

Date of Report: December 4, 2012 Requested Amount: \$45,194

BURNED - AREA REPORT

(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report:

- ☒ 1. Funding ... Request for 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 # 5-Note-Information relating to the new request will be highlighted in yellow.
 - ☒ 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: Twitchell Canyon Wildfire

B. Fire Number: UT - FIF - 000089

C. State: Utah

D. Counties: Beaver, Piute and Sevier

E. Region: Intermountain - 04

F. Forest: Fishlake NF - 0408

G. District: Beaver - D3

H. Fire / Incident Job Code: P4FL8Q

I. Date Fire Started: 07-20-2010 at 1120 – Lightning Strike

J. Date Fire Contained: 10-16-2010 (95 %)

K. Suppression Cost: \$ 21,080,000 ... estimated from the Incident Status Summary / ICS – 209 from 10-04-2010

L. Fire Suppression Damages Repaired with Suppression Funds

According to the GIS / Support Groups assigned to the Type 2 / Incident Command Teams of Ourada, Whalen and Gage ... the following disturbances were caused by fire suppression related activities:

1. Dozer Line – 1.2 miles / Saw Line – 2.1 miles / Hand Line – 15.9 miles and Masticator Line – 13.6 miles ... these disturbances were waterbarred when the lines were constructed on steep to very steep terrain – and, re-seeded on an as-needed basis. Some of the mountain and high mountain locations will re-sprout new grasses and shrubs once the site receives adequate moisture

2. Other (identify) ... Spike Camps – 10 / Helibase – 2 / Helispots – 11 / Drop Points – 10 / Water Sources – 6 / Main Fire Camps – 2 and Lookouts – 1

(note) ... several of our Resource Advisor's have commented and documented with photographs - just how, light-on-the-land the various crews were during the construction of the field camps and containment lines

M. Watershed Numbers: (This information was provided by the Fishlake NF / GIS Staff – Jenneka Knight)

Subwatersheds ... 6th Field HUCs and Drainage Names	
160300030101 – Fish Creek	160300070103 – Mud Spring Hollow / Wildcat Creek
160300030102 – Headwaters of Clear Creek	160300070203 – South Fork of Pine Creek
160300030104 – Mill Creek	160300070208 – North Creek
160300030208 – Deer Creek / Sevier River	160300070501 – Sulphur Creek
160300070101 – Upper Indian Creek	160300070502 – Bear Canyon

N. Total Acres Burned: (Summary of the Acres Burned by Land Ownership / 10-09-2010)

44,376	USDA - FS	-0-	USDI - BLM	-0-	State of Utah	498	Private
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O. Vegetation Types:	Much of the burn had consisted of Spruce / Fir, Seral Aspen and Stable Aspen (67 %) type plant communities located on moderately steep to steep mountainsides occurring throughout the higher elevations; Mixed Conifers (Ponderosa Pine, Douglas Fir and White Fir) with Mountain Brush (16 %) was observed in the canyons and along the very steep ridgetops at the mid-elevation areas; Gambel Oak, PJ & Mountain Big Sagebrush (15 %) was found on the lower elevation foothills and structural benches; the remaining areas were either Riparian Zones, Subalpine Meadows with Perennial Grasses or Rock Outcrops / Talus Slopes / Cirque lands (2 %) associated with the high peaks of the Tushar Mountains.
P. Dominant Soils	The High Mountain areas had Pachic Argicryolls, Typic Argicryolls, Alfic Argicryolls, Mollic Haplocryalfs, Typic Haplocryalfs, Typic Cryochrepts, Typic Cryorthents and Lithic Cryorthents under the Spruce / Fir, Seral Aspen and Stable Aspen type plant communities; the Mountain sites had Inceptic Haplocryalfs and Ustic Haplocryalfs under the Mixed Conifers with Ustic Argicryolls and Lithic Argicryolls under the Mountain Brush while ... Typic Argiustolls, Typic Haplustolls, Aridic Argiustolls and Lithic Argiustolls were mapped under the PJ and upland shrub plant communities.
Q. Geologic Types:	<p>Much of the area consists of loamy and clayey soils derived from intermediate and basic igneous rocks ... such as latite, andesite and basalt (62 %); distinct areas near Fish Creek, Shingle Creek and Indian Creek had sandy soils formed from acid igneous rocks called volcanic tuff and rhyolite (29 %) while the remaining areas were developed in mixed sediments of alluvium and colluvium or glacial deposits (9 %)</p> <p>(note) ... severely burned soils formed from latite, andesite or basalt are subject to flooding hazards and debris flows; severely burned soils formed in volcanic tuff or rhyolite are subject to flooding hazards and mudslides.</p>

R. Miles of Streams:→ **Perennial:** 56 miles→ **Intermittent:** 86 miles**S. Existing Transportation Systems (2)**

Trails:	USDA / Forest Service	3 miles (motorized)
	USDA / Forest Service	54 miles (non-motorized)
	Private Ownership	0.5 miles
Roads:	USDA / Forest Service	37 miles
	Private Ownership	2 miles

USDA – Forest Service ... 94 miles

Private Ownership ... 2.5 miles

Total ... 96.5 miles

PART III - WATERSHED CONDITION

A. Burn Severity Classes ... based upon BARC 256 / Burn Severity Classes taken from Landsat 5 / Imagery acquired from the EROS / Data Center on 09-21-2010 and SPOT 4 / Imagery secured by Jess Clark at RSAC on 09-30-2010 ... combined with several reconnaissance flights – and, on-the-ground sampling observations made by the BAER Team:

Burn Severity Classes	# of acres	% of the Incident
Unburned	5,723	13 %
Low	9,304	20 %
Moderate	15,206	34 %
High	14,641	33 %
Total ...	44,874	100 %

B. Estimate of Water-Repellent Soils: 24,680 acres (55 % of the burned-area)**C. Soil Erosion Hazard:** 20,363 acres (45 % of the burned-area is in a High Hazard Zone)**D. Erosion Potential:** 13.82 tons / acre (ERMiT Model – Year 1 / Forest)9.09 tons / acre (ERMiT Model – Year 1 / Chaparral)5.13 tons / acre (ERMiT Model – Year 1 / Range)11.76 tons / acre (ERMiT Model – Year 1 / Average)**E. Sediment Potential:** 6,021 cubic yards / square mile (ERMiT Model / Average)

PART IV - HYDROLOGIC DESIGN FACTORS

(Information for the Fish Creek Subwatershed / 160300030101)

A. Estimated Vegetative Recovery Period	2 – 5 years
B. Design Chance of Success	70 %
C. Equivalent Design Recurrence Interval	10 years
D. Design Storm Duration	30 minutes
E. Design Storm Magnitude	0.6 inches
F. Design Flow	19 cfs / mi²
G. Estimated Reduction in Infiltration	60 %
H. Adjusted Design Flow	30.4 cfs / mi²

PART V - SUMMARY OF THE ANALYSIS

A. Describe the Critical Values-at-Risk / Resource Concerns and Immediate Threats ...

A major flood event occurred in the Twitchell Canyon fire area during July of 2011 when a storm event dropped up to 1.5 inches of precipitation over the fire area. Damage occurred to the values at risk that were identified in the initial BAER report for the Twitchell Canyon Fire. Subsequent, storm events in 2012 additionally led to flooding from the Twitchell Canyon Fire area. This damage included, down-cutting of stream channels (Hydrologic function on burned NFS lands) increased sediment affecting water quality (Hydrologic function on burned NFS lands), loss of topsoil affecting long term soil productivity, and damage to existing infrastructure including roads and trails. Rain events of this magnitude (2011) are common for the area and although initial treatments proved effective, the possibility for damage to the values at risk remain elevated until hillslopes have had time to more fully re-vegetate and recover. An emergency situation still exists within and downstream of the burned area. Unacceptable levels of risk to critical BAER values of roads, water quality, soil productivity, and hydrologic function remain due to high probabilities of damaging storm events.

TWITCHELL CANYON WILDFIRE

BAER / CRITICAL VALUES-AT-RISK ... SUMMARY TABLE

Much of the burned-area is currently prone to extreme flooding hazards; specifically, Mill Hollow, Twitchell Canyon, Line Canyon, Hop Canyon, Sevier Canyon, Shingle Creek, lower Fish Creek, upper Fish Creek and most of North Creek can all be expected to flood, have mudslides or showcase a large debris flow. The values at risk shown below were assessed based upon the post fire conditions and likelihood of post fire events..

HUMAN LIFE AND SAFETY

Human Life and Safety on or in close proximity to burned NFS lands.

Users on or in Private / State Property – Flooding to county, private and state transportation surfaces, (i.e. Clear Creek Highway), occupied structures, and overall safety of the general public along the Clear Creek drainage – Possible / Minor ... LOW

Users of FS Transportation System (Roads) – There are likely flooding hazards to Indian Creek Road, Sevier Canyon, North Fork of North Creek, Mud Springs and Shingle Creek areas that are heavy use areas by the public. – Very Likely / Moderate ... VERY HIGH

After an incident of wildfire, damaged transportation systems often behave as conduits by accelerating the flow of surface water across unprotected landscapes during periods of spring snowmelt or summer thunderstorm events. In most cases, the drainage design of a given road or trail system will NOT be sufficient to handle the increased magnitude of flows that will be produced as a direct result of the burning disturbance.

Public Access to Mine Adits – Burned out barriers allowing public entry – Likely / Major ... VERY HIGH

Several abandoned mine sites located within Sevier Canyon and on Mud Springs were affected by the Twitchell Canyon Wildfire; the wooden barricades blocking their adits were consumed by the burn ... allowing the general public to have access back into these hazardous locations.

Public parking areas and high use areas- There are several public access areas that have many burned hazard Trees. They are located at trailhead, recreation sites, trail and roads – Possible / Major ... HIGH

Approximately 25 % of the aspen and conifer trees surrounding the Manderfield Reservoir Site were killed by the recent fire event. The public uses this area for dispersed camping, fishing and the storage of irrigation water. Many of these trees will be subject to severe windthrow hazards during periods of strong winds.

PROPERTY

Buildings, water systems, utility systems, road and trail prisms, dams, wells or other significant investments on or in close proximity to the burned NFS lands.

Forest Roads – Very Likely / Moderate ... VERY HIGH

There are over 90 miles of transportation surfaces (roads & trails) occurring on NFS Lands located inside the perimeter of the Twitchell Canyon Fire. Most of the existing roads and trails are considered to be at-risk from flooding hazards, debris flows and mudslides due to the size and severity of the recent wildfire event. In particular the transportation systems in the Sevier Canyon, North Fork of North Creek and Indian Creek drainages are at risk. 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. Some of the roads occupy the same location in the channel as our intermittent streams ... these transportation surfaces need to be re-located using CMLG, CMRG or NFN3 funds.

State Highway – Unlikely / Moderate ... LOW

The Clear Creek Highway may be at risk to flooding overtopping the highway through The Narrows.

Forest Trails / Trailheads – Likely / Moderate ... HIGH

See description above for Forest Roads.

Downstream Diversions – Unlikely / Minor ... VERY LOW

Agricultural/Livestock Water Systems – Possible / Moderate ... INTERMEDIATE

Downstream Improvements / Fish Barriers – Possible / Moderate ... INTERMEDIATE

There are 2 downstream improvements in Shingle Creek that were constructed to act as fish barriers to protect introduced populations of Bonneville cutthroat trout. These barriers are threatened by sediment and debris deposits resulting from the increased flows from the burned-area. The lowest culvert on North Fork North Creek is designed to function as a fish barrier as well.

Geothermal Plant – Unlikely / Moderate ... LOW

Manderfield Reservoir – Possible / Moderate ... INTERMEDIATE

The Manderfield Reservoir in upper Indian Creek may be at risk to debris flows initiated in the burned headwaters

NATURAL RESOURCES

Water used for municipal, domestic, hydropower, or agricultural supply or waters with special state or federal designations on or in close proximity to the burned NFS lands.

Eligible Fish Creek Wild and Scenic River – Unlikely / Minor ... VERY LOW

North Fork North Creek Irrigation Companies – Likely / Minor ... LOW

Clear Creek Irrigation Companies – Possible / Minor ... LOW

Sulphurdale Geothermal Plant – Unlikely / Moderate ... LOW

Soil productivity on burned NFS lands.

Loss of Topsoil and Long Term Soil Productivity supporting ecological function for:

- exposure of aspen root system
- other re-sprouting species (i.e. oak, manzanita, willows)
- loss of native seed bank

Protect soils from highly erosive ground conditions after the removal of effective ground cover and coarse woody debris.

Very Likely / Major ... VERY HIGH

Our most recent BARC 256 Image indicates about 70 % of this incident was subjected to Moderate and High Severity Burns. Approximately 14,641 acres were mapped as high burn severity. The steep mountainsides and very steep ridgetop areas located within this burn will be prone to flooding hazards and mudslides during spring / summer / fall thunderstorm events. Much of this fire-damaged terrain is located along Indian Creek, Fish Creek, Shingle Creek and North Creek, in Sevier Canyon, Hop Canyon and Line Canyon, on Rattlesnake Ridge and surrounding Manderfield Reservoir. All of these locations will be subject to extreme flooding hazards. Some areas could be impacted by large debris flow events. The sandy soils located near Mill Hollow and Twitchell Canyon have a high potential for mudslides and loss of soil resources.

Soil Productivity Aspen-Many of the burned landscapes were located in areas of Seral Aspen. If the topsoil is truncated from these fragile sites by accelerated rates of erosion, then it's possible we will lose our opportunity for aspen regeneration.

Very Likely / Moderate ... VERY HIGH

Hydrologic function on burned NFS lands Very Likely / Major ... VERY HIGH

An adverse change to hydrologic function is expected due to the large contiguous areas burned at moderate and high severity. These areas are very steep and contain large percentages of hydrophobic soils. Many of the tributary drainages contain accumulated channel sediments that have a high probability of being mobilized in high intensity, short duration rainfall events. This will result in the following changes:

- Increased flow and sedimentation (increasing threat for whirling disease)
- Channel down-cutting and lateral migration
- Loss of riparian areas and access to flood plains
- Degradation of aquatic and terrestrial wildlife habitat (i.e. BCT)

Channel down-cutting and lateral migration that may result in a loss of riparian areas and access to floodplains.

Critical habitat or suitable occupied habitat for federally listed threatened or endangered terrestrial, aquatic animal or plant species on or in close proximity to the burned NFS lands.

Unlikely / Minor ... VERY LOW

Bonneville Cutthroat Trout are considered a USDA – Forest Service / Intermountain Region and State of Utah sensitive species. They have been petitioned for listing as a threatened species several times. To help prevent the need for that listing, a Conservation Agreement and Strategy was developed to guide their management, including protection of populations and habitat from threats, habitat improvements and the active restoration of new populations. The USDA – Forest Service / Intermountain Region is a signnatory to this document. Bonneville cutthroat trout currently occupy about 11 % of their historic range in the southern Geographical Management Unit (GMU) which includes the Fishlake National Forest.

Native or naturalized communities on NFS lands where invasive species or noxious weeds are absent or present in only minor amounts.

Protection of native plant communities (e.g. curleaf mountain mahogany, manzanita and aspen communities) from invasive cheat grass and noxious weed infestations.

Lower Elevation (14 - 22 inch precipitation zone) = Likely / Moderate ... HIGH

Higher Elevation (22 + inch precipitation zone) = Possible / Moderate ... INTERMEDIATE

The pre fire existing noxious weeds growing in close proximity to the Twitchell Canyon Fire were 1) Musk Thistle, 2) Hoary Cress, 3) Leafy Spurge, 4) Scotch Thistle and 5) Russian Knapweed. In addition, both Bull Thistle and Houndstongue were identified near the burn by several District employees

CULTURAL AND HERITAGE RESOURCES

Cultural resources on NFS lands which are listed on or potentially eligible for the National Register of Historic Places.

Unlikely / Minor ... VERY LOW

B. Emergency Treatment Objectives:

The goal of burned-area emergency rehabilitation is to:

- Reduce threats to personal injury and/or human life in and immediately adjacent to Forest Service lands in the North Creek area by completing seeding in moderate and high severity burn areas.
- Reduce threats to personal injury and/or human life of Forest visitors in and immediately adjacent to the Twitchell fire by installing warning signs and performing storm patrols. In some instances area closure gates will aid in protecting people.
- Warn users of Forest roads, trailheads, and trails of hazards present in the burned area.
- Protect the public by closing mine adits with closure structures in cooperation with the State of UT.
- Mitigate potential post fire soil losses through increasing post-fire ground cover with mulch and with vegetation treatments.
- Reduce the likelihood of invasive and noxious species colonizing the burn area through vegetation and early detection rapid response treatments.
- Reduce potential for runoff through broadcast Seeding. This treatment will be used to stabilize existing ground conditions on severely burned terrain. Seeding would maintain long-term soil productivity, uphold the ecological integrity of our high mountain aspen sites, shielding the existing transportation system from surface runoff, and limit the amount of sediment available for transport into water bodies.
- Control expected invasion of noxious weeds within the area, especially along and adjacent to Forest roads, dozer lines, helispots, spike camps and private land boundaries used by fire equipment and in existing populations within the Twitchell Canyon Fire boundary.
- Minimize damage to system roads and trails within the Twitchell Canyon fire boundary by cleaning existing or installing new drainage structures.
- Maintain stream hydrologic function in streams by constructing cross vanes in strategic locations. These structures will aid with high BCT protection as well. Armored crossings would additionally aid in maintenance of stream function and would provide for travel corridor protection where constructed.
- Protect the function and water quality for downstream uses of Manderfield Reservoir by protecting the shoreline with straw wattles used in strategic locations to limit sedimentation. We will maintain the dam and spillway.
- Identify appropriate monitoring activities that estimate the effectiveness of emergency stabilization treatments and identify necessary maintenance and continuation of other approved BAER activities.

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

Land	60 - 90 %	Channel	90 %	Roads / Trails	75 %	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)	75 %	80 %	80 %
Channel Treatments (cross vanes)	90 %	80 %	70 %
Road / Trail Treatments (drainage)	90 %	90 %	90 %
Protection / Safety Treatments (signs)	90 %	90 %	90 %

E. The Cost of Taking No - Action: \$ 18,810,000

The values at risk directly lost through No-Action includes: damage to water quality, loss of soil productivity (as impacted by noxious weed potential and erosion), homes, recreational opportunities, roads, trails, utilities, and human life due to changed hydrologic and hillslope conditions.

Values-At-Risk	Estimated Costs
Impairment to Water Quality	\$4,000,000
Loss of Long-term Soil Productivity and Ecosystem Integrity from an increase in invasive species and erosion.	\$10,000,000
Loss of Homes and Structures	\$2,500,000
Loss of Recreational Opportunities	\$550,000
Loss of Forest Roads	\$1,090,000
Loss of Trail System	\$370,000
Bonneville Cutthroat Habitat, and Bats	\$300,000
Total	\$18,810,000

F. The Cost of the Selected Alternative: \$ 14,021,923 (including loss)

Values-At-Risk	Estimated Costs
Loss of Long-term Soil Productivity and Ecosystem Integrity from an increase in invasive species and erosion. Damage to Water Quality, Loss of Homes, Loss of Recreational Opportunities and Loss of Irrigation and Water System. <ul style="list-style-type: none"> The mulching and seeding treatments are estimated to be 60% effective in reducing the frequency of runoff and slowing erosional processes for 1-2 year storm events. 40% failure rate of \$18,810,000 plus \$5,542,887 of the cost of the aerial mulching and seeding treatments. 	\$13,066,887
Loss of Forest Roads	\$875,304

<ul style="list-style-type: none"> The road treatments are estimated to be 90% effective in protecting the forest roads. 10% failure rate of \$1,090,000 plus \$766,304 of the cost of the road treatments. 	
Loss of Trail System <ul style="list-style-type: none"> The road treatments are estimated to be 80% effective in protecting the forest trails. 10% failure rate of \$370,000 plus \$42,732 of the cost of the trail treatments. 	\$79,732
Total	\$14,021,923

G. Skills Represented on the Initial / Burned - Area Emergency Response Team:

X	Hydrology (4)	X	Soils (2)	X	Geology	X	Range		BLM
	Forestry		Wildlife	X	Fire Mgt.	X	Engineering (2)	X	Trainees (2)
X	R4 / Contracting	X	Ecology	X	Botany (2)	X	Archeology (2)	X	Helitack
X	Fisheries	X	Research		Visuals	X	GIS	X	District Staff

Co-Team Leaders: Doug Robison / NEPA Specialist - Monitoring and Adam Solt / Hydrology

BAER Team Mentor: Michael D. Smith / Soil Scientist – Technical Specialist (THSP)

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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

(Please see our 11 x 17 “ GIS displays for noxious weed monitoring and recommended BAER Treatments at this time)

LAND TREATMENTS

AERIAL MULCHING

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 soil productivity, hydrologic function, human safety, road and trail infrastructure, and native / naturalized communities where invasive species and noxious weeds are absent. These values are threatened by the post-fire response to short duration, high intensity precipitation events. The magnitude of consequences is moderate especially to road infrastructure, soil productivity, natural resources, and human safety. Overall, the assessed risk is high for natural resources and human safety.

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 treatments. 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's total 4,158 acres. The location of this treatment is upslope of road and trail infrastructure, and fish barriers (structures) important to the protection of the integrity of the aquatic ecosystem. The mulch will be applied in the watersheds of North Fork, Mill Hollow, Twitchell Canyon, Shingle Creek, Fish Creek and Sevier Creek. Refer to BAER Treatment Map for the exact locations.

Design Specifications:

- Treat areas in designated units with “ High ” and “ Moderate ” soil burn severity. Do not treat areas that have needles in trees, exposed rock outcrops, or slopes greater than 60 %.
- 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 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 Robichaud 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.
- 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 2010 growing season. Straw shaft length will not exceed 12 inches. Suitable straw includes barley, rice, and wheat grasses.
- 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.

This treatment is intended to achieve three sequential objectives:

- 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.
- Decrease overland flow and erosion from high soil burn severity areas upslope of trails or roads, which can intercept surface runoff and result in damage and/or loss of infrastructure.
- Decrease sedimentation from burned-areas and trails upslope of streams.

The mulching treatments are predicted to lower the estimated soil erosion and subsequent sediment delivery to the streams by up to about half of the areas treated. 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 of the streams can protect a much larger downstream area from cumulative runoff and sedimentation.

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, sensitive fish habitat, and road or trail infrastructure.

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 100 ft pace transect method once after treatment, and again in the spring of 2011.b

STRAW WATTLES

Purpose of Treatment: To trap sediment and mitigate negative effects to reservoir in terms of water quality.

General Description: Install 9” diameter straw wattles along hillslopes above Manderfield Reservoir below areas of high to moderate severity burn.

Location (Suitable) Sites: Hillslopes above Manderfield Reservoir that burned at a moderate to high severity

BROADCAST SEEDING

Purpose of Treatment: To seed with grasses in high and moderate severity burn areas to aid in preventing soil productivity loss, erosion, and debris flows that severely impact soil productivity and hydrologic function. At lower elevations (14 - 22 inch precipitation) a primary purpose of this seed treatment is to minimize the spread of minor amounts of adjacent cheatgrass and noxious weeds.

General Description: Aerially seed with grasses in conjunction with mulch treatments on 10,844 acres of other areas to increase the likelihood of success for soil stabilization, establish vegetation in high and moderate severity burn and to prevent additional soil productivity loss. The seeding applications are most effective beyond the first growing season. However, some success has been achieved within the first year using sterile Triticale in the mix.

Location (Suitable) Sites: Moderate to high severity burn areas of the Twitchell Canyon Fire.

Design Specifications:

The following seed mixes were developed specifically for **EMERGENCY STABILIZATION TREATMENTS** The proposed seed mixes are species known to be effective for erosion control, adapted to the target area, and compatible with future management objectives. The seed mixes are also the best known to restore ecosystem function and protect against the rapid increase of cheatgrass. The mixes contain a strong component of native species as well as some introduced species. In light of Executive Order 13112 (2/3/1999) on invasive species, we considered and determined that the introduced species in these mixes will not be “likely to cause economic or environmental harm or harm to human health.”

The seed purchased will be certified to the variety claimed. Also, the mixes will be certified that NO noxious weed seeds are present. Pure live seed (PLS) equals the percent of purity times the percent total germination ($PLS = \% P \times \% TG$).

Price estimates were obtained from Granite Seed Company in Lehi, UT. Actual costs may vary depending on availability at time of purchase from the successful bidder. The following table shows the pounds / acre of seed (PLS) that would be used in each mix. Cost for aerial application is estimated at \$35 per acre.

Native or Introduced	Species to be Seeded	Seed Mix #1 14 to 22 in. ppt.	Seed Mix #1 14 to 22 in. ppt. +Triticale	Seed Mix #2 22+ in. ppt.	Seed Mix #2 22+ in. ppt. +Triticale	Triticale Only
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< ---- Pounds / Acre (PLS) ---- >

N	Big bluegrass “Sherman”	0.25	0.25			
N	Bluebunch wheatgrass “Anatone”	1.5	1.5			
N	Snake River wheatgrass “Secar”	1.5	1.5			
N	Canby bluegrass	0.5	0.5	1	1	
N	Sandberg bluegrass (not canbyi)	0.25	0.25			
N	Slender wheatgrass “Pryor”	3	3	3	3	
N	Slender wheatgrass “San Luis”					
N	Mountain brome “Bromar” or “Garnet”	3	3	4	4	
N	Thickspike wheatgrass “Bannock”	1	1	2	2	
I	Crested wheatgrass “Fairway”	2	2			
I	Crested wheatgrass “Hycrest”	2	2			
I	Sterile triticale hybrid		20		20	40

Total Pounds / Acre	15.00	35.00	10.00	30.00	40.00
Total Seeds / ft ² <u>1</u> /	71	76	43	48	10
Estimated Seed Cost / Acre	\$44.00	\$76.00	\$25.25	57.25	64.00
Estimated Cost Seed Mix/Pound	\$2.93	\$2.17	\$2.53	\$1.91	\$1.60

1 / Recommended rates for broadcast seeding mixes are about 50 – 100 seeds per square foot.

Where the sterile triticale hybrid is used (20 lbs / acre @ \$ 1.60 / lb), it will cost an extra \$ 32 / acre) – so, the adjusted seed cost / acre becomes \$ 76.00 when adding triticale to the seed mix #1 – and, the estimated treatment cost becomes \$ 111.00 / acre when considering the aerial application.

These seed mixes include 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.

BAER Team / Recommendation

Treatments Proposed

Five seed treatments are proposed (see Aerial Seeding Treatment map):

- 1) Use Seed Mix #1 for lower areas that will be mulched – 844 acres
This treatment is designed to prevent a cheatgrass infestation.
- 2) Use Seed Mix #1 plus 20 lbs/ac of sterile hybrid for lower areas that will not be mulched – 1,439 acres
This treatment enhances Treatment #1 to grow mulch on site to protect the soil and cover the seed.
- 3) Use Seed Mix #2 for higher areas that will be mulched – 4,239 acres
This treatment provides a modest amount of 4 native grass species to supplement the expected natural response from fire-adapted species on site.
- 4) Use Seed Mix #2 plus 20 lbs/ac of sterile hybrid for higher areas that will not be mulched – 7,043 acres
This treatment enhances Treatment #3 to grow mulch on site to protect the soil and cover the seed.
- 5) Use sterile hybrid triticale at 40 lbs/ac – 1,234 acres. This treatment is designed specifically for the steep slopes and less receptive soils of the North Fork of North Creek to protect the slopes and keep the soil from washing off the mountain.

Most of the seed will be applied in areas that receive about 14 to 30 + inches of precipitation annually. Some of the species in these mixes each have the ability to dominate a stand depending on the location. The value of multiple species in the seed mix provides the flexibility for different species in the seed mix to thrive in a microsite that is best suited for that certain species.

Specific ecological attributes valued for some of the species include the following:

Big bluegrass— “when properly managed, will compete with cheatgrass”

Bluebunch and Snake River wheatgrass— “long-lived, drought tolerant, widespread”

Sandberg and Canby bluegrass— “important for soil stabilization...one of the first grasses to green-up in the spring...excellent in low rainfall native mixes - these bluegrasses should be very competitive with cheatgrass)

Slender wheatgrass— “valuable in erosion control because of its rapid development”

Mountain brome— “will establish and grow on rather poor, depleted soils ... recommended sites include weedy openings”

Thickspike wheatgrass – rhizomatous / “adapted to disturbed range sites and dry areas subject to erosion”

Crested wheatgrass— “one of the few grasses that has the ability to compete with difficult to control weedy annuals such as cheatgrass”

—Fairway is reported to fade in abundance sooner than other varieties

—Hycrest is “a hybrid between standard and introduced...outstanding seed producer, excellent seedling vigor, easy to establish under harsh conditions”

Sterile hybrid triticale – “hardy and durable – but, not persistent or invasive...adapts to a wide range of soil and moisture conditions”

There may be opportunities to add other species to the seed mix. We suggest that District personnel contact the Utah Division of Wildlife Resources (UDWR) prior to actual purchase of the seed. Depending on seed availability and time of seeding, the Division may have seed for forb and browse species that could be added to the seed mix that would enhance both wildlife habitat and diversity in the area.

We constrained the total number of acres to be seeded by several guiding factors:

Only seed in disturbed areas located on NFS lands.

Seed suitable areas located within some moderate and high / burn severity zones.

Seed areas where pre-burn juniper stands lacked adequate grass seedbank.

The Planting Guide for Utah gives the following information in the “Wildfire Seedings” section. “Steep slopes and rough areas that are not accessible to conventional ground equipment can be aerial seeded ... if it is not possible to cover seed, plant late in the fall and increase the seeding rate ... burned sites, including forest and desert ranges are often seeded within a few days or weeks following the fire, in the mistaken belief that the ash will cover the seed ... even if an ash residue or a loose seedbed is present, seed only during the appropriate seasons. Do not plant on a loose dry seedbed ... plant in the late fall when seedbeds are firm.”

*Partially funded through initial request to seed 1,234 acres with sterile hybrid and 2,721 acres of high to moderate severity burn.

MINE ADIT CLOSURES

Purpose of Treatment: As the fire burned the vegetation, mine adits became more visible on the landscape. In some instances wooden barriers at mine entrances were burned and rendered ineffective. The purpose of the closures is to provide public safety and secure the closure of the mine adit. The treatments will be conducted with direction and possible cost sharing with the State of UT and other FS program funds. BAER funding requested will be the minimum necessary to protect the public from access to the exposed adits.

General Description: Install culvert/rebar grate barriers at 3 mine adit locations in the Mud Flat and Sevier Canyon area to prevent public entry in to these dangerous hazards.

Location: The following mines need immediate attention for public safety.

- Rosebud #1
- Golden Gem
- Jumbo

NOXIOUS WEED EXPANSION MONITORING and SPOT TREATMENT

The Beaver RD weed crew will implement this strategy in 2011 to detect and treat any new infestations of noxious weeds in the burned area. Three aggressive noxious weeds need immediate attention; Scotch thistle, leafy spurge, and musk thistle threaten the area. Several other species on the Utah noxious weed list occur adjacent to the burned area (see Noxious Weed Monitoring and Spot Treatment map). This treatment includes a search for any new individuals of noxious weeds on forest-administered lands along four specific stretches of the fire perimeter, along most of the forest routes in the northeast quadrant of the burned area and the roads in Indian Creek and North Creek. The dozer line in the South Fork of North Creek and also spike camps, drop points, helispots, and some heliwell locations will be monitored. Individual noxious weed plants generally will be sprayed with herbicide at the same time they are discovered. The search will occur three times during the growing season preferably in May, late-June and early August; about 1,000 acres

CHANNEL TREATMENTS

GRADE CONTROL

Purpose of Treatment: Grade control structures will be constructed slightly higher than current stream elevations to act as low-grade sediment traps. Use of footers and large rock will act as grade control. Cross-vane shape acts to keep thalweg appropriately located. Sills act to prevent down-cutting of floodplains and terraces with subsequent lateral migration of the stream.

General Description: Expected increases in stream peak flows and sediment bedload threatens to cause down-cutting on two streams and aggradation and lateral incision on one stream. Values at risk include a Forest road along one stream with multiple stream crossings and one crossing on each of the other two streams. Habitat for one Bonneville cutthroat trout remnant population will be affected, and two streams that are in the process of being restored to Bonneville cutthroat trout. This treatment includes the installation of 8 cross-vane structures with sills to help trap and store excess sediment, act as grade controls to prevent down-cutting, and maintain thalweg location to prevent lateral stream migration that would lead to further erosion, bank mass wasting and debris flows. These measures will also reduce the risk to human safety along transportation systems, and reduce the risk of losses to trail infrastructure. The Utah Division of Wildlife Resources is proposing to install 20 cross-vanes in addition to the 8 proposed by the USFS with the intent to protect Bonneville Cutthroat Trout habitat. The Forest would coordinate with the Division on locations and implementation.

Location (Suitable) Sites: About half of the structures would be located in the North Fork of North Creek watershed along Forest Road 591 and the other half would be located along Shingle Creek, Fish Creek, and other portions of the Clear Creek watershed along approximately 4 miles on North Fork of North Creek, 1.5 miles of Shingle Creek, and 1.5 miles of Fish Creek.

Interim request #3 – Additional grade control structures are proposed in the North Fork of North Creek, Shingle Creek and Little Sevier Creek drainages to prevent channel incising, lateral migration of the channel, and propagation of head cuts all of which are threatening the existing road systems. Some damage has already occurred. Local BAER team members expert opinion on the structures potential indicate a strong likelihood of success to protect roads based upon the structures that were installed previously in the fire area in the Interim 2 request.

BAER team has identified need for 18 additional grade control structures for the drainages listed above. 18 ea @ \$3,000 = \$54,000

Channel Treatment Effectiveness Monitoring 3rd Year PROPOSAL (15 Oct 2012)

Justification: Forest fires can temporarily increase erosion rates in forested areas by 2-3 orders of magnitude. Much of the sediment produced from burned areas comes from increased erosion of ephemeral channels and swales. Channel treatments such as strawbale checkdams are designed to reduce in-channel erosion and downstream sediment delivery by capturing sediment and reducing bed scour, thus reducing the risk of blocked culverts and the deterioration of water quality downstream. Although channel treatments are commonly prescribed as part of BAER projects there is little quantitative information on their effectiveness. There is also a lack of information on how treatment effectiveness varies with the type, number, and location of treatments in a channel system, or environmental factors such as climate, soil type or geology. Improved knowledge of channel treatment effectiveness and the conditions under which they are most (and least) effective would improve BAER outcomes while also reducing overall project costs.

Objectives: To continue monitoring the effectiveness of strawbale checkdams for trapping sediment and reducing sediment yield from ephemeral channels within the area burned by the 2010 Twitchell Canyon Fire.

Method: Ten ephemeral channel catchments ranging in size from 0.5 to 4.5 acres and burned in high severity were paired, treating one catchment with straw bale check dams and leaving its pair untreated as a control, for a

total of five paired catchments. Six tipping bucket rain gauges recording rain event duration, intensity, and magnitude were installed on 10 June 2011 and have continuous data.

Eroded bedload sediment yields produced from high intensity rain events will be captured at the outlets of catchments using sediment retention structures made with wood frames covered in sediment fence fabric. Sediment retention structures define catchment areas, which are set roughly equal in a catchment pair. In treated catchments, retention structures are installed far enough below straw bale check dams to not affect check dam function. Sediment yields captured by retention structures will be measured by weighing buckets or by surveying the deposit pre- and post-event, extracting a volume, and converting the volume to mass with bulk densities samples taken from the deposit. Hillslope erosion rates will be measured with one hillslope fence in each catchment for a total of ten, and randomly assigning an upslope fence and a slope length fence within a pair. Catchment area of upslope fences ranged from 420 to 700 ft², averaging 538 ft², and the catchment area of slope length fences ranged from 452 to 2200 ft² and averaged 1400 ft². If funded, monitoring will continue during the 2012 field season. Monitoring will be conducted jointly by Rocky Mountain Research Station, University of Montana and Fishlake National Forest.

Analysis Methods: The effectiveness of the strawbale checkdams will be assessed on an individual basis, based on the total mass of sediment retained by the structure and its effect on channel scour, and at the swale/ephemeral stream scale based upon the difference between the normalized sediment yields in the paired treated and control swales/ephemeral streams. A multivariate analysis will be used to assess the effectiveness of individual structures as a function of upstream drainage area, channel slope, and runoff rate (on a per storm basis). An analysis of variance will be used to assess the effectiveness of the treatments at the swale/ephemeral stream scale.

Outcome and Products: A final report will be prepared detailing the results to date of the study at the end of the three year study. Improved guidelines for checkdam installation, checkdam location and the design storm that can effectively be mitigated will be discussed.

Expected Results: The effectiveness of individual checkdam structures will vary with storm size, drainage area, and local slope, and will generally decrease with larger storms, larger upstream drainage area and steeper channels. Under some circumstances, such as a large storm event, structural failure of the checkdams may occur. Effectiveness of treatments will depend largely on the performance of individual structures. Numerous events in 2012 occurred with large amount of sediment. We anticipate less sediment moving in the summer of 2013.

Budget FY 2013:

Salary

Hydrologist GS-11	8 days @ \$287/day	\$2,296
Field technician GS-5	30 days @ \$144/day	\$4,320
Data entry/analysis writing		
Graduate student	60 days @ \$154/day	\$9,240
Laboratory Technician GS-4	25 days @ \$128/day	\$3,200

Supplies

Replacement rain gauges, silt fence fabric, misc.		\$800
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Travel

Airline/vehicle rental	12 person-trips x \$820 trip	\$9,840
Per diem and housing (routine maintenance)	3 trips x 5 days x 2 people @ \$123/day	\$3,690
Per diem and housing (clean out)	4 trips x 4 days x 6 people @ \$123/day	\$11,808

Total 3rd Year Monitoring Cost		\$45,194
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ROAD AND TRAIL TREATMENTS

(ROAD STABILIZATION)

HARDENED CROSSINGS

Purpose of Treatment: Direct the drainage flows across the road in a single area and prevent water from running parallel to the road which would increase the chances of the road washing out for a further distance.

General Description: The armor consisting of riprap is placed where runoff could possibly cause erosion to the road surface and fill-slope.

Location (Suitable) Sites: North Fork of North Creek, Indian Creek, Shingle Creek, Mill Creek, and Sevier Canyon.

HARDENED / LOW WATER CROSSINGS

Purpose of Treatment: Concrete low water crossings are proposed in order to prevent complete wash-outs of several roads. The roads without these improvements will likely become impossible to navigate following post fire runoff. These locations will likely need much more expensive repairs to keep the road in a functional condition following the anticipated additional post fire runoff events. These crossings will also provide grade control to the creek. Without grade control, the flow-line of the stream will likely drop throughout the entire length of the stream corridor. These improvements will also aid in the protection of the sensitive Bonneville Cutthroat Trout in the stream from burned-area runoff.

General Description: Install 3 concrete hardened low water crossings in the North Fork of North Creek. Concrete crossings are installed as a solid apron to direct flows across road in one location. Aprons are designed to catch and direct flow back into the channel.

Location: North Fork of North Creek.

SEDIMENT BASINS

Purpose of Treatment: To catch increased sediment that will be carried by the storm runoff that will plug culverts and potentially cause blowout of road infrastructure. Prior to the runoff reaching the inlet of a culvert, the sediment basin will allow the velocity of the flow to drop, as will the flow's sediment load into the basin. The much cleaner flow of water that reaches the pipe will have a much smaller possibility of plugging up the culvert. The sediment basin will also protect downstream waterways by capturing transported sediment and

debris.

General Description: Basins constructed in flatter topography within drainages where runoff can be directed through the basin to deposit sediment. Sediment basins constructed under the initial request funding proved successful with certain caveats, after large rain events some of the basins failed. Lessons learned in design and construction will enable crews to armor basins appropriately and construct spillways capable of redirecting flows after sediment has been trapped. Observations show that even though some did fail a significant amount of sediment was trapped and remained in the basin.

Location (Suitable) Sites: Reconstruct basins in Sevier Canyon, Shingle Creek and Mud Flat areas. Construct new basins in Indian Creek, Mill Creek, and North Fork of North Creek. 8 basins @ 2,200.00 each= \$17,600

*Basins in Sevier Canyon, Shingle Creek, and Mud Flat areas were funded through initial request

DITCH CONSTRUCTION / RECONSTRUCTION

Purpose of Treatment: Construct or repair/clean ditches along roads to direct runoff and flows off of road surface to the channel thereby protecting the road prism.

General Description: In some locations the existing drainage ditch is inadequate for the anticipated runoff flows. In others there is no drainage ditch and one will be necessary to carry the expected drainage flows. Still, in others, they have filled up with debris and sediment since the last storm that occurred since the fire took place. Excavator time will be necessary to make sure that ditches are available and adequate for the anticipated runoff that will occur with storm events.

Location (Suitable) Sites: North fork of North Creek, Shingle Creek, and Sevier Canyon.

*Funded through initial request

Interim #3 request 25 days of excavator work to construct/reconstruct ditches in Indian Creek, North Fork of North Creek, Sevier Canyon, and Mud Flat areas to stabilize roads alleviating the threat from future damage. 25 days @ \$1,350 = \$33,750. Additionally the engineers have identified the need for a French Drain in the Indian Creek drainage to protect the road prism 1 ea @ \$5,000.

CATTLEGUARD CLEANING

Purpose of Treatment: Clean out silted in cattleguard to prevent further erosion that would cause the cattle guard and road prism to fail.

General Description: One cattleguard within the burn perimeter has become silted in and needs to be cleaned out for the safety of the travelling public and to maintain the cattleguards functionality.

Location (Suitable) Sites: Sevier Canyon

CULVERTS

Purpose of Treatment: Cleaning culvert pipes and replacing the missing and damaged lids over the drop inlets will enable the drainage system to convey design flows and will reduce the chance of plugging. This will avoid the expensive possibility of long lengths of road washouts and keep the roads safe to drive by keeping water off the road. In some locations where traffic counts are higher and the road is of a higher standard, hardened drainage crossings are not feasible or the best solution. If the culverts are not replaced or existing culverts

upsized, probability of road failure is high and the magnitude of losses could be substantial, since flows often find the edge of road and wash out long portions of the road itself.

General Description: Cleaning includes the cleanout of catch basin culvert inlets, outlets, and the drop inlets. Replacement of existing culverts with larger culverts is the best solution in cases where existing culverts are too small. On higher traveled roads, culverts provide a cost effective way to maintain traffic flow while also passing the drainage flows.

Location (Suitable) Sites: Culvert cleaning will occur within all drainages of the fire along associated roads. Culvert replacement is being recommended for Indian Creek, Mill Creek, Sevier Canyon, and Shingle Creek.

*Funded through initial request

Interim #3 request includes cleaning of existing culverts in Indian Creek, Mud Flat, Mill Creek, and North Fork of North Creek. 2 new 24" culverts are proposed for Sevier Canyon and North Fork of North Creek. Cleaning 36 ea @ \$250 = \$9,000. New culverts 200 lineal feet @ \$55/ft = \$11,000.

ROAD FILL MATERIAL

Purpose of Treatment: In some cases the road needs to be built up so that the adjacent stream will not wash out long lengths of the road. Without this treatment, the probability of this occurring is high and the cost of repair of such an event is equally high.

General Description: Bring in road fill material to build up road.

Location (Suitable) Sites: Indian Creek, Mill Creek, and Sevier Canyon have been identified as areas needing additional road fill material.

ROAD RECONDITIONING / GRADER AND DOZER

Purpose of Treatment: Several roads are located immediately downhill from burned-areas. Runoff from these areas will directly impact the road for continuous entire longitudinal lengths. Treatment will ensure drainage flow is directed to the nearest drainage structure as necessary so that the flow will sheet off of the road efficiently. This will prevent the the predictable higher flows off of burned-areas from washing out large areas of roads which will be much more costly to repair in the future if that happens.

General Description: Grader reconditioning will remove wheel ruts, re-establish the appropriate cross-slope or out-slope, and install rolling drainage dips where necessary. In those areas where terrain dictates the need for a dozer in lieu of a grader the equipment will be applied as appropriate.

Location: North Creek, Mill Creek, Shingle Creek, Sevier Canyon, and Indian Creek.

*Grader work funded through initial request

Interim #3 request. Road reconditioning would be performed to provide safety for FS personnel accessing areas in the burn to complete and continue with stabilization treatments. Roads would be reconditioned to the minimum degree necessary to provide a safe access route for personnel and equipment and would not be improved beyond existing road classification standards. XXX miles of road reconditioning are proposed to access treatment areas. 8 miles of road in Indian Creek and North Fork of North Creek are in need of reconditioning. This treatment would be necessary to access both drainages for culvert installation and debris basin construction/reconstruction. 8 miles @ \$2,500/mile = \$20,000. Please see attached map showing the road distances to access BAER culvert treatments.

(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.

General Description: Install drainage structures to prevent erosion, mass wasting and debris flows that are predicted to occur following the burn. These measures would also address the risk to human safety, risk of loss of trail infrastructure.

Location (Suitable) Sites: Locate drainage structures along 16.4 miles trails within the Twitchell Canyon fire perimeter. These include: FS trails 048, 049, 050, 054, 058, 202, 203, 208, 211, 281, and 3085.

TRAILHEAD BARRIER RECONSTRUCTION AND HAZARD TREE REMOVAL

Purpose of Treatment: The fire burned through the recreation area around Manderfield Reservoir resulting in the mortality of over 25 % of the trees in and around the reservoir. A dead tree is considered a hazard tree in a high use area setting. Falling and removal of these trees will prevent further damage to improvements (undamaged by the fire) and also prevent unnecessary injury to the public or their property. Replace the post and pole fencing associated with trailheads will restrict use of the trail system and maintain the use rating of the trails.

General Description: The fire burned through the Manderfield Reservoir day use recreational area, and 8 trailheads, leaving several hazard trees. The treatment is to fall and remove the hazard trees in the day use area and contour fall the hazard trees at trailheads.

Location (Suitable) Sites: Dispersed recreation area around Manderfield Reservoir and 8 trailhead entry points around the fire perimeter.

Design / Construction Specifications: Fall and/or remove all hazard trees which have the potential of striking any Improvement, trailhead sign, or bridges when they fall. Replace the post and pole barriers at trailheads with materials that meet Forest design standards in the same location or a location that is effective in maintaining trail use specifications.

TRAIL HAZARD SIGNS

Purpose of Treatment: The purpose of Burned-Area Warning Signs is to inform the public land users about the potential hazardous conditions associated with the fire.

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 specifying of items to be aware of when entering a burn area such as falling trees and limbs, rolling rocks, and flash floods.

Location (Suitable) Sites: Burned Area Signs - These signs shall be installed at all entries into the fire perimeter. The location of these signs shall be along roads and trails. The field perimeter map shall be used to identify those roads and trails that enter into the fire burn area.

PROTECTION AND SAFETY MEASURES

FOREST ENTRY GATES

Purpose of Treatment: These gates are needed at several locations to prevent traveling public from entering the burned area when it is not safe to do so. The gates will be closed and locked as deemed prudent by FS personnel to protect the public from increased unnecessary risk.

General Description: 8 gates are to be installed at various access points around the fire perimeter.

Location (Suitable) Sites: FS Roads 471, 591, 119, 114, 115, 116, and 1131.

*Partially funded through initial request

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. All signs will be placed facing the direction of travel entering the burn area. Other signs will also be placed within the burn perimeter at key locations.

OBJECT MARKER SIGNS

Purpose of Treatment: The purpose of the signs is to warn the public of potential hazards associated with structures and stream crossings along roadways.

General Description: This treatment is for the installation object marker signs. Signs are placed on structural improvements and at stream crossings and are so marked to protect the public and prevent damage to the structures and identify stream crossing areas.

Location (Suitable) Sites: These signs shall be installed on existing and new structural features and at stream crossings along the road in the Indian Creek drainage.

28 ea @ \$225 = \$6,300

Part VI – Emergency Stabilization Treatments and Source of Funds Interim Request # 5

A. Land Treatments									
Aerial Mulching	Acres	\$832	4158	\$3,459,456	\$0		\$0	\$0	\$3,459,456
Straw Wattles-Mandersfield Res Water Quality	Lin/Ft	\$3	2000	\$0	\$0		\$0	\$0	\$0
Implementation Crew for straw wattles	Each	\$5,000	3	\$0	\$0		\$0	\$0	\$0
Initial RF Approval Seeding-Sterile Hybrid only	Acres	\$112	1234	\$138,270			\$0	\$0	\$138,270
Seeding-Mod to High burn severity	Acres	\$87	10844	\$939,090	\$0		\$0	\$0	\$939,090
Weed Detection Rapid Response - 1 supervisor 3 crew	Days	\$805	15	\$12,080					\$12,080
Initial RF Approval Seeding Mod-High Burn Severity		\$87	2721	\$236,727					\$236,727
Subtotal Land Treatments				\$4,785,623	\$0		\$0	\$0	\$4,785,623
B. Channel Treatments									
Grade Structures - N Fk N Ck/Shingle Ck/Little Sevier Cree	Each	3000	18	\$54,000					\$54,000
Grade Structures - N Fk N Ck/Shingle Ck/Mud Flat	Each	\$3,000	12	\$36,000	\$0		\$0	0	\$36,000
Grade Structures - N.Fk N.Ck Fish Creek Clear Creek DW	Each	\$0	0	\$0	\$0		\$0	18	\$54,000
Subtotal Channel Treat.				\$90,000	\$0		\$0	\$54,000	\$144,000
C. Road and Trails									
Riprap 45 cu/yds	cu/yds	150	45	\$6,750					\$6,750
Sediment Basin reconstruction and new construction (8)	Each	2200	8	\$17,600					\$17,600
24" culverts Sevier Cyn and North Fork of North Creek	feet	55	200	\$11,000					\$11,000
Cleaning of Culverts	Each	250	36	\$9,000					\$9,000
French Drain at Indian Creek	Each	5000	1	\$5,000					\$5,000
Recondition Road – Grader in N. Fork N. Cr and Indian Cr	miles	2500	8	\$20,000					\$20,000
Ditch construction/reconditioning – Indian Cr., N. Fork, Sev	Days	1350	25	\$33,750					\$33,750
Trail Treatments	Miles	\$2,391	16.4	\$39,210	\$0		\$0	\$0	\$39,210
Road Treatments - Hardened Crossings	Each	\$7,432	33	\$245,250	\$0		\$0	\$0	\$245,250
Road Treatments - clean cattle guard replace cg base	Each	\$409	16	\$6,545	\$0		\$0	\$0	\$6,545
Trailhead Hazard Tree Removal and Barrier replacement	Each	\$978	8	\$7,826	\$0		\$0	\$0	\$7,826
Initial RF Approval Road Treatments-Culvert cleaning(15)	Each	\$1,643	21	\$34,500			\$0	\$0	\$34,500
Initial F Approval Road Reconditioning-Grader work	Miles	\$2,750	14	\$38,500			\$0	\$0	\$38,500
Road Reconditioning-Dozer	Days	\$990	39.5	\$39,105	\$0		\$0	\$0	\$39,105
Road Treatments-Import Roadmix	Cu.Yds	\$75	1250	\$93,750	\$0		\$0	\$0	\$93,750
Road Treatments-Install Gravel	Tons	\$30	4300	\$0	\$0		\$0	\$0	\$0
Initial RF Approval Road Treatment Sediment Basins Shin	Each	\$2,000	10	\$20,000			\$0	\$0	\$20,000
Initial RF Approval Road Treatment-Ditch Construction/Re	Days	\$1,485	6.5	\$9,653			\$0	\$0	\$9,653
Road Treatment-Hardened Crossing Low Water	Each	\$30,000	5	\$0					\$0
Subtotal Road & Trails				\$637,439	\$0		\$0	\$0	\$637,439
D. Protection/Safety									
Object Marker Signs (28) Indian Creek	Each	225	28	\$6,300					\$6,300
Road Hazard Signs	Each	\$625	16	\$10,000	\$0		\$0	\$0	\$10,000
Initial RF Approval Road Hazard Signs	Each	\$625	10	\$6,250					\$6,250
Trail Hazard Signs	Each	\$450	13	\$5,850	\$0		\$0	\$0	\$5,850
Mine Adit Closure	Each	\$2,043	3	\$6,128	\$0		\$0	\$0	\$6,128
Road Gate Large	Each	\$4,400	3	\$13,200	\$0		\$0	\$0	\$13,200
Initial RF Approval Road Gate Large	Each	\$4,400	3	\$13,200					\$13,200
Road Gate Small	Each	\$2,750	1	\$2,750	\$0		\$0	\$0	\$2,750
Initial RF Approval Road Gate Small	Each	\$2,750	1	\$2,750					\$2,750
Road Gate - Replace	Each	\$5,225	1	\$5,225	\$0		\$0	\$0	\$5,225
Subtotal Structures				\$71,653	\$0		\$0	\$0	\$71,653
E. BAER Evaluation									
Assessment Team	Report		1		\$112,500		\$0	\$0	\$112,500
BAER Team Supplies	Each	\$1,500	1		\$1,500		\$0	\$0	\$1,500
Helicopter FT BAER Recon	Days	\$7,500	2		\$15,000		\$0	\$0	\$15,000
BAER Report Printing	Each	\$2,500	1		\$2,500		\$0	\$0	\$2,500
Subtotal Evaluation					\$131,500		\$0	\$0	\$131,500
F. Monitoring									
Effectiveness Monitoring	Days	\$375	15	\$5,625	\$0		\$0	\$0	\$5,625
Effectiveness Monitoring-Helo FT	Hours	\$1,000	6	\$6,000	\$0		\$0	\$0	\$6,000
Document Preparation	Days	\$375	10	\$3,750	\$0		\$0	\$0	\$3,750
RMRS Monitoring FY 11	Job	\$35,430	1	\$35,430			\$0	\$0	\$35,430
RMRS Monitoring FY 12	Job	\$45,194	1	\$45,194			\$0	\$0	\$45,194
RMRS Monitoring FY 13	Job	\$45,194	1	\$45,194			\$0	\$0	\$45,194
Storm Patrol	Days	\$200	7	\$1,400			\$0	\$0	\$1,400
Subtotal Monitoring				\$142,593	\$0		\$0	\$0	\$142,593
G. Totals All Years									
Previously approved FY 11				\$5,473,521					
Previously approved FY 12				\$45,194					
Balance of Approved FY 13 funds				\$0					
Total for this FY 13 request				\$45,194					

\$45, 194 for BAER Monitoring by Pete Robichaud.

PART VII - APPROVALS

1. /s/ Allen Rowley
Forest Supervisor (signature)

12/4/12
Date

2. _____
Regional Forester (signature)

Date

BAER PROJECT LOCATION EXHIBIT

