

Date of Report: 10/05/2014

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 # 1.
☒ 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: Levan Fire

B. Fire Number: UT-SCS-040150

C. State: Utah

D. County: Juab County

E. Region: 4

F. Forest: Uinta National Forest
(administered by Manti-La Sal NF)

G. District: Sanpete RD, Manti-La Sal NF

H. Fire Incident Job Code: PNH9E514

I. Date Fire Started: July 24, 2014

J. Date Fire Contained: August 8, 2014

K. Suppression Cost: \$3,498,809 as of August 4, 2014

L. Fire Suppression Damages Repaired with Suppression Funds

1. Fireline waterbarred (miles): 0
2. Fireline seeded (miles): 0
3. Other (identify): 1.5 miles dozer on Private (outside burn perimeter)

M. Watershed Number:

6 th level HUC	6th level HUC acres	% of 6th level HUC burned
Deep Creek	24,292	11.3
Quaking Aspen Creek-Chicken Creek	18,871	9.1

N. Total Acres Burned: 4,343

[3,447] NFS Acres [] Other Federal [211] Private [676] State of Utah

O. Vegetation Types:

Code	Vegetation Class	Unburned Acres	Low Acres	Moderate Acres	High Acres	TOTAL
N80	Agriculture	1.9	0.0	0.0	0.0	1.9
S056	Colorado Plateau Mixed Low Sagebrush Shrubland	1.5	1.7	0.5	0.2	3.9
S039	Colorado Plateau Pinyon-Juniper Woodland	348.7	507.6	635.4	172.1	1663.9
S054	Inter-Mountain Basins Big Sagebrush Shrubland	23.4	92.0	0.0	4.9	120.2
S096	Inter-Mountain Basins Greasewood Flat	1.0	4.0	0.0	0.0	5.0
S065	Inter-Mountain Basins Mixed Salt Desert Scrub	12.7	7.2	0.1	0.0	20.0
S071	Inter-Mountain Basins Montane Sagebrush Steppe	4.6	9.9	8.1	0.0	22.6
S050	Inter-Mountain Basins Mountain Mahogany Woodland and Shrubland	3.7	2.5	13.2	17.3	36.8
S079	Inter-Mountain Basins Semi-Desert Shrub Steppe	1.0	8.1	0.0	0.0	9.1
S011	Inter-Mountain Basins Shale Badland	2.8	1.9	0.2	0.0	4.9
S042	Inter-Mountain West Aspen-Mixed Conifer Forest and Woodland Complex	0.0	0.0	0.0	0.9	0.9
D08	Invasive Annual Grassland	1.3	0.0	0.0	0.0	1.3
S023	Rocky Mountain Aspen Forest and Woodland	5.6	1.8	18.0	48.8	74.1
S006	Rocky Mountain Cliff & Canyon	9.3	12.6	5.2	2.5	29.6
S046	Rocky Mountain Gambel Oak-Mixed Montane Shrubland	199.3	301.2	1051.3	425.8	1977.6
S093	Rocky Mountain Lower Montane Riparian Woodland and Shrubland	3.6	1.5	2.7	3.8	11.6
S032	Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland	15.1	6.4	25.3	33.5	80.3
S034	Rocky Mountain Montane Mesic Mixed Conifer Forest and Woodland	32.5	9.6	29.6	162.0	233.8
S028	Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland	0.0	0.0	0.1	1.4	1.6
S085	Southern Rocky Mountain Montane-Subalpine Grassland	10.6	3.1	0.0	0.0	13.7
TOTAL		678.4	971.2	1789.7	873.2	4312.6

P. Dominant Soils:

NRCS Fairfield-Nephi Area, Utah Map Unit Symbol	Unburned Acres	Low Acres	Moderate Acres	High Acres	TOTAL
CG	10	1	0	0	11
DdE	20	86	0	21	127
HaF	44	13	31	231	319
HdC	7	40	0	3	49
LdF	56	67	136	46	305
LeF	75	197	678	242	1,192
PeF	15	6	3	0	23
PK	2	1	0	0	3
RnF	28	33	8	14	83
RpD	2	15	0	0	17
SeF	117	104	7	6	234
ShF	51	123	234	98	506
SsF	51	101	161	40	353
WaB	2	15	0	0	17
XB	218	174	456	173	1,021
TOTAL	697	976	1714	874	4,261

There are 15 soil map units within the 4,343 acre burn perimeter. Soils in the burned area are mapped and described by the NRCS Soil Survey of Fairfield-Nephi Area Utah, Parts of Juab, Sanpete, and Utah Counties (UT608). See Soil Survey Report in Appendix for map unit description and other information for T-Factor, erosion hazard and other soil characteristics.

Q. Geologic Types:

Map Unit Symbol	Unit Name	Age
Jtc	Twin Creek Limestone	Middle Jurassic
Jtg	Twist Gulch formation	Middle Jurassic
Ki	Indianola Group, undivided	Upper Cretaceous
QTcf	Coalesced alluvial-fan deposits	Holocene to Pliocene?
QTpm	Pediment mantle	Holocene to Pliocene?
Qal	Alluvium	Holocene
T(Ja)	Intrusive masses of Arapien Shale	Quaternary? To middle Jurassic?
Tg	Green River Formation	Eocene
Tlm	Monzonite	Lowermost Miocene to uppermost Oligocene
Tmp	Monzonite, porphyry	Lowermost Miocene to uppermost Oligocene
Tsp	Syenodiorite porphyry	Lowermost Miocene to uppermost Oligocene

The dominant geologic unit in Chicken Creek Canyon is the Jurassic Arapien Formation (Ja). The formation formed in the Callovian Age of the latest Middle Jurassic period. Also known as the Arapien Shale, the lithology consists of limestone, shale, mudstone, and gypsum.

During the middle Jurassic, the region was characterized by shallow inland seas with water entering from Canada and spreading over wide areas of Montana, Wyoming, and Utah. The Mesocordilleran High, a mountainous barrier between Utah and California, resulted in intensified desert conditions in Utah, leading to an evaporative climate. Sedimentary accumulation occurred by evaporating the inland seas.

The structural geology of the Levan Quadrangle is characterized by significant deformation and folding in the western portion of the San Pitch mountain range. East of lower Chicken Creek, a large scale anticline and associated diapir traverses the mountain range in a northerly orientation. A small north-plunging anticline is found north of Chicken Creek.

Within the Chicken Creek drainage, the south canyon slope soils include Quaternary units which include alluvial fan, young alluvium, and mass-wasting landslides (Qms). The Qms unit consists of unsorted clay to boulder-sized material. Qms, appears on the south slope and would have a substantial clay content to form the landslides.

The mid to late Holocene alluvial fan deposits, Qafc, consist of poorly-sorted clay, silt, sand, gravel, and boulders. Qafc appears along the margins of Chicken Creek at the base of drainages. The early to mid-Holocene alluvial deposits, Qal, is made of clay to cobble-sized particles. Qal includes the Chicken Creek stream-channel sediments deposited within the flood plain and is composed of coarser material including rounded river cobble, gravel, sand, and less silt and clay.

Slope alluvial deposits are relatively thin on the canyon slopes, and are characterized as dark brown organic clayey sand topsoil overlying a layer of clayey sand with Arapien formation gravel, which in turn overlies the Arapien bedrock. This alluvium material varies in thickness from a few inches to roughly 30 feet thick.

R. Miles of Stream Channels by Order or Class: Intermittent-ephemeral, 26.9 miles

S. Transportation System

Trails: 3.2 miles motorized trails (Private) **Roads:** 0.28 miles (Private)

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Land Ownership	Unburned Acres	Low Acres	Moderate Acres	High Acres	TOTAL
Federal (USFS)	445	605	1,624	774	3,447
State (DWR)	187	321	71	97	676
Private	65	44	98	3	211
TOTAL	697	970	1,793	874	4,334

USFS Lands Burn severity for example microwatersheds with potential BAER concerns

Micro-watersheds Name	Burn Severity				USFS Total Acres
	High	Moderate	Low	Unburned	
Burnt Hollow	202	281	69	29	581
Maple Canyon	252	225	147	150	774
Spring Hollow	87	344	125	70	626
Water Hollow	46	340	77	55	519
Green Grove	152	250	166	185	636
Front 2	0	2	29	53	84

Micro-watersheds Name	Burn Severity				USFS Total Acres
	High	Moderate	Low	Unburned	
Prospect	42	127	88	3	260

B. Water-Repellent Soil (acres): 1,707 (39%)

C. Pre-fire Soil Erosion Hazard Rating (acres):

1,758 unclassified, 608 rock outcrop, 0 low, 372 moderate, 1,605 high

D. Post-fire Erosion Potential: 11 tons/acre

E. Post-fire Sediment Potential: 5,842 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 2 to 5

B. Design Chance of Success, (percent): 50

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

D. Design Storm Duration, (hours): 0.5

E. Design Storm Magnitude, (inches): 10 yr event – 0.67

F. Design Flow, (cubic feet / second/ square mile): see table

G. Estimated Reduction in Infiltration, (percent): 47

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

Thunderstorm driven – will influence overland flow/debris flows

Maple Canyon	
10 Year 30 Minute storm 0.67 inches	
Pre fire	Post fire
0 cfs (no flow from storm to channel)	756 cfs delivered to channel
	25.86 acre feet (volume of flow)

Spring Hollow	
10 Year 30 Minute storm 0.67 inches	
Pre fire	Post fire
0 cfs (no flow from storm to channel)	210 cfs delivered to channel
	9.16 acre feet (volume of flow)

Water Hollow	
10 Year 30 Minute storm 0.67 inches	
Pre fire	Post fire
0 cfs (no flow from storm to channel)	164cfs delivered to channel
	5.94 acre feet (volume of flow)

Burnt Hollow	
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10 Year 30 Minute storm 0.67 inches	
Pre fire	Post fire
0 cfs (no flow from storm to channel)	464cfs delivered to channel
	14 acre feet (volume of flow)

Green grove	
10 Year 30 Minute storm 0.67 inches	
Pre fire	Post fire
0 cfs (no flow from storm to channel)	149 cfs delivered to channel
	5.77 acre feet (volume of flow)

Prospect	
10 Year 30 Minute storm 0.67 inches	
Pre fire	Post fire
0 cfs (no flow from storm to channel)	31.5 cfs delivered to channel
	1.02 acre feet (volume of flow)

Front 2	
10 Year 30 Minute storm 0.66 inches	
Pre fire	Post fire
0 cfs (no flow from storm to channel)	3.46 cfs delivered to channel
	0.1 acre feet (volume of flow)

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

Summary of Issues:

1) Human Life and Safety

- **Possible Probability of Damage or Loss/Major Consequences – Risk Very High**

National Forest Administered Lands Steep confined channels have already deposited debris and sediment from several intense rain events during and post fire. These flows highlight the increased risk to human life and safety for Forest Service employees and other public visitors working and hiking in, or near drainages. Further thunderstorms and spring snow melt have a high probability of continuing to concentrate flows and debris into these areas threatening human life and safety. Many users of these areas are likely unaware of heavy rains in headwater drainage and the downstream flood flows that follow rain events placing them at extreme risk.

The risk of snow avalanches is heightened for the next 3 to 5 seasons. Trees that helped to hold and stabilize snow on steep slopes are now weakened. Over time, these dead trees will become structurally compromised and the steep, open slopes will become more avalanche prone.

- **Possible Probability of Damage or Loss/Major Consequences – Risk Very High**

Adjacent State, County, City and Private Lands – The Levan fire caused high and moderate severity burns in headwater streams that drain directly to State Highway 28, Chicken Creek road, mining access roads along Chicken Creek drainage, county roads, Levan city roads, the Bateman Dairy Farm, agricultural fields, farm and ranch residences, and private residences within the county and the city of Levan. Highway 28 users and local citizens, county employees, farm families and employees, and city residents are subject to future downstream flood flows that follow heavy rain events placing them at extreme risk.

2) Property

- **Possible Probability of Damage or Loss/Major Consequences – Moderate**

National Forest Administered Lands – The only property that could be threatened is the Chicken Creek Campground. The campground is not within the burn perimeter, and is upstream from any flash flows from the burn area. There is one flood control structure with a catchment basin on Forest System lands in Chicken Creek, below Maple Canyon drainage. The outlet structure is in good condition and was not severely impacted by the observed flooding; however the catchment basin has filled in with sediment from storm flows and vegetation over the years.

- **Possible Probability of Damage or Loss/Major Consequences – Risk Very High**

Adjacent State, County, City and Private Lands – State and Private lands down slope and downstream of the fire that have been, or could be impacted by debris flows, and flooding events include State Highway 28, a State Wildlife Refuge, agricultural fields, a large Dairy, homes and other ranch structures, the town of Levan, water-diversion structures that supply agricultural water to Levan, sediment/debris catchment basins on Chicken Creek, and a private spring-water collection system located in Spring-Hollow that supplies water to 4 homes.

3) Critical Natural Resources – National Forest Administered Lands

- **Possible Probability of Damage or Loss/Major Consequences – Risk Moderate**

Water Quality – The threat of erosion has increased as a result of the fire in areas of high and moderate burn intensities. In addition, channels have been scoured, debris flows have occurred, and hillslopes have eroded. Maple Canyon, Green Grove and Burnt Hollow have delivered heavy sediment loads to Chicken

Creek. This increased sediment and ash affects water quality in drainages directly below the fire and into Chicken Creek.

- **Possible Probability of Damage or Loss/Major Consequences – Risk High**

Native or Naturalized Plant Communities – The main concern from a range perspective will be to restore vegetation in areas that will be susceptible to erosion and to prevent cheatgrass spread. Other known noxious weed populations (Musk Thistle, Scotch Thistle, Hoary Cress, Hounds Tongue exist within and immediately adjacent to the burned area.

The burned area, now lacking desired vegetation that would normally compete with noxious weeds, is vulnerable to expansion of existing noxious weed sources and other invasive species (Cheatgrass). Even in the low intensity burned areas, it will still take at least one growing season until native vegetation can reestablish and compete with existing unburned noxious weed populations.

- **Possible Probability of Damage or Loss/Major Consequences – Risk Very High**

Long-term Soil Productivity – The potential soil loss due to snowmelt and thunderstorm runoff jeopardizes the natural vegetation recovery. Soils developed from Jurassic Arapien Formation (Ja) and Quaternary geologic units have inherently moderate-to-high surface erosion characteristics. These natural erosive characteristics are negatively compounded by fire induced soil hydrophobicity. In high and moderate soil burn severity areas, the fire consumed the vegetation canopy and the effective ground cover that dissipates rainfall and regulates snowmelt runoff. Therefore, average precipitation events have and will result in accelerated soil erosion rates in combination with higher surface runoff efficiencies. A 2 to 5-year rainstorm event occurring during the first two years following the fire will greatly increase the potential for loss of topsoil and the nutrient-rich ash. Soil productivity is dependent on surface topsoil and the soil nutrient pool. The loss of topsoil and the nutrient pool will result in lower soil productivity.

Natural revegetation to establish vegetative ground cover to protect the soil surface in high and moderate soil burn severity areas will vary. The non-forest cover types (mostly south facing slopes) will likely be 2-3 years, while forested lands may take up to 5-7 years to establish pre-fire vegetative ground cover. Lack of vegetative cover and litter can contribute to chronic erosion and perpetual hillslope instability directly impacting soil productivity.

4) Critical Natural Resources – Adjacent State, County, City and Private Lands

- **Possible Probability of Damage or Loss/Major Consequences – Risk Moderate**

Water Quality – The threat of erosion has increased as a result of the fire in areas of high and moderate burn intensities. In addition, channels have been scoured, debris flows have occurred, and hillslopes have eroded. Maple Canyon, Green Grove and Burnt Hollow have delivered heavy sediment loads to Chicken Creek. This increased sediment and ash affects water quality in drainages directly below the fire and into Chicken Creek.

- **Possible Probability of Damage or Loss/Major Consequences – Risk Very High**

Long-term Soil Productivity – Pastures and agricultural fields were negatively impacted by the alluvial fan flood flows, in some cases buried under several feet of coarse rocky debris. Therefore, soil productivity in terms of agricultural use is lost, unless the debris can be cleared off the fields.

B. Emergency Treatment Objectives:

The goal of the burned area emergency rehabilitation is to:

- Reduce runoff erosion and minimize the loss of soil productivity from high burn severity areas which contain soils that are hydrophobic by seeding and mulching.
- Protect any indigenous viable seeds, and protect the investment placed treatment seeds in high burn severity areas which contain soils that are hydrophobic by reducing runoff, by mulching to minimize the loss of topsoil, promote water infiltration, retain soil moisture, help germination, and protect young seedlings.
- Reduce threats to personal injury and/or human life to motorists using State Highway 28 in areas threatened by aluvial fan storm flows.
- Reduce threats to personal injury and/or human life by installing warning signs.
- Control expected invasion of noxious weeds, including the spread of cheatgrass, within the burn area by seeding to help restore vegetation in areas

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

Land	65 %	Channel	65 %	Roads / Trails	85 %	Protection / Safety	90 %
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D. Probability of Treatment Success: (on NFS lands)

Treatment Types:	← Years After Treatment →		
	1	3	5
Land Treatments (seeding)	60 %	70 %	75 %
Land Treatments (mulching)	70 %	80 %	80 %
Sediment Basins Treatments (None)	85 %	85 %	85 %
Protection / Safety Treatments (signs)	90 %	90 %	90 %

E. The Cost of Taking No - Action: \$2,345,600

The values at risk directly lost through No-Action includes: damage to water quality, loss of soil productivity, water quality, infrastructure, and human life due to change in hydrologic and hillslope conditions.

Values-At-Risk	Estimated Costs
Potential impairment to water quality and loss of irrigation	\$500,000
Potential Damage or Loss of Soil Productivity and Ecosystem Integrity (native or naturalized communities) from an increase in invasive and noxious species and erosion.	\$1,845,600
Total	\$ 2,345,600

F. The Cost of the Selected Alternative: \$1,993,760 (including loss)

Values-At-Risk	Estimated Costs
Potential Impairment to Water Quality The mulching and seeding treatments are estimated to be 65% effective in reducing the frequency of runoff and slowing erosional processes for 1-2 year storm events. 35% failure rate of 500,000	\$175,000
Potential Damage or Loss of Soil Productivity and Ecosystem Integrity (native or naturalized communities) from an increase in invasive and noxious species and erosion. The mulching and seeding treatments are estimated to be 65% effective in reducing the frequency of runoff and slowing erosional processes for 1-2 year storm events. 35% failure rate of \$1,845,600 plus \$1,172,800 of the cost of the aerial mulching and seeding.	\$1,818,760
Total	\$1,993,760

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Robert Davidson

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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 QUALIFYING TREATMENTS FOR THE APPROPRIATE FUNDING AUTHORITIES. FOR SEEDING TREATMENTS INCLUDE SPECIES, APPLICATION RATES AND SPECIES SELECTION RATIONALE

LAND TREATMENTS

Land Treatments:

Land Treatments consist of wood-straw mulch, agricultural-straw mulch, and seeding treatments. The mulching areas are located in the upper watershed source areas within the burn, on steep facing slopes. The purpose of the mulch is to protect soils on steep slopes from raindrop impact, to reduce the event energy at the watershed head source areas, to minimize soil erosion and debris-particle entrainment in the runoff at the source areas, and protect the both native seed and aerial seeded areas against loss of seed by erosion

Agricultural Straw and Wood Straw Mulches – 383 acres for AgStraw mulch (approximate \$1,000/acre), and 278 acres for wood- mulch (approximate \$2,500/acre). These areas are located on slopes 20 to 60%, on slopes in high burn severity with soils having high water repellency. AgStraw will be applied to areas that burned which contained mountain brush, oak brush, mahogany, etc., and Wood mulch will be applied to areas that burned that

had a dominate conifer/timber component. The Wood mulch is appropriate for the conifer/timber areas because these north facing slopes are typically steeper, and take approximately 2 years longer to re-vegetate than mountain brush type vegetation slopes do. The wood straw is much more stable on steeper slopes, and since timber areas takes much longer to re-vegetate versus mountain brush areas, the wood mulch longevity is much greater than agricultural straw. Agricultural straw application is limited by slope restrictions, bio-degrades much faster and loses its effectiveness during the 2nd year. Wood mulch will continue to protect into the 3rd, 4th, and 5th years following treatment, allowing extra time for plant rejuvenation within the timber areas. TOTAL \$1,078,000 for all mulching.

Oct 05 2014 Update. Mulching was only funded for agricultural straw on 623 acres at \$498,400. Contract and implementation costs will be significantly less than approved funding. Estimated costs for the aerial mulching are \$240,000. This is due to contract costs that are well below average aerial mulching costs.

Seeding – The main concern from a range perspective will be to restore vegetation in areas that will be susceptible to erosion and to prevent cheatgrass spread. A few days after the fire began, monsoonal moisture moved in over the area which resulted in two large rain events that occurred over the area and caused a large amount of erosion and soil loss. This has had a great impact on areas of risk such as private land and landowners below the Forest Boundary, water diversion structures, irrigation water and culinary water supplies, infrastructure around the town of Levan, Homes in and around Levan located on Alluvial fans and flood plains, Alfalfa fields, and Highway 28.

Oct 05 2014 Update. Seeding costs were funded for 666 acres at \$25,000. Actual seeding costs are estimated to be \$14,500.

A review of the Burned Area Reflectance Classification map (BARC) was conducted which resulted in 666 acres (see Figure 9) in High intensity burned areas that are recommend for rehab with seed to help reduce erosion, soil loss and restore the range. Recommended types of seed, pounds per acre and cost of seed to be used are shown in the Table below (Note: all seed mix will be donated by the Utah Division of Wildlife Resources).

Table 5. Recommended Seed, Pounds per Acre, and Cost

Seed: Common Name	Seed: Scientific Name	Bulk Pounds per acre	PLS Pounds per acre	Cost Per pound	Total Pounds	Total Cost \$
Bluebunch Wheatgrass	Agropyron spicatum	2	1.53	\$7.67	1332	10,216
Western Wheatgrass	Agropyron smithii	2	1.74	\$4.70	1332	6,260
Sandberg Bluegrass	Poa secunda	0.75	0.66	\$6.09	500	3,045
Mountain Brome	Bromus marginatus	2	1.96	\$4.61	1332	6,141
Lewis Flax	Linum lewisii	0.5	0.47	\$17.36	333	5,781
Slender Wheatgrass	Agropyron trachycaulum	2	1.82	\$3.81	1332	5,075
Sterile Triticale	Triticosecale (v. Quickguard)	4	3.69	\$3.55	2664	9,457
TOTALS					8,825	45,975

***All seed will be donated by the Utah Division of Wildlife Resources.**

Due to terrain and elevation it is recommended that a Helicopter be used to apply the seed. Estimated costs for a Type 2 Helicopter per day are:

Daily Availability = \$5,000.00

Hourly Rate = \$1,760

It is estimated that it will take five days to fly seed onto the burn.

TOTAL USFS COST \$25,000.

PROTECTION AND SAFETY MEASURES

Situation: As mentioned above, there are three flood control structures with catchment basins in Chicken Creek Canyon. The outlet structures are in good condition and were not severely impacted by the observed flooding, however the catchment basins have filled in with sediment and vegetation over the years.

Recommendation: Use BAER funds to excavate stored sediment in the catchment basin located within the forest boundary. The toe of the outlet structure has been exposed and is in need of rip-rap to prevent further damage to the structure. It would also be recommended to have the local landowners or state remove sediment from the two lower catchment basins. Excavated sediment should be placed in areas where it will not wash back into the stream channel or onto any existing roads.

Periodic maintenance should be done over the next 3 years to remove sediment as it builds up in catchment basins as soon after future storm events as possible.

Oct 05 Update. The initial assessment accounted for cleaning only one debris basin that was thought to be within the forest boundary. Two additional debris basins were identified, but at the time were thought to be located on a private inholding inside the forest boundary and therefore were not included in the initial assessment. It has since been learned that they are not on private ground, but on Forest Service property. A site visit was made to assess the work needed to treat these areas and the cost estimate revised accordingly. The attached map shows the locations of the Debris Basins. The initial assessment covered Diversion 2. Diversion 4 requires 15,000 CY of sediment to be removed to provide adequate capacity for increased debris flow and sedimentation. Diversion 3 needs rip-rap placed at the outlet structure and 5,000 CY of sediment removed. It is similar in size to Diversion 2, however it does not have as much volume. This interim request is for \$100,200 of additional funding to include the two additional debris basins. The initial funding for the first debris basin is \$106,800. The total requested for all three debris basins is \$207,000

Public Safety - Install Warning Signs

Situation: The severity of burn in some watersheds, combined with road location, high possibility of flash flooding and debris flows has increased the risk to road users.

Recommendation: Install warning signs for flash flooding and potential debris flows. Install “Burn Area Warning” signs and “Road Closed” signs where necessary to properly alert the travelers of the dangers ahead. “Road Closed” signs should also be used in conjunction with gated closures. See *Burned Area Emergency Response Treatments Catalog Chapter 5, Warning Signs pages 179-182* for more information.

Engineering Treatments Cost Estimate

Engineering Specification	Treatments	Cost
Debris Flow Protection Treatments of 3 existing debris basins	Remove built-up sediment and replace rip-rap along toe of flood control structures. Provide periodic maintenance over the next 3 years	\$121,800 \$207,000
Road and Trail Warning Signs	Warning sign installation at roads, campsites, recreation sites and trailheads that enter or are within the burned area or provide access to trails within the burn; warning of increased hazard from falling burned trees, closure signs at trailheads, roads, and campsites	\$1,000

Patrols for Storm Induced Road Hazards

Situation: Storm inspection and response is only funded by BAER funds for the initial year of implementation.

Recommendation: Continue storm inspection and response until vegetation has reestablished in affected watersheds or for at least a total of two years.

Gated Closures

Situation: Some water sheds may require multiple year seasonal closures until the watershed has recovered. Second and third year storms can produce debris flows and floods as extreme as first year flows. District should also consider closing specific watersheds to vehicular travel and grazing to reduce additional erosion and promote revegetation.

Recommendation: Monitor first year activity and watershed rehabilitation to determine if a second or third year road closure would be required.

Implementation Safety

Situation: The risk of flash floods has greatly increased due to severity of the burn. Forest users comfortable with area flows should not become complacent. Major flows are expected with minimal rain fall.

Recommendation: Work should be performed in the morning and early afternoon. Leave drainages when chance of rain is moderate or higher. Store equipment and materials out of flood plains and where chance of loss is low. Stay informed of the weather and changing conditions. Workers in the watershed and drainages should be prepared to exit drainages quickly. Have an escape route planned in case of flash flood and/or debris flows. Ensure equipment and materials are stored out of areas of risk. Leave any watershed when rain is encountered.

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.)

Monitoring Plan

1) Introduction: Why Monitor? Monitoring is the periodic assessment of BAER treatments in order to evaluate their success and/or failure and report on these findings to management. Forest Service Manual 2523.03 directs that the implementation and effectiveness of all treatments, as well as the consequences of decisions not to treat certain areas, will be monitored. This plan will assess BAER measures taken to assist in the rapid recovery of the burned-areas, nearby lands and resources affected by the burn. Direction in this Monitoring Plan complies with the Manti- La Sal National Forest Land and Resource Management Plan. Any adjustments or additional treatments observed as needed during monitoring will be recommended to management.

The Forest Service Handbook 2509.13, Section 61.1 requires that, as a minimum, the following conditions should be monitored:

1. The effectiveness and proper functioning of emergency stabilization measures - especially road drainage facilities and channel structures seeding and mulch treatments.
2. Need for re-treatment.
3. Quality and quantity of water leaving the burned-area and the location and causes of any problems.
4. Rates of recovery for vegetation.
5. Effects of resource utilization and restoration activities and emergency response measures on each other.

Members of the Forest / Ecosystem or District Staffs will conduct the implementation and the effectiveness monitoring (FSH 2509.13 Section 61.04). All evaluations will be documented in a brief, written report.

2) Types of Monitoring

Implementation Monitoring:

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

- **Aerial AgStraw and Wood mulch application areas:** Was work performed safely and without injury? Did ground cover meet location and extent? Was application timely? Did the estimated costs approximate budgeted allocations?
- **Aerial Seeding:** Are the seed mixtures applied to the intended sites with the proper rates of application?
- **Warning 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?

Effectiveness Monitoring: This monitoring is specifically designed to answer the question: DOES THE BAER TREATMENTS PROVIDE THE PLANNED EMERGENCY PROTECTION AND STABILIZATION OF THE BURNED-AREA?

Are the emergency treatments successful in: protecting long-term soil productivity, preventing the deterioration of water quality, preventing loss of water control, protecting long-term ecological structure and function, and reducing the threats to human life and property?

Specific objectives of the treatments are described below:

Aerial AgStraw and Wood mulch Application Areas: reduce raindrop splash and surface sealing of the soil, and helps hold soil in place on hillslopes?

Aerial Seeding: Establish vegetative cover on the site quickly to: stabilize severely burned soils to maintain long-term productivity and meet Regional and Forest Plan standards, prevent production and delivery of off-site erosion to the stream channel network, reduce overland flow caused by raindrop splash that seals the soil surface.

Warning Signs: Place signs as described in the treatment map to provide for public safety and promote fire recovery by communicating the potential flooding hazards and the need to adhere to motorized access restrictions so that: signs are clearly understandable, signs are placed with optimum visibility in concert with visual objectives, signs use language to encourage the public to make informed and safe decisions.

General Data Collection Procedures

The information to be recorded and documented will include the dates and type of emergency treatments implemented. The total number acres treated and the actual costs associated with these treatments will also be recorded. Any monitoring item having a specific location will be mapped using GPS and loaded into the corporate GIS database. The Implementation Team Leader will ensure that all data being collected meets the established standards. Data collected for inclusion into the Forest GIS database will meet corporate standards.

For all monitoring projects, as a minimum, record the dates of treatments or accomplishment. Name(s) of person(s) collecting data and name of person, organization, or contractor performing work with a lead contact name if possible, types of equipment used, time for project completion, GPS location as well as a detailed map and narrative of directions to the site if possible, short narrative explaining how the job was completed, any problems encountered and how they were solved, recommendations for continued use of the treatment on other fire rehabilitation projects considering both implementation and effectiveness concerns, evaluation of whether treatments supported the “ minimum necessary ” goal.

3) 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 Manti-La Sal National Forest submits interim reports to request addition funding and provided that the Forest documents and shares their findings.

4) Monitoring Reports

The overall results will be presented in a detailed summary report during 2013. This report will be submitted to the Forest Supervisor, District Rangers, the Regional Office and all cooperating agencies and other interested parties.

5) Annual Financial Requirements

Report cost of monitoring by year.

Part VI – Emergency Stabilization Treatments and Source of Funds						Interim #				
			NFS Lands			Other Lands			All	
		Unit	# of		Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER \$	\$	units	\$	Units	\$	\$
A. Land Treatments										
Aerial AgStraw-acre includes \$20K for implementation	acres	800	623	\$240,000	\$0		\$0		\$0	\$240,000
Aerial WoodStraw-acre	acres	2,500	0	\$0	\$0		\$0		\$0	\$0
Aerial Seeding-ac	acres	37.538	666	\$14,500	\$45,975		\$0		\$0	\$60,475
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
Subtotal Land Treatments				\$254,500	\$45,975		\$0		\$0	\$300,475
B. Channel Treatments										
Debris basin cleanout inclu	each	121800	1	\$207,000	\$0		\$0		\$0	\$207,000
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
Subtotal Channel Treat.				\$207,000	\$0		\$0		\$0	\$207,000
C. Road and Trails										
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
Subtotal Road & Trails				\$0	\$0		\$0		\$0	\$0
D. Protection/Safety										
Warning Signs	each	100	10	\$1,000	\$0		\$0		\$0	\$1,000
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
Subtotal Structures				\$1,000	\$0		\$0		\$0	\$1,000
E. BAER Evaluation										
Assess. & Report	each	17,000	1	\$17,000			\$0		\$0	\$0
<i>Insert new items above this line!</i>				---	\$0		\$0		\$0	\$0
Subtotal Evaluation				---	\$0		\$0		\$0	\$0
F. Monitoring										
monitoring plan	each	13,000	1	\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
Subtotal Monitoring				\$0	\$0		\$0		\$0	\$0
G. Totals				\$462,500	\$45,975		\$0		\$0	\$508,475
Previously approved				\$631,200						
Total for this request				-\$168,700						

PART VII - APPROVALS

/S/ THOMAS W. LLOYD (FOR):
ALLEN ROWLEY
Acting Forest Supervisor

Forest Supervisor (signature)

October 08, 2014

Date

Chris Iverson (for)

Regional Forester (signature)

October 17, 2014

Date