Canyon HUC 6 watershed and the majority of the effects will occur within Ebbs Canyon. Initial flooding effects have been observed as a thunderstorm on August 5, 2016 passed through the area. The nearest weather station reported 0.44 inches of precipitation in a one hour time period. The observable rain event verified hydrologic modeling that was being prepared for this report. The model indicated a 1-15 year rain event would cause effects of approximately a 100 to 200 year event within the fire area. Estimated flows were in the 300 to 400 cubic feet per second range. Downcutting, rilling, channeling, debris flow, and large overland flows were observed after the rain event. Some damage to the critical values at risk has occurred. The values at risk shown below were asssessed based upon the post fire conditions and likelihood of post fire events and are threatened by short duration, high intensity precipitation events similar to the storm on August 5, 2016. The BAER critical values and level of associated risk to loss or damage are;

- Human life and safety for forest users – Very High Risk
- Forest and State lands road infrastructure – Very High Risk
- Forest trail infrastructure –Very High Risk
- Livestock improvements –Very High Risk
- Native or naturalized plant communities –High Risk
- Spring delevopment – Very High Risk
- Soil productivity – Very High Risk
- Hydrologic function – Very High Risk

Other Non BAER Program Values at Risk

- Human life and safety for users on Interstate 15
- Key big game winter and summer range
- Private land structures and improvements

HUMAN LIFE AND SAFETY

Human Life and Safety on NFS lands.

Users of NFS Transportation System (Roads and Trails) – As evidenced in the flooding that occurred August 5, 2016 and the fact there is no physical way to prevent access to the area it is reasonably likely that a user may be in the area during a flood event or shortly thereafter. The road network is accessed and used by recreationists, hunters, outfitters and guides, firewood gatherers, and livestock permittees. – Likely Probability of Damage or Loss / Major Consequences… **VERY HIGH RISK**

Human Life and Safety on lands other than NFS.

Users of Interstate 15 and County frontage road – I-15 and the frontage road systems are not located on NFS lands and the rain event on August 5, 2016 transported mud and ash into the east borrow pit of the northbound I-15 lanes near mile marker 182. The flood did cross the east frontage road and the county responded with equipment to clean away the debris and mud, clean culverts and other storm patrol work. The county, UT Department of Transportation, and NRCS have been made aware of the risk to these values. The Forest Service is assisting in determining risk to values off NFS lands.

PROPERTY

Buildings, water systems, utility systems, road and trail prisms, residences, ponds, dams, wells or other significant investments on NFS lands.

Upper Ebbs Spring – The Upper Ebbs spring development supplies water to the north end of the Wildgoose allotment through a buried waterline and series of troughs. The cement collection box and intake valve are situated at the base of steep hillslope which burned at high intensities. The wooden collection box cover partially burned. No vegetation remains around the spring and access to the area is through a 50" motorized trail. Some erosion into the collection box has started with recent rain. - Very Likely Probability of Damage or Loss / Major Consequence… **VERY HIGH RISK**

Livestock water system improvements – The waterline from the Upper Ebbs Spring is ripped into the 50" motorized trail from the springbox to the Ebbs Canyon road. From that junction it parallels the Ebbs Canyon road to the forest boundary where it runs north. Approximately 7 miles of pipeline support this system of 8 water troughs. Washouts are likely along both the atv trail and road system. The uppermost trough in the system after the recent rain event is 90% buried in ash and mud. - Very Likely Probability of Damage or Loss / Moderate Consequence… **VERY HIGH RISK**

Livestock management improvements (spring exclosures, boundary, allotment, and pasture fences, cattle guards) – Approximately 7 miles of fence and 3 cattleguards are within the burn perimeter with the potential to be impacted by debris and sedimentation mainly in areas where fences cross channels and structures are directly downslope of high and moderate burn severity areas. One section of fence has been compromised from flooding that occurred on 8/5. These structures will be important to exclude livestock to stabilize the area and allow grasses to establish in year one. - Very Likely Probability of Damage or Loss / Moderate Consequences… **VERY HIGH RISK**

Forest Roads - There are approximately 6.87 miles of transportation surfaces in the burn perimeter (roads & motorized trails) occurring on NFS Lands. The existing roads and trails are considered to be at-risk from flooding hazards, and debris flows due to the size and severity of the recent wildfire event. The Ebbs Canyon road FR404 will experience runoff and down cutting will occur in the high and moderately burn severity sections (see example pictures appendix A) totaling 4.5 miles. These surfaces will be subject to accelerated rates of soil erosion for the next 2 to 4 years during inclement weather conditions. Most of the roads and drainage structures require normal maintenance, cleaning or repairs to function properly and accommodate anticipated additional runoff. – Very Likely Probability of Damage or Loss / Major Consequences… **VERY HIGH RISK**

Forest Trails – 8.6 miles of non-motorized trails and 1.7 miles of the motorized trail are within the burn perimeter. 5.6 miles of non-motorized and all of the 1.7 miles of motorized trails are at risk from debris flows and accelerated erosion rates associated with rain events. Hydrophobic soils will add to the severity of the erosion rates. Trail segments selected for treatment are those that are directly downslope from high and moderate burn severity areas (see BAER Road/Trail Treatments Map). It is anticipated that sections of the trails will be lost where hillslopes and drainages that

burned at high or moderate intensities, intersect with it resulting in a hazardous and impassible trail system. Effects to trail surfaces from erosion will remain for 2 to 4 years until soils stabilize. - Very Likely Probability of Damage or Loss / Major Consequences… **VERY HIGH RISK**

Property at Risk off NFS Lands

Forest Access Roads downstream from NFS lands – Three forest access roads are downstream from the fire. These roads start at the county frontage road and cross Utah Division of Wildlife Resources lands to NFS lands. Minimal waterbarring and drainage improvement would provide adequate protection to maintain forest access.

Structures on Private Lands near NFS burned lands - While not a critical BAER value at risk the potential for effects exists for a livestock holding facility, small outbuildings, and prefabricated metal carport. These improvements are located near the main drainage in Ebbs Canyon. Following the rain event on 8/5 water, debris, and ash were deposited within 15 to 20 yards of the structures.

NATURAL RESOURCES

Soil Productivity - Potential loss of soil due to post fire runoff events. Following the wildfire, erosive conditions exist due to the burning of ground cover, coarse woody debris and soil subsurface organic material. Loss of topsoil negatively affects ecological function for:

- native seed bank and native species recovery
- root growth and soil stability

With BARC imagery and on the ground assessments and verification the BAER team concluded that 77% of this incident was subjected to Moderate and High Severity Burns. Approximately 2,354 acres were mapped as high burn severity and 1,944 acres burned at moderate severity. The lack of ground cover and hydrophobic soils will likely increase surface runoff, flooding, and erosion during typical summer monsoon rain events. - Very Likely Probability of Damage or Loss/ Moderate Consequences… **VERY HIGH RISK**

Hydrologic function on burned NFS lands – An adverse change to hydrologic function is expected due to contiguous areas burned at moderate and high severity. 96% of the fire is within the Ebbs Canyon HUC 6 and the fire burned 21% of entire HUC. With 77% of the fire burning at high and moderate intensities effects to the hydrologic function of Ebbs canyon is anticipated to be severe. Hydrophobic soils are found on 3,900 acres and increased flows have been documented and more events are expected. Flooding and excess sediment can be expected throughout the affected drainages with subsequent movement of large amounts of sediment and water in the lower canyon during climatic events. According to ERMIT model runs, 8 tons per acre of sediment delivery is possible during the first year following the fire.- Very Likely Probability of Damage or Loss/ Moderate Consequences … **VERY HIGH RISK**

Native or naturalized plant communities on NFS land where invasive species or noxious weeds are absent or present in only minor amounts - The naturalized plant community that existed prior to the fire contained a mix of native and non-native grass species. The mixed conifer, juniper, and mahogany dominated areas of the fire had a minimal herbaceous understory. Opportunities for reseeding from existing populations of grasses and forbs are limited in these areas which were also the areas that burned at high and moderate intensities. The majority of the fire area is currently **noxious weed free**. However, field bindweed is located along the Ebbs Canyon road, and a small area of whitetop occurs near water troughs in lower Ebbs Canyon. Musk thistle is found near the Lower Ebbs spring. There is a high risk of cheatgrass spread into the burn because of the inherent dry nature of the area and surrounding proliferation of cheatgrass in untreated areas near the fire. The aggressive nature of the invasive species adds to the high potential to spread further into the fire area especially where pre-burn vegetation understory was limited. Also, it is possible that equipment used during suppression activities transported noxious and/or invasive weed species into the

area. Areas that were prepped for contingency lines, roads, parking areas, drop points and spike camps are areas of primary concern for introduction. The adjacent populations of noxious weeds have a high potential to spread further into the fire area. - Likely Probability of Damage or Loss / Moderate Consequences …**HIGH RISK**

Non BAER Values at Risk

Critical and substantial big game areas – 1,896 acres of critical big game winter range and 3,544 acres of substantial summer big game habitat were effected during the fire. This loss of habitat will impact wildlife during the remainder of this summer, fall and winter seasons. Effects to the native and naturalized plant communities and soil resources will determine future uses of the area for wildlife. Establishing vegetation to stabilize soil and provide wildlife forage and browse would contribute to the maintenance of wildlife population numbers in the area. - Likely Probability of Damage or Loss / Moderate Consequences …**HIGH RISK**

CULTURAL AND HERITAGE RESOURCES

Cultural resources on NFS lands which are listed on or potentially eligible for the National Register of Historic Places. – No known significant historical or cultural resources were identified within the burn perimeter. It is recommended that if ground disturbing stabilization techniques are utilized, cultural surveys will occur before implementation. - Unlikely Probability of Damage or Loss / Minor Consequences… **VERY LOW**

C. Probability of Completing Emergency Stabilization Treatments Prior to a Storm Damaging Event:

Land	**70 %**	**Channel**	**NA**	**Roads / Trails**	**85 %**	**Protection / Safety**	**90 %**

D. Probability of Treatment Success: (on NFS lands)

Treatment Types:	**← Years After Treatment →**		
	1	**3**	**5**
Land Treatments (seeding)	**70 %**	**70 %**	**75 %**
Channel Treatments (None)	**NA**	**NA**	**NA**
Road / Trail Treatments (drainage)	**85 %**	**85 %**	**85 %**
Protection / Safety Treatments (signs)	**90 %**	**90 %**	**90 %**

E. The Cost of Taking No - Action: $ 1,388,149

Monetary analysis of the cost of taking no action considered loss of and effects to; road and trail infrastructure, conversion of native or naturalized plant communities to invasive/noxious weedy species, replacement costs of range improvements, effects to outfitters and guide business, human life and safety and possible property damage while on NFS lands. While still extremely valuable, monetary values were not considered in the cost of taking no action, for hydrologic function, soil productivity, off forest infrastructure, and human life and safety on county and state roads. Cost estimates were obtained through consultation with Forest Service engineers, hydrologists, soil scientists, and botanists and include repair/reconstruction costs and where appropriate replacement costs.

Values-At-Risk	Estimated Costs
Human life and safety are at risk both on NFS and off NFS lands.	
Potential damage/loss to NFS roads (Dozer and Excavator equipment and operator time to re-grade road surfaces + fill material + replacement costs x miles lost).	$112,500
Potential damage/loss to NFS trails (Number of reconstruction items i.e. trail miles to build, waterbars, check dams, ditches, slope treatments needed in H and Mod burn areas x unit cost including labor).	$24,500
Potential damage or loss of range improvements including water sources, water system components and boundary fences.	$132,092
Potential damage or loss to forest users vehicles and personal equipment and loss of outfitter guide business	$15,000
Introductions of noxious weeds and invasive weed to native or naturalized plant communities on NFS lands. This includes noxious weed spread during suppression and spread of cheatgrass in burned areas. Cost factors considered; personnel costs + equipment + treatment chemicals + number of treatments needed	$ 1,104,057
Total	$ 1,388,149

F. The Cost of the Selected Alternative: $ 1,222,596 (including loss)

Values-At-Risk	Estimated Costs
Potential damage to NFS roads. (see VAR Map Zone A)	$68,875
Potential damage to NFS trails. (see VAR Map Zone B)	$6,300
Potential damage or loss of soil productivity and hydrologic function from erosion following climatic events. Seeding and chaining treatments are estimated to be 70% effective in reducing frequency of runoff and slowing erosinal processes for 1-2 year storm events. Aerial mulching of 1 ton per acre is estimated to be 75% effective in reducing frequency of runoff and slowing erosinal processes for 1-2 year storm events. Seeding and mulching will also reduce introductions of noxious weeds to native or naturalized plant communities on NFS lands affected by suppression efforts and compete with the introduction of invasive species to native or naturalized plant communities on NFS lands that would convert the existing species mix to a cheatgrass dominated system affecting crtical big game winter and summer ranges. (see	$1,145,421

VAR Map Zone C).	
Human Life and Safety (see VAR Map Zone D)	$2,000
Total	$1,222,596

G. Skills Represented on Burned-Area Survey Team:

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

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H. Treatment Narratives: Describe the emergency treatments, where and how they will be applied- and, what they are intended to do. This information helps to determine qualifiying treatments for the appropriate funding authorities. For seeding treatments include species, application rates and species selection rationale.

LAND TREATMENTS

Broadcast Seeding

Findings
The initial assessment of the burned area and its surrounding landscape identified risks to the **Native or naturalized plant communities on NFS land where invasive species or noxious weeds are absent or present in only minor amounts**. The same assessment identified risks to **Critical and Substantial Big Game Habitat on NFS land**. Critical and Substantial Big Game habitat is not a critical BAER value and restoration of this habitat is not the sole purpose for the seeding proposal. It has been brought forward to disclose the values of neighboring agencies involved in the Lower Ebbs fire. Soil stabilization and invasive/noxious weed exclusion are the main objectives of the proposed treatment.

Risk 1- Threat of expanding infestations of noxious weeds:
The adjacent landscape, as well as along road and trail corridors within the fire, contain undesirable plant species. There is a high probability of rapid invasion and/or expansion of noxious weeds and other invasive, undesirable species in and around the burned area. Because of inherent dry conditions and proximity to existing populations of invasive species and noxious weeds the entire burn area is prone to infestation. Burn areas on this part of the Fishlake National Forest are highly susceptible to Cheatgrass invasion if left untreated.
The restoration that would be recommended if the burn area is converted to an undesirable annual grass system is similar to the treatments the BAER team is requesting post fire. However, the cost to restore this system, once Cheatgrass is established, exceeds the proposed post fire treatment because of the added

cost to chemically remove it. That cost is estimated to be approximately $250,000 more than the seeding and chaining as proposed below.

Risk 2 – Soil Erosion and loss: Utilization of cereal grains and perennial grasses will stabilize hillslopes and augment revegetation where seed sources are limited due to the pre-burn conditions of a limited understory. The district has experienced success with stabilizing hillslopes with past seeding treatments i.e. Sawmill and Clay Springs fires with perennial grass seed mixes.

Monitoring data from past BAER seeding treatments on the district, both qualitative and quantitative, supports the recommendation of seeding as an effective year 1 treatment for soil stabilization and noxious weed prevention.

- Year 1 results on the Sawmill BAER reseeding. Seeded in April of 2010, first reading in June of 2010 – 31% ground cover. Second reading July of 2010 – 53% ground cover. In 2011 the plots recorded 65% ground cover all from an increase in vegetation and litter (Tait 2015)
- Year 1 results on the Clay Springs BAER reseeding. Seeded in the fall of 2013 with native and non-native grasses. Qualitative estimates of 50-70% ground cover observed.

Proposed Treatments

For these reasons, we propose a seeding of 15lbs. per acre with a combination seed mix of native grass and cereal grain species that are intended to supplement the post fire response of the existing plant species and compete well with noxious weeds. The seeding will take place by means of an aerially broadcast. Post seeding we propose covering the seed by chaining the seeded area. This seeding and subsequent chaining should counter the potential establishment, and spread of noxious weeds and invasive species. We are pursuing the chaining to be completed under a partnership with the state of UT. The burned area is essentially free of noxious weeds; however, the area is on the receiving edge of noxious weeds coming in from all directions. The burn area will require use of an early detection/rapid response strategy with the noxious weed program for several years.
The Utah Division of Wildlife Resources (UDWR) has a high interest in the successful restoration of the burned area as the bench areas are Critical Big Game winter range. In addition, the remainder of the fire is Substantial summer range for Big Game. Because of this vested interest, the UDWR are willing to supplement our seed mix with forb, shrub and additional grass species in an effort to speed up the recovery of highly used wildlife species. The state will also submit for chaining of both the state and federal lands to ensure seeding success.

In addition to the chained area we propose to aerially broadcast a cereal grain on the high severity burn areas that cannot be chained.

The recommended seed mix is "of species known to be effective for erosion control, adapted to the target area and compatible with future management objectives". (FSH 2509.13,20 p. 13) The seed mix contains native species and cereal grain to help restore ecosystem function by reducing erosion with the early germinating cereal grains and protecting against the invasion of noxious weeds through the establishment of native grasses.

The seed purchased will be certified to the variety claimed. Also the mix will be certified that No noxious weed seeds are present. Actual costs may vary depending on availability at time of purchase from successful bidder.

The following table shows the pounds per acre that is used in the seed mix.

Seed mix with Chaining	Application-lbs./acre	Cost $/lbs. Estimate
Blue bunch wheatgrass	2	6.50
Slender Wheatgrass	1	3.75
Winter Wheat	10 w/chain	0.50
Thick spike wheat grass	2	5.50
	Total = 15 lbs./acre	
Seed mix without Chaining		
Winter Wheat	30	0.50
	Total = 30 lbs./acre	

This seed mix includes the recommendations of District and Forest Specialists. We referred to seed mixes previously used on the Forest and the Intermountain Planting guide, from Utah State University Cooperative extension Service, while designing these seed mixes to achieve the FSM objectives listed above.

The seeding is being pursued as a partnership project with the state of UT. Opportunities to utilize available seed from the state seed warehouse in Ephraim as well as other sources is being considered.

Aerial Seeding Monitoring
Implementation monitoring of the seeding application will include inspections of the seed distribution by known area markers on the ground to verify adequate seed density/sq. ft.
Adequate winter or spring moisture will be key to the success of the aerial seeding treatment. It will be important to monitor the establishment of seeded species during the 2017 growing season.

Aerial Mulch

Purpose of Treatment: Apply agricultural straw mulch to the ground surface to achieve a continuous cover of uniform thickness, as specified below, to replace ground cover consumed by the fire. Ground cover is needed to maintain soil moisture, accelerate recovery of native vegetation, to protect any seed remaining onsite, and to improve success of stabilization seeding treatment. In addition, the organic mulch will protect soil from solar heating and drying, thereby improving the ability of seeds to germinate.

Location or General Description of Suitable Sites for Treatment
The treatment unit totals 437 acres. The location of this treatment is upslope of facilities including irrigation diversion, roads (Including I-15 and its' frontage roads), and trails. The mulch will be applied in the upper watersheds of Ebbs Canyon, Refer to BAER Treatment Map for exact locations.

Design/Construction Specifications:

1. Treat areas in designated units with "High" and "Moderate" soil burn severity that are less than 70% slope. Do not treat areas that have needles in trees, exposed rock outcrops, or slopes greater than 70%.

2. Straw application rate: Apply mulch to achieve a continuous cover of uniform thickness over 70% of treatment area at a depth of less than 2.0 inches. Application rate will be approximately 1.0 ton/acre (2,000 pounds). This is about 0.25 inches or 3 straw shafts deep. Aerial application may not achieve desired ground cover, therefore ground crews will likely be needed to spread straw clumps by hand in select locations in each treatment unit. Discussion with Pete Robicheau on October 14, 2010 regarding a rate of 0.5 tons/acre identified that patching or stripping has not proved to be successful in the past. It was determined that the energy created between patches or strips of treated area overwhelms the next treated area and/or undercuts with rilling.
3. Straw must conform to State Department of Agriculture (SDA), Certified Noxious Weed Free Standards for Noxious Weed Free Forage and Straw (NWFFS). All straw provided must have been planted and harvested during the 2016 growing season. Straw shaft length will not exceed 12 inches. Suitable straw includes barley, rice, and wheat grasses.
4. The straw must be applied dry (less than 12 percent internal moisture content) to ensure proper dispersal during aerial applications. The Forest Service may randomly test bales using a moisture probe.

Purpose

The purpose of the mulching treatment is to reduce the delivery of sediment from severely burned hillslopes to avoid sediment bulking of flows entering stream channels and damaging road and trail infrastructure and spring source protection.

This treatment is intended to achieve these objectives:

1. Protect the spring source in Upper Ebbs Canyon through the application of mulch. The area selected for mulching is directly upslope from the spring. Mass wasting and overland flows threaten the existing water system.
2. Protect the road and trail infrastructure by decreasing overland flow and erosion from high soil burn severity areas upslope of trials and roads. Overland flows intercepted by roads and trails can channel the flow resulting in damage and loss to the road and trail network.
3. Improve conditions to protect soil productivity by replacing ground cover burned in the fire. Replacing ground cover will: a) decrease erosion by interrupting raindrop impact and surface soil detachment; and b) increase hillslope obstructions to decrease slope lengths which mitigate accelerated overland flow, thereby decreasing sediment delivery. Mulching also helps to protect the native seedbed and retain moisture on the burned slopes to facilitate vegetative recovery of the treatment areas.

The mulching treatments are predicted to lower the estimated soil erosion and subsequent sediment delivery to the streams by up to about 75%. Mulching will also reduce downstream peak flows by absorbing and slowly releasing overland runoff which is likely to be increased due to reduced soil cover and hydrophobic soil conditions. Mulching treatments in the headwaters can protect a much larger downstream area from cumulative runoff and sedimentation.

The mulching treatments were determined to be the minimum necessary to protect critical values, as defined in FSM 2523.1. The probability of damage or loss to the following critical values is very likely. The critical values are upper ebbs spring, road and trail infrastructure, native or naturalized plant communities where invasive species and noxious weeds are absent, soil productivity, and hydrologic function. These values are threatened by the post-fire response to short duration, high intensity precipitation events.

Effectiveness Monitoring

Visually inspect randomly selected mulch treatment units for proper application rate and uniform thickness during/immediately after treatment. In each unit, measure percent ground cover using a 100ft pace transect method once after treatment, and again in the spring of 2017.

Noxious Weed Monitoring and Spot Treatment

The Fillmore Ranger District weed crew will implement this strategy in 2017 and 2018 to detect and treat any new infestations of noxious weeds in the burned area. Two aggressive weeds need immediate attention: Musk Thistle and whitetop. Field bindweed is also found along the Ebbs Canyon road. In addition to ensuring the existing noxious weed populations do not spread into the burned area, work needs to be completed to monitor, detect, and treat any new weed infestations brought in on suppression equipment. The suppression response to the fire installed approximately 20 miles of dozer line on direct and indirect line construction efforts. The recently burned area is a prime disturbed site for noxious weeds to occupy.

The treatment provides for a weed crew to monitor the 300 ft. wide buffer around roads and motorized trails that were used during suppression. A 600 foot buffered area around dozer lines will be monitored and treated. Also points of entry such as helispots, sling sites, and spike camps will be monitored. In total 3,550 acres will be monitored and treated as needed.

Storm Patrols

Following large storm events or as reports are received about debris flows on roads and trails Forest staff will patrol the area and address the problem. This may involve equipment use to grade road surfaces for proper drainage and reinforce waterbars. Additionally, staff will make recommendations for interim BAER funding requests that may be needed.

ROAD AND TRAIL TREATMENTS

Road Stabilization

Purpose of Treatment: To protect the road infrastructre from erosion damage by ensuring proper drainage through outsloping, armoring drainage crossings, and ditching to direct water off the road surface and eliminate the possibility of the road becoming a channel. nstalling rolling dips, grading, and some fill will be needed on This will minimize damage to the road and maintain access to the canyon.

General Description: Apply necessary treatments along Forest Road 404, Ebbs Canyon Road, to prevent channelling, downcutting, and general erosion that will compromise the road. 4 treatment types will be needed; rolling dips, outsloping/grading, waterbarring, and ditching. Installing rolling dips that are armored with native matierals will prevent headcutting from the fill side of the road. Filling in downcuts and outsloping the road surface to ensure proper drainage off the road surface. This includes removing any berms on the downslope side of the road. Installing/reconstructing waterbars that have failed with the August 5th storm is necessary in a few places on the upper 1/3 of the road. Cleaning and re-establishing ditches to direct water to proper outlet areas will be needed from the intersection of the Scipio Pass motorized trail to the Noon Rock Peak saddle. These protection measures will maintain the current condition (or previous to the August 5th flood condtion) of the road.

Location (Suitable) Sites: Forest Road 404 through the burn area that will be influenced by overland flows associated with water repellant soils in the high and moderate burn severity areas for a total of 4.5 miles (see Roads/Trail Treatment Map). A total of 10 areas/drainage crossting were identified for protection of the road prism. Rolling dips will be installed where slope drainages cross the road in the

high and moderate burn severity zones along the lenth of the 4.5 miles of road identified in the map. Installing/reconstructing waterbars that have failed with the August 5th storm is necessary on the upper 1/3 of the road. Cleaning and re-establishing ditches to direct water to proper outlet areas will be needed from the intersection of the Scipio Pass motorized trail to the Noon Rock Peak saddle.

Trail Stabilization

Purpose of Treatment: Grade dips, and waterbars will divert water off of the trail preventing erosion and debris flows from degrading the trail. These methods will keep the trail from becoming a stream channel and prevent the loss of the trail network. These methods apply to motorized and non-motorized trails.

General Description: Install drainage structures to prevent erosion, mass wasting and mud flows that are predicted to occur, or that have occurred, following the burn. Motorized trails would be treated with a SWECO trail cat/dozer to construct adequate waterbars and grade dips. Non-motorized trails will be treated with handcrews. These measures would reduce the risk to trail infrastructure.

Location (Suitable) Sites: Locate drainage structures along 3.6 miles of non-motorized and along 1.7 miles of motorized trail within the fire perimeter that are adjacent to or will be influenced by overland flows off of water repellant soils in the high and moderate burn severity areas (see Road/Trail Treatments Map).

PROTECTION AND SAFETY MEASURES

Road and Trail Burned Area Warning Signs

Purpose of Treatment: The purpose of the BURNED-AREA signs is to warn the public of potential hazards resulting from the effects of the fire, such as rolling rocks, falling trees, road washouts, and flash floods.

General Description: This treatment is for the installation of burned-area warning signs. Burned-area signs consist of a warning to the public identifying of the possible dangers associated with a burned-area. It shall contain language listing items to be aware of when entering a burn area such as falling trees and limbs, rolling rocks, and flash floods.

Location (Suitable) Sites: These signs shall be installed at all entries into the fire perimeter. The location of these signs shall be along roads and trails that access the burned area (4 signs in total). All signs will be placed facing the direction of travel entering the burn area.

Implementation Monitoring:
Determine if the following proposed treatments were implemented as outlined in the BAER report:

- **Broadcast Seeding:** Are the seed mixtures applied to the intended sites with the proper rates of application?
- **Explanatory Signs:** Are the signs installed at the designated locations with the intended messages? Are the signs clear and legible? Was the installation timely? Did costs approximate budgeted allocations?
- **Road and Trail:** Are drainage structures installed correctly? Were culverts cleaned and are grade dips and water bars functioning properly?

I. Effectiveness 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.

Interim Evaluations
The Implementation Team Leader will conduct periodic evaluations with the District and Forest / Implementation Team to assess implementation progress, effectiveness monitoring and to determine if parameters measured and sampling frequency meet the planned objectives. The BAER team understands that monitoring funds could be available for effectiveness monitoring in years 2 and 3 provided that the Fishlake National Forest submits interim reports to request additional funding and provided that the Forest documents and shares their findings.

Monitoring Reports
The overall results will be presented in a detailed summary report during 2017. This report will be submitted to the Forest Supervisor, District Rangers, the Regional Office and all cooperating agencies and other interested parties.

Annual Financial Requirements
Report cost of monitoring by year.

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

			NFS Lands		State		Other Lands			All
		Unit	# of		Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER $	$	units	$	Units	$	$
A. Land Treatments										
Broadcast Seeding-WinterWheat	acres	61	1238	$75,518						
Broadcast Seeding Invasive Plant Preventon	acres	98	2039	$199,822	$203,900		$0		$0	$403,722
Weed Treatment-ac	acres	16.96	3,550	$60,208	$0		$0		$0	$60,208
Aerial Mulching	acres	915.39	437	$400,025	$0		$0		$0	$400,025
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$660,055	$203,900		$0		$0	$863,955
B. Channel Treatments										
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Channel Treat.				$0	$0		$0		$0	$0
C. Road and Trails										
Trail Drainage-mile	mile	745.47	5.3	$3,951	$0		$0		$0	$3,951
Road Drainage	Crossin	4500	10	$45,000	$0		$0		$0	$45,000
Storm Patrol	Job	2500	1	$2,500	$0		$0		$0	$2,500
Insert new items above this line!				$0						
Subtotal Road & Trails				$51,451	$0		$0		$0	$51,451
D. Protection/Safety				$1,280	$0					
Warning Signs	each	320	4	$1,280						$1,280
					$0		$0		$0	
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Structures				$1,280	$0		$0		$0	$1,280
E. BAER Evaluation					$0					
Asess. & Report	1	25,000	1	$25,000			$0		$0	$25,000
Insert new items above this line!				---			$0		$0	$0
Subtotal Evaluation				$25,000	$0		$0		$0	$25,000
F. Monitoring					$0					
monitoring plan	Job	0	0	$0			$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring				$0	$0		$0		$0	$0
					$0					
							$0		**$0**	
G. Totals				$712,786	$203,900					**$941,686**
Previously approved				$112,939						
Total for this request				**$599,847**						

PART VII - APPROVALS

1. */s/ Mel Bolling* 08/11/16
   Forest Supervisor (signature) Date

2. /s/ Nora B. Rasure 8/16/16
Regional Forester (signature) Date

Appendix A – Lower Ebbs Post Fire Effects of Rain Event August 5, 2016

Fig 1. Before rain event. Ebbs Canyon Road

Fig 2. After rain event. Flows over Ebbs Canyon Road

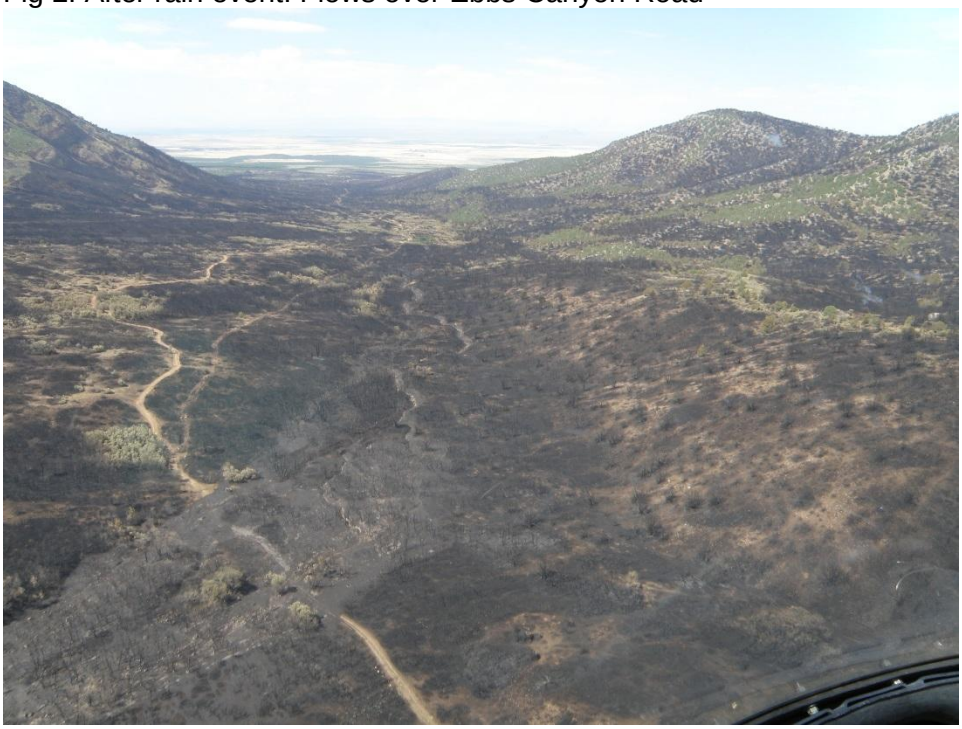

Fig 3. Headwaters Ebbs Canyon before rain event

Fig 4. Headwaters Ebbs Canyon after rain event. Rilling noticeable

Fig 5. General road condtion pre flood

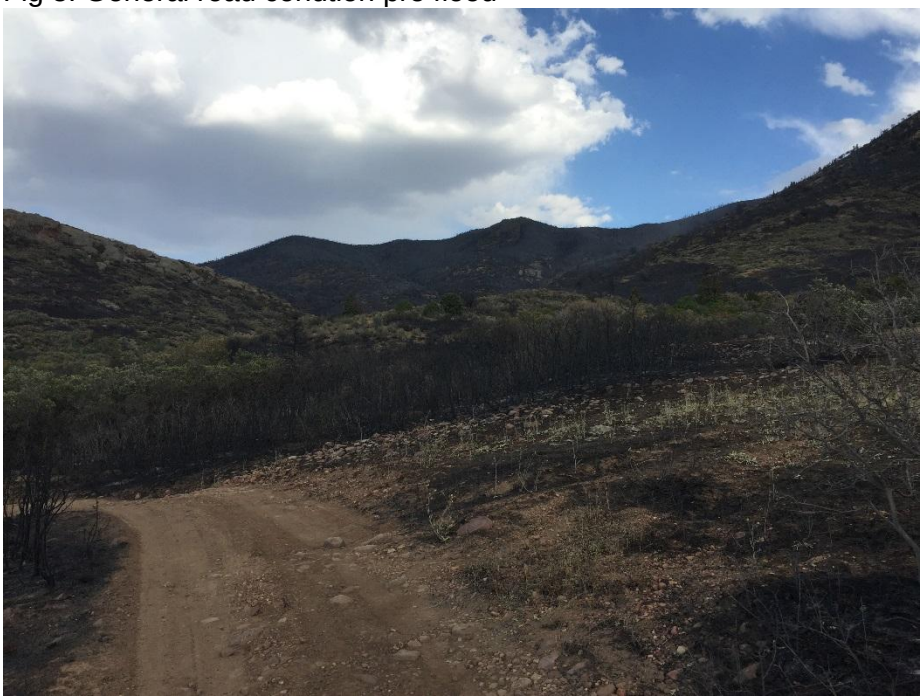

Fig 6. Road after flood

Fig 7. Road after flood

Fig 8. At risk improvements

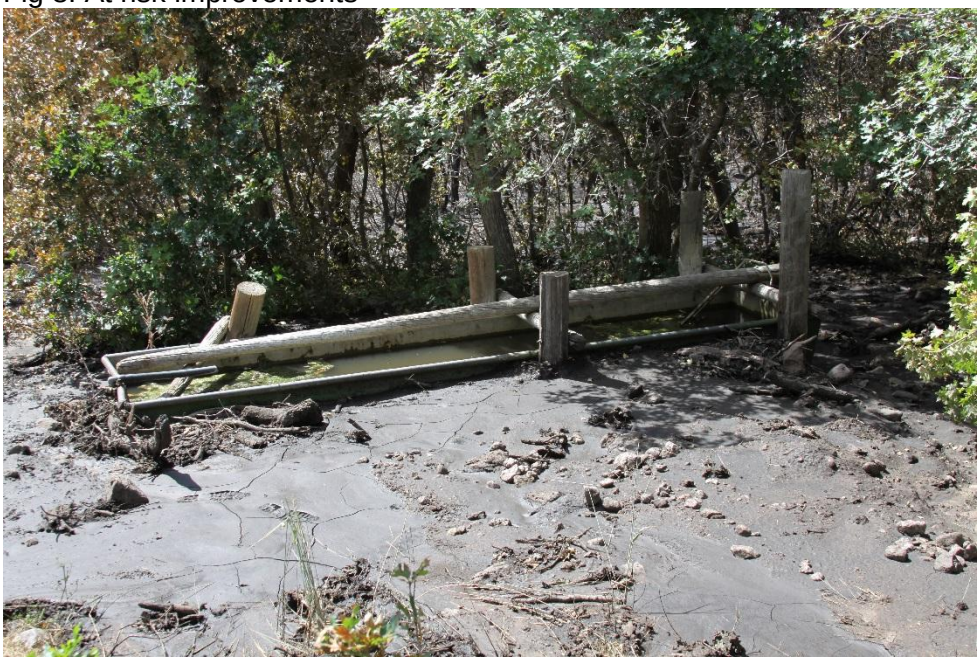

Fig 9. Flood effects to boundary fence and channels.

Fig 10. Fence damage

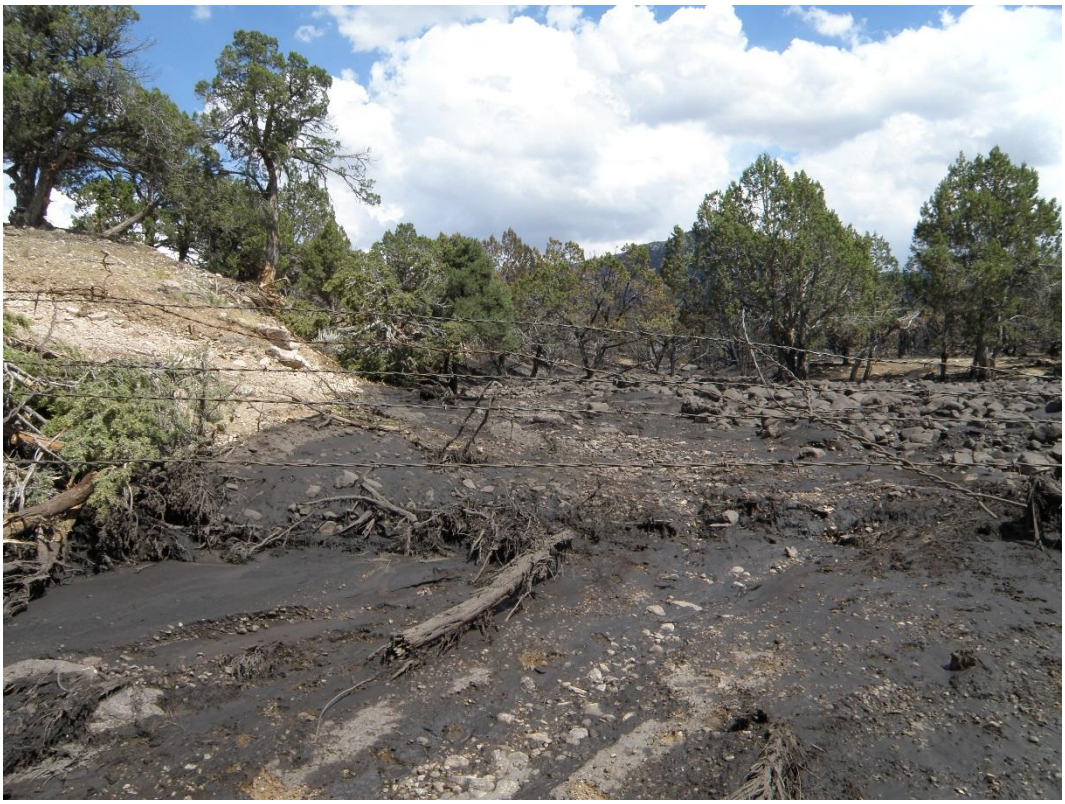

Fig. 11 At Risk Springbox. Mulch proposed to protect water source

Fig 12. Springbox erosion

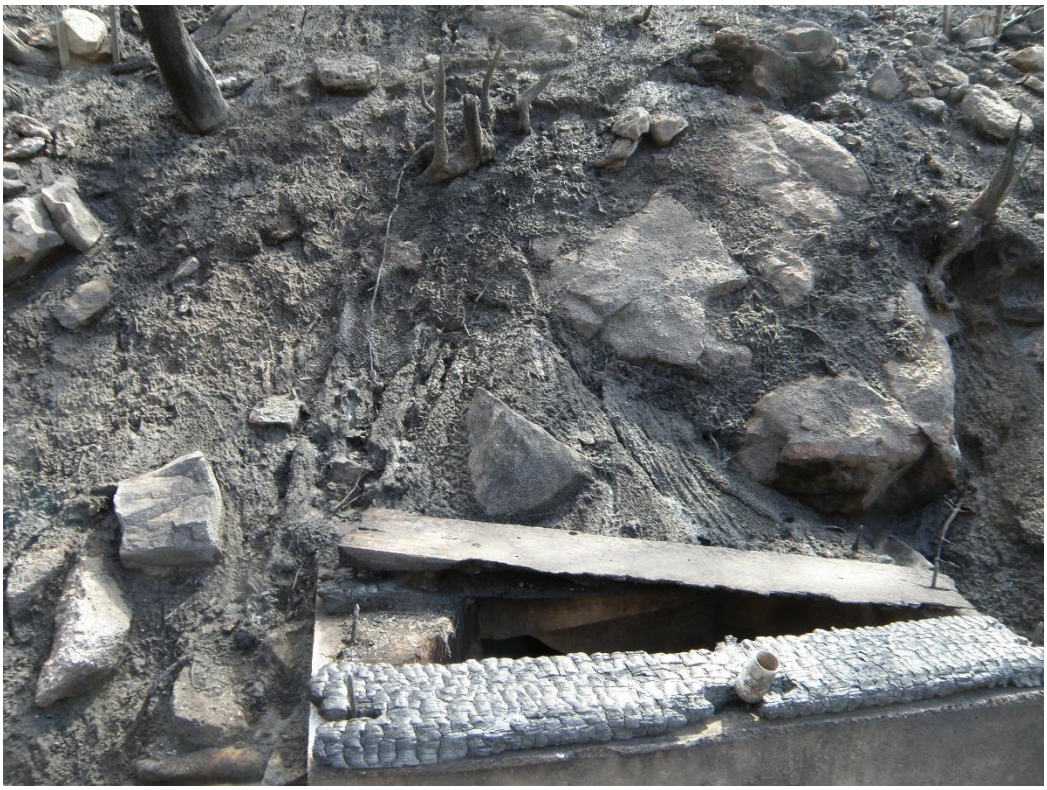

Fig13. Proximity of debris flow to Interstate 15.