

Date of Report: 7-31-2012

RF Initial Approval July 24, 2012

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: Shingle Fire****B. Fire Number: UT-DIF-120299****C. State: Utah****D. County: Kane****E. Region: 04 - Intermountain****F. Forest: 07 - Dixie****G. District: 02 - Cedar City****H. Fire Incident Job Code: P4G0D2 (0407)****I. Date Fire Started: July 1, 2012****J. Date Fire Contained: July 10, 2012****K. Suppression Cost: \$8,800,000 (est.)****L. Fire Suppression Damages Repaired with Suppression Funds**

1. Fireline waterbarred (miles): **10.7 miles total (9 miles dozer line and 1.7 miles hand line)**
2. Fireline seeded (miles): **9 miles of dozer line seeded**
3. Other (identify):

M. Watershed Number(s): (6th level hydrologic units, percent of watershed acres within fire perimeter):

HU Number	HU Name	% in Fire
160300010104	Swains Creek	18%
150100080201	Headwaters East Fork Virgin River	82%

N. Total Acres Burned: 8,062NFS Acres (7,596) Private (466)

O. Vegetation Types:

Vegetation Group	Acres
Mountain Brush/Pinyon Juniper	84
Mixed Conifer	1,646
Ponderosa Pine	5,052
Grass-Forb	71
Rock/Limber Pine, Bristlecone Pine	607
Gambel Oak	602

P. Dominant Soils: The soils are typically 10 to 60 inches deep to bedrock with gravelly to very gravelly silt loam and loam surface textures formed from Claron formation. From the Virgin River Rim (82% of the fire) numerous “Pink Cliffs” of geologic material are present and are highly erosive; the upper areas (7,000 feet and above with favorable aspects) supported mixed conifer and Ponderosa pine stands that are very susceptible to erosional loss.

Q. Geologic Types: The soils within the Shingle fire were formed from the Claron formation. This formation is nationally known for the scenic erosive landscape that is found within Bryce Canyon National Park and Cedar Breaks National Monument.

R. Miles of Stream Channels by Order or Class: **Perennial: 1 miles** **Intermittent: 31.9 miles**

S. Transportation System: **Trails: 2.8 miles** **Roads: 40.1 miles**

PART III - WATERSHED CONDITION

Burn Severity (acres): **4,228** (unburned & low) **2,809** (moderate) **1,025** (high)

Burn severity for example microsheds with potential BAER concerns

Microsheds	Severity (acres and percent within Hydrologic Unit)			
	High	Moderate	Low/Unburned	Total
Dairy Canyon	137 (5%)	1,097 (42%)	1,409 (53%)	2,643
Stout Canyon	771 (23%)	1,186 (36%)	1,274 (41%)	3,231

B. Water-Repellent Soil (acres): **308 (approximately 30% of the high severity burned areas)**

C. Soil Erosion Hazard Rating (acres):
251 (low) **3,537** (moderate) **4,274** (high)

D. Erosion Potential: **7.7** average ton/acre (4.5 to 11.4 tons/acre first year erosion rate - ERMIT)

E. Sediment Potential: **4,900** tons / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): **5 to 10**

B. Design Chance of Success, (percent): **60-70% (ag straw mulch)**

C. Equivalent Design Recurrence Interval, (years): **2 and 5 year events**

D. Design Storm Duration, (hours):

15 minute and 24 hour

E. Design Storm Magnitude, (inches):

- **15 minute 2 yr event - 0.37**
- **15 minute 5 yr event - 0.52**
- **24 hour 2 yr event – 1.68**
- **24 hour 5 yr event – 2.10**

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

24 hour/5 year event
Dairy Canyon – 83.51
Stout Canyon – 53.43

G. Estimated Reduction in Infiltration, (percent):

40%

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

see table

Microsheds (time/year storm)	Design Flow (cfs per square mile)	
	Pre-fire	Post-fire
Dairy Canyon (15 minute/2 year)	104.22	104.22
Dairy Canyon (15 minute/5 year)	198.93	199.96
Dairy Canyon (24 hour/2 year)	163.34	239.84
Dairy Canyon (24 hour/5 year)	225.83	375.81
Stout Canyon (15 minute/2 year)	68.89	68.89
Stout Canyon (15 minute/5 year)	132.47	133.76
Stout Canyon (24 hour/2 year)	169.33	286.33
Stout Canyon (24 hour/5 year)	242.52	471.84

PART V - SUMMARY OF ANALYSIS

Background: On July 1, 2012 a “human-caused” ignition occurred in the early afternoon near Shingle Mill Canyon below the Swains Creek subdivision inholding of the Dixie National Forest, approximately 6 air miles southeast of Duck Creek Village, Utah. Very low RH values (8-10%) coupled with high temperatures (85 degrees) and strong southwest winds caused long-range spotting to occur. Within 48 hours fire growth went to approximately 8,000 acres. The fire was 100% contained on July 10, 2012. The final acreage of the fire was 8,062 acres on the Dixie National Forest and private land.

A. Describe Critical Values/Resources and Threats:

Summary of Issues:

Human Life and Safety

- Probability of Damage or Loss – Likely Occurrence (>50% to <90%)
- Magnitude of Consequences – Moderate (injury to humans possible)
- Risk – High

The Shingle fire caused high and moderate severity burns in headwater streams and midslope areas that drain directly to the Dairy Canyon/Stout Canyon developments. These steep confined channels are likely to concentrate increased flows and debris flows into homes threatening human safety and property damage. Homes, recreational ponds and a water system are present within the direct drainage of this fire. Additional potential of high to extreme flooding is predicted below this fire perimeter due the steepness and erosivity of the Claron formation found within the watersheds directly above the human life and safety critical values.

Property (Road and Trail Prisms)

- Probability of Damage or Loss – Very Likely Occurrence (>90%) for damage to road and trail prisms.
- Magnitude of Consequences – Moderate
- Risk – Very High

The primary property concerns are with Forest Road 062 and 063 (maintenance level 3 roads). These primary travel routes to forest inholdings do not have the proper drainage to handle the anticipated increase in runoff. Culverts and drainage structures sited along these routes are at risk of damage from floods, erosion, sediment, debris, and debris flows generated from within the burned area. Some homes and the road system near Dairy/Stout Canyon may also be subject to flooding due to increased peak flows and debris flows that may block the channel. Flooding along these canyon streams may result in road washouts closing access in and out of the NF as well as seasonal and permanent residences. Several homes near Dairy Canyon and Stout Canyon are built within a few feet of the channel increasing the risk of flooding.

A motorized trail within Dairy Canyon is at very high risk within and below the burned area. This trail may have increased surface post fire runoff due to loss of surface ground cover burned during the fire and water repellent soils. The increased runoff may cause severe erosion and mass failures impacting trails, water quality, and aquatic habitat downslope. The Dairy Canyon motorized ATV trail within the fire perimeter parallels and crosses the streams at multiple locations, increasing the risk of damage and sediment delivery at crossings.

Natural Resources – Agricultural and Municipal Water Supply

- Probability of Damage or Loss – Likely Occurrence (>50 to <90%)
- Magnitude of Consequences – Moderate
- Risk – High

There is a high risk of flood flows downstream of Dairy Canyon. These flows have a high risk of damaging is expected to inundate and damage a domestic water supply source and agricultural water storage ponds at the base of the canyon directly downstream from the burn scar. The threat for high and flashy peak flow will persist over several years until vegetative recovery conditions can assist in moderating high flow potentials.

Natural Resources – Soil Productivity and Hydrologic Function

- Probability of Damage or Loss – Very Likely Occurrence (>90%)
- Magnitude of Consequences – Major
- Risk – Very High

This fire created a moderate and high severity burn within two HUC8 watersheds (Dairy and Stout Canyon) with 47% to 59% complete canopy removal. An additional 20% of these micro-sheds have existing Claron formation outcrops that do not support vegetative growth. These affects are very similar to the Bridge fire that burned in 2009 and caused extensive gully and rill erosion from late summer thunderstorms. Debris flows from these events caused deep gully erosion along drainage's and within roads prisms that concentrated flow. A field review from Intermountain Region hydrology staff in May 2012 highlighted our concerns with fire effects to soils formed in Claron formation and there inherent soil instability.

Hydrologic Function – The threat of erosion has increased over much of the fire. Trails and roads are likely to be impacted by higher hillslope runoff and debris flows, scouring treads and increasing sedimentation to streams. This increased sediment and ash will affect water quality in streams directly below the fire and in Dairy Canyon Creek, Stout Canyon Creek and further downstream into the Virgin River. There is a domestic water source in Dairy Canyon that could be impacted during flood events.

Soil Productivity – In high and moderate soil burn severity areas the fire completely consumed the vegetation canopy and the effective ground cover that dissipates rainfall and regulates snowmelt runoff. Even with average precipitation, erosion rates will be accelerated in combination with higher surface runoff efficiencies. A 2- or 5-

year rainstorm event occurring during the first two years following the fire will greatly increase the potential for loss of topsoil, including the ash from the burned plant litter and duff that also replenish the soil nutrient pool, and soil productivity of these sites. The potential soil loss due to snowmelt and thunderstorm runoff jeopardizes the natural vegetation recovery.

Natural recovery rates of ground cover to protect the soil surface in high and moderate soil burn severity areas will vary across the burned area. The forest cover types that burned as mod-high burn severity will likely take up to 10 or more years to establish pre-fire ground cover. Lack of ground cover and litter can contribute to chronic erosion and perpetual hillslope instability.

Natural Resources – Critical or Suitable Occupied Habitat for Federally Listed T&E

- Probability of Damage or Loss – Likely Occurrence (>50 to <90%)
- Magnitude of Consequences – Moderate
- Risk – High

During field reconnaissance the potential risk to federally listed species habitat was evaluated. It was determined through field reviews suitable occupied habitat for federally listed threatened or endangered terrestrial species on or in close proximity to the burned area is at risk as a result of the Shingle Fire. Mexican Spotted Owl (MSO) and California condor are federally listed species.

For the MSO the fire burned a high amount of prey species habitat. The magnitude of this loss is high due to the intensity of this fire and the total number of acres burned in these canyons. Dairy and Stout canyons provide quality travel corridors for dispersing adult and juvenile MSO. MSO have been documented leaving Zion National Park and traveling through the Dixie National Forest. These canyons are relatively narrow and steep and had high quality MSO prey species habitat prior to the fire. There have been documented records of vocalization in this area and along the rim above Zion National Park. While most of the habitat for MSO primary prey species (desert wood rat) was impacted from the Shingle fire in these canyons, habitat still exists and can be improved with seeding as well as both leaving of standing dead. This impact is assessed as a likely loss or damage of habitat as a result of this fire with a high degree of magnitude since birds have been known to use the area and suitable prey species habitat existed and some still exists.

For the Condor the probability of damage of these critical values is high due to the lack of suitable habitat for prey species. The magnitude of this loss is high due to the intensity of this fire and the total number of acres burned near rim habitat. Dairy and Stout canyons provide quality rim habitat used by condors as foraging and roosting. Condors have been documented in this area on lands administered by the Dixie National Forest on a frequent basis since the original re-introduction. Weekly radio collared condors are documented in this area by Peregrine Fund biologists.

Two other important aquatic species that are being managed under conservation agreements are the Virgin spinedace and flannelmouth sucker populations that are approximately 33 miles (53km) downstream from where Stout Canyon enters the East Fork Virgin River. This is within the distance where major reductions have been seen to fish populations during large sediment transport event following wildfires. The probability of losing these fisheries is possible and the magnitude of the consequences would be major given that these two species are managed under Conservation Agreements to alleviate threats that would warrant listing them under the Endangered Species Act of 1973; therefore the overall risk is high.

Natural Resources – Naturalized Plant Community

- Probability of Damage or Loss – Possible Occurrence (10-50%)
- Magnitude of Consequences – Minor to Moderate
- Risk – Low to Intermediate

Invasive and noxious weed monitoring is needed in this area and should be conducted with allotment management inspection. Treatments could be warranted if invasive and noxious weed concerns are discovered.

Currently no known noxious weed locations are found within the Shingle fire perimeter and ICP location.

Cultural and Heritage Resources

- Probability of Damage or Loss – Unlikely Occurrence (<10%)
- Magnitude of Consequences – Minor
- Risk – Very Low

No known sites are within the fire perimeter or immediately downstream of the burned area.

B. Emergency Treatment Objectives:

The goal of the burned area emergency response is to:

- Reduce threats of runoff and erosion to NFS BAER values and downstream values.
- Mulch and vegetation treatments are intended to reduce anticipated soil loss.
- Minimize damage to system roads and trails within the Shingle fire boundary by cleaning existing or installing new drainage structures.
- Warn users of forest roads and trails of hazards present in the burned area.
- Identify appropriate monitoring activities that estimate the effectiveness of emergency stabilization treatments and identify necessary maintenance and continuation of other approved BAER activities.
- Improve prey species habitat on forest system lands for federally listed species; Mexican Spotted Owl and California Condor.

Objective:

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

Land **60-90** % Channel **90** % Roads/Trails **75** % Protection/Safety **60-90** %

D. Probability of Treatment Success - Short duration high intensity storm events of greater than a 5 yr event can overwhelm most hillslope treatments.

	Years after Treatment		
	1	3	5
Land (seeding)	60	70	75
Land (mulch)	75	80	80
Roads/Trails (drainage treatments)	90	90	90
Protection/Safety (road/trail warning signs)	90	90	90

E. Cost of No-Action (Including Loss): **\$13,935,000**

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

Value At Risk	Estimated Cost
Damage to Water Quality	\$3,800,000
Loss of Long-term Soil Productivity and Ecosystem Integrity from an increase in erosion.	\$6,000,000
Loss of Property	\$2,750,000
Loss of Forest Roads	\$975,000
Loss of Motorized Trail System	\$165,000
Loss of Irrigation and Water System	\$245,000
Total	\$13,935,000

F. Cost of Selected Alternative (Including Loss): \$5,848,179

Value At Risk	Estimated Cost
Damage to Water Quality, Soil Productivity, Loss of Property. <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 \$12,850,000 plus \$2,857,002 of the cost of the aerial mulching /seeding treatments. 	\$5,557,350
Loss of Forest Roads <ul style="list-style-type: none"> The road treatments are estimated to be 90% effective in protecting the forest roads. 10% failure rate of \$675,000 plus \$176,130 of the cost of the road treatments. 	\$243,630
Loss of Trail System <ul style="list-style-type: none"> The road treatments are estimated to be 80% effective in protecting the forest trails. 20% failure rate of \$165,000 plus \$14,199 of the cost of the trail treatments. 	\$47,199
Total	\$5,848,179

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: **Rich Jaros, Forest Soil and Water Program Manager**

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Team Members:

Rich Jaros, Soil and Water Program Manager, Dixie National Forest
 Chris Butler, Hydrologist, Dixie National Forest
 Kelsha Anderson, Hydrologist, Dixie National Forest
 Mike Golden, Fisheries Biologist, Dixie National Forest
 Marian Jacklin, Cultural Resources, Dixie National Forest
 Mark Madsen, Botanist, Dixie National Forest
 Jake Dodds, Engineering, Dixie National Forest
 Chad Horman, Range Program Manager, Dixie and Fishlake National Forest
 Pam Gilbert, Special Uses, Dixie National Forest
 Colby Peterson, Forestry/Silviculture, Dixie National Forest
 Patrick Moore, Forestry/Silviculture, Dixie National Forest
 Laurie Parry, Resource Information Manager (GIS), Dixie National Forest
 Matt Lee, GIS Technician, Dixie National Forest
 Jess Hancock, Motorized Trails Manager, Dixie National Forest
 Nick Glidden, Trails Program Manager, Dixie National Forest
 Nate Yorgason, Wildlife Biologist, Dixie National Forest
 Ron Rodriguez, Wildlife Program Manager, Dixie National Forest

H. Treatment Narrative:

Protection/Safety Treatments:

Road Hazard Signs

Purpose of Treatment: Ensure maximum visibility and readability of signs warning visitors of the hazards to human life and safety that exist in burned area. Signs are intended to emphasize the increased hazards from debris flows and flooding.

General Description: Install signs at key roads that enter or the burned area.

Location (Suitable) Sites:

- 1) 3 large (3 feet by 5 feet) hazard signs on the FR 061 and 062.
- 2) 7 large (2 feet by 2 feet) hazard signs on the FR 3485, 698, 685, 164, 4096, 063, 4109.

Design/Construction Specifications:

- 1) Road Signs: Reflectorized signs (3'x5' and 2' x 2') with letter size according to USFS Handbook specifications mounted on 4" x 4"x 8' posts at heights and distances mandated in USFS Handbook.

Trail Hazard Signs

Purpose of Treatment: Ensure maximum visibility and readability of signs warning visitors of the hazards to human life and safety that exist in burned area. Signs are intended to emphasize the increased hazards from falling burned trees, and potential for debris flows and flooding.

General Description: Install signs at all trailheads and junctions that enter or provide access to trails in the burned area. Install signs at all trailheads that enter or are within the burned area or provide access to trails within the burn.

Location (Suitable) Sites:

- 1) 2 signs in Dairy Canyon.

Design/Construction Specifications:

- 1) Trail Signs: Reflectorized signs 12"x18" trail signs, mounted on 4"x4"x8' posts at heights and distances mandated in USFS Handbook.

Land Treatments:

Aerial Mulching (Agricultural Straw)

Purpose of Treatment: This treatment is to reduce soil loss and protect water quality and infrastructure. In addition, this treatment will reduce risks to property located down-gradient of burned slopes by reducing the potential for erosion, sedimentation, and debris flow initiation. Mulching will 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 also helps to protect the seedbed and retains moisture on the burned slopes to facilitate quick vegetative recovery of the treatment areas. Mulching treatments in the headwaters of the streams would be anticipated to protect a much larger downstream area from cumulative runoff and sedimentation. Aerial mulching will also benefit the recovery of prey species habitat for Mexican Spotted Owl by providing additional forage, hiding cover and bedding habitat for small mammal species. Both moderate and high severity burn areas are recommended for mulching; this fire created a moderate and high severity burn within two HUC8 watersheds (Dairy and Stout Canyon) with 47% to 59% complete canopy removal. An additional 20% of these micro-sheds have existing Claron formation outcrops that do not support vegetative growth. This leaves these watersheds with 60 to 80% loss/lack of cover and coupled with highly erosive Claron formation geology; making these sites highly susceptible to irreversible soil and hydrologic function loss on national forest service system lands.

General Description: Agricultural straw mulch will be applied to the ground surface by helicopter (and spread with hand crews as necessary) in a continuous cover of uniform thickness to replace vegetative ground cover lost in the fire. The mulch treatments are most effective in reducing runoff from 5 year or less storm events. Agricultural erosional control mulch is preferred above Dairy/Stout Canyon. Field reviews with the BAER team indicated that agricultural straw is the best treatment because these sites above Dairy/Stout Canyon are lacking effective ground cover to minimize downslope runoff hazards and also to provide for critical moisture retention for vegetative recovery.

Location (Suitable) Sites: - Three treatment units totaling 2,231 acres have been identified for treatment. The selected sites have been identified based on the post-fire increased streamflow and potential to initiate and translate debris flows down stream to critical values at risk. Two sites are direct drainages

located directly above Dairy Canyon. The other site is in the upper basins of Stout Canyon. Refer to BAER Treatment Map for exact locations.

Design/Construction Specification(s):

Straw application rate - Agricultural strand erosional control mulch at a rate of 70% uniform cover of the surface area of any treatment unit. This is approximately 0.25 inches or 3 to 4 straw shafts deep but not to exceed 2 inches in depth. If aerial application does not achieve desired ground cover, hand crews will be necessary to distribute straw in each treatment unit. Use straw that conforms to Utah Department of Agriculture (UDAF) certified noxious weed free standards. Wheat straw which is required to be dry for application.

Seeding

Purpose of Treatment: To seed with grasses in high and moderate severity burn areas to lessen the risk to soil productivity, water quality and property within and downstream of the fire area.. The seeding will also increase the recovery of prey species habitat for Mexican Spotted Owl.

General Description: Aerially seed with grasses in conjunction with mulch treatments on 2,231 acres and on 450 acres of other areas to increase the success for soil stabilization, establish prey base habitat for federally listed species, and establish vegetation in high and moderate severity burn and to prevent additional soil productivity loss. The seeding applications are most effective beyond starting about nine months following the burn and into the first growing season. Success of seeding treatments is dependent upon favorable soil and climatic conditions during germination periods. Within the 450 acres of seeding that is not in conjunction with aerial mulching; low, moderate and high burn severity areas are proposed to be seeded to increase prey species habitat for critical suitable habitat associated with Mexican Spotted Owl.

One hundred acres of bitterbrush planting (with the Utah Division of Wildlife Resources) is being proposed within the 450 acres of seeding only to provide for emergency recovery associated critical value wildlife habitat. The bitterbrush seed will be funded by the UT-DWR.

Location (Suitable) Sites:

See attached BAER Treatment maps.

Design Specifications:

The seeding recommendations are for species that are sterile and/or native species in the area and have been proven to be aggressive and effective in quick establishment for soil stabilization and establishment of ground cover.

- Soft White Winter Wheat (Eltan) – 20 lbs. PLS/acre
- Mountain Brome (Bromar cultivar) - 5 lbs. PLS/acre
- Western Wheatgrass (Arriba cultivar) - 4 lbs. PLS/acre
- Blue Wildrye (Elkton cultivar) – 2 lbs. PLS/acre
- Bluebunch Wheatgrass (Secar cultivar) 2 lbs. PLS/acre
- Canby Bluegrass (Canbar cultivar) 1 lbs. PLS/acre

Approximately 56 seeds per square feet

Roads and Trails Treatments:

Road Drainage Maintenance

Purpose of Treatment: The purpose of these treatments is to increase culvert capacities, install water bars (rolling dips), catch basin clean-out and road side slope armoring (rip-rap) to accommodate increased water flows and associated bedload and debris, and restore road template drainage. The objectives for accommodating increased flows are to: 1) stabilize and protect the existing transportation facilities; 2) decrease the chances of washing road fill into adjacent streams; and 3) minimize road failure induced flooding that could impact human life and safety.

General Description: The emergency stabilization recommendations are as follows:

- 1) Multiple culvert placement.

- 2) 750 linear feet of rip-rap placement.
- 3) Catch Basin/Outlet Cleaning.
- 4) Multiple cross drains installation (rolling dips).

Location (Suitable) Sites: Forest Roads within or adjacent to the fire perimeter.

Design/Construction Specifications:

- 1) Survey, design, and contract administration by USFS.
- 2) Forest Service Specifications for Construction of Roads and Special Contract Provisions.

Trail Drainage Maintenance/Construction

Purpose of Treatment: The trail maintenance/construction is needed to provide for maximum effectiveness of water bars to efficiently route water and sediment from the trails, thereby preventing erosion of trail surface and minimizing impacts to water quality and additional sedimentation. Predicted increases in surface runoff/overland flow are expected to erode soils from the burned area and deliver sediment to adjacent streams. Trails within burn perimeter are excellent conveyors for routing significant volumes of sediment to nearby streams if drainage facilities are not adequate to process increased runoff. In addition, the increased flows can erode trail tread, delivering even greater amounts of sediment to nearby streams. Trail treatments will be conducted within low, moderate and high burn severity to address the cumulative flow impacts of runoff on this motorized trail and side drainage runoff impacts from moderate and high severity burn areas.

General Description: Trail maintenance/construction on Dairy Canyon near high and moderate severity burned areas to ensure increased runoff will not destroy trail tread and contribute sediment to streams impacting water quality and additional sedimentation.

Location (Suitable) Sites: Motorized trails within burn perimeter are likely to contribute significant volumes of sediment to stream system if drainage facilities are not adequate to increased runoff. Within the fire perimeter 2.8 miles of trail are in areas that will be affected by cumulative runoff from moderate and high severity burn areas.

I. Monitoring Narrative:

Vegetation recovery monitoring will integrate assessing the effectiveness of the emergency hillslope and channel stability treatments. The integrated monitoring will include methods and parameters that evaluate: seeding and mulch cover. A key element of the integrated monitoring is to evaluate if ground cover objectives are being met. Achieving the ground cover objectives should mitigate most, if not all of the short term hazards and concerns associated with the loss of vegetative cover in the burned area. The benefits of early (or rapid) revegetation and ground cover will: 1) reduce the impacts of “normal” and 2-year precipitation events on erosion and surface runoff/overland flow; 2) decrease the flood hazard and debris flow potential. Overall, the combined treatments of seeding and mulching are intended to address the hazards that put lives and property at risk, through the related advantage of maintaining soil productivity by keeping soil on site and establishing desirable vegetation for short and long term ecosystem sustainability.

A monitoring plan will incorporate metrics that address the objectives for each of the emergency hillslope treatments. The intent is to collect the essential information and avoid multiple visits to the treatment locations. While the underlying assumption for the integrated monitoring is the emergency stabilization treatments were correctly installed in the appropriate locations, maintenance needed to ensure the treatments continue to operate and function properly will also be documented.

All monitoring reporting cost was calculated at a GS-11 day rate of \$350 per day. All per day monitoring costs are addressed in Part VI table.

Aerial Seeding

Determine the percentage of seed establishment in areas seeded and compare with un-seeded areas.
Determine if additional seeding/treatment are necessary. The use of transects and fixed plots will be used to sample vegetation.

Aerial Mulching

The purpose of this monitoring is to determine if ground cover objectives for mitigating raindrop impact erosion and accelerated surface runoff are being met. The primary indicator is ground cover resulting from aerial application and condition of wood strand or agricultural straw mulch. At least 15 transects would be completed within each of the four treatment areas using a pace-step or point intersect methodology.

Motorized Trail Drainage Monitoring

The purpose of the monitoring is to identify maintenance and/or repairs necessary for ensuring effectiveness of the trail drainage maintenance and water bar construction in meeting objectives of minimizing damage to the trail resource and reducing sediment delivery to adjacent streams.
Trail/recreation personnel will survey the trails located within the high or moderate burn severity areas, and specific trail segments where new water bars were constructed after spring snow-melt. Monitoring will evaluate trail tread erosion and efficiency of water bars to route surface flows from trails into areas where sediment is not delivered to nearby streams.

Line Items	Units	Unit Cost	NFS Lands		Other \$	Other Lands			All Total \$
			# of Units	BAER \$		# of units	Fed \$	# of Units Non Fed \$	
A. Land Treatments									
Aerial Mulch	Acres	906	2231	\$2,021,000	\$0		\$0	\$0	\$2,021,000
Aerial Seed	Acres	112	2670	\$300,000	\$0		\$0	\$0	\$300,000
Bitterbrush Seeding	Acres	65	0	\$0	\$0		\$0	100 \$6,500	\$6,500
<i>Subtotal Land Treatments</i>				\$2,321,000	\$0		\$0	\$6,500	\$2,327,500
B. Channel Treatments									
<i>Insert new items above this line!</i>				\$0	\$0		\$0	\$0	\$0
<i>Subtotal Channel Treat.</i>				\$0	\$0		\$0	\$0	\$0
C. Road and Trails									
Culvert Replacements	LF	124	1000	\$124,000	\$0		\$0	\$0	\$124,000
Rip-Rap	LF	89	450	\$40,050	\$0		\$0	\$0	\$40,050
Clean Intakes/Outlets	Each Site	78	35	\$2,730	\$0		\$0	\$0	\$2,730
Rolling Dips/Road Drainage	Miles	425	22	\$9,350	\$0		\$0	\$0	\$9,350
Motorized Trail Drainage	Miles	5071	2.8	\$14,199	\$0		\$0	\$0	\$14,199
				\$0	\$0		\$0	\$0	\$0
				\$0	\$0		\$0	\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0	\$0	\$0
<i>Subtotal Road & Trails</i>				\$190,329	\$0		\$0	\$0	\$190,329
D. Protection/Safety									
Road Hazard Signs	Each	10	732	\$7,320	\$0		\$0	\$0	\$7,320
Trail Hazard Signs	Each	2	395	\$789	\$0		\$0	\$0	\$789
<i>Insert new items above this line!</i>				\$0	\$0		\$0	\$0	\$0
<i>Subtotal Structures</i>				\$8,109	\$0		\$0	\$0	\$8,109
E. BAER Evaluation									
Assessment Team	Report	31200	1	---	\$31,200		\$0	\$0	\$31,200
<i>Subtotal Evaluation</i>				---	\$31,200		\$0	\$0	\$31,200
F. Monitoring									
Aerial Seeding	Report	3500	1	\$3,500	\$0		\$0	\$0	\$3,500
Aerial Straw Mulch	Report	3500	1	\$3,500	\$0		\$0	\$0	\$3,500
Trail Drainage	Report	700	1	\$700	\$0		\$0	\$0	\$700
Road Drainage	Report	700	1	\$700	\$0		\$0	\$0	\$700
				\$0	\$0		\$0	\$0	\$0
				\$0	\$0		\$0	\$0	\$0
<i>Subtotal Monitoring</i>				\$8,400	\$0		\$0	\$0	\$8,400
G. Totals				\$2,527,838	\$31,200		\$0	\$6,500	\$2,565,538
Previous Requests				\$199,838					
Total for this request				\$300,000					

Blue is Approved

Yellow is Pending WO Approval

Green is Requested R4 Approval

PART VII - APPROVALS

1. /s/Kevin Schulkoski 07/31/2012
Acting Forest Supervisor (signature) Date

2. /s/ Marlene Finley (for) 8/1/2012
Regional Forester (signature) Date